



USS

For members, for the future.

Universities Superannuation Scheme

TCFD Report 2022



We are the **principal pension scheme** for universities and other Higher Education institutions in the UK.

Contents

02 **1 Foreword**

03 **2 Introduction**

04 2.1 Climate change: risks and opportunities

06 **3 Summary of key points**

08 **4 Governance**

08 4.1 Roles and responsibilities
10 4.2 How we identify and manage climate-related risks
10 4.3 Climate change-related training
11 4.3.1 Specialist training
11 4.3.2 ESG training by external providers

12 **5 Strategy**

12 5.1 Our climate scenario analysis
13 5.1.1 The rationale for our approach
13 5.1.2 Three transition pathways
14 5.1.3 Assumptions made in our analysis
15 5.1.4 Limitations of our scenario analysis
16 5.2 Potential impact on scheme assets and liabilities
16 5.3 The resilience of our investments and funding strategies
16 5.3.1 DB cumulative performance and funding position
17 5.3.2 What climate change means for mortality rates
18 5.4 What the transition pathways look like for DC members' investments
19 5.5 Next steps
19 5.6 Case study: our new climate tilt

20 **6 Risk management**

20 6.1 Risk management and governance
21 6.2 Integrating climate risk into our risk management processes
21 6.2.1 Enterprise Risk Framework
21 6.2.2 Risk inventory
21 6.2.3 Climate change is a Principal and Top Risk
22 6.2.4 Our risk appetite and key risk indicators
22 6.3 How we manage valuation risk – the Integrated Risk Management Framework (IRMF)
22 6.3.1 IRMF and covenant – impact of climate risks on covenant
23 6.3.2 IRMF and liabilities – impact of climate risks on funding liabilities
24 6.4 How we manage scheme and asset-level risk
24 6.4.1 Assessing and managing climate risk across asset classes
28 6.5 Case studies: investing in sustainable agriculture and engaging with Cemex

29 **7 Metrics and targets**

29 7.1 Data sourcing
30 7.2 Our Net Zero ambition and targets
31 7.3 Metrics
31 7.3.1 The third metric – alignment with the transition to Net Zero
31 7.3.2 Quality and coverage of data
32 7.3.3 Data mapping risks
32 7.3.4 Data/footprint gaps
32 7.3.5 Data sourcing by asset class
35 7.4 Our GHG emissions summary
36 7.4.1 Defined Benefit investment emissions
36 7.4.2 Defined Contribution investment emissions
37 7.5 Progress and targets

38 **8 Our future plans**



1 Foreword

Welcome to the 2022 TCFD Report from the Universities Superannuation Scheme.



Bill Galvin
Group Chief Executive Officer



Dame Kate Barker
Chair of the Trustee Board

We are proud to have been a leading voice on the need for pension funds and other investors to address climate change for over 20 years. We have long recognised the potential impacts of climate-related risks. It is why we established our Responsible Investment team in 2000 and completed our first work on the effects of climate change on our investments in 2001, the year we founded the Institutional Investors Group on Climate Change (IIGCC). We are also a founding signatory of the UN's Principles for Responsible Investment and have been recognised in its 2020 Leaders' Group for our work on climate change-related activities and reporting. We also produced our first TCFD report in 2018, four years before it was mandatory to do so.

We made our first investments in renewable energy and clean technologies in 2002, and now have over £1.9bn invested in a sector that is helping our planet progress towards a cleaner, more sustainable future. We are looking to do more, investing as an owner and a lender, in many aspects of decarbonisation technology. In addition to our investments in renewables and cleantech, we have approximately £330m invested in timberland.

We recognise that our members and other stakeholders are interested in how we are managing climate change risk and opportunities. The importance of the issue means there is natural concern that we are managing any risk to the scheme's assets and liabilities, while also doing what we can to limit climate change. In addition to this TCFD Report, which details how we are addressing climate issues, you can also find a summary highlighting the key points on our website – uss.co.uk.

In May 2021, we announced our ambition to become Net Zero by 2050, if not before. This ambition is in line with the Paris Agreement, which the UK has signed up to, designed to limit global warming to below 2 degrees centigrade. Achieving this goal will involve both reducing emissions from our investment portfolio and investing in assets that support the transition towards a low-carbon economy. We are now developing a comprehensive strategy for delivering on this Net Zero ambition while remaining mindful of our fiduciary duties. We will work with peer funds, our external asset managers, and others in the investment value chain to achieve this ambition. Having the Net Zero ambition at a scheme level ensures that the focus of those responsible for USS's investments is on delivering that outcome.

We have begun this journey in earnest. We have asked our internal investment team to work with the companies in its portfolio to cut the emissions they generate by 25% by 2025, and by 50% by 2030 (relative to the 2019 baseline). You can read more about this in the Metrics and targets section. We have also introduced a climate tilt to part of our portfolio, appointed S&P Trucost as our climate data provider and established internal Net Zero Working Groups at an asset-class level reporting to our Net Zero Steering Committee.

This report, which includes details of our carbon footprint and scenario analysis data, is another significant step in that journey. Some of the numbers in this report, particularly the scenario analysis and carbon footprint data, are estimations. They will inevitably change as more and better climate data becomes available and as the situation evolves. We will report on progress every year and keep you updated.

Bill Galvin and Kate Barker

2 Introduction

The Financial Stability Board (FSB) created the Task Force on Climate-related Financial Disclosures (TCFD) in 2015. The TCFD is an industry-led group that helps companies and their investors understand their financial exposure to climate risk.

In 2017, it published recommendations designed to help companies, asset managers and asset owners disclose how they are managing climate risks and opportunities in a clear and consistent way.

The recommendations are structured around four sections:

- 1 Governance**
How the organisation's board, committees and senior management are assessing, managing and monitoring climate-related risks and opportunities.
- 2 Strategy**
Actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning where such information is material.
- 3 Risk management**
The processes for identifying, assessing and managing climate-related risks, and how these are integrated into the organisation's overall risk management.
- 4 Metrics and targets**
The metrics and targets the organisation uses to assess and manage relevant climate-related risks and opportunities.

We have voluntarily reported in line with the TCFD recommendations since 2018. TCFD reporting is now a statutory requirement. The UK Department of Work and Pensions (DWP) Occupational Pension Schemes (Climate Change Governance and Reporting) Regulations 2021 ('DWP TCFD Regulations') mean that large pension funds like USS must follow the TCFD structure to report how they are managing climate change risks.

Along with a number of other pension funds, we developed a **reporting tool** to help us all report in line with the TCFD in a consistent way. By all following the same reporting structure, it is easier to compare our efforts to address climate change with others.

Our report follows the DWP's TCFD Regulations and guidance rather than the updated TCFD guidance¹ published by the FSB in autumn 2021.

As we said in the Foreword, the numbers in the scenario analysis and carbon footprint are estimates, and subject to change as further climate data becomes available and the situation evolves. In addition, the trustee has used the overall shape and direction of the scenarios, rather than the exact numbers, to consider the potential impact of climate change on the scheme and any actions that result from it.

"ESG, and in particular, climate change, are more important than ever in how we consider investment returns."

Note

1 Publications | Task Force on Climate-related Financial Disclosures (fsb-tcfd.org)



About USS

USS is the Universities Superannuation Scheme (the 'scheme'). We were established in 1974 as the principal pension scheme for universities and other Higher Education institutions in the UK. Now, we have more than 475,000 members across 340 institutions. We are the largest private pension scheme in the UK by assets, with total fund assets of around £90.8bn (at 31 March 2022).

The scheme's trustee is Universities Superannuation Scheme Limited ('USSL'/trustee'). USSL is a corporate trustee that has overall responsibility for managing the scheme. USSL is led by a non-executive board of directors and employs a team of pension professionals in Liverpool and London. The trustee's key responsibility is to

make sure pension benefits promised to members are delivered in full on a timely basis. The trustee employs an experienced team of pension administrators who are based in the Liverpool office. This team is supported by Capita, an external pensions administration firm.

The trustee delegates implementation of investment strategy to its wholly owned subsidiary – USS Investment Management Limited ('USSIM'). USSIM acts as principal investment manager and adviser to the trustee. USSIM itself manages between 60% and 70% of the scheme's investments and appoints and oversees external investment managers to manage the rest. USSIM employs a team of investment management professionals in USS's London office,

providing in-house investment management and advisory services. USSIM is authorised and regulated by the Financial Conduct Authority (FCA).

USS is a hybrid pension scheme which means that it provides both defined benefit ('DB') and defined contribution ('DC') pension benefits. While members accrue distinct DB and DC benefits, the two elements exist within a single trust. All our members participate in the DB section of USS, which is called the Retirement Income Builder, and which (at 31 March 2022) had assets of c.£88.9bn. DC benefits are offered via USS' Investment Builder element of the scheme, which had assets of c.£1.9bn.

➤ You can read more about USS in the Governance section.

2.1 Climate change: risks and opportunities

Climate change is an urgent issue of global significance. The scientific consensus is that carbon dioxide and other greenhouse gas emissions, caused by human activity, are contributing to changes in the atmosphere that will cause significant changes in global temperatures.

While there are uncertainties around the specific impacts, the predicted changes include rising sea levels, flooding and droughts. These changes pose a threat to environmental, social and political stability, and so to the businesses and other assets in which USS invests. As changes in the climate could have major effects on both the economy and the quality of life of our members, issues related to climate change are legitimate concerns for pension fund trustees. The policy response to a changing climate, including the Paris Agreement and the targets set for reducing emissions, also presents risks and opportunities to long-term investors like USS.

The way in which the companies and assets we invest in manage these risks is therefore a key concern, in line with our responsibility to safeguard the fund for the long-term benefit of our members. As a result, we expect the companies we invest in to analyse climate change risks, both in terms of their carbon emissions and how they are adapting to a changing climate, to develop mitigation plans and to disclose this information to investors. We also expect our investment managers to be addressing these risks where they are material.

Climate change therefore represents potentially significant risks for the assets in which we invest. These risks can be:

- **physical** – where a changing climate may directly impact some assets or business models. For example, extreme weather may cause flooding, which could damage property assets. Temperature rise increases the risk of wildfires, which could damage timberland assets



2 Introduction Continued

2.1 Climate change: risks and opportunities Continued

- **regulatory (or transitional)** – where governments establish policies to reduce emissions or encourage changes in technology in the shift to a lower carbon future. This could lead to, for example, the stranding of coal assets or the phasing out of internal combustion engine powered vehicles
- **reputational** – where members, beneficiaries or other stakeholders express concerns regarding investments in certain sectors associated with fossil fuels.

“The climate tilt and new investment mandate form part of a much bigger plan that will involve all of our investment professionals and the management teams of our portfolio companies. We will need to work closely with our industry peers, regulators, governments and many others. Ultimately, we all need to work together to achieve Net Zero.”

Climate change, and the policy responses to it, also provide opportunities to invest in the transition to a low-carbon future. Investing in such opportunities gives us some resilience against the financial impacts of a changing climate.

We have a long history of recognising climate change as an investment risk. Our first work on this in 2001 led to the launch of the Institutional Investors Group on Climate Change (IIGCC). Since that time, our members and other stakeholders have increasingly wanted to understand how climate-related risks and opportunities may affect USS in the short, medium and long term. The DWP TCFD Regulations and this report help us to structure our assessment, to manage climate change risks and opportunities and to communicate what we are doing. As a large asset owner and manager, we also have an important role to play in influencing the organisations in which we invest to provide better climate-related disclosures and solutions.

*Carbon dioxide equivalent or ‘CO₂e’ is a term for describing different greenhouse gases in a common unit.

Highlights

We believe that better-run companies are acting now to address climate change risks. By identifying and investing in these companies, we expect to achieve better returns, which means better outcomes for members and other stakeholders. Over the past year, we have:

- **made progress on our Net Zero ambition:** in May 2021, we announced our **ambition to achieve Net Zero by 2050** if not before. Since then, we have continued to make progress. We announced **interim targets** for working with the companies we invest in to cut the intensity of the emissions they generate by 25% by 2025, and by 50% by 2030. These cuts are relative to our 2019 baseline, and on a CO₂e* per £m invested basis. These interim targets cover all of our assets except sovereign debt
- **introduced a climate tilt to our developed market equity portfolio.** This affects over £5bn of assets under management and represents an important step in our journey to Net Zero. Read more on page 19
- **announced a new £500m Sustainable Growth mandate.** We will invest globally in high growth, privately owned businesses that are developing technologies and services that will help companies and the broader economy to decarbonise. We will invest in these businesses either directly or through funds. This investment will complement our existing renewable energy strategy, which will continue to develop and invest in wind and solar generation capacity. As at 31 March 2022, we had £1.9bn invested in wind farms and other green technologies
- **achieved the exclusion and divestment** of a number of sectors including, for example, companies that mine for thermal coal, where this activity made up more than 25% of a company’s revenue. We did this because of our belief that this sector cannot make the transition to Net Zero.



3 Summary of key points

Here is a summary of our report's key points, aligned with the DWP's TCFD reporting requirements.

1

Governance

We have announced our ambition to achieve Net Zero by 2050 with interim targets at 2025 and 2030, and have adapted our governance structures to incorporate oversight of the scheme's climate strategy

- The Trustee Board has ultimate responsibility for all issues relevant to the scheme, including the oversight and management of climate-related risks and opportunities. As a result, the board has announced interim targets of working with the companies in our investment portfolio to cut the intensity of emissions they generate by 25% by 2025, and by 50% by 2030. These targets are relative to our 2019 baseline.
- The board, on recommendation from its Investment Committee, also approves the scheme's overall climate-related strategy. This includes scenario analysis, metrics and targets, and short- (5 to 10 years), medium- (15 years) and long-term (30 years) time horizons. Please see the Strategy section for more information.
- We provide a range of mechanisms for staff (including the Trustee Board) to learn more about climate change risks and opportunities, and how we identify and manage them.

2

Strategy

Our scenario analysis shows that risk-adjusted returns vary across assets, pathways and time horizons

- We used three climate scenarios, also known as pathways. These are:
 1. An Orderly Transition pathway, where the transition to below 2°C happens without major shocks to financial markets.
 2. A Disorderly Transition pathway, where the transition to below 2°C involves financial shocks, as risks are abruptly priced-in to the market.
 3. A Failed Transition pathway, in which everything continues with 'business as usual', and global temperatures rise by 4°C by 2100.

These scenarios looked at short- (5 to 10 years), medium- (15 years) and long-term (30 years) time horizons.

- The analysis found that in a Disorderly or Failed Transition, there would be long-term downside risk to our DB and DC assets, and to our funding position. In the short term, the Disorderly Transition would result in the worst outcome as a result of financial markets' response to transition risks. In the long term, the worst outcomes are in the Failed Transition pathway as a result of physical risks generated by increasing average temperature.
- The climate change modelling that we used in our scenario analysis includes significant assumptions, so actual numbers generated by the process should be treated with great caution. However, the overall impact indicated by the scenarios is useful and gives us a helpful assessment of the implications of alternative climate outcomes.

3

Risk management

We have integrated ESG risks, and specifically climate risks, into USS's wider risk governance, monitoring and management processes

- Our risk identification process for climate risk is maturing and is regularly reviewed. We set and monitor our risk appetite statements with appropriate metrics, also known as key risk indicators. This gives our governing bodies high visibility of reporting. We have set our risk appetite statement for climate risks as 'cautious'.
- We have processes for identifying, assessing and managing climate risk at asset class and asset level. This includes, for example, incorporating climate data into the financial modelling undertaken by our emerging markets equities team.
- We have embedded climate considerations into our ongoing employer covenant monitoring activities. We will engage with employers and other sector stakeholders to understand how their assessment of climate risks evolves. We will also undertake our own review of medium-to-long-term risks, including those relating to climate, as part of our annual employer covenant monitoring activity.
- Bottom-up analysis by our in-house investment teams identifies both climate-related risks and opportunities and enables the scheme to focus its stewardship activities on those assets posing greatest risk.

4

Metrics and targets

Measuring our carbon footprint and reporting against key metrics will help us to both track and make progress

- We are reporting against three metrics: absolute emissions, emissions intensity and alignment. The first two metrics are an explicit measure of the historical greenhouse gas (GHG) emissions footprint our investments had on 31 December 2021. Over the long term we expect to see these numbers reduce substantially as both the scheme and the world transition to a low-carbon future. The third metric measures the percentage of our assets aligned with a below 2° centigrade outcome.
- We have concerns about the quality of the data used to calculate the scheme's carbon footprint. The data vary in both availability and quality across markets, asset classes and companies. In addition, the methodologies for evaluating some asset classes (for example, sovereign debt) remain under development.
- The focus of our reporting this year is on Scope 1 and 2 emissions. This is because the availability and reliability of Scope 3 data for a number of companies and sectors is still poor. We plan to report Scope 3 data (where they are available) from next year, as the quality and availability of the data improves. Read more in the Metrics and targets section of this report.
- At the end of 2021, our carbon footprint analysis indicated that our DB fund's financed emissions for corporate assets were c.4.2m tCO₂e, with an intensity of 89.5 tCO₂e per £m invested. Between 2019 to 2021, we achieved a reduction in carbon intensity of 3.7% or 1.9% annualised for our non-sovereign debt assets. This is based on the latest available data. This means that the reductions over the past two years were lower than needed for us to achieve our targets.

Next steps

We are at the start of both our Net Zero and TCFD reporting journeys. Each year we will be reporting on how we are addressing climate change and our progress towards Net Zero in line with the TCFD recommendations. This will not only drive our own improvement, but also influence the companies in which we invest as well as a wider group of stakeholders.

➤ You can find more information about how we invest at uss.co.uk/how-we-invest/responsible-investment.

4 Governance

In this section, we describe how our Trustee Board, committees and senior management assess, manage and monitor climate-related risks and opportunities.

“We steward around £90.8bn in assets under management with high standards of Responsible Investment and a focus on environmental, social and governance (ESG) factors.”

4.1 Roles and responsibilities

The roles and responsibilities of our main boards and committees in relation to climate-related risk and strategy are outlined below.

- The **USS Trustee Board** has ultimate responsibility for all issues relevant to the scheme, including the oversight and management of risks and opportunities related to climate change. It agrees our Responsible Investment (RI) strategy, and formally reviews the RI team’s activities every year, signing off key focus areas and policies. To comply with the TCFD Regulations, we have incorporated additional climate change related reporting into new or existing reporting and updated the board’s and its Investment Committee’s (IC’s) annual agenda planners accordingly. Changes to the terms of reference of the board and IC took effect from September 2021 to comply with the DWP’s TCFD reporting requirements, including approving our approach to ESG and climate risk related matters as they relate to USS. On recommendation from the IC, the board also approves the scheme’s overall climate-related strategy, including scenario analysis, metrics and targets and short-, medium- and long-term time horizons. The board is also responsible for:
 - making sure our trustee directors have sufficient knowledge and understanding of climate change to fulfil their statutory and fiduciary obligations
 - identifying and assessing the main climate-related risks and opportunities for the scheme and documenting how they are managed
 - incorporating climate-related considerations into the scheme’s investment beliefs, investment policies, risk register and contingency planning and monitoring framework
 - allowing for climate-related considerations when assessing and monitoring the strength of the sponsoring employers’ covenant
 - considering and documenting the extent to which the advisers’ responsibilities are included in any agreements, such as investment consultants’ strategic objectives and service agreements.
- **Investment Committee (IC):** The IC supports the Trustee Board by making recommendations and by overseeing the implementation of the trustee’s climate strategy. A key part of this involves reviewing and assessing the work of the trustee’s in-house investment manager (‘USSIM’) in implementing the strategy. The IC must review, in each scheme year, the most recent scenario analysis and determine whether it is appropriate to undertake new analysis. New scenario analysis must be undertaken at least every three years. The IC also has oversight of the scheme’s metrics and targets, and the relevant time horizons.
- **USS Investment Management Ltd (USSIM):** The day-to-day management of the scheme’s investments is delegated to the trustee’s internal FCA regulated investment manager and adviser USSIM (through a formal investment management and advisory agreement). USSIM is focused on delivering the investment requirements of the scheme and it may, if appropriate, allocate investment mandates to external managers. This includes both managing climate-related risks and identifying any investment opportunities that the transition to a low-carbon future presents, for example, increased investment in renewable energy.
- **USSIM chief executive officer:** The USSIM CEO is responsible for making sure an appropriate strategy is in place to understand, identify, measure, monitor, control and report risks from climate change. This must be in line with the risk strategy and risk appetite parameters set by the USS Trustee Board. The USSIM CEO also provides regular reporting to the Trustee Board on these matters.

4 Governance Continued

4.1 Roles and responsibilities Continued

- **Group chief risk officer:** The USS CRO oversees and challenges how relevant executives manage risk, including how the USSIM CEO and their delegates manage climate risk. The CRO also supports business managers in developing appropriate processes to monitor and report exposures to climate risks, and integrating climate risk into the Risk Management Framework. See the Risk management section for further details.
- **USSIM Net Zero Steering Committee (NZSC):** The NZSC oversees and manages the scheme's efforts to address climate change, providing planning, governance, and oversight of the activities associated with achieving Net Zero. The heads of the different asset class teams across USSIM are core members of the NZSC. Asset class-led working groups are accountable to NZSC to make sure we are on track to deliver our Net Zero ambition.

➤ See our Net Zero Steering Committee graphic on the next page

- **USSIM Responsible Investment (RI) Team:** The seven-strong team of in-house RI experts supports the implementation of the scheme's climate strategy, and has supported activities associated with climate change risk and opportunities since 2001. The team works with the internal asset managers to integrate climate change and other ESG risks into investment decision making across asset classes. It also leads much of the stewardship activity associated with encouraging both listed companies and other assets to better manage climate-related risks and improve corporate disclosure. This includes monitoring and engaging with external fund managers. While USSIM's CEO has ultimate responsibility for climate-related investment activities, the oversight of the RI function is via the Head of Strategic Equities, a member of USSIM's Executive Committee and Chair of USSIM's Net Zero Steering Committee.

- **External advisers:** The trustee also takes advice from external advisers where appropriate. The trustee makes sure the scheme's actuarial, investment, and covenant advisers have clearly defined responsibilities in respect of climate change, that they have adequate expertise and resources to carry these out, and that they are taking adequate steps to identify, assess and prioritise any climate-related risks and opportunities that are relevant to the matters on which they are advising. In line with the requirements of the regulations, we agreed with key external advisers (for example, our actuary and covenant advisers) that they would include climate analysis on their advice to the scheme.

The Trustee Board and its IC regularly discuss climate-related issues and have done so for many years. Following the TCFD regulations, we have also added specific climate-related decision points to the board and IC agendas to sign off reporting and other specific actions. This includes signing off the outcomes of climate-related scenario analysis.

The Trustee Board also challenges the USSIM executive on how it manages climate-related risks and opportunities and any recommendations it makes about this. For example:

- the IC and Trustee Board challenged the USSIM executive on the choice of climate scenarios. There was no explicit Inevitable Policy Response (IPR) scenario, although the Failed Transition scenario used follows a similar track. The Trustee Board accepted the explanation that, given the time frames under which we were operating, it was appropriate to follow the Ortec base scenarios, and that in the future we will look at a broader range of scenarios including the IPR
- the Trustee Board and its IC also challenged the metrics being proposed by the USSIM executive. This led to one of the metrics (associated with climate value at risk) not being included in this TCFD Report.



4.2 How we identify and manage climate-related risks

The trustee considers a range of different information about the climate-related risks and opportunities the scheme faces.

We have integrated ESG risks, and specifically climate risks, into our wider risk governance, monitoring and management processes. This includes additional processes for identifying, assessing and managing these risks. As part of these processes, we consider both climate transition risk and physical risk (see the Strategy section). However, as reflected in our risk registers, the risk posed to our investments by transition risk has had greater focus as they are, in turn, drivers of the non-investment related risks. See the Risk management section for more details.

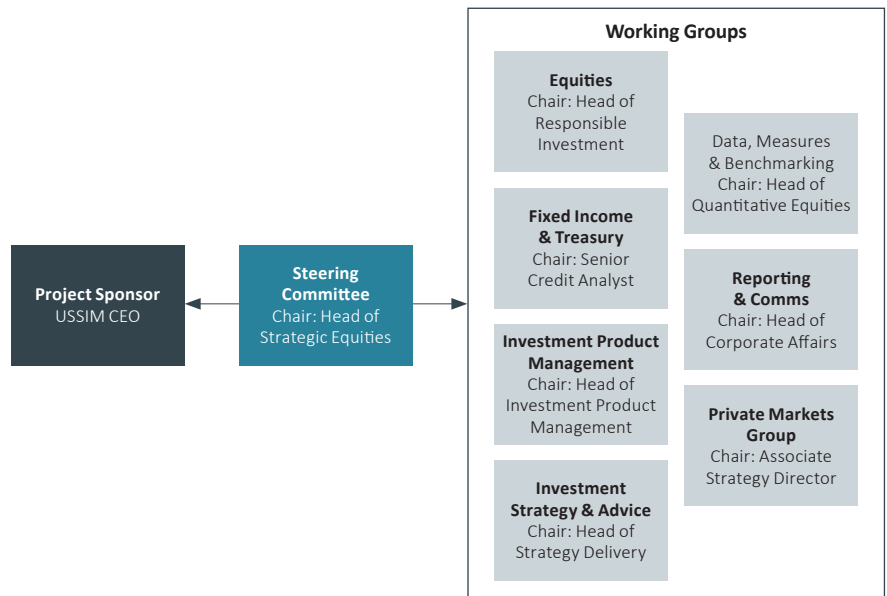
Our risk registers

A risk register is a business function's documented view of the material risks that it must manage in order to deliver its objectives. It includes the mitigating controls and an assessment of the effectiveness of those controls, to determine its overall risk exposure.

Net Zero Steering Committee

In May 2021, we announced our ambition to be Net Zero by 2050, if not before. Since then, we have established a USSIM Net Zero Steering Committee (NZSC). The core members of the NZSC are the heads of the different asset classes across USSIM. The NZSC's role is to co-ordinate our efforts to address climate change, providing planning, governance, and oversight of the activities associated with achieving this ambition.

We have also set up Net Zero Working Groups (NZWG) for each asset class, as well as for specific support functions. Each Working Group makes sure that USSIM investment teams across assets classes have a specific focus on the steps they will take to achieve the scheme's targets, and that support functions also play their role. The NZWGs are accountable to the NZSC to make sure we deliver on our Net Zero ambition.



4.3 Climate change-related training

We provide a range of mechanisms for staff to learn more about climate change risks and opportunities, and how we identify and manage them.

- Lunch and learns:** regular informal training sessions run by leaders from across the business, depending on the topic. Sessions run over the reporting period include our Net Carbon Zero plans, how we integrate ESG/carbon into our Global Emerging Markets (GEMs) team's investment process, and how we build carbon emissions data into scenario analysis for our equity valuations at a company level.
- Town Halls:** these are monthly leadership events, hosted by senior management on a rotating basis. The events give an update on key developments across the business and enable employees to ask questions. We have held Town Hall sessions on our ambition to be Net Zero by 2050.
- Open House events:** each year, we invite members of the Trustee Board to attend an event in our Liverpool and London offices, showcasing activities and highlights from the year. In November 2021, the event included presentations by our GEMs and RI teams on our net carbon zero plans and how we integrate ESG/carbon into the investment process.
- Intranet:** we also share key news items, including our public announcement to be Net Zero by 2050 if not before, with employees on our intranet and via email.
- Induction sessions:** we deliver induction sessions quarterly for all new staff. This includes a session on responsible investment, covering an introduction to ESG issues, the potential impact of climate change on the performance of the fund, IIGCC and the Transition Pathway Initiative, and how we engage with companies to encourage them to address climate change risk.

4.3 Climate change-related training
Continued

- **Our employer institutions/members:** we have produced a Responsible Investment online module, available to all participating employers, for everyone from pensions managers to front-line staff. This training covers climate change.
- **Climate-specific Trustee Board training:** we ran climate change-specific training for Trustee Board members in 2021, and climate change is also included in the induction sessions for all new Board members. This training covers:
 - the science of climate change – why we need to address the issue
 - why climate is an issue for pension funds
 - addressing climate change at USS
 - USS’s Net Zero ambition
 - reporting on climate change.

4.3.1 Specialist training

We have also delivered specialist training to specific investment teams. For example, our RI team has carried out ‘Carbon/Greenhouse Gas Analysis for Analysts’ training for USSIM’s investment teams. It covered equities, corporate credit, private markets and government bonds. This training included the basic principles of carbon equivalent emissions accounting, along with asset class-specific elements for each team.

For our GEMs team, we ran a combination of external training (led by Credit Suisse) and internal training by our RI Team. It focused on using Credit Suisse’s ‘Holt’ tool to model the impact of carbon pricing, emissions allowances, cost pass throughs, carbon abatement capex and research/development spending in their valuations. The team is now implementing what they’ve learned, using these tools to produce scenario analysis on the companies in their portfolio, based on different carbon prices.

4.3.2 ESG training by external providers

In 2021/22 we conducted a strategic learning needs analysis for USSIM, which identified ESG and Net Zero/climate change training as a common theme across teams. We ran a survey for all London staff, which covers our investment teams and those Group functions supporting investment teams. We asked what they would like to see included in an ESG training plan.

Themes of interest included foundation level training, comprising ‘what does RI/ ESG mean for a pension fund?’ and ‘what is Responsible Investment?’ Some teams also asked for training specific to their functions, for example, the Fixed Income Team were interested to find out about more about integrating RI into credit. Others highlighted an interest in systemic risks such as climate change, and what achieving Net Zero means. These results gave us a set of requirements to take to suppliers to get proposals on how these needs can be met. We will decide on which organisation to engage in 2022/23, with the aim of implementing an ESG training plan.



5 Strategy

In this section, we focus on our climate change-related scenario analysis and assess what this means for the assumptions we make for returns on investments.

This includes an explanation of time frames, potential impacts on our assets and liabilities, the resilience of our investment and funding strategies and key assumptions and limitations. We also, at a high level, review the implications of the scenario analysis for our liabilities, funding and covenant. We include case studies to illustrate how we assess climate risks at an asset class level.

As mentioned previously, climate change poses physical, transitional and reputational risks for the scheme and its assets. We have various processes in place at an asset class level for identifying and managing such risks (see the Risk management section for further details). At a total scheme level, given that climate change will be occurring over decades and there are no certainties as to how society will respond, we have to use a variety of tools to assess its implications.

Scenario analysis

Scenario analysis is a process for identifying and assessing the potential implications of a range of plausible future states under conditions of uncertainty. Scenarios are hypothetical constructs and not designed to deliver precise outcomes or forecasts. Instead, scenarios provide a way for organisations to consider how the future might look if certain trends continue or certain conditions are met.¹

Given the importance of climate scenario analysis, we presented the thinking behind the scenarios we used, and the outcomes of the process, to our IC and the Trustee Board. The IC and the Trustee Board then signed this off.

“We believe investment in more climate-friendly assets – those positioned to adapt or benefit as the world transitions to a low-carbon economy – offer upside return potential, while lower exposure to companies poorly positioned to adapt to such a world reduces our exposure to downside risk.”

5.1 Our climate scenario analysis

On the following pages, we set out the details of our climate scenario analysis, which was led by USSIM. In line with the DWP’s TCFD Regulations, this analysis must include a ‘2°C or lower’ scenario.

We reviewed available service providers to help us with this analysis, and appointed **Ortec Finance**, a well-known provider of climate-related portfolio analysis, in October 2021. Ortec also supported us with our initial climate scenario work in 2019.

Ortec considered three climate pathways that explore potential future climate policies, interventions and consequences of the world failing to mitigate climate

change. Ortec’s pathways were constructed to explore a range of *plausible futures*, rather than exploring tail risks. Each pathway tests key elements of climate resilience.

The purpose of scenario analysis is to test our assets and liabilities, illustrating plausible future paths, accompanied by narratives to help us interpret them. Those narratives could indicate that specific climate impacts may happen by certain dates. However, it is also plausible that, thanks to the proliferation of TCFD reports such as this one, such impacts to portfolios could be factored into valuations by the markets sooner.

Climate change can affect our investments directly or indirectly:

- directly, through weather or climate policies directly impacting the economy – these are known as physical and transition risks
- indirectly through the ‘pricing-in’ mechanism, where financial markets anticipate future direct impacts

We have captured both direct and indirect impacts in the scenarios used.

Note

¹ <https://www.fsb-tcfd.org/recommendations/#scenario-analysis>

5.1 Our climate scenario analysis
Continued

5.1.1 The rationale for our approach

We have based our approach on four principles:

1. We model a plausible scenario set that spans from a fast transition to a lower-carbon economy, to a ‘business-as-usual’ failure to transition to a lower-carbon economy.
2. Ortec advised that modelling a steep transition pathway and a higher warming pathway gives enough insight into both investment opportunities and downside risk.
3. We use an integrated modelling framework which designs scenarios that consider climate outcomes, policy response, macroeconomic and financial markets implications.
4. Modelling multiple additional scenarios would take a considerable amount of time, without providing significant additional insights. It would also generate complications in comparing the results of different scenarios, against each other and a baseline.

“In evaluating any ... scenario, it is fundamental that scenarios are not (treated as) predictions, which is why they are not associated with likelihoods. Rather, scenarios are used to present decision makers with the outcomes of as broad a range of plausible choices as possible, ... to inform their decisions.”

Schwalm et al. (2020).

5.1.2 Three transition pathways

Pathway	Description	Average temperature increase
1 The Orderly Transition pathway	In an Orderly Transition pathway, emissions reduction starts now and continues in a measured way until 2070. This means the world does not meet the objectives of the Paris Agreement to reduce emissions to Net Zero by 2050. But the Transition is assumed to occur as smoothly as possible, with markets responding steadily and rationally. The end result is a global average temperature increase of 1.6°C by 2100 above pre-industrial levels. To pursue the Net Zero target, an ambitious policy regime of decarbonisation of the energy sector is assumed as well as a reduction in emissions across all sectors of the economy. These efforts include: <ul style="list-style-type: none"> • the implementation of Emission Trading Schemes (ETs) across the world with rising carbon prices • significant investments in renewable energy technologies and efficiency • a phase out of coal-fired power generation in major economies 	+1.6°C
2 The Disorderly Transition pathway	The Disorderly Transition pathway is characterised by similar projections, climate policies and investment to the Orderly Transition pathway. Its effect on the global climate is identical to the Orderly, with an average temperature increase of 1.6°C above pre-industrial levels by 2100. However, in this scenario, there is a delayed awareness of the scale and speed of the transition. This leads to a confidence shock to the financial system. Expected transition and physical risks from now until 2050 are priced-in abruptly in one year, at around 2025. This causes financial markets to react similarly to the response to the 2008 financial crisis.	+1.6°C
3 The Failed Transition pathway	In the Failed Transition pathway, the world continues its current emission trends and fails to transition away from fossil fuels. This ‘business as usual’ scenario leads to a 4+°C warming in global temperatures by 2100. This pathway is characterised by physical risks that financial markets price-in across two different periods: 2026 to 2030 for risks up to 2050, and 2036 to 2040 for longer-term risks. These pricing-in periods reflect a possible reaction of the markets to a dawning realisation (perhaps backed by new Intergovernmental Panel on Climate Change reports) of the unavoidable temperature rises.	+4°C

The modelling framework is in the early stages of its development with only a limited number of scenarios modelled. This framework could be improved by, for example, including a scenario with long-term climate outcomes falling in

between the Orderly Transition and Failed Transition pathways.

The modelling used a benchmark representation of the asset allocation of the DB and DC default funds’ actual

portfolios, including private markets mandates. DB liabilities were also modelled based on projected future cash flows without considering demographic risks.

5.1 Our climate scenario analysis

Continued

The time horizons in our scenario analysis

For our scenario analysis, we used the time frames built into the Ortec process. These scenarios use the following time frames:

- **short term:** 5 to 10 years
- **medium term:** 15 years
- **long term:** 30 years

We cannot be too precise on the exact time frame over which risks could emerge. This is because of the uncertainty of climate policy risk, for example, when and how policy may be enacted, and particularly when markets may price-in future climate impacts.

What these scenarios and time horizons show us about the risks we are exposed to

In the **short term** (5 to 10 years): our assets are vulnerable to transition risks in the Orderly Transition pathway. They are vulnerable to market risk in a Disorderly Transition pathway, because the Ortec model under this scenario assumes the transition is priced-in in 2025. And in all scenarios, they are vulnerable to the pricing-in of future expected physical risks.

In the **medium term** (15 years): while the exact timing is uncertain, the Ortec climate model is assuming an uneven pricing-in of physical risks. However, for the purpose of the Failed Transition pathway, a second market shock is assumed to take place in the medium term as the world realises the consequences of locked-in physical risks from previous decades to our economies in the very long run. This results in a large pricing-in in the latter half of the 2030s in this scenario. It is possible that this large pricing-in moment happens sooner.

Finally, in the **long term** (30 years): direct physical risks are the main contributor of climate-related risk across all three pathways. This time frame and associated pathway projections cover a long enough history/time frame to reflect the effects of key risks to assets and liabilities.

We believe that our scenario analysis time frames are appropriate as they provide realistic framing for early action, or inaction, on climate risk. They also align to a certain extent with the interim targets we recently established.

In addition, the 30-year time frame also aligns with the Paris Agreement commitments and our Net Zero ambition for 2050. When interpreting the results of this analysis with our advisers, we also considered the potential implications of these time frames being accelerated – since this is a key element of uncertainty in this type of modelling.

5.1.3 Assumptions made in our analysis

The Ortec model is broken down into transitional, gradual physical and extreme weather impacts.

Climate change scenarios focus on two interdependent climate risk drivers:

1. **Transition risk:** transition risk impacts are driven by the combination of policy drivers and technological innovation. They allow for feedback loops such as tax revenue recycling as well as interactions within and between sectors and regions.
2. **Physical risk:** physical risks are driven by gradual physical risks in the form of temperature effects on productivity, and by the increase in frequency and severity of extreme weather events.

Ortec's Stochastic Financial Model derives financial market impacts across our different time horizons from climate-adjusted macro factors, like gross domestic product (GDP) and inflation. Climate-adjusted GDP and inflation assumptions feed through their medium-term model, which estimates the trend of different financial variables. This, combined with short- and long-term models, generates several future paths of multiple financial and macro factors. Ortec's climate model assumes that government revenues from carbon taxes are recycled back to the economy, which means they are used to finance public investments in energy efficiency, and – if any remain – they are used to lower taxes. Interest rates are modelled by Ortec based on GDP and inflation forecasts. This allows the modelling of the financial asset universe to fully leverage the Ortec framework.



5.1 Our climate scenario analysis

Continued

In generating the scheme's liabilities within the stochastic model, a number of core assumptions have been kept constant across the scenarios.¹ These assumptions include the margin above gilts used in the discount rate, the adjustment to Retail Price Index (RPI) expectations used to establish the Consumer Price Index (CPI) on which benefit increases are calculated, and mortality rates experienced by the scheme's beneficiaries. However, the present value of the liabilities does differ between scenarios due to changes in interest rates (gilt yields) and inflation RPI expectations.

5.1.4 Limitations of our scenario analysis

Climate scenario analysis can give us useful insights as to how different assets are exposed to alternative assumptions on climate pathways. This insight can help USSIM develop more climate-informed investment choices. However, there are limitations we must consider when we are interpreting the results. Climate scenario modelling is particularly challenging due to:

- the inherent uncertainty in the climate modelling
- the complexity of scientific modelling, which is characterised by significant uncertainties around the interaction between climate, macroeconomic and financial market developments
- the timescales involved being extended, which makes the ability to predict future outcomes even more complex
- the approach to identifying climate-related risks to financial markets being top-down, therefore the analysis does not cover individual securities

In the version of Ortec's model that we used for this analysis, one of the limitations is that the potential for supply-side factors arising from gradual

physical risks and extreme weather events to affect inflation are not allowed for. This means the model does not take into account the potential for supply-side inflationary pressures arising from physical risks, in other words, supply chain disruption, damage to infrastructure etc.

Physical risk impacts are likely to be underestimated, as the various possible climate tipping points² are not well captured. The Ortec approach does not capture potentially devastating climate tipping points. It also does not capture the potential knock-on effects of complex political and social processes hastened by the stresses of climate change – for example, mass migration, war, political and social instability. Ortec notes that while tipping points are not explicitly captured, the damage function used by the Ortec model, combined with regional-specific temperature impacts, leads to higher GDP impacts related to temperature change compared to other literature sources. These range from -18% impact on GDP by 2100 in the Orderly and Disorderly Transition Pathways (consistent with ~1.5°C warming), to -60% GDP impact by 2100 in the Failed Transition scenario (consistent with ~4°C warming).

In addition, climate adaptation is not considered. With the right measures, the economy could become more resilient to climatic changes.

Another limitation of our analysis, and most likely of any analysis of this type, is the choice of the baseline scenario. Ortec's approach assumes a 'climate uninformed baseline'. This is similar to what the Bank of England refers to as 'counterfactual pathways'. A climate uninformed baseline is a scenario where no climate policies or impacts are embedded in the assumptions. USS does not expect or believe that a climate uninformed baseline is an outcome that

Climate tipping points

A climate tipping point is where a small amount of extra change in the climate triggers a larger and often unstoppable change in part of the climate system. For example, melting polar ice causes a change in the Gulf Stream, which impacts the climate of Western Europe.

will occur, and this is not the baseline assumption we use for our standard (not climate) analysis. Such a baseline is hard to identify as it is almost impossible to gauge accurately the extent to which climate impacts are already priced-in to financial markets or macro factors. To facilitate interpretation of the results, these are presented relative to a common baseline.

For this analysis, Ortec did not include a pathway in line with our most plausible scenario, in which long-term climate outcomes fall in between Paris Aligned and Failed Transition.

Defined Benefit liabilities are modelled based on projected future cash flows using demographic assumptions, the key demographic assumption being the mortality rates experienced by beneficiaries. No explicit consideration is given to how a particular climate scenario will impact demographic risks.

No allowance is made for portfolio or other actions that we might take to mitigate our exposure to climate change. For example, the scenarios assume we don't need to change contributions or benefits in the future to mitigate our exposure to climate risks. We also believe that the steps we are taking to achieve Net Zero by 2050 will help mitigate potential impacts on our assets, and support reducing climate change more generally.

Notes

- 1 We do an actuarial valuation of the scheme at least every three years, where we consider if our assets are adequate to pay existing pensions (liabilities) and to work out how much is needed in future to pay new pensions. To do this, we make a number of assumptions about the future, and in particular assumptions about what sort of investment return we think we might get in the future. For ease of communication, we express these returns as a margin above gilts. Gilts are government bonds, which arguably are risk free so the margin above them is how much more of a return we think we might get from taking investment risk. CPI is a measure of inflation, and RPI enables us to calculate a forward-looking measure of inflation. The pensions we pay increase every year to reflect inflation; some have full inflation protection, others have caps on the increases, so this assumption is all about how much we think inflation will rise and the increases we will need to grant. 'Mortality rates' is an assumption about how long we think people will live, and so how long we will need to pay pensions for.
- 2 The 2021 [IPCC Sixth Assessment Report](#) defines a tipping point as a 'critical threshold beyond which a system reorganises, often abruptly and/or irreversibly. It can be brought about by a small disturbance causing a disproportionately large change in the system.'

5.2 Potential impact on scheme assets and liabilities

The trustee has to meet the statutory funding objective, which is to have enough money in the scheme to pay all our members their promised pensions, referred to as the Technical Provisions. The assets backing the Technical Provisions are built up from contributions from members and their employers together with investment returns from the assets held. In determining the Technical Provisions, the trustee takes advice from our actuary as to which underlying discount rates and demographic assumptions, including mortality, to use at each actuarial valuation.

The discount rates used in determining the Technical Provisions reflect, to the extent permitted under legislation, the expected returns on the assets that the trustee holds now and in the future, as well as the covenant provided by our sponsoring employers.

Climate change, and how we respond to it, can influence:

- the investment returns achieved on our assets
- the mortality experienced by our membership

- the covenant provided by our sponsoring employers. (The stronger the covenant, the more we can rely on our sponsoring employers, resulting in potentially lower Technical Provisions. How the Trustee monitors the employers' covenant is discussed in section 6.4.)

These changes will influence the level of the Technical Provisions that the trustee needs to hold, and the balance between contributions and the investment returns that finance them.

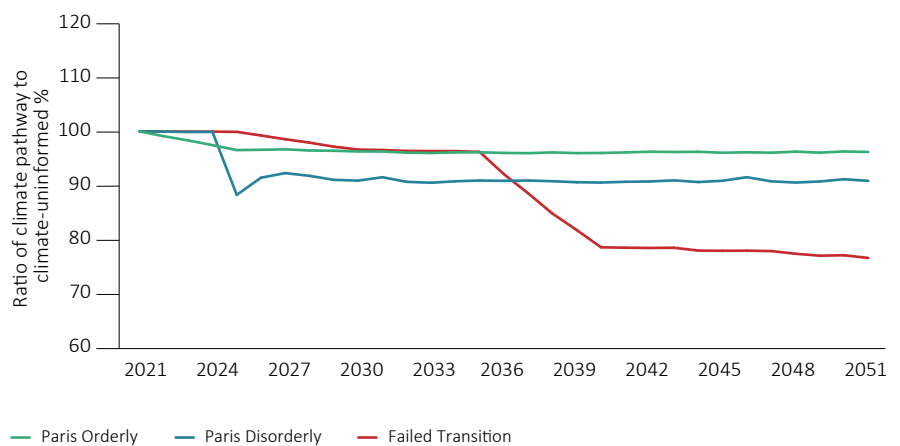
5.3 The resilience of our investments and funding strategies

In addition to a focus on our investments and assets, DWP's TCFD requirements also include describing the impact of the climate scenarios on our portfolios, liabilities and funding strategy.

The key findings from our scenario analysis show that risk-adjusted returns vary across assets, pathways and time horizons.

- The analysis found long-term downside risk to DB assets' investment returns in less optimistic climate scenarios. This is relative to a realistic 'best' case climate scenario (Orderly Transition pathway), where transition to below 2°C happens without major shocks to financial markets.
- **In the short term**, the consequences of the transition are particularly detrimental in a Disorderly Transition pathway due to financial markets' response to transition risks.
- **In the long term**, the worst outcomes are in a Failed Transition pathway as a result of physical risks generated by increasing average temperature.
- **In general, cash and corporate bonds are more resilient to climate risks.** The least resilient asset classes are public/listed equities, private equities, property and infrastructure. This is due to their sensitivity to pricing-in shocks, market overreaction and supply chain disruption caused by transition and physical risks.

Figure 1: Cumulative median real returns



Source: USSIM and Ortec Finance (GLASS)

5.3.1 DB cumulative performance and funding position

In Figure 1 above, the Paris Orderly Transition and Failed Transition pathways represent plausible 'best' and 'worst' climate outcomes, and the difference in long-term returns gives us an indication of the scale of the potential impact of climate on DB fund performance.

USSIM's most plausible scenario for climate outcomes sits between Paris Orderly Transition and a Failed Transition.

In the short term, our assets are vulnerable to transition risks. The Paris Disorderly Transition pathway is particularly impactful in the short term due to the sudden repricing of assets in 2025.

This disruptive transition causes financial markets to overreact and inflicts long-lasting damages to returns. In the longer term, physical risks are the main contributor of climate-related risk. The Paris Orderly Transition pathway limits the impacts on the fund, thanks mainly to its mitigated physical risks exposure.

5.3 The resilience of our investments and funding strategies Continued

Assuming the trustee is aiming to hold a similar level of Technical Provisions under each scenario, then:

- **in the short term:** lower returns lead to a higher deficit being experienced under the Paris Disorderly pathway
- **in the medium term:** it is the Failed Transition pathway that is likely to impact returns and lead to higher deficits
- **over the longer term:** Paris Orderly and Disorderly Transition pathways have similar returns implications, with Failed Transition having potentially significantly lower returns and an associated impact on funding levels

Another way to illustrate the implications of climate change is to view the annualised performance differentials that result from the different scenarios versus the climate uninformed baseline. As illustrated in Figure 2, returns under all scenarios are lower than the climate uninformed baseline.

Figure 2: Differential between annualised expected returns under different climate scenarios vs. climate uninformed baseline

Climate scenario	30-year annualised expected returns
Paris Orderly	-0.3%
Paris Disorderly	-0.5%
Failed Transition	-1.0%

Source: USSIM and Ortec Finance (GLASS)

5.3.2 What climate change means for mortality rates

Climate change is expected to have effects on both direct and indirect drivers of mortality rates experienced by our members. These are highlighted in Figure 3 below, provided by the scheme's actuarial adviser, LCP.

Figure 3: Direct and indirect drivers of mortality rates

Direct drivers

- Mortality rates in the UK are not expected to be as sensitive to climate change as some other regions in the world.
- In the UK, the estimated number of deaths each year due to heatwaves is around 2,000 and cold-related deaths typically range from 25,000-60,000. If temperatures rise, we could expect fewer deaths due to cold periods, and more deaths due to more frequent and longer lasting heatwaves. The net effect in the medium term of direct deaths due to temperature changes in the UK is likely to be lower mortality rates overall.
- In the UK, the number of deaths each year due to air pollution is around 30,000. If air pollution continues to increase, we could expect more deaths.

Indirect drivers

- Adverse economic consequences due to climate change or moving to Net Zero could result in less funds available for health and social care.
- There could be disruption to health and social care services, and damage to related infrastructure, due to extreme weather.
- Disruption to UK farming due to extreme weather conditions could affect food production and prices.
- Interruption to food supply chains from overseas could mean rising prices and healthy fresh food becoming out of reach for some. There could be increased risk of transmission of vector-borne diseases from other parts of the world.
- Changes in lifestyle.

There is considerable uncertainty and a wide range of possible outcomes. Some of the harder-to-quantify effects of climate change could be material. Indirect drivers could have a more significant impact in the UK than direct deaths.

Our current expectation, based on advice we have received, is that the Failed Transition pathway would potentially result in higher mortality rates than that for Paris Orderly or Disorderly, where expected rates are similar. However, as noted above, there is considerable uncertainty over how climate change will impact mortality, and therefore our liabilities, particularly taking into account the knock-on effects of changes to economic growth in the UK. There is also uncertainty on the timing of any impact, but any change is expected to emerge over time with views of the future becoming more certain as time passes.

The trustee reviews mortality experience and future expected trends at each valuation and will make allowance for such changes as they emerge.

5.4 What the transition pathways look like for DC members' investments

Here, we aim to show how climate change and the energy transition might affect the value of defined contribution (DC) portfolios of different DC members based on investment made as of September 2021 (the date of the scenario analysis). This analysis differs from the previous section on defined benefit (DB), as in that case members' pension portfolios follow an assumed glidepath.

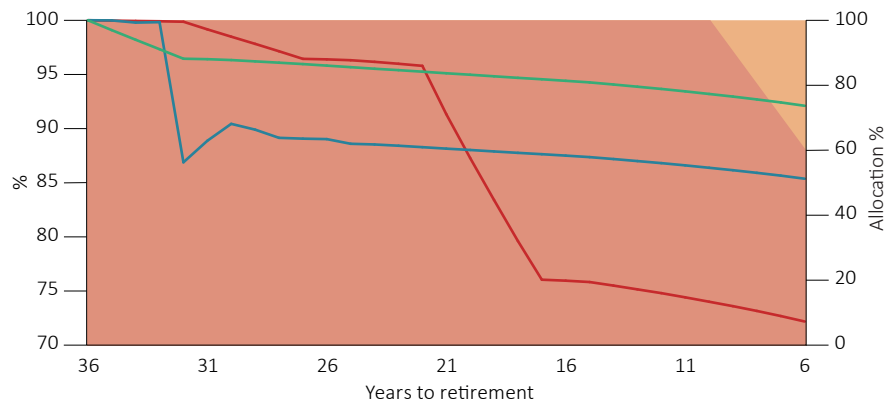
The Default Investment Option (where the majority of our members invest) is where a younger member will be invested in a 'Growth' portfolio mainly composed of risky assets, such as equity and property. As the member ages, their portfolio will de-risk to an asset allocation more suitable for someone who is about to access their retirement benefits. Therefore, the allocation to 'Growth' will be replaced by a mix of 'Moderate Growth', 'Cautious Growth' and 'Liquidity' portfolios.

The extent to which the value of a members' DC portfolio is affected by climate change is a function of their allocation to equity – like, property and infrastructure assets.

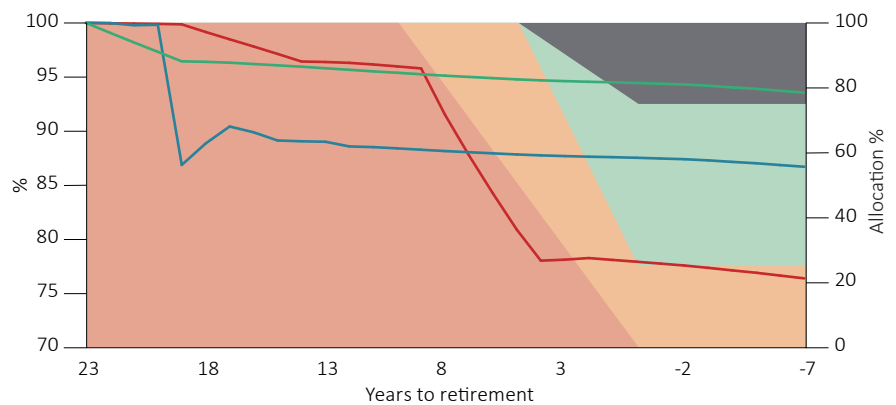
In the short term, the example members experience comparable climate impacts as they share similar allocations until year 7. It is in the long term where the climate impacts are more visible. The younger the member, the longer they will be invested in the Growth portfolio throughout the analysis period and the greater the impact on asset returns due to physical risks exposure in the long term. This is clearly visible in the Failed Transition pathway: a 30-year-old member will be significantly more affected than a 50-year-old member, because, when the 2050 to 2100 physical risks start to be priced-in, the older member has reduced his or her allocation to risky assets, if not completely switched to low-risk ones.

Figure 4: DC example member experience: cumulative median nominal returns – Relative to climate-uninformed

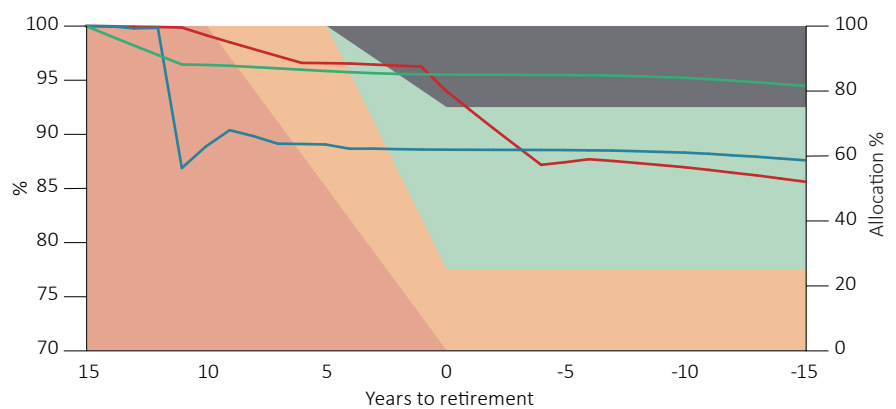
Aria – Age 30, USS member for 3 years



Bryn – Age 43, USS member for 8 years



Chloe – Age 51, USS member for 18 years



— Paris Orderly — Paris Disorderly — Failed Transition
 ● Growth ● Moderate ● Cautious ● Cash

Source: USSIM and Ortec Finance (GLASS)

5.5 Next steps

We believe this scenario analysis raises important questions about our portfolio exposures, which need to be addressed as we fully integrate climate factors in our investment process. Specifically, it highlights the need for us to:

- strengthen our top-down macro analysis by further integrating climate pathways with other macro factors
- integrate the top-down perspective from climate scenarios with bottom-up analysis of climate exposure of individual companies or fixed income instruments
- understand the impact of our journey towards Net Zero on sensitivity to different climate scenarios

USSIM has already taken action to mitigate the transition risks by moving away from standard equity benchmarks and considering a global climate-transition aware benchmark for asset allocation decisions.

While we are still working through the implications of the results, in 2022 we plan to undertake a number of initiatives to determine how we can create a more climate-resilient portfolio. These include:

- assessing how we can further integrate climate risk in the investment decision-making process
- expanding the scenario set to, for example, include an Inevitable Policy Response scenario

- looking at how we manage our assets and how we create our asset allocation framework
- examining how we consider the economic impacts of our investment mandates and how these are benchmarked, improving both internal and external climate-related reporting
- working to enhance 'climate aware' models of returns to achieve complete consistency in risk-return modelling
- looking at scenario analysis for the valuation best estimate.

5.6 Case study: our new climate tilt

We have introduced a **climate tilt** to a portion of our Global Developed Markets equity investments. This makes up part of both our defined benefit and defined contribution funds. The change will affect over £5bn of assets under management, and will include all Scope 1, 2 and 3 emissions from day one. Please see page 29 for a definition of Scopes 1, 2 and 3. This is an important step in our journey to achieving our Net Zero ambition.

We reviewed carbon and climate-tilted benchmarks to find a provider. We appointed Solactive, a German-based index provider, and worked with them to develop an appropriate benchmark. Solactive also helped us put some of our other requirements in place, such as our financially-based exclusions.

We chose to adopt a Climate Transition Benchmark (CTB). This is because, with a focus on transition rather than exclusions, the CTB has the potential to capture the financial benefits expected for companies that successfully transition to a low-carbon economy that some other approaches may miss.

Initially, this approach will reduce emissions by at least 30% compared to the broad equity market. Then, every year after that, this approach will decrease its carbon intensity by 7% for Scope 1, 2 and 3 emissions.



6 Risk management

In this section, we disclose our processes for identifying, assessing and managing climate-related risks and how we integrate these into our overall risk management framework.

Management of the scheme's investments is delegated to USSIM. The delivery of these duties creates risks for USS and, in this context, risk is defined as the possibility that the scheme's objectives will not be achieved. This includes, for example, the possibility that target funding levels are not met, or that expected investment returns do not materialise, or that a changing climate impacts the scheme's investments.

We are committed to dealing appropriately and effectively with the risks presented by the delivery of our business objectives. We take all necessary steps to make sure we operate in alignment with the Trustee Board's expectations, which are set down in the risk appetite and risk culture statements. Staff and relevant third parties are expected to be aware of the risks pertaining to our group's business activities. We promote an appropriate risk framework and culture to make

sure this happens. We will also use all suitable tools and techniques (the 'framework') to give the Trustee Board an integrated view of material risks and risk concentrations across the whole enterprise.

Rather than having a separate risk management framework, the way we assess and manage climate risk is built into our existing risk management processes. We describe these processes on the following pages.

6.1 Risk management and governance

Risk management is concerned with:

- determining the likelihood and frequency that risk (including climate change risks) materialising will impact the scheme, and
- taking appropriate actions to avoid, transfer or accept the risks, or minimise their impact through mitigation

Risk governance addresses the risk management tools and structures, governing committees, risk frameworks, processes and activities that we must implement to manage risk effectively.

Risk governance and reporting

The USS Trustee Board has ultimate responsibility for risk management across the USS Group (even where delegated to its in-house manager USSIM). It is the ultimate owner of all risks. This means it retains responsibility for setting risk appetite and tolerances and satisfying itself that appropriate systems are implemented by management across both USSL and USSIM to make sure the Risk Governance Policy is implemented.

Risk Governance Policy

Our Risk Governance Policy (RGP) directs the development of the governance, rules, frameworks and processes we need to implement effective risk governance across its activities.

The objectives of the policy are to:

- define the range of risks we must manage and set the requirement and framework for establishing corporate risk appetite across our range of risks
- establish the requirement that we implement risk governance arrangements
- establish the requirement that we respond where risk exposures are deemed to exceed risk appetite in alignment with the risk framework

Our RGP is supported by USS and USSIM Risk Governance Policy Framework documents. Elements of this Framework are considered essential and integral to the policy. The Framework sets out the:

- High Level Risk Inventory and Classification structure (Taxonomy)
- Risk Appetite Statements
- Risk Culture Statement
- the governance arrangements for risk management within USS



6.2 Integrating climate risk into our risk management processes

We have integrated ESG risks, and specifically climate risks, into our wider risk governance, monitoring and management processes. This includes additional processes for identifying, assessing and managing these risks. As part of this process, both climate transition and physical risks have been considered (see the scenario analysis section on pages 12-15) and the Strategy section). However, as reflected in the risk registers (see box on page 10), the risks posed to our investments by transition risk has had greater focus. This is detailed in the following pages.

6.2.1 Enterprise Risk Framework

All board level risks are owned by a senior management executive. The USSIM CEO was appointed as the executive owner for climate risk, with the following responsibilities:

- identifying, monitoring and managing climate risk on a day-to-day basis
- understanding the implications of the risk on USS strategy/operations
- directing the appropriate risk response (avoid, mitigate, transfer, accept) and making sure it is applied effectively
- implementing and enforcing risk management policy
- making sure frameworks for managing climate risk are available and applied across the organisation

- performing a quarterly risk assessment of risk exposure against risk appetite.

Underpinning our overall Risk Management Framework, we operate a ‘three lines of defence’ approach, which is embedded in the organisation.

- **The first line of defence** comprises our various business divisions. They are the owners of the risks they take in the course of their operations. They are responsible for identifying, monitoring and managing these risks in the first instance. This includes the various USSIM asset class-specific investment teams. **It is this first line of defence – the investment teams – that is responsible for identifying and managing climate-related risks in our investments.**
- **The second line of defence** includes the Risk, Legal and Compliance functions that facilitate the risk programme and provide oversight and challenge to the first line on risk management. The second line Risk Team is responsible for providing a suitable framework for the first line to assess the risks in aggregate at the board level, and for challenging the assessments of risk exposure where necessary.

- **The third line of defence** comprises the Internal Audit function. They provide independent assurance on the risk management and oversight activity undertaken in the first and second lines.

6.2.2 Risk inventory

We have added climate risk to both the trustee’s and USSIM’s risk inventories and classification structures. The risk identification process for climate risk specifically is maturing and continually reviewed, but this initial step allows risk appetite statements to be set and monitored with appropriate metrics (key risk indicators) and gives high-level visibility of reporting to the scheme’s governing bodies. Climate risk, as it relates to the investing and investment decision-making processes, has also been added to the day-to-day operating risk registers of USSIM investment teams.

6.2.3 Climate change is a Principal and Top Risk

Our senior executives maintain a comprehensive register of the principal risks faced by the business along with their potential impact and how we mitigate them. In 2021, we identified climate change risk as one of our ‘Principal Risks’ and included it in the relevant section of the **2021 Annual Report and Accounts**, along with ongoing high-level mitigation (see Figure 1 below).

Figure 1: Climate risk entry in the USSL Annual Report and Accounts

Risk	Description	Impact	Control/mitigation
Climate Change Risk	The risk of material financial impact from climate change, driven by transition risk where asset values are impacted by economic transition in response to climate change, and by physical risk of damage to assets from extreme climate and weather events.	Loss of value of assets from transition to a low-carbon economy or from actual or potential physical damage, especially where we are long-term holders of those assets.	<ul style="list-style-type: none"> • USSIM ambition to achieve Net Zero by 2050 with interim targets for 2025 and 2030 • Integration of Climate Risk into our Governance and Risk Management processes with oversight at the Trustee Board level • Integration of Climate Risk into investment decision-making process • Ongoing Scenario Analysis and modelling to help identify and quantify the systemic impact of climate change on the real economy and markets • USSIM Net Zero Steering Committee and Net Zero Working Groups to monitor and implement change at asset class level • Dedicated in-house Responsible Investment team with specialist expertise to support investment teams and trustee • Continued stewardship, voting and engagement.

6.2 Integrating climate risk into our risk management processes
Continued

The ‘Top Risks’ is a similar process, which is currently conducted for USSIM. It is a key part of the Enterprise Risk Management Framework (ERMF) that allows us to identify and prioritise the risks that pose the most significant potential for an adverse outcome, whether financial, non-financial or reputational. Climate risk was once again identified within this set of risks for USSIM. This has resulted in various actions (detailed throughout this report) to help manage the potential impact on our investments.

6.2.4 Our risk appetite and key risk indicators

Risk appetite is the maximum level of risk we are willing to accept in pursuit of our objectives.

A risk appetite statement for climate risks has been set at the highest level in the organisation – the Trustee Board – as advised by the Investment Committee. Appetite is expressed according to the definitions in Figure 2 opposite:

Figure 2: Definitions of the risk appetite dispositions

Disposition	Meaning
Averse	Avoidance of risk and uncertainty is a key organisation objective even if the financial or opportunity costs of doing so are very high.
Minimal	Preference for very safe options that are very low risk and have either high financial or opportunity cost, or only have the potential for very limited reward.
Cautious	Preference for safe options that are low risk and having either moderate financial or opportunity cost, or only have the potential for moderate reward.
Open	Willing to consider all potential options and choose the one most likely to result in successful achievement of objectives by providing a level of reward and value for money commensurate with the level of risk.
Hungry	Eager to be innovative and to choose options offering potentially higher business rewards (in terms of higher returns or cost avoided), despite greater inherent risk.

We are **cautious** in respect of climate change issues being detrimental to performance. This means that with respect to exposure to climate change, we prefer safer and lower risk options. We place great importance on this risk and continue to positively and actively engage to reduce the carbon footprint of our investment portfolio over time. Active measures we have taken so far are outlined throughout this report including reporting, governance, climate integration and risk management, climate tilt of portfolio and ongoing divestments.

6.3 How we manage valuation risk – the Integrated Risk Management Framework (IRMF)

In line with The Pension Regulator’s defined benefit funding guidance, we have taken a proportionate integrated approach in developing the IRMF as an approach to managing valuation risk. The IRMF is a regulatory requirement, and the Regulator’s guidance recognises that trustees have a strong vantage point from which to identify the risks (including climate risk) that their scheme faces, taking account of the advice they receive across the employer covenant, investment and funding strands in an integrated way.

The IRMF is informed by expert professional advice from different specialist sources covering:

1. Employer covenant
2. Investment
3. Actuarial considerations and potential impact on liabilities

We then integrate this advice into a coherent framework for addressing how we manage risk in the context of the covenant (see below). The following paragraphs set out more detail on the impact of climate risk on the covenant and liabilities aspects respectively. The investment aspects are covered in more detail throughout this report.

6.3.1 IRMF and covenant – impact of climate risks on covenant

Covenant is the ability and willingness of employers to make financial contributions to the scheme as they fall due. Our assessment of the scheme covenant is that it is strong. There are four key drivers behind that assessment:

- over 95% of the scheme’s covenant comes from employers that make up most of the UK Higher Education sector, which is well-positioned in a growing global market
- the scheme operates on a ‘last man standing’ basis, within which employers have joint and several liability, and with a moratorium on employer exits from the scheme, allowing the trustee to rely on the full support of the sector
- scheme contributions flex with the size of an institution’s cost base, meaning contributions shrink if an institution’s size decreases, which helps mitigate distress
- the UK Higher Education sector has shown itself to be flexible and adaptable (which has been reinforced by the resilience shown by the sector in response to COVID-19).

6.3 How we manage valuation risk – the Integrated Risk Management Framework (IRMF)
Continued

We believe that these factors continue to be relevant, irrespective of the potential risks to the covenant from climate-related considerations. We recognise, however, that no sector can claim realistically to be unaffected by climate risks.

To address this, we have embedded climate considerations into our ongoing covenant monitoring activities. Initially, our focus will be on engaging with individual employers and their representative bodies, such as Universities UK (UUK). UUK published a **climate commitment document** in October 2021. This document sets commitments at a high level to target reducing emissions by 78% by 2035 and achieve Net Zero by 2050, as well as outlining various initiatives across the sector. Many individual institutions have developed their own plans and targets for environmental sustainability in parallel and, as a consequence, have embedded climate considerations into their financial planning and reporting processes. We recognise, however, progress across the sector is not uniform.

Our engagement to date has not identified climate as a significant near-term risk for employers. However, there are a number of potential climate-related issues that the sector will need to address over the medium-to-long term, including:

- potentially significant costs associated with transitioning campuses towards more efficient and low-carbon heating, lighting and transport
- increased flood and weather risks that may affect the cost or availability of insurance
- climate risks may affect the value and liquidity of institutions' endowment and other investment assets
- environmental concerns around travel may make it more difficult to attract international students to courses delivered via traditional in-person teaching models

- there may be opportunities for the sector from new climate-related areas of research and innovation
- the sector's recent experience with delivering remote learning may mean it is able to increase its share of the global market by introducing or expanding non-traditional teaching formats

The trustee will continue to engage with employers and other sector stakeholders to understand how their assessment of climate risks evolves. We will also undertake our own review of medium-to-long-term risks, including those relating to climate, as part of our annual covenant monitoring activity with a view to keeping these risks under review. Our assessment of covenant strength will include work to understand how robust the scheme employer group is when it comes to relevant downside scenarios similar to those developed by Ortec.

6.3.2 IRMF and liabilities – impact of climate risks on funding liabilities

Most of the focus to date has been the impacts of climate change on the assets held by pension funds and other investors. However, the changing climate could also impact our liabilities. The impacts are varied and include potential changes to GDP, mortality rates, and longevity and population patterns (both positive and negative). All of these changes could have implications for our liabilities. As a result, for a number of years, we have been consulting our advisers to understand how climate change could impact liabilities, including mortality impacts.

Our climate scenario modelling (see the Strategy section on pages 12-19) uses a range of scenarios to provide insights on how exposed our assets and liabilities would be to different assumptions in climate pathways. These insights help USSIM develop more climate-informed investment choices.

They integrate climate within the external model provided by Ortec, which is used for generating economic simulations and scenarios, and has been used as an input to the asset-liability management framework and the 2020 Valuation. Along with using representations of the asset allocation of the DB Implemented Portfolio¹, the modelling was performed using DB liabilities that are modelled based on projected future cash flows, but without considering demographics risks.

As noted in the Strategy section, the results of this scenario analysis showed that:

- our funding position is projected to be worse in scenarios that are worse than a Paris Orderly Transition pathway
- the impact on funding position is driven mainly by lower investment returns and so asset values
- the Failed Transition pathway leads to the worst funding position

To address these outcomes further we plan to fully integrate climate factors in our investment process and specifically:

- strengthen our top-down macro analysis by further integrating climate pathways with other macro factors
- integrate the top-down perspective from climate scenarios with bottom-up analysis of climate exposure of individual companies or fixed income instruments
- understand the impact of our journey towards Net Zero on sensitivity to different climate scenarios.

Note

1 To help the scheme assess returns, we identify a set of hypothetical investments that could be made passively (we call this the Reference Portfolio). We then challenge our in-house team to achieve even better results at the same levels of risk (we call this the Implemented Portfolio).

6.4 How we manage scheme and asset-level risk

As well as the risk frameworks we mention in this section, we have processes for identifying, assessing and managing climate risk at scheme, asset class and asset level. This includes the scenario analysis described in the Strategy section, and further details relating to risk are set out below.

Scenario analysis

As noted in the Strategy section, we undertook scheme-wide climate scenario analysis and stress testing, looking at the impact of global warming based on different climate pathways. The scenario analysis focused on both the transition and physical risk drivers. The analysis also used two climate scenarios: an increase in global temperatures of 1.5°C (both under an Orderly Transition, and a Disorderly Transition) and an increase that is more than 4°C which represents a Failed Transition.

While we are still working through the implications of the results, in 2022 we plan to undertake several initiatives to determine how we can create a more climate-resilient portfolio going forward. We have reported the results of the analysis to both the Investment Committee and Trustee Board. See the Strategy section for more details.

Carbon footprinting

We first calculated our carbon footprint in 2009, and have looked at the carbon footprint of our internally managed public equity investments for some years. As part of our Net Zero management processes and for this report we have calculated our carbon footprint for as many of our assets as possible.

Calculating this means we can estimate a total footprint and emission intensity for the scheme. But it also means that, by looking at our carbon footprint for each asset class, we can identify the assets responsible for the greatest contributions to our carbon footprint. For many asset classes, we have found that approximately 10 assets are usually responsible for roughly 75% to 80% of emissions. We are using this analysis to inform how we engage, vote and manage our assets. It also allows us to integrate carbon risk into our investment analysis. There is more detail about this in the Metrics and targets section of this report.

6.4.1 Assessing and managing climate risk across asset classes

Public equities

Public equities are our largest asset class, representing approximately 40% of assets. While most of our assets are currently managed passively against various indices, we do have an actively managed Global Emerging Markets (GEMs) portfolio.

Given the importance of the asset class, we have a number of approaches for assessing and managing climate-related risk in our equity portfolios. These include identifying and integrating climate-related financial factors into investment decisions, engaging with companies to encourage them to manage their own climate-related risk, and using our vote on climate-related issues.

Changing benchmarks

This year we announced our intention to **introduce a climate tilt** to a portion of our Global Developed Markets Equity investments. This forms part of both the defined benefit and defined contribution funds. We have now implemented this tilt. It affects over £5bn of assets under management. See the case study in the Strategy section for more details.

Integration into our GEMs team's investment processes

Our GEMs team uses a range of sources in integrating environmental, social and governance (ESG) issues into their investment research including climate-related data. This ESG and climate research is fully integrated into its own section within the team's investment notes. It helps to drive the agenda at both meetings with companies and, where appropriate, investment decisions.

The team conducts carbon analysis using a range of different carbon price scenarios, based on:

- company meetings
- external carbon price scenarios (such as the International Energy Agency's Net Zero by 2050 scenarios)
- market prices and public disclosures, such as the internal price of carbon used by a company and disclosed to the CDP (formerly the Carbon Disclosure Project).

These carbon prices are then used as part of a discounted cash flow analysis to see how different carbon price scenarios change a company's valuation. Alongside the carbon price itself, our analysts build in an analysis of whether a company will become more or less carbon intensive during the valuation period. This may be driven by a company changing its business mix, investing in research and development, spending more on green capital equipment or altering its energy supplies.

Engagement

As our **Stewardship Code Report** notes, we have long been a supporter of actively engaging with companies to both obtain information (which we can integrate into our investment decisions) and to encourage better management of ESG issues (including climate change). We have been engaging with the companies in our portfolio on climate-related issues for two decades. As a recent example, we have joined more than 700 global investors with over US\$682 trillion in assets under management as part of the **Climate Action (CA) 100+**. This project sees investors engage with the world's largest emitting companies to encourage them to act on climate change by, for example, reducing emissions, strengthening climate-related financial disclosures, and improving their governance of climate change issues as they affect their business. We will continue to engage with companies in collaboration with other investors to ensure that they do more to address climate change. The outcome will be better communication with investors on how companies are managing the transition risk. See the case study on page 28.

6 Risk management Continued

6.4 How we manage scheme and asset-level risk Continued

Voting

We are an active owner of our assets. We regularly meet with the executives and boards of the companies we invest in. This includes using our voting power at company AGMs where we typically support the vast majority of climate change-related shareholder resolutions, as well as engaging regularly with company boards to encourage positive behaviours. The aim of our voting is to encourage companies to provide climate-related data to their investors, and to put appropriate climate transition plans in place. We particularly expect companies in high-emitting sectors, or sectors exposed to climate risks, to have their own transition plans. We will use our voting to encourage this. For more information, please see our 2022 [Stewardship Code Report](#).

To be even more proactive, our UK [Voting Policy](#) now integrates data from the Transition Pathway Initiative (TPI). We helped develop and launch the TPI in January 2017. Partnering with other global pension funds, FTSE and the Grantham Research Institute (part of the London School of Economics), this project tracks how companies are implementing policies and practices that manage a shift to a low-carbon world. It helps our fund managers see where companies are in their transition.

Physical risk (low risk – 10/10)

Global warming, rising sea levels and extreme weather may pose a degree of flood, landslide and/or wildfire risk to Company XYZ.

We would note that their sites are at lower risk of flooding/rising sea levels vs. other leisure opportunities we have reviewed, albeit we will diligence this further in the next round.



Private markets assets Direct assets

We have significant direct investments in a range of assets. This includes infrastructure, such as Heathrow Airport and Thames Water, and a broad range of other companies: Moto (motorway service stations), Westerleigh (crematoria), and G.Network (telecoms) are just a few examples.

We factor climate-related issues into the ESG due diligence we undertake for all direct investments. This will be asset specific but can include assessments of

both regulatory/transition and physical climate risk, and how the asset is managing them. USSIM's Private Markets Group (PMG) have developed a Climate Risk Framework (see next page) to capture both physical and transition climate risks across new PMG deals and existing assets. The Framework is used in due diligence for new deals. These high-level assessments (see simplified example below) will inform additional due diligence to be conducted including the use of external environmental advisers/consultants.

Transition risk (medium – low risk – 9/10)

Direct emissions:

Carbon emissions related to energy efficiency: As a premium operator, we are not aware of any particular energy efficiency concerns within the Company XYZ estate, although will have to diligence this and any associated 'minimum standard' costs.

Carbon offsetting: Company XYZ has planted over 25,000 trees and often develops new sites that have been otherwise allocated for tree felling thereby preserving forested land; Sources of the companies' power for operations are to be explored.

Indirect emissions:

Carbon emissions related to travel/risk of change in consumer preferences. Staycation thematic and 'back to nature' focus of Company XYZ has inherent environmental positives versus international alternatives reliant on air travel.

6 Risk management

Continued

6.4 How we manage scheme and asset-level risk

Continued

Physical risk assessment	Climate risk assessment
<p>1-2 (High risk) High exposure to assets located in areas with high physical risk incidence</p> <p>Limited mitigation and adaptation plans are in place</p>	<p>1-2 (High risk) The company has <i>significant direct and/or indirect exposure</i> to the Net Zero transition, facing significant loss of revenue, increased costs and risk of stranded assets</p> <p>The business lacks a robust decarbonisation plan and is reliant on status quo</p>
<p>3-5 (Medium – High risk) High exposure to assets located in areas with high physical risk incidence</p> <p>Some mitigation and adaptation plans are in place but require enhancements</p>	<p>3-5 (Medium – High risk) The company has <i>some exposure</i> to direct and indirect transition risks, facing some cost increase, loss of revenue</p> <p>Mitigations plans are in place but require further development to ensure competitiveness</p>
<p>6-8 (Medium – Low risk) Some exposure to assets sensitive to physical climate risk</p> <p>Some mitigation and adaptation plans are in place but require enhancements</p>	<p>6-8 (Medium – Low risk) The company has <i>some exposure</i> to direct and indirect transition risks, however a robust decarbonisation plan is in place to ensure competitiveness</p>
<p>9-10 (Low risk) Low exposure to physical assets OR</p> <p>The physical assets are located in areas where some physical risks from climate change can occur but do not impact the specific business under due diligence</p>	<p>9-10 (Low risk) The company's direct and indirect exposure to the Net Zero transition is limited</p>

Investing in low-carbon alternatives

There is a strong focus in the TCFD around how climate change risk is managed. However, climate change, and the steps that governments around the world are putting in place to support the transition to a low-carbon future, also provide opportunities for pension funds like ours to invest in that transition. We have been investing in renewable energy and clean technologies for over 20 years and now have approximately £1.9bn invested. These assets provide both appropriate returns for us and offer some resilience against the impacts of a changing climate.

We are financing renewables in the UK and internationally, including on- and offshore wind and solar (or photovoltaic (PV)) energy. Our investments include **L1 Renewables**. This is our wholly-owned renewable lending (debt) platform, which we established in 2014. It supports onshore wind projects and project finance loans to operational wind farms. We also own **direct equity interests in a number of offshore wind farms** acquired when the UK government sold the Green Investment Bank and its assets.

Bruc Energy

In 2021 we took a 50% stake in Bruc Energy, a Spain and Portugal renewables-focused investment vehicle. We have invested €225m (c.£200m) in return for the stake in a major pipeline of 4000 MW of solar photovoltaic (PV) farms. Bruc Energy has an ambitious growth plan that goes beyond this to invest in other green energies, such as wind power. Spain's long days of sunshine and its national target to reach 100% renewable-based generation by 2050 make it an attractive place to invest in solar energy. Plus, the decades-long lifespan of solar PV panels makes them well-suited to us in helping pay our members' pensions long into the future.

Sustainable growth mandate

Another initiative that will support our Net Zero ambition is a new **£500m Sustainable Growth mandate**. This will be invested globally – either directly or through funds – in high growth, privately-owned businesses that are developing technologies and services that will help companies and the

broader economy to decarbonise. This will complement our existing renewable energy strategy, which will continue to develop and invest in wind and solar generation capacity. As at 31 March 2022, we had committed £1.9bn to renewable energy and green technologies. Our Sustainable Growth mandate will be managed by the Private Markets Group within USSIM and benefit the defined benefit and, over time, the defined contribution segments of the scheme. The first asset in the fund is **our investment in TPG Rise Climate**, whereby we joined a number of other large institutional investors in subscribing to the climate investing strategy of alternative asset firm TPG's private markets impact investing platform. The strategy will focus on five climate sub-sectors: clean energy, enabling solutions, decarbonised transport, greening industrials, and agriculture and natural solutions.

6.4 How we manage scheme and asset-level risk Continued

Stewardship of assets

Once we have invested, we typically work with the management of the portfolio company on an asset management plan. When we have identified material ESG and climate issues in our due diligence, these issues are integral to this management plan. A USS appointee typically sits on the board of the company, which allows for regular oversight of climate and other risks. In addition, USSIM undertakes post-investment visits to the companies and infrastructure assets we own directly. Among other things, these visits look at how well these companies and assets are managing environmental and social issues.

For co-investments, the due diligence process is largely similar to our direct asset investments. But then, after we have invested, our control is limited by the Limited Partner (LP)/General Partner (GP)¹ relationship. In this case the GP (or fund manager) has complete responsibility for management and oversight of the investment including climate issues. We will, however, challenge the manager on how they manage climate issues as part of our external manager monitoring programme.

Finally, a number of our direct assets already provide public Net Zero commitments including Heathrow and Thames Water.

Property

The vast majority of our property assets are UK-based directly held assets, although we do have some exposure internationally via funds. For the directly held buildings, given the potential physical risks that a changing climate can pose (for example, flood risk, storm damage), we always assess this risk before we invest. In addition, regulation also requires that Energy Performance Certificates (EPCs) are available for UK properties. This helps us assess a building's energy efficiency and therefore its potential exposure to higher energy and/or carbon costs.

We have had an active Responsible Property Investment (RPI) programme in place for over a decade. The **RPI programme** has focused on reducing energy consumption, and therefore potential carbon exposure, in some of our major property assets.

Fixed income Sovereign debt

We use a proprietary tool, first developed in 2008, that ranks countries based on ESG factors. For our Emerging Market Debt (local currencies) portfolio, we use the composite index ranking as a core tool to construct the portfolio. Climate data are among the inputs into a component of the tool. There are more details in our **Stewardship Code Report**.

We also build climate and carbon exposure into our modelling by allocating towards countries showing the best improvement and allocating away from countries with larger increases in coal production. We also use data on countries' percentage change in CO₂ emissions from Our World in Data. We reduce our exposure to countries with the largest increases in these. Finally, we reviewed the signatories to the Paris Agreement and allocate away from countries that either conditionally signed up or did not sign up to the Agreement. This is because we view signing up to the Agreement as an indicator of willingness to transition.

Credit (corporate debt)

Our Credit Team assess environmental factors including climate-related issues as part of their ESG integration process. They generally follow the frameworks established by the three major credit rating agencies that have identified relevant environmental factors for various sectors and companies. If a company scores poorly on 'E' factors and climate risks, the team does further analysis of the reasons for this, and assesses implications for the company's creditworthiness. The team also assesses to what extent these risks are already priced-in by investors. Based on this approach, the Credit Team reduced their position in a major oil company earlier this year.

This was for environmental reasons and their assessment of how these issues will impact the company's future creditworthiness.

Externally managed funds

Approximately 40% of our assets are managed externally. We have processes in place to assess and monitor how potential or existing managers are addressing ESG-related factors including climate change. This applies to both public and private markets managers. This means that how a fund is addressing climate change, and its positions on TCFD reporting and Net Zero, are built into our due diligence and monitoring frameworks. There are more details under Principle 8: Monitoring managers and service providers in our **Stewardship Code Report 2022**.

Resilience/physical risk

There is a strong focus on transition risk within this TCFD Report. But, as we have said, climate change poses both transition and physical risks to our assets and liabilities. In future TCFD reports, we expect to be in a better position to report more on physical risks and the resilience of our assets to them.

We have established Key Risk Indicators associated with climate change. One of which is 'A qualitative assessment by the Risk team of how USSIM is delivering on management of physical risk'. As a result, we will have more data on the exposure of our assets going forward.

Note

¹ LP (Limited Partner) is the investor, for example, the pension fund. GP (General Partner) is the fund manager.

6.5 Case studies: Investing in sustainable agriculture and engaging with Cemex

Investing in controlled environment agriculture

We made a commitment to a sustainable agriculture fund during the year. Equilibrium's Controlled Environment Food Fund II will invest primarily in high-tech greenhouses and adjacent businesses focused on controlled environment agriculture. We have underwritten the Fund on the basis of attractive risk-adjusted investment returns, but stewardship and sustainability considerations are embedded in the fund's proposition, strategy and management approach.

Controlled environment agriculture needs less resource input (water, fertiliser, pesticides) per unit of production, and minimises crop spoiling and wastage (for example, from poor weather). The environments can be positioned nearer to end-markets to reduce transportation costs, and so emissions. This means farmers can offer year-round, higher quality produce. It also offers highly skilled jobs with improved working conditions.

In addition to standard financial reporting, the manager will give us ESG performance data covering water savings, energy use, carbon emissions intensity and jobs created. This will allow us to compare yields versus field-crops and the beneficial impact of the Fund.

Equilibrium has also established a partnership with FutureProof to improve the assessment of physical climate risk in its portfolio. **FutureProof** uses new tools to assess the physical impacts of climate risk on real assets such as property, ports and agriculture.

The Fund manages large high-tech greenhouses where weather, temperature and climatic changes impact crop yields and working conditions. Equilibrium therefore needed more granular and actionable data on climate impacts to support their business planning and risk management. Through their partnership with FutureProof, Equilibrium was able to get more accurate predictions on value at risk. This has helped them make better decisions about operations and maintenance programmes, insurance costs, investment/divestment for site development and construction resilience.

The insights have influenced the Fund's decision-making on assumed operating lives for their assets, for heating, ventilation and air conditioning (HVAC) optimisation, choices of construction materials, and assumptions on crop cycles. Ultimately, the goal is to make sure that climate risks and opportunities are being accurately priced to gain a competitive advantage, support farmers using their equipment and maximise long-term returns as they invest capital on behalf of pension funds like USS.

Engaging with one of the world's largest cement companies as part of the Climate Action 100+ group

USSIM has been one of the lead investors engaging with Cemex, one of the world's largest cement companies, as part of Climate Action 100+. This five-year project has seen investors engage with the world's largest emitting companies to encourage them to act on climate change.

The cement sector is an often-overlooked carbon-intensive industry. Some 60 to 70% of the sector's CO₂ emissions come from the chemical processes associated with the production of cement. So for the cement sector to decarbonise, it needs not just to look at alternative fuel sources (responsible for the remaining 30 to 40% of emissions), but also alternative technologies (either through alternatives to carbonates or carbon sequestering and re-use). It has been estimated that the cement sector must decarbonise by at least 5% per year every year to reach neutrality by 2050.

We have encouraged the company to build on its carbon reduction ambitions from previous years and to submit its 2030 target and road map to the Science Based Target Initiative (SBTI) for verification. Cemex has stated that it expects to reach its 2030 emissions target five years early and has submitted its 'well below 2° scenario' to the SBTI. In early 2022, the company joined the Race to Zero challenge and signed up to the Business Ambition for 1.5° programme led by the We Mean Business Coalition, in partnership with the UN Global Pact and SBTI.

Cemex published its Annual Integrated Report in March 2022. The report shows an improvement in its disclosure and an acceleration of its short-term efforts to reach its stated Climate Goals. However, its strategy to 'deliver Net Zero concrete' by 2050 is dependent upon a number of 'breakthrough technologies' throughout its value chain. Over the course of 2022, we will seek to understand what happens if the breakthrough technologies fail to deliver the results hoped for, and what the company's alternative options may entail.

7 Metrics and targets

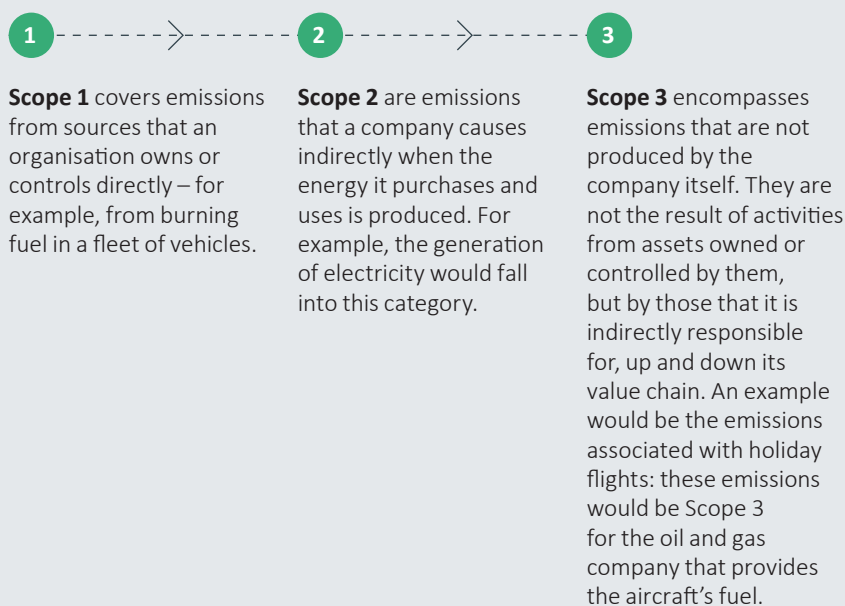
In this section, we set out the metrics and targets that we use to assess and manage climate-related risks and opportunities. We also highlight some of the challenges associated with collecting and analysing carbon and climate data.

The metrics and targets we use are aligned with peer funds and reflect good practice. The availability and quality of data vary across, and even within, asset classes. This means that some assets and asset classes will rely on estimated data. Also, as both carbon data disclosure and measurement techniques evolve and improve, reported numbers are likely to change.

The focus of our reporting this year is on Scope 1 and 2 emissions. This is because the availability and reliability of Scope 3 data for many companies and sectors is still poor. We plan to report available Scope 3 data from next year, as the quality and availability of the data improves.

To support access to carbon data, we have been a signatory to **CDP** (formerly the Carbon Disclosure Project) since its first iteration in 2002. CDP offers a framework for companies to follow when providing key climate change data to their investors.

What are Scope 1, 2 and 3 emissions?



7.1 Data sourcing

A critical step in managing and reducing our exposure to climate change risk is understanding our starting point. From there we can track our transition to Net Zero. Therefore, to support our Net Zero activities and TCFD reporting, we conducted a detailed review of carbon data providers using both qualitative and quantitative factors to assess their capabilities. We followed this with extended trial periods with the highest scoring providers.

We needed a data provider that could supply us with emissions estimates where reported data was absent, and that could deliver the data in the right format for us to analyse.

By comparing different data providers and then monitoring the selected provider's ability to deliver, we have made sure that carbon data service providers fulfil our requirements for both TCFD reporting and investment analysis.

Following this in-depth review of providers, we chose S&P Trucost as the most appropriate source of these data. While this was a recent and independent process, we have used S&P Trucost for its carbon footprinting work since our first such assessment in 2009.

We selected S&P Trucost as they could meet our needs in providing both carbon and broader climate data for a wide range of asset classes and geographies. We use their data for the majority of our public market holdings, as well as to support analysis or estimates for external funds where we lack data. We also take disclosures from company reports and via direct communication with our unlisted or direct assets, where such data are available.

7 Metrics and targets

Continued

7.1 Data sourcing

Continued

The issues with climate data

Climate data sourcing for pension fund footprinting and analysis is still in its infancy. As a result, it is important to reiterate the following when it comes to climate data and resulting metrics:

- **The availability and quality** of data vary across assets classes, and even within asset classes. This means that some assets and asset classes will rely on estimated data.
- With all climate data, as both carbon data disclosure and measurement techniques improve, reported numbers are likely to change. This means that the metrics and other data we publish are not certain and that

they may change in the future. As a result, if necessary, we may need to rebase our calculations as carbon data and measurement processes change.

- Scopes 1 and 2 data are generally available for public asset classes. **But disclosure of Scope 3 data is rare.** Scope 3 is particularly important for some sectors, for example, in oil and gas it makes up approximately 85% of emissions. As a result, while our core reporting is focused on Scope 1 and 2 data this year, we plan to disclose Scope 3 where possible from next year, with an initial focus on energy intensive sectors.

- **The processes for assessing carbon footprints for certain asset classes are still in development**, particularly, for example, for sovereign debt. This means the results can be anomalous. In the case of sovereign debt, the footprint is apparently an order of magnitude higher than that for public equities because whole-of-economy data are used. This is because of the very substantial effect of double-counting of data reported by companies. It therefore makes sense to report metrics for sovereign debt and other asset classes separately.

7.2 Our Net Zero ambition and targets

In May 2021, we announced our **ambition to achieve Net Zero by 2050** if not before. This is in line with the Paris Agreement, which we have publicly supported. It is also in line with the UK government's Net Zero commitment, and that of many other countries, companies and peer pension funds. This also aligns with the recommendations of the **IIGCC Paris Aligned Investor Initiative** and the **UN's Net Zero Asset Owner Alliance**.

To measure and demonstrate our progress towards this long-term ambition, we need interim targets. Targets based on climate science, meaning what is needed to achieve Net Zero by 2050, would suggest we need to reduce emissions by 6% to 8% each year.

We have therefore **announced interim targets** of working with the companies in our investment portfolio to cut the intensity of emissions they generate by 25% by 2025, and by 50% by 2030. These targets are relative to a 2019 baseline. We have used 2019 as the baseline point from which to measure our footprint and progress because the 2020 data are skewed by COVID-19 and, as such, would not make an appropriate start point.

In addition, our internal investment teams will develop separate targets for each asset class. Our Net Zero Steering Group (consisting mainly of USSIM asset class leads) will be responsible for making sure the sum of asset class targets achieves our overall scheme ambition.



7.3 Metrics

There are a broad range of potential metrics that can be used to measure progress to Net Zero and exposure to climate risk. Under the DWP's TCFD Regulations, we must disclose three metrics that we use to measure and track climate-related performance. These Regulations require us to disclose both the absolute emissions and an intensity of emissions metric, plus at least one other metric.

For internal measurement and tracking purposes, we are using a broader range of metrics, but we are reporting publicly on the following three metrics

Metric	Example	Further detail
Absolute emissions	Total portfolio emissions	Tonnes of carbon dioxide and equivalents (tCO ₂ e) Scope 1, 2 (plus material Scope 3 emissions from 2023 where they are available). For this report we will cover Scope 1 and 2 only.
Emissions intensity	Carbon footprint – tCO ₂ e per £m invested	As above. The amount of CO ₂ and equivalents tCO ₂ e (see above) emitted per million pounds of USSIM investments.
Alignment	% portfolio emissions attributable to assets aligned with a well below -2° pathway	This will assess the proportion of our assets that are on a decarbonisation trajectory that is expected to be aligned with 2°C or below. This is based on the warming path as assessed by S&P Trucost modelling.

The first two metrics are an explicit measure of the historical impact our investments have had on global greenhouse gas (GHG) emissions. Over the long term we expect to see these numbers reduce substantially as both the scheme and the world transition to a low-carbon future.

7.3.1 The third metric – alignment with the transition to Net Zero

We believe that, in order to achieve Net Zero by 2050, there has to be a change in how companies, economies, and societies generate and use energy. This must be a transition not a cliff edge: recognising that fossil fuels have a role to play in the near term, but that for most sectors fossil fuels will not be there in the long term. As a pension fund we therefore must encourage the assets and markets in which we invest to make this transition. After all, we don't just want a Net Zero pension fund, we want a Net Zero world.

As a result, as well as our absolute emissions and investment-based intensity, we also report the percentage of our assets that are estimated to be aligned with a 'below 2° centigrade scenario'. A company's alignment to a given warming path is calculated by S&P Trucost based on its individual profile and using the best data available for future emissions, for example, company targets, industry averages, etc.

For companies in carbon intensive industries such as steel or cement production, S&P Trucost use the Sectoral Decarbonisation Approach (SDA) as recommended by the Science Based Targets Initiative (SBTI). This more accurately reflects their anticipated impact on the path to a low-carbon economy.

We recognise that alignment metrics are highly sensitive to the methodology they are based on and include estimated inputs that themselves can be debated. But in the short to medium term, we believe that this metric will be a useful indicator of how successful our stewardship and engagement activities are in encouraging companies to plan for a low-carbon future in a responsible, sustainable, and cost-effective way. It is more sensitive to a company's specific decarbonisation trajectory, making allowances for the likely cost of decarbonisation and the need for new technologies to make that future a reality.

We also recognise that transition data and the methodologies to calculate them are still developing and as such will be subject to change over time.

7.3.2 Quality and coverage of data

Climate and carbon data quality and availability will vary across companies, asset classes, and markets. We have made best efforts to collect accurate and up to date emissions data for each underlying company or country. For investments in funds managed by third parties, and for which underlying holdings information is either unavailable or unsuitable, we have two options for collecting data. We either take disclosures from the manager, or we estimate the intensity of the portfolio using average intensities for the sectors and regions in which the portfolio is invested, based on available data. We are pleased that we were able to get up to approximately 90% data coverage for our defined benefit assets.

We expect that both data quality and coverage will increase over time as reporting on emissions improves and methodologies are agreed upon by industry experts.

Scope 1 emissions data for 45% of our assets, excluding sovereign debt, are based on information reported by companies directly. You can see this in Table 1 on the next page. This information is classified as 'verified' if we receive it through S&P Trucost, meaning it has been through rigorous quality assurance checks. It is 'unverified' if we have taken the number from a company publication or disclosure but cannot be certain as to its reliability. For our sovereign debt investment our service provider was able to provide data covering 99.9% of the assets, although we do not have a 'quality of data' rating for this.

7 Metrics and targets

Continued

7.3 Metrics

Continued

Table 1: Proportion of corporate and property AUM by Scope 1 emissions source quality

Scope 1 emissions source quality	% Assets
1. Verified reported emissions	30
2. Unverified reported emissions	15.5
3. Estimates derived from partially reported emissions	28.5
4. Estimates based on modelling of consumption and production	7
5. Estimates based on emissions per unit of value typical to that region and/or sector	19

For our DC (Investment Builder) segment of the scheme, the assets are primarily managed passively by third parties. So we use calculated intensities of the implemented portfolio's benchmark rather than the portfolio itself. The exceptions are for internally managed active portfolios such as Emerging Market Equity or private market funds. For these, we used the intensity calculated for the individual portfolio in the DB segment.

7.3.3 Data mapping risks

USSIM has taken data from leading climate and market data vendors to derive our scheme emissions. Of course, the issues and caveats we have already mentioned with climate and ESG data still apply. But, because we have taken our data from a market leading provider, we are confident that the data are as accurate as can be expected. Our key data risks relate to the mapping and post-processing of that data rather than the data itself.

To minimise data inaccuracy or misinterpretation, portfolio managers and analysts conducted an asset-level review of the key contributors. This made sure appropriate mapping had occurred, and any errors would have marginal to no impact on reported figures.

While the model used to aggregate the data has been sent to a third party for validation, two key risks remain.

1. **Entity mapping:** In our data set, companies may be represented more than once if they issue financial instruments in different forms. To manage these multiple entries, and other issues associated with the scale and breadth of our investments, we have relied heavily on automation to map the data points to the correct entities. While best efforts are made to ensure correct identification has occurred, it is possible that some assets are incorrectly mapped in different databases.
2. **Carbon apportionment:** Multiple factors can impact the calculation of enterprise value or total capital, for example: minority stakes, negative equity value, lack of Enterprise Value for banks and insurers. This in turn can have a large impact on the issuer's calculated emissions intensity, which is then used to calculate USSIM's emissions. While best efforts have been made to adjust for the relevant issues across all assets, it is possible that the calculated intensities at the issuer level may be incorrect or inappropriate in the context.

7.3.4 Data/footprint gaps

We have been unable to obtain or calculate carbon data for all our assets. Due to a lack of methodological consensus and data availability issues, the following are currently not included in our emissions exposure calculations:

- cash and foreign exchange contracts
- mortgages and asset-backed securities
- all listed and OTC derivatives including futures, options and swaps
- any asset for which emissions are not disclosed or modelled by S&P Trucost or EVORA (see following page)

7.3.5 Data sourcing by asset class

Company footprints

S&P Trucost has many years' experience both collecting published corporate climate data or estimating these data if they are not available. More information on these processes is available on their [website](#).

For companies, we can invest in both equity and debt, and as such need to consider both in our calculation of carbon footprints.

The carbon footprinting process has enabled us to identify the companies that have the greatest contribution to emissions across the asset classes and markets we invest in. Table 2 on page 33 shows the top 10 contributors to our financed Scope 1 and 2 emissions from our public market equities and credit portfolios. This is as at 31 December 2021. They are listed in order of contribution to our carbon footprint.

7 Metrics and targets

Continued

7.3 Metrics

Continued

Table 2: Company carbon footprints and our exposure to them

Company name	Company Scope 1 + 2 emissions (tCO ₂ e)	Company Scope 1 + 2 intensity (tCO ₂ e/£m)	USSIM public market portfolio holdings (£)	Contribution to USS Scope 1 + 2 emissions (tCO ₂ e)	Data source
Eskom Holdings SOC Limited	221,777,071	7,152	32,870,506	235,096	Scope 1: Verified reported emissions Scope 2: Estimates based on modelling of consumption and production
Anhui Conch Cement Company Limited	202,860,801	9,222	20,176,397	186,068	Scope 1: Estimates derived from partially reported emissions Scope 2: Verified reported emissions
CEMEX, S.A.B. de C.V.	40,977,871	2,839	46,929,950	133,234	Scopes 1 and 2: Estimates derived from partially reported emissions
Shell plc	74,048,404	379	294,790,172	111,785	Scopes 1 and 2: Estimates derived from partially reported emissions
China Petroleum & Chemical Corporation	170,940,000	1,742	50,952,906	88,766	Scope 1: Estimates derived from partially reported emissions Scope 2: Verified reported emissions
PJSC LUKOIL	43,651,492	951	84,623,129	80,436	Scope 1: Verified reported emissions Scope 2: Estimates derived from partially reported emissions
POSCO	75,649,882	2,518	31,734,034	79,921	Scope 1: Verified reported emissions Scope 2: Estimates derived from partially reported emissions
Tata Steel Limited	62,895,845	2,952	26,073,784	76,976	Scope 1: Verified reported emissions Scope 2: Estimates derived from partially reported emissions
UltraTech Cement Limited	49,623,550	2,196	33,924,766	74,512	Scopes 1 and 2: Estimates derived from partially reported emissions
Glencore plc	24,344,000	337	160,969,542	54,268	Scope 1: Estimates derived from partially reported emissions Scope 2: Verified reported emissions

7 Metrics and targets Continued

7.3 Metrics Continued

While some of these companies are energy related, for example, the oil and gas companies, the majority are energy users – notably cement and steel companies. This is also a reflection that the footprint only covers Scopes 1 and 2. If it included Scope 3, the Oil and Gas sector number would be significantly higher. In addition, most of these companies are in emerging markets, which reflects our active investment in these regions.

This kind of information enables us to both integrate carbon data into our investment decision making, and to identify those companies where we should prioritise our stewardship activities. For example, we have been actively engaging with CEMEX (see the case study on page 28) and Shell as part of the international CA100+ collaborate engagement. We have also been engaging with other companies on the list and will continue to do so. In the case of Lukoil, USSIM will be selling any remaining holdings in the company as a result of the decision to divest from Russian holdings.

Property

We are largely a direct property investor, owning offices, retail and industrial buildings across the UK. We have detailed processes in place to assess energy costs. Data on emissions for our real estate investments is provided by **EVORA**, a leading sustainability consultancy focused on the property sector – we have worked with them for a number of years.

Whether investing directly or through funds, real estate presents a series of practical challenges in assessing carbon footprint. The most significant in the context of reporting is working out who is responsible for emissions between the landlord and tenant, or between an owner and a mortgage provider (or debt provider). This is a particular problem for the Full Repairing and Insuring (FRI) leases commonly used in the sector. In these leases, tenants have explicit and sole responsibility for energy usage and management, with building owners tending to have limited, if any, Scope 1 and 2 emissions.

While this may be an accurate reflection of responsibilities, it may lack credibility with stakeholders who do not believe that the numbers reported for the landlord's or owner's emissions are a fair characterisation of their emissions. It may also not provide a good reflection of the carbon- and climate-related risk associated with owning a building. However, reporting on total building emissions does not account for tenants' responsibilities for their emissions (in other words, it introduces an element of double counting).

There is also no obvious benchmark for carbon footprints of real estate portfolios. One suggestion was that **GRESB** could fulfil this role at a global level, and that national bodies (for example, the Better Buildings Partnership or the Royal Institution of Chartered Surveyors in the UK) could provide country-specific data and benchmarks.

It was also suggested that a better measure of carbon performance may be to report on the energy ratings of buildings in the investment portfolio. This may also provide a (partial) measure of investment risk.

Other climate-related risks may be more significant for real estate than a carbon footprint. For example, investors may be more concerned about other risks such as flood risk and building energy efficiency.

Private assets

Internal

With assets that we directly hold and own fully or partially, we have good access to energy, carbon, and other climate-related data. This includes our direct infrastructure assets and other direct assets, such as Moto. As a result, we used reported data for these assets.

External funds

This is not the case for our private assets held in external funds, such as private equity, debt and infrastructure. For these, there are a lack of public data, as private companies tend to be some way behind public assets in their disclosure of climate-related information, and indeed other ESG data. As such, S&P Trucost use estimation methods to allocate carbon footprints in such asset classes.

To improve access to carbon data in externally managed Private Equity funds, we have written to our major managers requesting that they provide us with these data in the future. We are also supporting broader market actions to encourage private market carbon disclosure. For example, we are supporters of the **CalPERS/Carlyle Data Convergence Project**, to streamline the private investment industry's approach to collecting and reporting ESG data.



7 Metrics and targets

Continued

7.3 Metrics

Continued

Sovereign debt

We have substantial investments in government – or sovereign – debt. This is when a government borrows money to fund its activities. The decision for us to allocate to government debt versus other corporate investments is a critical risk management tool that we must be able to make to manage member funds responsibly. Sovereign debt investments cover all bonds issued by a country's government. The total absolute emissions used for these investments is the respective country's production-based emissions, as reported by S&P Trucost. This will generally reflect government emissions reported in accordance with international standards for National GHG inventories by the Intergovernmental Panel on Climate Change (IPCC). It will include all point source emissions generated within their borders, amounting to the sum of domestic consumption emissions and emissions embedded in exported goods and services.

This approach to sovereign debt carbon footprinting, recommended by various industry bodies such as IIGCC and TCFD, leads to some odd outcomes. As a result, we questioned the methodology for calculating sovereign debt carbon footprints. For example:

- Under this measure, country emissions include the emissions of companies within the jurisdiction as well as public sector and government funded emissions. As previously noted, this leads to significant double-counting and makes it impossible to compare assets on a like-for-like basis.
- The outcome is that the resulting sovereign debt footprint is significantly greater than that of our corporate investments. Our sovereign investments represent around 40% of the DB assets that we can measure the carbon footprint for. But apparently these sovereign investments represent nearly 85% of our total emissions. As a result, small changes in either our allocations to sovereign debt, or the carbon footprint of that debt, disproportionately impacts the overall footprint. It potentially swamps any changes in the footprints of corporate portfolios. Reporting these figures together could misleadingly imply progress or failure when we make changes to asset allocation, even if these changes have no tangible impact on global emissions or other climate-related objectives.

Given the challenges discussed above, we believe it is impossible to compare corporate and country emissions effectively. Combining them into a single figure for the fund gives a meaningless outcome, as sovereign emissions swamp corporate emissions.

We will therefore report the emissions data for our sovereign and non-sovereign investments separately. In addition, while we will track and report our carbon footprint associated with our sovereign investments for the purposes of transparency and risk management, we have not set interim targets given our lack of influence over country emissions. That said, USSIM will continue to engage with the UK and other governments in all ways possible to encourage their transition to a low-carbon future. After all, given our exposure to UK government debt in particular, we cannot achieve our Net Zero ambition unless the government achieves its 2050 goals.

7.4 Our GHG emissions summary

We are reporting against three metrics:

Metric	Example
Absolute emissions	Total portfolio emissions
Emissions intensity	Carbon footprint – tCO ₂ e per £m invested
Alignment	% portfolio emissions attributable to assets aligned with a well below -2° pathway

Given the data concerns we have with sovereign debt, we are reporting our corporate and property investment footprints separately from our investments in government bonds. In addition, the diverse portfolio composition at the reported levels means that USSIM does not have a meaningful or relevant benchmark against which to set itself. Individual portfolios will, however, be monitored and reported internally relative to their respective benchmarks, in line with asset class reporting mentioned in 7.3. The following provides a summary of our carbon footprint as of 31 December 2021.

7 Metrics and targets

Continued

7.4 Our GHG emissions summary

Continued

7.4.1 Defined Benefit investment emissions

The defined benefit (DB) or Retirement Income Builder section of the scheme has by far the greater share of assets at c.£92bn (at 31 December 2021) of a total assets under management (AUM) of c.£95bn. It also allocates to a much broader range of asset classes than is found in the defined contribution/Investment Builder section of the scheme. The DB section of USS has the following GHG emissions and alignment data.

Table 3. Greenhouse gas (GHG) emissions and intensities for DB section calculated on 11 February 2022 and based on 31 December data in tonnes of carbon dioxide equivalent (tCO₂e)

31 December 2021	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)	Well below 2°C aligned** (%)
Corporate and property	47,388	4,243,411	89.5	24
Sovereigns	35,039	25,375,617	724.2	
Data unavailable	9,800	–	–	
Grand total	92,227			

*Emissions reported are Scopes 1 and 2 only.

**Proportion of the £28bn of assets for which Trucost has Paris Alignment data available.

7.4.2 Defined Contribution investment emissions

The DWP requires that we report carbon footprint for all default DC funds where assets are over £100m. For us, this includes our three Growth funds. The GHG metrics for these three funds are in Table 4 below.

Table 4: GHG emissions and intensities for each popular DC section, calculated on 14 February 2022 and based on 31 December data in tonnes of carbon dioxide equivalent (tCO₂e)

31 December 2021	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)	Well below 2°C aligned** (%)
Growth Fund	953.1	–	–	–
Corporate and property	725.4	54,410	75.0	18.5
Data unavailable	227.7	–	–	–
Moderate Growth Fund	203.2	–	–	–
Corporate and property	117.1	8,313	71.0	17.2
Data unavailable	83.0	–	–	–
Sovereigns	3.1	869	278.4	–
Cautious Growth Fund	104.0	–	–	–
Corporate and property	34.0	2,415	71.1	17.5
Data unavailable	66.6	–	–	–
Sovereigns	3.4	941	278.4	–
Grand total	1,260.3	–	–	–

*Emissions reported are Scopes 1 and 2 only.

**Proportion of the £28bn of assets for which Trucost has Paris Alignment data available.

7.5 Progress and targets

As we have said, our ambition is to achieve Net Zero emissions by 2050. Our interim targets are to reduce the Scope 1 and 2 emission intensity of our non-sovereign investments by 25% by 2025 and 50% by 2030. These targets are compared to 2019 levels.

These targets imply that, on average, we need to reduce our carbon intensity by between 4.7% and 6.1% each year. We expect to see greater reductions in later years as we:

- improve the integration of climate change carbon data into our investment decision making processes
- realise the impact of our engagement with our long-term investments on reducing their emissions
- incorporate climate change risks into our asset allocation processes

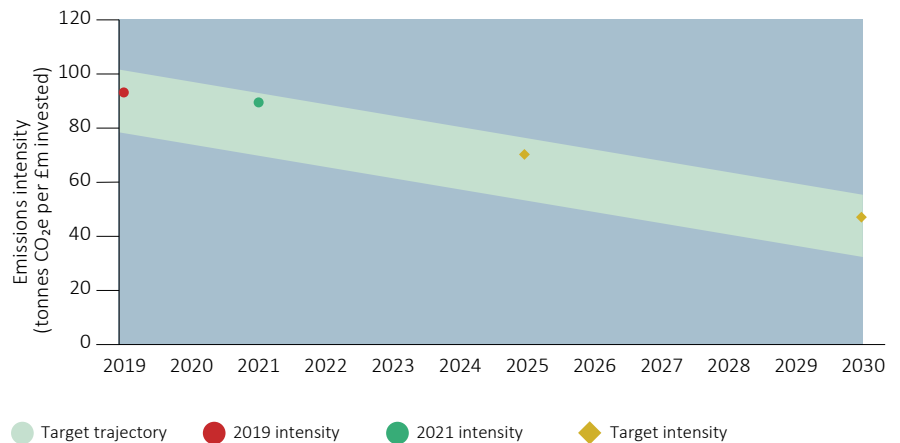
As indicated in Table 5, between 2019 to 2021, based on the latest available data, we achieved a reduction in carbon intensity of 3.7%, or 1.9% annualised, for our non-sovereign debt assets.

Table 5: 2021 vs. 2019 emissions Intensity of non-sovereign assets

TCFD Group	2019 emissions intensity (tCO ₂ e/£m)	2021 emissions intensity (tCO ₂ e/£m)	Reduction from 2019 to 2021 (%)	Annualised reduction (%)
Corporate and property	93.0	89.5	-3.7	-1.9

As shown in Figure 1 below (depicted by the green dot), this means that we are currently slightly behind a straight-line path from our baseline in 2019 (red dot) to our 2025 or 2030 target intensities (the yellow dots), but still within the broad target trajectory (depicted by the shaded blue area).

We are currently 5 tCO₂e/£m over budget versus our 2025 transition rate, and 7.5 tCO₂e/£m over budget versus our 2030 transition rate.



Being behind where we would like to be at this stage in our transition is largely expected. This is because most of the actions we have taken to date relate to engagement and stewardship activities, which are expected to reduce long-term emissions rather than short term. We were also aware that our decarbonisation rate was unlikely to track directly in line with a required transition rate. We expect that some years the rate will overshoot and some years undershoot the necessary 4.7% to 6.1% yearly decrease required to achieve our interim goals. We have therefore defined tramlines (as illustrated in Figure 1) around the expected transition pathways required to achieve those interim targets. We expect our carbon footprint to vary over time within these tramlines.

As we begin to realise the benefits of these actions with future reporting, along with the outcomes of our other decarbonisation initiatives, we expect to return to the pathway to achieving our interim and long-term targets.

It is also worth noting that the results here are based on a carbon footprint taken before we introduced the **climate tilt** to a portion of the Global Developed Markets equity investments. This tilt, affecting over £5bn, will initially reduce emissions by at least 30%, and further decrease carbon intensity by 7% for Scope 1, 2 and 3 emissions annually thereafter. There are more details in the case study on page 19.

8 Our future plans

We established our Net Zero ambition in May 2021 and, as you can see from this report, have been working to put in place the policies and processes we need to deliver on that ambition.

We have already allocated more than £5bn to a carbon tilted climate transition benchmark-based passive index. This will reduce the carbon footprint for those assets by 30% initially and 7% a year after that. We have not captured this change in the 2021 footprint data. We will also invest £500m in our Sustainable Growth mandate, investing in the technologies that will help support the transition to a low-carbon future.

But we recognise that we will need to do more to achieve our interim targets. We will, for example, need to further integrate climate change and carbon into our investment decisions. As well as reporting at scheme level, ongoing monitoring and assessing climate-related risks and opportunities will be the responsibility of all those involved in the investment decision-making process. Analysts are increasingly factoring climate impact assessments into their valuations and portfolio managers will be given their own targets, relevant to their investment universe, to make sure we meet our climate-related objectives.

As is common in diversified portfolios, a large proportion of our emissions are concentrated in a small number of investments. You can see our top 10 corporate emitters on page 33. This means we can have the largest impact on reducing global emissions by engaging with our highest emitters around their carbon footprint. Using the data gathered to calculate our overall footprint, we can identify and track our key climate risk exposures and opportunities. Where engagement is not possible, or emissions reduction is not feasible, we can seek alternative investments that offer similar return characteristics for our members at a lower carbon cost.

Our Net Zero Steering Committee and Net Zero Working Groups (see the Governance section) are working on asset class level targets and processes for reducing carbon exposure, as well as looking at the implications for asset allocation. We are focusing our stewardship and engagement on those companies with the most significant carbon footprints and exposure, as well as those not addressing climate-related issues. In addition to the almost £2bn we have already invested in renewables, we will look to allocate more to low carbon or transition assets, where available and as appropriate.

While we are still working through the implications of both our carbon footprint and scenario analysis results, we plan to undertake several initiatives to determine how we can create a more climate-resilient portfolio going forward. These include:

- assessing how we can better integrate climate risk in the investment decision-making process
- looking at how we manage our assets and how we create our asset allocation framework
- examining how we consider the economic impacts of our investment mandates, and then how these are benchmarked
- improving both internal and external climate-related reporting

- working to enhance 'climate aware' models of returns to achieve complete consistency in risk-return modelling
- looking at scenario analysis for the valuation best estimate

Finally, we are aware that this report has had a strong focus on transition risk. In future reporting, depending on the quality of data we can obtain, we plan to report more on how we are assessing and managing the physical risks posed by a changing climate.

We hope that this first statutory TCFD Report demonstrates the seriousness and commitment with which the USS Trustee and USSIM are addressing this issue. At USS, we believe achieving Net Zero is of critical importance from both a financial and a societal perspective.

We do not expect this journey to be easy. There will be difficult decisions to be made along the way. Divestment of all carbon-exposed assets is possible, but this would make no difference to the actual carbon emitted to the atmosphere, nor would the climate benefit. Encouraging or supporting the transition of assets to a low-carbon world will take time, but we feel it is the most appropriate and effective approach we can take to achieving the climate we will need in the future.



The USS logo is a red circle containing the letters "USS" in white, bold, sans-serif font. The background of the entire page is a composite of abstract, geometric patterns. On the left, there are golden-yellow lines forming a grid-like structure. On the right, there are blue lines forming a similar grid. A large, dark blue curved shape overlaps the top right corner. The overall aesthetic is modern and technological.

USS

For members, for the future.