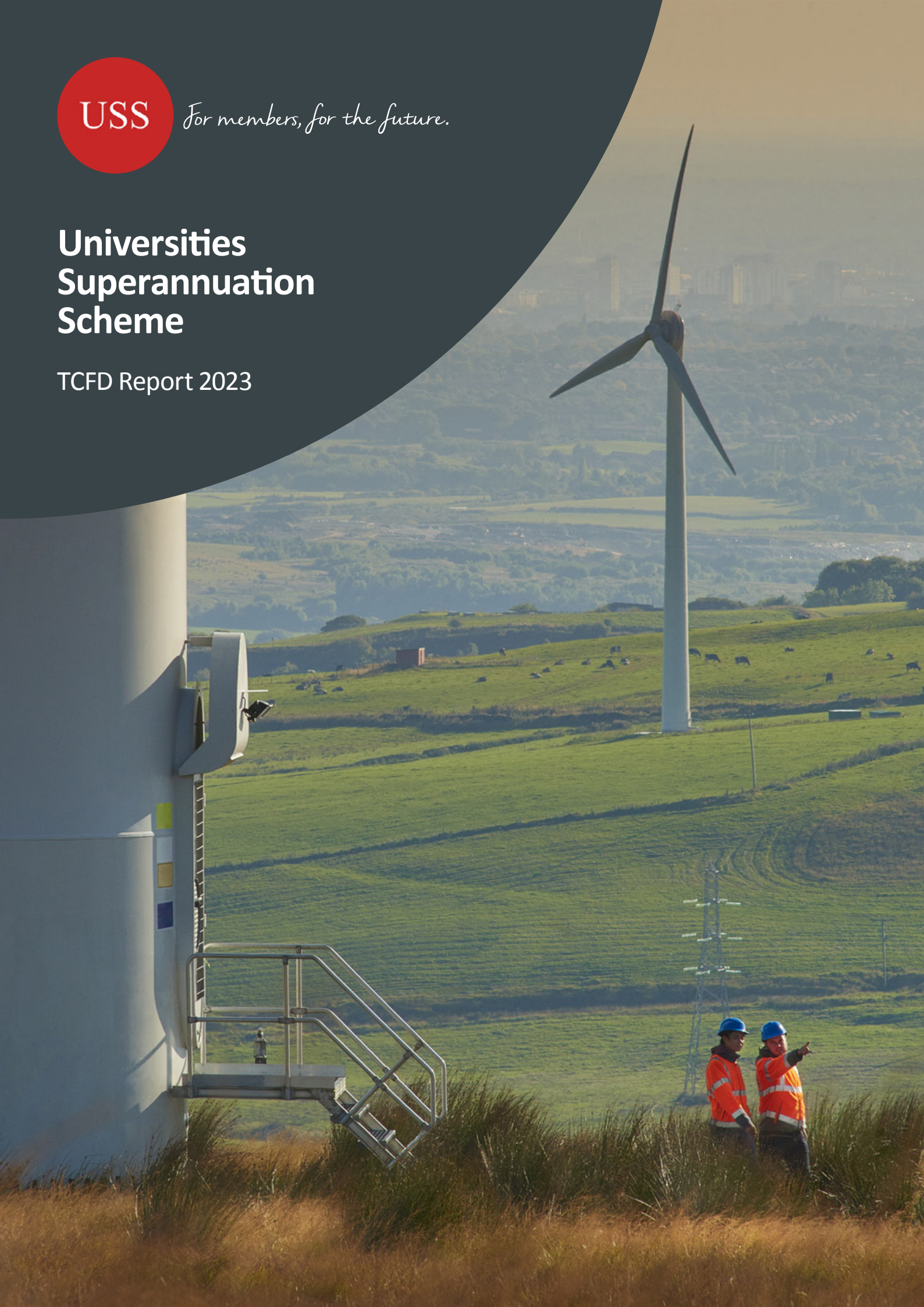


USS

For members, for the future.

Universities Superannuation Scheme

TCFD Report 2023



We are the **principal pension scheme** for universities and other higher education institutions in the UK.

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1 Foreword

Welcome to the 2023 TCFD (Task Force on Climate-related Financial Disclosures) Report from the Universities Superannuation Scheme Limited.



Bill Galvin
Group Chief
Executive Officer



Dame Kate Barker
Chair of the
Trustee Board

This is our second mandatory TCFD Report, although we have been reporting against the TCFD framework voluntarily since 2018.

Managing climate change risks and opportunities continues to be central to our investment strategy, and we continue to embed our Net Zero ambition into our culture and ways of working. Since announcing our ambition for our investments to become Net Zero by 2050 if not before and setting interim targets, we have established a Net Zero Steering Committee (NZSC) and supporting asset class Net Zero Working Groups (NZWGs) to drive progress. Each Working Group ensures that our in-house investment teams within USS Investment Management Limited (USSIM)¹ have a specific focus on achieving our interim Net Zero targets for our investments. The NZWGs are critical in delivering a Net Zero investment portfolio. As the managers of these assets, they are best placed to assess where reductions in carbon exposures can be made whilst achieving financial returns.

We recognise that the transition to a low-carbon future will not be easy: it requires nothing less than the decarbonisation of the global economy.

We continue to influence the businesses in which we invest and encourage governments and regulators around the world to drive this transition. It will require continued focus by USSIM's in-house investment teams in terms of where and how we invest. We will also need to work with peer funds, our external asset managers and others in the investment value chain in order to deliver against our ambition. This global change is needed if the world is not only to generate the required financial returns for pension funds like USS, but also for it to be a better place in which to live. This is only likely to happen if we work in tandem with other like-minded long-term universal owners² and is more important than divestment which is unlikely to bring about the systemic change that is needed. This will complement the scheme's existing approach to investing in renewable energy and clean technologies. We will continue to develop and invest in wind and solar generation capacity where opportunities arise. As at 31 March 2023, USS had approximately £2bn invested in renewable energy and green technologies.

Climate risk is also of continued interest to our members and other stakeholders.

We hosted a [webinar](#) designed to engage members with our journey to Net Zero, giving them an opportunity to ask our investment specialists some questions. We presented a Net Zero update to the USS Employer Investment Discussion Forum. We also held panel discussions focused on environmental, social and governance (ESG) issues at our 2022 Institutions Meeting and a member day at Durham University.

We continue to capture significant amounts of carbon data, and other climate data associated with our investments to enable us to measure and manage our carbon and transition exposure. The data continue to be problematic, and it is vital to reiterate that some of the numbers in this Report, particularly carbon footprint data, are estimations. Notwithstanding, you can read about our latest carbon emissions data in the Metrics and Targets section.

As we reviewed our climate data during 2022, we realised that there were areas in which we could improve the quality of what we were collecting and reporting, as well as improve the processes we use to collect the data. This has led to us restating both our 2019 baseline year data and the

Note

- 1 Universities Superannuation Scheme (USS) is the pension scheme itself. It is set up under a trust and governed by a trust deed and rules. Universities Superannuation Scheme Limited is the trustee that runs and manages USS in line with the trust deed and rules and legal duties. USS Investment Management Limited (USSIM) is a subsidiary of Universities Superannuation Scheme Limited. It is the principal investment manager and adviser to the scheme, looking after the investment and management of the scheme's assets.
- 2 Universal owners: institutional investors that are so large and invest in so many securities and assets that they are a representative component of financial markets.

Foreword Continued

carbon footprint data reported in our 2022 TCFD Report. The emissions intensity of the scheme in 2019 reduced from 93 tCO₂e per £m invested to 90 tCO₂e per £m, and our 2021 carbon footprint reduced from an estimated 90 tCO₂e per £m invested to an estimated 78 tCO₂e per £m. Because we have re-estimated the start point, we have also amended the targets for 2025 and 2030.

Our 2022 carbon footprint seems to therefore indicate that we are ahead of the trajectory required to achieve our interim targets (to cut the emissions intensity of the companies in our portfolio by 25% by 2025 and by 50% by 2030 relative to the 2019 baseline). However, our 2025 target is just a milestone on the path to deliver Net Zero, and arguably it will become more difficult to deliver carbon reductions over time. As such, we recognise that we will need to do more to ensure that the reductions we deliver are sustainable and that we establish the processes to deliver our ambition in the future.

We are therefore putting considerable effort into improving our processes for integrating climate change, and for that matter other ESG factors, into our investment decision-making processes. While this is easier in some asset classes than others, we recognise that we are exposed to climate change wherever we invest. We will therefore continue to work with our investment managers, both internal and external, to develop our approaches to taking carbon and climate change into account in our investments.

Our efforts also include our approach to stewardship and voting. We assess how companies manage ESG factors before we invest in them and, once we have invested, we engage with companies as a steward to ensure they are managing ESG issues appropriately. This year, we have implemented a new [Stewardship and Voting Policy](#), which may see us vote against the reappointment of relevant directors if we believe the company is failing to appropriately manage or address an issue. We would expect to do this where, among other things, a company has not disclosed its climate transition plan or when a company is backtracking on previous climate commitments.

We believe in being active stewards of the companies we invest in, encouraging companies to address material environmental and social issues to create positive change and long-term financial value for our members.

Finally, we were delighted to have received positive feedback on our 2022 reporting. The Pensions Regulator praised the clarity of the 2022 TCFD Report, the effective use of case studies and the standalone summary document. In addition, we received the ICGN's [Global Stewardship Disclosure Award 2022](#) (for asset owners with more than £60bn of assets) for our full range of disclosures, particularly our Stewardship Code Report, full and summary TCFD Reports and our web content. This demonstrates our commitment to Responsible Investment and our approach to transparency.

As we move into the third year of our Net Zero ambition, our investment teams will continue to work on integrating climate into their investment decision making and stewardship activities. Encouraging the assets which we both lend to and invest in to transition carbon out of their operations is a core focus for all our investment teams. We believe that such transition is essential for both the financial returns we require and, more importantly, ensuring a world worth retiring into. We are also collaborating with Exeter University on scenario analysis and working to improve our data collection and management. You can read more about our future plans in section 8.

In addition to this TCFD Report, which details how we are addressing climate issues, you can find a summary that highlights the key points on our [website](#).

Bill Galvin and Kate Barker



2 Introduction

TCFD (Task Force on Climate-related Financial Disclosures)³ reporting has been a statutory requirement since the UK's Department of Work and Pensions (DWP) Occupational Pension Schemes (Climate Change Governance and Reporting) Regulations 2021 (DWP TCFD Regulations) were introduced.

These regulations require large pension funds like USS (and smaller funds in the coming years) to follow the TCFD structure to report how they are managing climate change risks.

The UK regulations follow the TCFD's structure around four sections:

Governance

How the organisation's board, committees and senior management are assessing, managing and monitoring climate-related risks and opportunities.

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.

Risk management

The processes for identifying, assessing and managing climate-related risks, and how these are integrated into the organisation's overall risk management.

Metrics and targets

The metrics and targets the organisation uses to assess and manage relevant climate-related risks and opportunities.

Note

³ 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 manner.

While we have voluntarily reported in line with the TCFD recommendations since 2018, this is our second mandatory Report. The TCFD Regulations specify that we must conduct scenario analysis at least every three years unless there are significant changes in either the scheme or the climate. Having undertaken scenario analysis for last year's 2022 TCFD Report, and as there had been no material changes either within the fund or with our climate scenarios, the Trustee Board decided not to update the climate scenario analysis for the 2023 TCFD reporting cycle. This gives the trustee the opportunity to review the approach we are taking to this analysis. In the Strategy section, we recap some of the details of the climate scenario analysis we undertook for our 2022 Report and provide a summary of our climate change-related scenario analysis, including an explanation of timeframes, potential impacts on our assets and liabilities, the resilience of our investment and funding strategies and key assumptions and limitations.

This Report also contains details of our most recent carbon footprinting exercise, which provides an estimation of the scheme's investment footprint at

31 December 2022. As was the case in our 2022 Report, our carbon footprint involves considerable estimations, and is subject to change as further climate data becomes available.

As part of our data collection exercises in 2022, we have also improved the sourcing and processes we used for these data. As a result, we have restated the footprint for last year, and for our 2019 baseline year. Details of these changes, and the up-to-date carbon footprint for the scheme's assets, are provided in the Metrics and targets section. This section also provides an indication of our position with respect to our interim 2025 target.

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While we have voluntarily reported in line with the TCFD recommendations since 2018, this is our second mandatory Report.



Introduction
Continued

About USS

The Universities Superannuation Scheme (USS) was established in 1974 as the principal pension scheme for universities and higher education institutions in the UK. We work with around 330 employers to help build a secure financial future for more than 520,000 members and their families. We are one of the largest pension schemes in the UK, with total assets of around £75.5bn (as at 31 March 2023).

The trustee of USS is Universities Superannuation Scheme Limited. It has overall responsibility for scheme

management and administration, led by a non-executive board of directors and employs a team of pension professionals in Liverpool and London. The trustee is regulated by The Pensions Regulator and has a primary responsibility to ensure that benefits promised to members are paid in full on a timely basis.

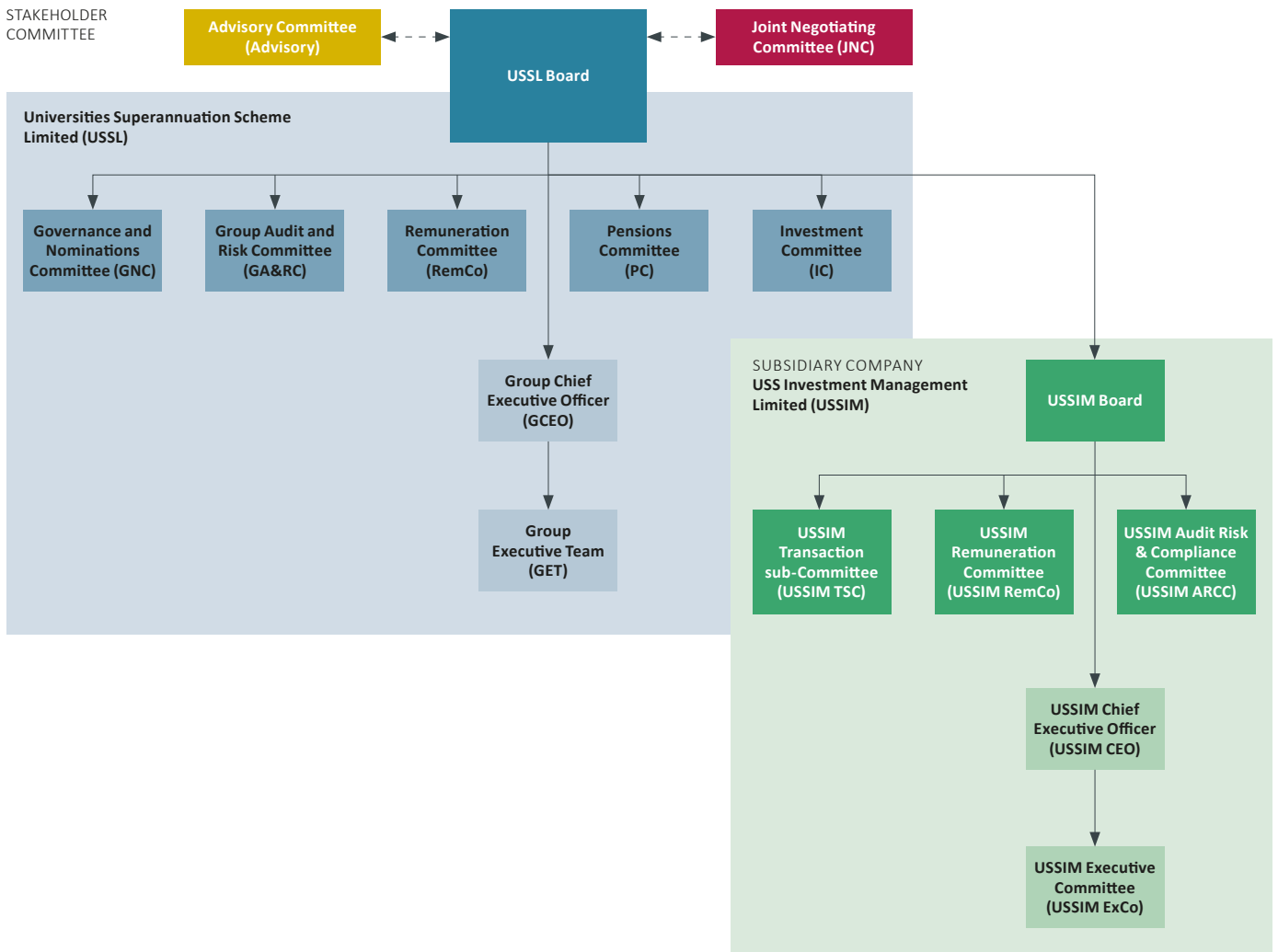
The trustee delegates implementation of its investment strategy to a wholly-owned subsidiary – USS Investment Management Limited (USSIM) – which provides in-house investment management and advisory services to the trustee.

USSIM manages between 60% and 70% of the investments in-house and appoints and oversees external investment managers to manage the rest. USSIM is authorised and regulated by the Financial Conduct Authority.

USS is a hybrid pension scheme, which means we have both a defined benefit (DB) part – the Retirement Income Builder – and a defined contribution (DC) part – the Investment Builder.

> For more information please [visit our website](#).

Figure 1: USS Group Corporate Governance structure – main boards and committees



3 Summary of key points

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

Governance

We 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. USSIM have incorporated additional climate change-related reporting into new or existing reporting and updated the board's and Investment Committee's annual agenda planners accordingly.
- The Investment Committee (IC) must review the most recent scenario analysis in each scheme year and recommend to the Trustee Board whether it is appropriate to undertake new analysis. It was decided that for the 2022/23 TCFD reporting cycle updated scenario analysis was not required.
- The IC also oversees the scheme's metrics and targets, and the relevant time horizons.
- The Net Zero Steering Committee (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. Asset class Working Groups are accountable to the NZSC to ensure we are on track to deliver our Net Zero ambition.

Strategy

Having undertaken scenario analysis in 2022, and with no material changes within the fund or with climate scenarios, we will review our approach to climate scenario analysis ready for future reporting

- In this year's Report, we provide a summary of our climate scenario analysis, and an explanation of timeframes, potential impacts on our assets and liabilities, and the resilience of our investment and funding strategies. As noted above, we did not undertake new climate scenario analysis for the 2022/2023 TCFD reporting cycle.
- Last year's scenario analysis raised important questions about our portfolio exposures which need to be addressed as we fully integrate climate factors into our investment process.
- We identified significant limitations with approaches to climate scenario analysis, including excessive focus on precise measurement, its limited use as an allocation input and inadequate modelling of physical risks.
- We are therefore working with the University of Exeter to develop a more useful approach for investors which builds in climate tipping points and better integrates climate factors with other macro drivers.

Risk management

We have taken further steps to integrate ESG risks, and specifically climate risks, into USS's wider risk governance, monitoring and management processes

- We introduced a new Investment Framework in 2022 which makes clear the risk appetite of the trustee and sets out the parameters within which USSIM is to manage the scheme's investments. It includes Key Risk Indicators and balanced scorecards (one for each of DB and DC), which are now used by the IC to assess USSIM's performance. One of the areas explicitly set out within the investment balanced scorecards is the integration of ESG factors in the management of all investments, and the progress towards our ambition in relation to Net Zero.
- The delivery of Net Zero and other ESG activities form part of the balanced scorecard assessments and therefore could impact the remuneration of USSIM staff.
- We have added climate risk to our risk inventories and classification structures. This allows Risk Appetite Statements to be set and monitored, and gives visibility of reporting to the scheme's governing bodies.
- Consideration of climate risk is embedded into our monitoring and assessment of the employers' overall covenant. We 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 employer covenant monitoring activity.

Summary of key points

Continued

Metrics and targets

The metrics and targets we use are aligned with peer funds and reflect good practice, although the availability and quality of data vary across, and even within, asset classes

- We have made some improvements to our measurement methodology which has enabled us to obtain better estimates of the associated financed emissions. These improvements mean that we are restating the carbon intensity number for both our 2019 baseline year and our 2021 carbon footprint.
- The impact of these adjustments to our 2019 baseline year (and therefore our decarbonisation trajectory) is marginal. The carbon intensity of the scheme in 2019 reduced from 93 tCO₂e per £m invested to 90 tCO₂e per £m. However, the impact to our 2021 intensity was more pronounced: our carbon footprint reduced from an estimated 90 tCO₂e per £m invested to an estimated 78 tCO₂e per £m.
- Given the methodological updates and the restatement of emissions intensities, we have recalibrated our interim targets to align with our new estimate of our 2019 emissions intensity.
- Last year, we reported Scope 1 and 2 emissions data. This year, we have also included an estimate of our Scope 3 emissions. While we have been able to obtain estimates for a large proportion of our universe, the availability and reliability of Scope 3 data remains poor. We were only able to obtain Scope 3 data for approximately £23bn of our £46.4bn of non-sovereign assets.
- In last year's 2022 Report, we voluntarily reported on 'data quality'. We are reporting this as our fourth, mandatory metric this year. This tracks how well the companies we invest in are disclosing their carbon exposure and climate plans, giving us more confidence to be able to use this in our investment decision making.
- Given the data concerns we have with sovereign debt, we continue to report our corporate and property carbon footprints separately from our investments in government bonds.
- Between 2019 and 2022, based on the latest available restated data, for our non-sovereign debt assets we have achieved a total reduction in carbon intensity of 21% over three years (or 7.6% annualised). See Table 7 on page 49.
- At the end of 2022, our analysis indicated that the financed emissions for the £46.4bn of non-sovereign assets within the Retirement Income Builder (the DB part of the scheme) were c.3.3m tCO₂e, giving an intensity of 70.7 tCO₂e per £m invested.

3.1 Next steps

Although we are making progress, we are still 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 wider groups (including policymakers, peer funds, regulators and others). Our future plans are in section 8 of this Report include the following:

1. Improved integration

2. Stewardship of our assets

3. Improved scenario analysis

4. Improved data collection and management

5. Allocating assets to lower carbon mandates

▶ You can find more information about how we invest [on our website](#).

4 Governance

In this section, we describe how our Trustee Board, committees, principal investment manager (USSIM) and senior management assess, manage and monitor climate-related risks and opportunities.

“

To ensure that we manage the delivery of the scheme's Net Zero targets, USSIM has established a Net Zero Steering Committee and Net Zero Working Groups (NZWGs) for each asset class, as well as for specific support functions.

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:

Universities Superannuation Scheme Limited

• The **USS Trustee Board**⁴ 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 the scheme's 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, it has incorporated additional climate change related reporting from USSIM into new or existing reporting and updated the board's and its Investment Committee's (IC) 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. This included approving USSIM's 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:

- 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 scheme's external advisers' responsibilities to include climate change in advice they provide are included in any agreements, such as investment consultants' strategic objectives and service agreements
- Making sure our directors have sufficient knowledge and understanding of climate change to fulfil their statutory and fiduciary obligations (see box on page 12 on [Information provided to the board](#))

- **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 climate metrics and targets, and the relevant time horizons.

USS Investment Management Limited

- **USS Investment Management Limited (USSIM):** The trustee delegates implementation of its investment strategy to a wholly-owned subsidiary – USS Investment Management Limited (USSIM). USSIM provides in-house investment management and advisory services to the trustee. USSIM is authorised and regulated by the Financial Conduct Authority. Overseen by its own board of directors, USSIM is focused on delivering the investment requirements set by the trustee and

Note

⁴ To make this document easier to read, we have used the terms 'USS', 'we', and 'our' as catch-all references to different elements of the USS Group. So, depending on where it appears in the text, 'USS', 'we' or 'our' means either (i) the scheme (Universities Superannuation Scheme), (ii) the trustee (Universities Superannuation Scheme Limited acting as trustee) or (iii) the trustee's wholly-owned investment management company (USS Investment Management Limited/USSIM). On a few occasions we do refer specifically to one of these three elements, where it seems helpful to do so.

Governance Continued

4.1 Roles and responsibilities Continued

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.
- Group Chief Risk Officer:** The USS Chief Risk Officer (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 in integrating climate risk into the Risk Management Framework. The CRO also provides input to the IC's assessment of USSIM's performance in managing climate risk. See the Risk Management section for further details.
- USSIM Net Zero Steering Committee (NZSC):** The NZSC oversees and manages our efforts to address climate change. It provides 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, who is 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 ensures 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, the trustee agreed with

key external advisers (for example, our actuary and covenant advisers) that they would include climate analysis in their advice to the scheme.

The Trustee Board and its Investment Committee (IC) regularly discuss climate-related issues and have done so for many years. Following the TCFD Regulations, USSIM and the RI team 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. Having undertaken detailed scenario analysis in the scheme year 2021/22 the trustee and its IC approved that USSIM would not undertake new climate scenario analysis for this year's TCFD reporting cycle. It was agreed, however, that we would adopt 'data quality' as a fourth TCFD metric. Please see the box on page 12 along with the Strategy and Metrics and targets sections for further details.

The Trustee Board and its IC also challenge the USSIM executive on how it manages climate-related risks and opportunities and any recommendations it makes about this.

Governance
Continued

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’s investments face.

We have integrated ESG risks, and specifically climate risks, into the wider risk governance, monitoring and management processes for our investments. 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 continues to have greater focus as we seek to develop our physical risk management processes.

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.

➤ [Read more in the Risk Management section.](#)

Assessing performance

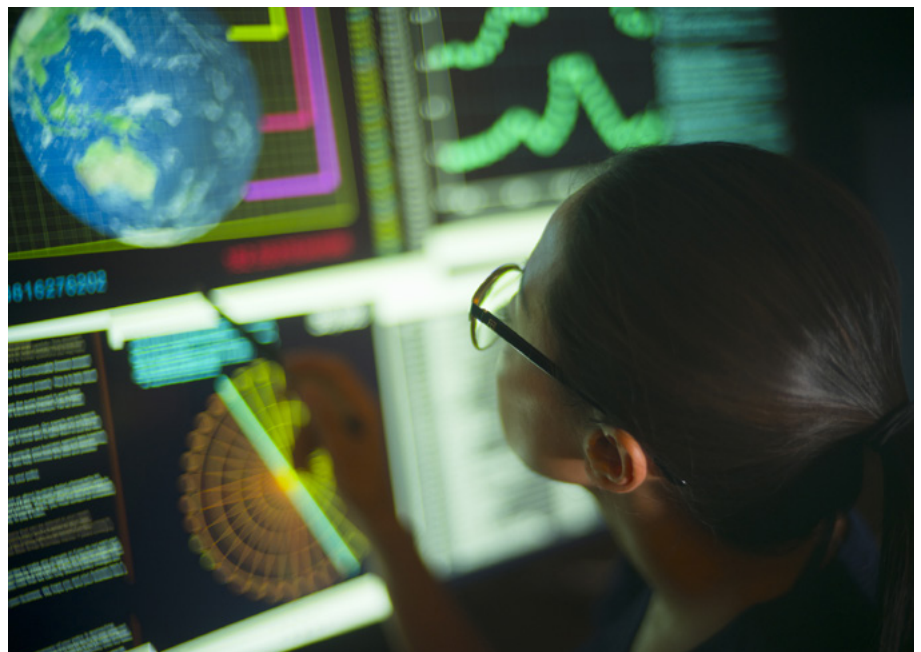
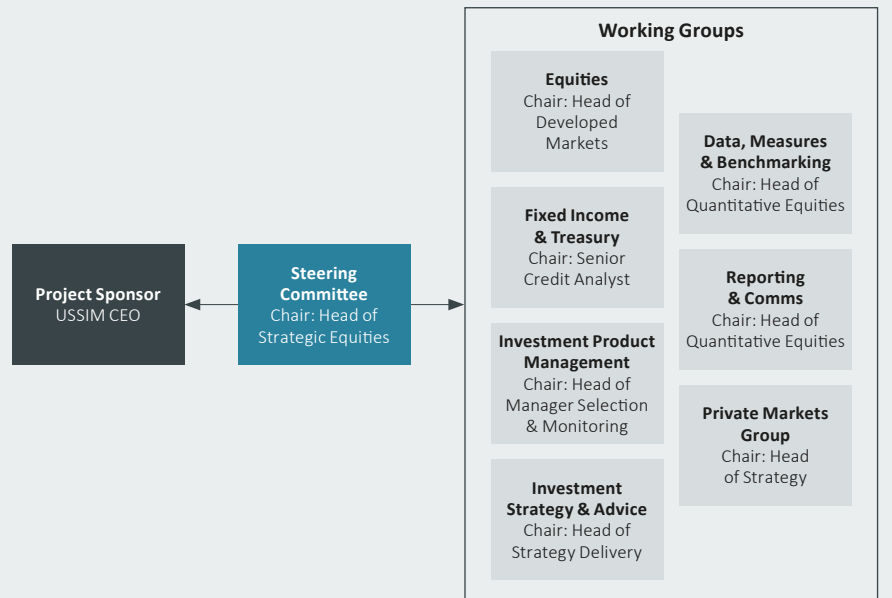
In 2022, the trustee introduced investment balanced scorecards for both the Retirement Income Builder (the DB part) and the Investment Builder (the DC part) as a holistic way of assessing USSIM’s investment and advisory performance. These scorecards include analysis and an assessment of USSIM’s performance in integrating ESG factors in the management of all investments.

Further details about the scorecards and the Investment Committee’s assessment of performance can be found in the scheme’s Report and Accounts and the Risk Management section of this Report.

Net Zero Steering Committee (NZSC)

In May 2021, we announced our ambition for our investments to be Net Zero by 2050, if not before. To ensure that we manage the delivery of this, USSIM has established a Net Zero Steering Committee and Net Zero Working Groups (NZWGs) for each asset class, as well as for specific support functions. Each Working Group makes sure that USSIM investment teams across asset classes have a specific focus on the steps they will take to achieve this ambition, and that support functions also play their role. The NZWGs are accountable to the Net Zero Steering Committee, consisting of senior investment executives. See Figure 2 below.

Figure 2: Net Zero governance structure



Governance Continued

4.3 Climate change-related training

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

- **Specialist training:** We have delivered specialist training to specific investment teams. For example, our RI team 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. There has been internal climate-related training as follows:
 - Incorporating carbon costs into valuation models for various teams
 - Physical risk tools for our private markets team
 - Assessing corporate emissions and how different emissions levels can correspond to different alignment pathways for our Fixed Income team
 - Key carbon and climate-related issues training for the corporate communications team
 - Guidance on how derivatives should be treated when calculating carbon emissions for our strategy team
 - Different carbon regulation schemes globally and an examination of Scope 3 emissions for our Equities team
- **Climate-specific Trustee Board training:** We ran climate change-specific training for Trustee Board members in September 2022. This covered universal ownership and systemic risks (what are they and how should the scheme address them), and climate change integration. It included presentations from our key asset classes (Equities, Fixed Income and Private Markets) on the approaches they were taking to incorporate ESG factors, including climate change, into their investment processes.
- **Induction sessions:** We deliver quarterly induction sessions for all new staff and individual induction training for all new USSL and USSIM directors. 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, the Institutional Investors Group on Climate Change (IIGCC) and the Transition Pathway Initiative, and how we engage with companies to encourage them to address climate change risk.

- **Our employer institutions/members:** We have produced a Responsible Investment online module, available to all participating employers, for everyone from pensions managers to frontline staff. This training covers climate change. We also provided an online webinar for USS members on how USS is approaching its Net Zero activities, details of which are available [online](#). Finally, USS is beginning to roll out face to face events at universities, providing updates for members on topical issues for the scheme including our approach to Net Zero and Responsible Investment.
- **Open House events:** Each year, we invite our directors to attend events in our Liverpool and London offices, showcasing activities and highlights from the year. In March, the event included an update on our approach to Net Zero, and the steps we are taking to achieve it.
- **Town Halls:** These monthly leadership events, hosted by senior management on a rotating basis, 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.
- **Intranet:** We also share key news items with employees on our intranet and via email, in relation to our climate change work.
- **Lunch and Learns:** These are informal training sessions run by leaders from across the business. Sessions have covered our Net 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.

Information provided to the board

Given the significance of climate change and our Net Zero ambition, the Trustee Board and its Investment Committee (IC) receive regular updates on this issue. This includes:

1. Annual board training, which included a Net Zero update and details of asset class climate change and carbon integration processes.
2. Regular updates from the Responsible Investment (RI) team, including progress on Net Zero, ESG integration and changes to the Voting Policy (which included climate change related policies). Read more in the [Stewardship Code Report 2023](#).
3. Sessions at the IC's Away Day, including an update on Net Zero progress, reasons for restating our climate data (see the Metrics and targets section) and a guest academic speaker on climate change modelling. The IC was provided with details of how USSIM approach voting of climate-related resolutions at company meetings.
4. Information on USSIM's RI and Net Zero activities during the year for the annual investment balanced scorecard scoring process (as noted in 4.2 of this Report).

Trustee Board decides fourth mandatory metric

Under a 2022 update to the DWP TCFD Regulations, UK pension funds must now publish a fourth climate metric that in some way measures alignment with the Paris Agreement/ Net Zero.

Although we already publish an alignment metric (% of portfolio emissions attributable to assets aligned with a well below 2°C pathway) we are still required to publish an additional metric. While the DWP proposed a

number of options, **we are choosing to include a measure of the quality of climate/carbon data as an official metric.**

Having already reported figures on data quality in our 2022 TCFD Report, it seems prudent to continue disclosing this information. Data quality is the least subjective indicator and, over time, should demonstrate the improvement in the reliability of the other metrics we are already reporting.

5 Strategy

In this section, we recap the climate change-related scenario analysis we undertook for our 2022 TCFD Report. We also provide details of our work to improve our scenario analysis and make it more useful for the scheme.

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.⁵

We give an overview of the potential impact of climate change on the scheme's assets and liabilities, and the resilience of our investment and funding strategies for both the Retirement Income Builder (the DB part) and the Investment Builder (the DC part).

“

While climate scenario analysis can provide useful insights as to how different assets are exposed to alternative assumptions on climate pathways, there are limitations that must be considered when interpreting the results.

Under the TCFD Regulations, we are only required to undertake climate scenario analysis every three years.

Since our scenario analysis for the 2022 TCFD Report, there have been no material changes either within the fund or with climate scenarios.

Therefore, the Trustee Board decided not to update the climate scenario analysis for the 2023 TCFD reporting cycle. This gives the trustee the opportunity to review the approach we are taking to this analysis.

It will enable us to, for example:

1. Consider more plausible climate scenarios. Our original approach tended to explore more extreme outcomes (at one end 1.5°C, and at the other 4°C). We would like to consider some scenarios that look more likely, including the 'inevitable policy response' (where significant policy changes take effect before 2030) and a scenario based on current policies and objectives.

2. Develop a more detailed model of the climate transition under different scenarios and explore the role of technology alongside regional and sector patterns.

3. Provide improved, holistic modelling of the physical impacts of climate change on the economy, taking into account certain climate tipping points that may be triggered (see box on page 15).

4. Further thinking around how climate change may impact long run levels of interest rates, economic growth, inflation, and asset prices.

➤ More details on some of these points are provided later in this section.



Note

⁵ <https://www.fsb-tcdf.org/recommendations/#scenario-analysis>

Strategy Continued

5.1 Our climate scenario analysis

On the following pages, we recap some of the details of the climate scenario analysis we undertook for our 2022 TCFD Report which was undertaken by USSIM for the trustee. We provide a summary of our climate change-related scenario analysis, including an explanation of timeframes, potential impacts on our assets and liabilities, the resilience of our investment and funding strategies and key assumptions and limitations.

More details on these aspects of scenarios analysis are provided in our [2022 TCFD Report](#).

As mentioned previously, climate change poses physical, transitional and reputational risks for the scheme and its assets. As the Risk management section notes, we have various processes in place at an asset class level for identifying and managing such risks. 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.

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

For our 2022 TCFD Report we used [Ortec Finance](#), a well-known provider of climate-related portfolio analysis, to undertake the modelling based on fund data from October 2021. 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. The purpose of scenario analysis is to test our assets and liabilities, illustrating plausible future paths, accompanied by narratives to help us interpret them.

Climate change can affect our investments in two ways:

- **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.

5.1.1 The rationale for our approach

We based our approach on some key principles:

- We modelled a plausible scenario set that spans a *fast transition to a lower carbon economy*, to a *'business-as-usual' failure to transition to a lower carbon economy*
- Ortec advised that modelling a steep transition pathway and a higher warming pathway gives enough insight into both investment opportunities and downside risk
- We used an integrated modelling framework, which designs scenarios that consider climate outcomes, policy response, macroeconomic and financial markets implications

5.1.2 Three transition pathways

Pathway	Description	Average temperature increase
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 result is a global average temperature increase by 2100 of 1.6°C above pre-industrial levels.	+1.6°C
The Disorderly Transition pathway	The Disorderly Transition pathway is characterised by similar climate policies and actions to the Orderly Transition pathway. Its effect on the global climate is identical, 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, assumed to be 2025. This causes financial markets to react dramatically, comparable to the response to the 2008 financial crisis.	+1.6°C
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. There is no impetus for policymakers to implement additional policies over and above what is already in place, and so the Paris Agreement goals are not achieved. 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, reflecting a possible reaction of the markets to a dawning realisation of the unavoidable temperature rises and economic impact.	+4°C

Strategy Continued

5.1 Our climate scenario analysis Continued

🔗 The time horizons in our scenario analysis

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

- Short term: 5-10 years
- Medium term: 15 years
- Long term: 30 years

It is not possible to be precise on the timeframe over which risks could emerge. This is because of the uncertainty over climate policy risk, for example, when and how policy may be enacted, and particularly when markets may price-in future climate impacts. Tipping points may also trigger abrupt changes in the climate.

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

In the **short term** (5-10 years): Our assets are vulnerable to transition risks in the Orderly Transition pathway. They are also vulnerable to market risk in a Disorderly Transition pathway, because under this scenario Ortec assume the transition is priced into markets 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, Ortec assume an uneven pricing-in of physical risks. For 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 of carbon emissions for the global economy 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 timeframe and associated pathway projections cover a long enough history/timeframe to reflect the effects of key risks to assets and liabilities.



Defining the terms: Transition risk, physical risk, and tipping points

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 (carbon) 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.

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.

Strategy
Continued

5.2 Potential impact on scheme assets and liabilities

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 Provisions⁶. 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 target in respect of current liabilities
- The balance between contributions and the investment returns on assets that fund those liabilities
- The cost of future service benefits being built up within the scheme.

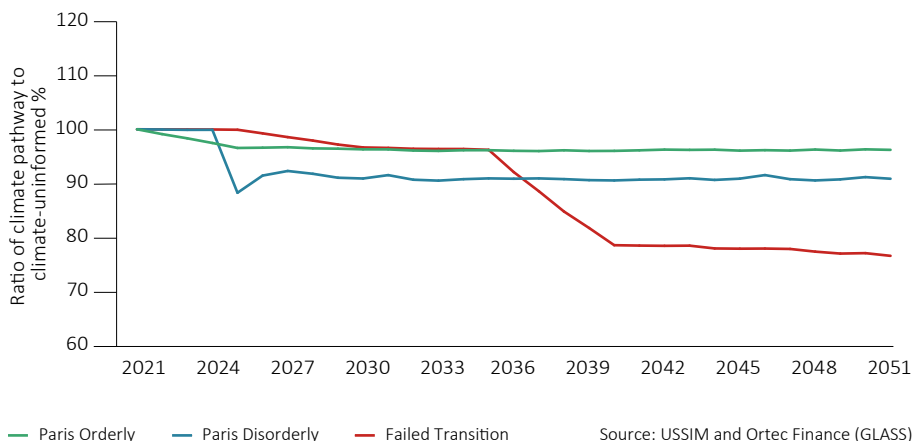
5.3 The resilience of our investments and funding strategies

In addition to a focus on our investment strategy 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, which was undertaken in autumn 2021, show that risk-adjusted returns vary across assets, pathways, and time horizons:

- **The analysis found long-term downside risk** to DB investment returns in less optimistic climate scenarios. This risk 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 associated with increasing average global temperatures
- **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 economic disruption caused by transition and physical risks.

Figure 3: Cumulative median real returns



5.3.1 Retirement Income Builder (DB) cumulative performance and funding position

In Figure 3 above, the Paris Orderly Transition and Failed Transition pathways represent plausible ‘best’ and ‘worst’ climate outcomes respectively. The difference in long-term returns gives us an indication of the scale of the potential impact of climate on the Retirement Income Builder (DB) fund performance.

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 damage to returns. In the longer term, physical risks are the main contributor of climate-related risk. The Failed Transition pathway delivers the largest impact on the fund.

Note
⁶ Technical Provisions (TP): An estimate of the scheme’s liabilities – i.e., the benefits promised up to the valuation date. The liabilities are calculated on a prudent basis, as is required by law. They are driven by the benefits members have already earned and the actuarial assumptions we make about what will happen in the future.

Strategy
Continued

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 worsening funding position 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 4, returns under all scenarios are lower than the climate-uninformed baseline.

Figure 4: Differential between annualised expected returns under different climate scenarios vs. climate uninformed baseline

Climate scenario	30-year annualised expected returns for DB fund
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 affect both the direct and indirect drivers of mortality rates experienced by our members. These are highlighted in Figure 5 below, provided by the scheme’s actuarial adviser, LCP.

Figure 5: Direct and indirect drivers of mortality rates

Direct drivers	Indirect drivers
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 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 full valuation of the DB part of the scheme – the Retirement Income Builder – and will make allowance for such changes as they emerge.

Strategy
Continued

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

Here, we aim to show how climate change and the transition might affect the value of Investment Builder (DC) pots for different DC members. This is based on investments held as of September 2021, the date of the scenario analysis. This analysis differs from the previous section on the Retirement Income Builder (the DB part), as DC members' savings follow an assumed glidepath in the Default Lifestyle Option, where most DC members are invested.

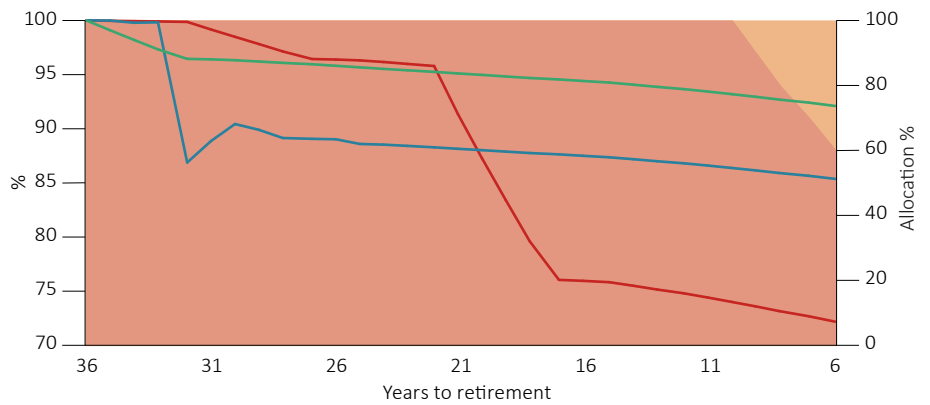
In the Default Lifestyle Option, a younger member will be invested in a 'Growth' portfolio mainly composed of risky assets, such as equity and property. As the member ages, their portfolio will de-risk to an asset allocation more suitable for someone who is about to access their retirement benefits. 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 member's DC pot is affected by climate change is a function of their allocation to equity-like, property and infrastructure assets.

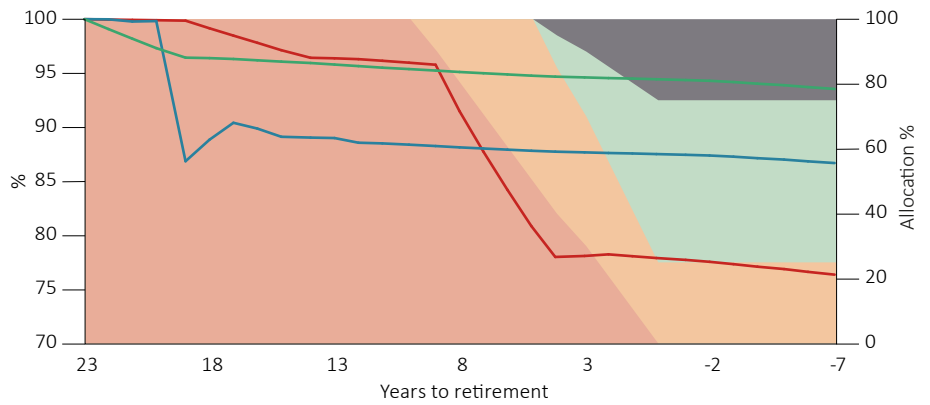
In the short term, the example members (see Figure 6 opposite) experience comparable climate impacts as they share similar allocations until year seven. It is in the long term where the climate impacts are more visible. The younger the member, the longer they will be invested in the Growth portfolio 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 6: DC example member experience: cumulative median nominal returns

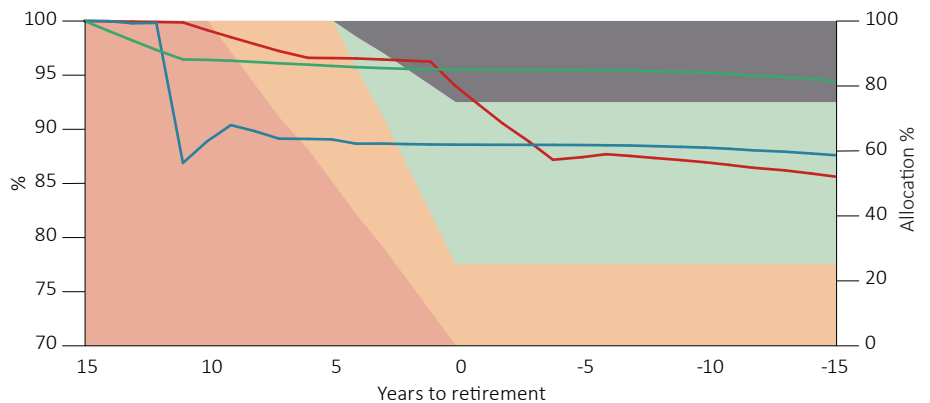
Aria – Age 30, USS member for 3 years



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)

Strategy Continued

5.5 Limitations of our scenario analysis

In our 2022 TCFD Report we highlighted that, while climate scenario analysis can provide useful insights as to how different assets are exposed to alternative assumptions on climate pathways, there are limitations that must be considered when interpreting the results. Climate scenario modelling is particularly challenging due to:

- The inherent uncertainty in the climate modelling
- The complexity of integrated 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 top-down approach to identifying climate-related risks to financial markets, which means the analysis does not capture the specifics of individual companies or securities

Other limitations include:

- Physical risk impacts could be underestimated as the various possible climate tipping points are not well captured. 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, or political and social instability

- Climate adaptation is not considered sufficiently. With the right measures, the economy could become more resilient to climate change
- 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

5.6 Reflections on 2022 climate scenario analysis

At its 2022 Away Day, the Investment Committee (IC) held a discussion on climate scenarios, which identified some significant limitations with approaches to the climate scenario analysis currently used by USS and the investment sector more broadly. More specifically, the discussion identified the following aspects from our 2022 approach that warranted further development:

- **Limited assistance in setting our central financial assumptions** for investment returns and other variables, consistent with a reasonable central case for the climate transition and physical risk impacts on the economy and financial markets, given the use of a climate-uninformed baseline and choice of scenarios well away from current policies. While it is almost impossible to gauge accurately the extent to which climate impacts are already priced into financial markets, a climate-uninformed scenario is likely inconsistent with current market pricing and so provides a poor starting point for analysis.
- **Excessive focus on precise measurement** of the impact of climate risks over very long horizons and **not enough on narratives** of how complex interactions between both climate transition and the physical risks associated with a changing climate and the macroeconomic and financial variables under different real-world assumptions.
- **Limited use as an asset allocation input** due to a lack of focus on shorter term dynamics (5-10 years) and the interaction of climate transition and/or physical risk with other drivers of financial risks (for example, geopolitical or demographic factors). This makes it difficult to fully explore critical issues such as the relationship between climate transition policies and inflation.
- **Generally unsuitable for applying to bottom-up investment decisions** given the top-down nature of the scenarios specified, and the reliance on economic output as a summary metric for impact of climate change. This also makes it hard to assess the extent to which ‘climate-tilted’ equity or bond portfolios might offer protection against climate risks.
- **Inadequate modelling of physical risks** relying on estimated relationships between economic growth and temperature levels without accounting for potential tipping points. Our approach did 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 – or the possibility of greater adaptation to mitigate the impact.

Notwithstanding these challenges, we recognise that scenario analysis has the potential to become one of the key inputs to the asset allocation process. It could provide guidance not only to help us navigate an uncertain world, but also to understand structural changes arising from climate transition or other factors that may fundamentally alter the macro and investment environment relative to what we have experienced in recent history.

In an attempt to overcome the challenges outlined above, USS’s Investment Strategy and Advice (ISA) team developed an approach that largely focused on narratives and high-level implications over 5-10 year horizons of broad macro scenarios integrating climate with other factors. While this analysis has gone in the right direction, to explore the interactions between climate and other macro drivers more fully, we believe USS would benefit from a more detailed exploration of the consequences and ramifications of each climate scenario, as well as greater expertise on climate modelling. As a result, to date this analysis has played a limited role as an input to the scheme’s strategic asset allocation.

Strategy Continued

5.7 Our proposed solution: collaboration on climate



We are working with the University of Exeter on a collaborative project to develop 'Decision Useful Climate Scenarios' to support our efforts to incorporate climate and transition considerations in the investment strategy and risk management processes.

We believe that climate scenario analysis has the potential to become an important input to the asset allocation process. It could provide guidance to help us navigate an uncertain world. It could also help us understand structural changes arising from climate transition or other factors that may fundamentally alter the macroeconomic and investment environment relative to what we have experienced in recent history.

However, institutional investors like USS face a challenge of evolving their investment process to capture additional uncertainties from the changing climate, in which long-established views of correlation and diversification may no longer hold. In such a world, the analysis of plausible scenarios becomes a powerful tool.

We believe that through collaboration we can develop an approach to climate scenario analysis that integrates a deep understanding of climate science with its interaction with macroeconomic and financial markets outcomes over different time horizons. This is particularly important because the climate challenge and policy response are likely to represent one of the key drivers of the macro and investment environment over the next 20-30 years.

From our perspective the key objective of this collaboration is to develop an approach to scenario analysis that brings together climate and other macro drivers (rather than looking at climate risks in isolation) and developing a framework to integrate scenario analysis into our investment processes. More specifically, we will be looking for:

- Deeper understanding of physical and transition risks and how tipping points may affect these
- A framework to build scenarios across different time horizons integrating climate and other macro drivers such as demographics and geopolitics
- A framework to assess resilience of assets and portfolios to alternative scenarios on climate and other drivers
- Decision-useful inputs to our investment processes

5.8 Next steps

We believe these plans for climate scenario analysis will enable us to address some of the questions we raised about our portfolio exposures in our 2022 TCFD Report. Specifically, we expect to:

- Strengthen our top-down macro analysis by further integrating climate pathways with other macro factors
- Understand the impact our journey towards Net Zero has on sensitivity to different climate scenarios

USSIM has already taken action to mitigate some transition risks by moving away from standard equity benchmarks. For example, the climate tilt applied to a portion of our developed equities portfolio. USSIM has also expanded its investments in private assets (the climate solutions allocation) that will both support and benefit from the transition. We plan to undertake further 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 and making our climate scenario analysis suitable to include in the asset allocation toolkit

- Examining how we set objectives and benchmarks for our investment mandates

We will report on our progress in our 2024 TCFD Report.



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.

“

The way we assess and manage climate risk fully aligns with our existing risk management processes.

In this context, risk is defined as the possibility that the scheme's objectives will not be achieved, including, for example:

- Target funding levels are not met
- Expected investment returns do not materialise
- A changing climate impacts the scheme's investments

These and any other risks need to be managed appropriately and, as such, 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 strategic objectives and risk appetites (see section 6.2.2). 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 appropriate tools and techniques (the 'frameworks') to give the Trustee Board an integrated view of material risks across the whole enterprise.

Rather than having a separate risk management framework for climate risk, the way we assess and manage climate risk fully aligns with our existing risk management frameworks (see section 6.2). In 2022, we introduced a new Investment Framework which includes Risk Appetites and Key Risk Indicators for climate risk.

These indicators also feed into the new investment balanced scorecard alongside other investment risk indicators. They are qualitatively assessed by the risk team, and included with normal risk governance and reporting, as well as reporting to the Investment Committee and to the Trustee Board. We describe these and other processes on the following pages.

“

We are committed to dealing appropriately and effectively with the risks presented by the delivery of our business objectives.



Risk management

Continued

6.1 Risk management governance

Risk management is concerned with:

- Estimating the likelihood of and impact from risks (including climate change risks) materialising, and
- Taking appropriate actions to minimise their likelihood or impact through mitigating, avoiding, transferring or accepting the risks

Risk governance and reporting

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

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

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

1. The first line of defence comprises our various business divisions. They are the owners of the risks they take in 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.**

2. 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.

3. 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.

As part of the Investment Framework (IF) introduced in 2022 (see box opposite and 6.2.2), the Investment Committee now also has a formal role in the governance of climate and Environmental, Social and Governance (ESG) risks. This is achieved through recommending appropriate risk appetites and Key Risk Indicators to the Trustee Board and through the review of the DB and DC investment balanced scorecards. The scorecards include a section on Responsible Investment, comprising qualitatively assessed Key Risk Indicators covering our ambitions in relation to Net Zero, and the integration of broader financially material ESG factors into our investment processes. See section 6.2 for more detail.

Investment Framework

We introduced a new Investment Framework in 2022, which ties to the investment risk appetite of the Trustee Board and sets out the parameters within which USSIM is to manage the scheme’s investments. It includes a set of Key Risk Indicators and an investment balanced scorecard for each of DB and DC, which are now used by the Investment Committee as it assesses the investment performance of USSIM. Areas explicitly set out within the investment balanced scorecards include the integration of ESG factors in the management of all investments, the management of climate risks and the progress towards our ambition in relation to Net Zero. See section 6.2.2 for more information.



Risk management

Continued

6.2 Integrating climate risk into our risk management processes

We have integrated broader ESG risks, and specifically climate risks, into our wider risk governance, monitoring and management processes. This includes 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 page 14 of the Strategy section).

Risk inventories

We have added climate risk to both the trustee's and USSIM's risk inventories. As for all risks, identification and mitigation is an ongoing process and continues to mature for climate risk. An early step in the process 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. At lower levels, for example for different investment teams, 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's Responsible Investment team and investment desks.

Enterprise Risk Management Framework

Risks for which the board has set Risk Appetites are assigned to an owner at Group Executive level. The USSIM CEO is the executive owner for climate risk, with the following responsibilities:

- Ongoing identification, monitoring, and management of climate risks
- Understanding the implications of the risk on USS strategy/operations and investments
- Directing the appropriate risk response (mitigate, avoid, 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 regular risk assessment of risk exposure against risk appetite



Risk management
Continued

6.2 Integrating climate risk into our risk management processes
Continued

6.2.1 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 2022, we identified climate change risk as one of our ‘Principal Risks’ and included it in the relevant section of the [2022 Report and Accounts](#), along with ongoing high-level mitigation (see Figure 7 below).

Figure 7: Climate Risk entry in the USS 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"> • The ambition to achieve Net Zero investments 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 • Regular 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 • Continued stewardship, voting and engagement • Dedicated in-house Responsible Investment team with specialist expertise acts as a first line function to support investment teams and trustee

Similarly, there is a high level and top-down ‘Top Risks’ process conducted for USSIM. It is a key part of the Enterprise Risk Management Framework (ERMF) that allows us to identify and prioritise the high-level risks (i.e., enterprise level) that pose significant potential for an adverse outcome, whether financial, non-financial or reputational. This allows a more focused and robust approach to identifying and managing our strategic and operational risks and complements both the risk appetite and Key Risk Indicator monitoring, as well as the bottom-up approach using business level risk registers. Climate and ESG risk were 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.

This process is conducted on an annual basis and refreshed as necessary, or if triggered by events. Mitigating action plans are owned at the executive level and tracked and reported at the various governing bodies on a quarterly basis.

Executive level risk register reviews

As part of the process for managing risk and ensuring we stay within appetite, business areas are required to maintain risk registers that document the risks and controls associated with their processes. These risk registers incorporate climate and other ESG risks, and evidence that investment desks and supporting functions are integrating climate and ESG considerations into their everyday processes and decision-making, where appropriate.

The business risk registers are reviewed periodically with input from the RI team and receive oversight and challenge from the Group Risk team. The results of these assessments are reported to relevant governance forums on a quarterly basis (for example, Risk Committees).

The Group Risk team’s bottom-up assessment of these risk registers contributes to the qualitative assessment for the DB investment balanced scorecard assessment on Responsible Investment (see below).

6.2.2 Our risk appetite and Key Risk Indicators

The Risk Appetite Framework is one of the key methods by which we manage and govern the risks associated with Responsible Investment. USSIM’s Risk Appetite Statements (RASs) and Key Risk Indicators (KRIs) are formally approved by the USSIM board on an annual basis and are set in relation to its strategic objectives. They have been designed to cascade through USSIM to guide decision-making by its employees. The strategic objectives determine which risks the scheme is exposed to and the extent to which it wants to accept risk into the organisation.

Risk Appetite Statements and Key Risk Indicators have been recommended by the Investment Committee and approved by the Trustee Board for the scheme’s ESG and climate risks (considered as part of USS’s wider investment risks). These risks are subsequently monitored with appropriate indicators and reported to appropriate governance bodies within the scheme.

Risk management

Continued

6.2 Integrating climate risk into our risk management processes

Continued

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.

The current ESG/Climate Risk Appetite Statements and Key Risk Indicators are shown in Figure 8 below:

Figure 8: Risk Appetite Statements (RAS) and Key Risk Indicators (KRI)

Risk	Investment RAS	Investment KRI
DB and DC Investment Risk	'Cautious' for ESG risk (the potential for long-term detrimental impact on financial performance arising from ESG factors, except climate change) within the DB implemented portfolio.	Qualitative assessment by the Risk team of how USSIM is integrating ESG factors (including reporting and stewardship)
Climate (applies to DB and DC)	'Cautious' appetite for climate issues causing detriment to performance	Qualitative assessment by the Risk team of how USSIM is delivering vs our ambition to Net Zero

Appetite is expressed according to the definitions in Figure 9 below:

Figure 9: 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 engage positively and actively 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, engagement, climate integration and risk management, climate tilt of portfolio and ongoing divestments, where deemed appropriate and to the benefit of our members.

Risk management
Continued

6.2 Integrating climate risk into our risk management processes
Continued

Climate risk and the new Investment Framework

In 2022, we introduced a new Investment Framework (IF), which changes the way the trustee sets the mandate for USSIM. The IF provides mechanisms for the IC to assess USSIM’s investment performance and how well USSIM has managed investment risk.

Investment risks taken by USSIM in both the Retirement Income Builder (DB) and the Investment Builder (DC) are governed by a set of investment RASs and KRIs covering a range of risks, from short-term liquidity risk to long-term funding risk, and including those for ESG and climate (see section 6.1). This brings a multi-faceted view of risk applicable over multiple time horizons.

The IS uses a balanced scorecard approach to assess USSIM’s investment performance and advice, as well as how well it has managed investment risks. This reflects the trustee’s belief that USSIM’s investment performance should not be assessed one-dimensionally using performance versus a benchmark. Instead it should be assessed using a range of quantitative risk and return metrics and qualitative assessments,

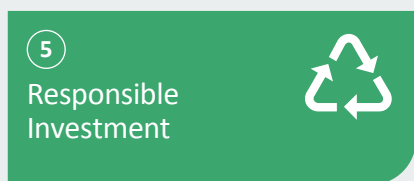
Figure 10: DB Balanced Scorecard categories



including many of the KRIs used for governing risk. This approach better aligns USSIM’s objectives and assessment to the trustee’s wider objectives and investment policies.

The DB and DC investment balanced scorecards are produced twice a year primarily for the IC to enable it to carry out its annual assessment of USSIM’s investment performance.

Figure 11: Responsible Investment – qualitative Key Risk Indicator measures for ESG and Net Zero



a. Net Zero ambition

i. An assessment of how USSIM is delivering versus the Scheme’s Net Zero ambition

b. ESG integration

ii. An assessment of how USSIM is integrating ESG factors (including reporting and stewardship)

In the Responsible Investment category (5) of the balanced scorecard, we include an assessment of the scheme’s progress against its Net Zero ambition and the extent to which USSIM has integrated financially material Environmental, Social and Governance (ESG) factors into its investment decision-making and stewardship processes, both also used as KRIs (see 6.2.2). While these issues have always been important, they have in the past not fed directly into our formal assessment of USSIM’s performance.

As the trustee’s ambition in this area develops, the assessment of this category in the balanced scorecard will evolve.

USSIM’s performance across the KRIs in the RI category are qualitatively assessed on an annual basis by the USS Group Risk function. This assessment feeds into the overall scorecard assessment by the IC alongside USSIM’s other RI achievements over the period. That overall scorecard assessment is used as an input by the remuneration committee in setting the overall compensation for USSIM.

The IF thus provides an integrated governance framework for climate risk, linking the assessment of investment risk and performance back to board strategy, objectives and risk appetite.

Risk management

Continued

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

In line with TPR'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 in 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 – the impact of climate risks on covenant

'Covenant' is the ability and willingness of employers to make financial contributions to the scheme now and in the future. At our 2020 valuation, we concluded that the scheme covenant was strong, driven by four key factors:

- 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 what TPR calls a 'last man standing' basis, within which employers have joint and several liability. In addition to this the scheme has a moratorium on employer exits without trustee consent, allowing the trustee to rely on the full support of the sector

- Each individual institution's scheme contributions flex with the size of its payroll, meaning contributions shrink if an institution's size decreases, which helps mitigate financial stress
- 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)

We expect these factors will remain relevant when we complete our ongoing assessment of the covenant as part of the 2023 valuation. Consideration of climate risks is embedded into our covenant monitoring and assessment activities and is reflected in our overall covenant assessment. As part of those activities, we:

- Review information on climate-related issues published by employer representative bodies
- Review individual employers' climate-related disclosures in their published financial statements
- Engage with individual employers to understand their overall governance and risk management processes
- Discuss with employers how climate risks specifically are captured in those processes
- Understand how climate-related risks are incorporated into employers' scenario analysis
- Consider potential climate-related risks when assessing potential downside risk scenarios for the covenant overall

There are a number of potential climate-related issues that the sector will need to address, including:

- Potentially significant costs associated with transitioning campuses towards more efficient and environmentally friendly heating, lighting and transport
- Increased flood and weather risks that may affect campus design and the cost or availability of insurance
- Managing the impact of climate-related risks on institutions' endowment and investment portfolios
- Potential opportunities for the sector from new climate-related areas of research and innovation

- Environmental concerns around travel may make it more difficult to attract international students to courses delivered via traditional in-person teaching models. Opportunities exist for employers to develop alternative hybrid and remote delivery models that result in increased share of the global market for higher education

With around 330 sponsoring employers supporting USS, there are inevitably differences between them in their approach to climate-related issues and the extent to which they are incorporated into governance, risk management and strategic and financial planning. The extent to which these issues are disclosed in employer financial statements also varies. University representative body Universities UK (UUK) published a climate commitment document in October 2021 outlining high-level targets for the sector and various initiatives. UUK also provides some [data for the sector](#) in aggregate as of December 2022:

- 75% of UUK member universities had committed to Net Zero targets under Scopes 1 and 2 (from 61% in 2021)
- 59% of UUK member universities had committed to Net Zero targets for Scope 3 (up from 53% in 2021)

Our engagement to date has not identified climate as a significant near-term risk for employers. We 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 (see the Strategy section for further details).

Risk management

Continued

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

Continued

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

Most of the focus to date has been on 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 – as discussed as part of our scenario analysis in section 5.3.2.

Our climate scenario modelling (see the Strategy section) 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 Portfolio, the modelling was performed using DB liabilities that are modelled based on projected future cash flows, but without considering demographics risks. For the 2023 valuation, the actuarial assumptions will be chosen with consideration of the impact of climate change.

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

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 portfolio, asset class and asset level. At a high level this includes the scenario analysis (described in the Strategy section of this Report) and carbon footprinting (see box opposite). Further details relating to how we assess and manage climate risk, particularly at an asset class level, are also set out below.

6.4.1 Assessing and managing climate risk across asset classes

Public equities

Public equities represent approximately 30% of our assets. While most of our public equity 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.

🔍 Carbon footprinting at USS

As noted in our 2022 TCFD Report, we first calculated a carbon footprint for its public equity portfolio 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 as part of our mandatory TCFD reporting, we have established processes for calculating the carbon footprint for as many of our assets as possible.

Notwithstanding issues with the quality and accuracy of the data, calculating this means we can estimate to some extent

a total footprint and emission intensity for the scheme. 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%-80% of emissions. We are using this analysis to inform how we engage and vote. 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.

Changing benchmarks

In 2022, the scheme [introduced a climate 'tilt'](#) to over £5bn of our Global Developed Markets equity investments. This allocation forms part of both the defined benefit and some defined contribution funds.

Integration into our Global Emerging Markets team's (GEMs) 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.

Risk management

Continued

6.4 How we manage scheme and asset-level risk

Continued

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.

In 2022, this was broadened out with the in-house development of several key tools:

- A new Investment Case template (with a full ESG report) encompassing a firm's current position and goals for future development
- A new Company Meeting template including comments on climate and ESG allowing the team to record a firm's progress against our goals and to share this with other teams internally, such as the RI and other investment teams
- A Carbon Model that allows the team to quantify our research and assumptions about a firm's future carbon emissions, their spending on emissions abatement and our views on the future price of carbon. This means we can better understand the sensitivity of each stock's target price to our key assumptions and focus our research efforts on the most carbon sensitive names

Engagement

As our [Stewardship Code Report](#) notes, we have long been a supporter of actively engaging with companies both to 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\$68 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 (166 at the last count) 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 reduce emissions, strengthen climate-related financial disclosures and improve their governance of climate change issues as they affect their business. The outcome will be better communication with investors on how companies are managing the transition risk. See the case study on page 37.

In addition to collaborative engagements, our GEMs team identified the 12 most intensive carbon emitters in their portfolio. These are mainly involved in energy-intensive industries such as cement, chemicals and energy, and accounted for 75% of the greenhouse gas (GHG) emissions from the portfolio by intensity. The GEMs team has engaged directly with many of these companies to clarify the team's assumptions about their emissions and then used this information to better quantify the key variables in their carbon models. A set of customised questions have been developed for each company which will be used to continue engagement with them to set goals on emissions reduction and measure their progress.

Finally, we have continued to engage with major oil and gas companies on their transition planning. For example, following recent apparent changes in position by both Shell and BP and unsatisfactory discussions with the companies, [we announced](#) that we will vote against the re-election of the Chair of the board at BP. This is due to the absence of meaningful engagement with shareholders on the recent strategic changes to BP's Net Zero strategy, and the lack of opportunity to vote on its changes.

Voting

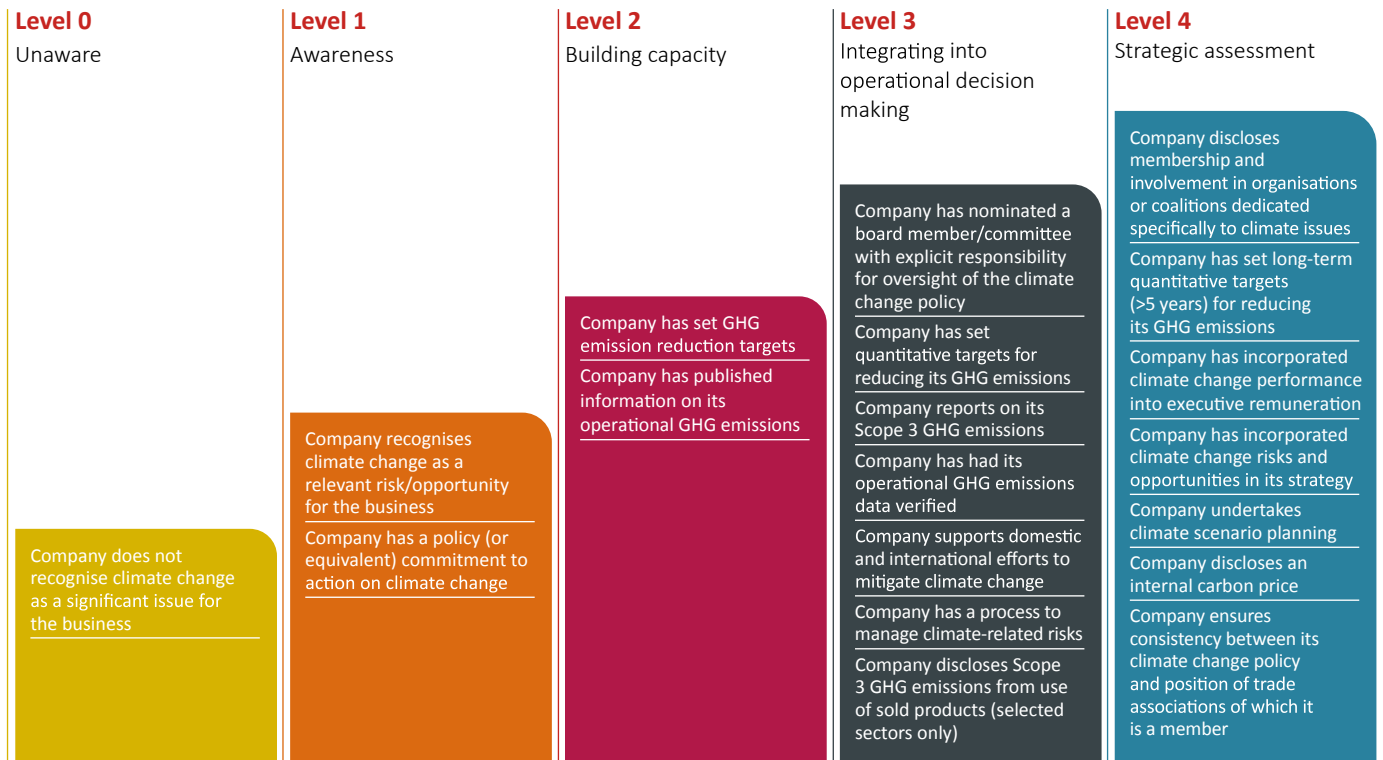
We are an active owner of our assets. We regularly meet with the executives and boards of the companies we invest in. This includes using our voting power at company AGMs where we typically support the vast majority of climate change-related shareholder resolutions, as well as engaging regularly with 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 transitions 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 2023 [Stewardship Code Report](#).

To be even more proactive, our [Stewardship and Voting Policy](#) now integrates data from the [Transition Pathway Initiative](#) (TPI). We helped develop and launch the TPI in January 2017 and are now on the Initiative's board. Partnering with other global pension funds, FTSE Group and the Grantham Research Institute (part of London School of Economics), this project assesses how companies are implementing policies and practices that manage their transition to a low-carbon world. We may vote against or abstain on the resolution for the (re) election of relevant board members where a company's management quality score fails to achieve a Level 3 score or higher in the TPI's assessment. Companies with a score of less than three are either unaware of their climate impact, not doing enough to address it or are only just starting their journey (see graphic on the next page).

Risk management
Continued

6.4 How we manage scheme and asset-level risk
Continued

Figure 12: TPI ranking of companies on their management quality relating to GHG emissions



Finally, where climate change is identified as a material risk, we expect clear identification of the principal director(s) assigned responsibility for the development and implementation of the company’s climate change or Net Zero alignment strategy and corresponding disclosures.



Risk management

Continued

6.4 How we manage scheme and asset-level risk

Continued

USSIM's approach to climate voting

The number of climate-specific shareholder resolutions to be voted on at company annual general meetings (AGM) continues to grow. These resolutions are from companies themselves ('Say on Climate' resolutions) and separate shareholder resolutions.

'Say on Climate' resolutions are company board-sponsored resolutions asking for support for company Net Zero transition plans. Shareholder resolutions are shareholder-led (rather than company-led) and ask the company to undertake specific actions.

When considering whether to support company 'Say on Climate' resolutions, climate-related shareholder resolutions or director elections, we have developed a set of expectations against which we assess climate plans, recognising that Net Zero pathways look different for different sectors. The expectations are grouped under the following principles:

- **Principle 1:** Ensure robust board oversight and accountability
- **Principle 2:** Reporting – commitment to annual transparent disclosure aligned with TCFD framework

- **Principle 3:** Commit to a Net Zero strategy and disclose the specific actions needed to achieve the outlined strategy
- **Principle 4:** Ensure capital expenditure is aligned with targets
- **Principle 5:** Set ambitious, science based quantitative targets across all material emission scopes

We use various investor-led benchmarking tools, including Transition Pathway Initiative (TPI) and the Climate Action 100+, to help with the assessment and we encourage companies to meet the CA100+ indicators.

We tend to support resolutions where we could see merit in enhanced transparency on a company's specific processes and strategies to set and monitor the business to achieve GHG reduction targets that aligned with the Paris Agreement, as we do not consider requests to align with the Paris Agreement as influencing strategy. We also supported further disclosure on corporate lobbying alignment, noting the importance that government policy will have in enabling successful company decarbonisation plans.

For priority companies operating in sectors where climate change impact is material (Energy, Mining, Automotive, Industrials), we aim to pre-declare our voting intention via a UNPRI collaborative tool. We also notify the company post-vote with our vote rationale and highlight areas that we do not consider meet our expectations of successful decarbonisation to achieve the Net Zero goals. For these high emitting companies, we also tended to set out further criteria (for example inclusion of Scope 3 metrics or more clarity on capital expenditure) that we would expect them to achieve before the next reporting cycle, irrespective of whether we supported the transition plan. We expect climate transition plans to become a standard part of corporate reporting and we therefore disclose our climate transition plan expectations to help companies understand the criteria we consider key if we are to limit warming to less than 2°C to remain Paris-aligned.

Private Markets assets

Direct assets

We have significant direct investments in a range of assets. This includes core infrastructure, such as Heathrow Airport and Thames Water, and a broad range of other core and opportunistic infrastructure companies: [Moto](#) (motorway service stations), [Westerleigh](#) (UK crematoria), and PECO Pallet (a US based pallet distributor) are just a few examples. A number of these assets already provide public Net Zero ambitions (Heathrow and Thames Water) and have established their own detailed processes to deliver this.

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 or transition and physical climate risk, and how the asset is managing them.

USSIM's Private Markets Group (PMG) has developed a Climate Risk Framework (see Figure 13) to capture both physical and transition climate risks across both new PMG deals and existing assets. The Framework is used in due diligence for new deals. These high-level assessments will inform additional due diligence to be conducted including the use of external environmental advisers/consultants.

In 2022, as the focus on improving data and portfolio visibility continues, PMG launched its first annual ESG survey to portfolio companies and put practices in place to provide alignment with third-party managers on a recurring basis.

Risk management
Continued



Climate resolutions

From April 2022 to March 2023, we prioritised climate votes to ensure in-house assessment of both management and shareholder climate-related resolutions. In the case of management-proposed resolutions, many were annual climate progress votes. Where we had previously voted on the management’s strategy, we supported progress where they were on target. Overall, we supported 24 of the 34 management ‘Say on Climate’ (c.71%) resolutions.

We also supported 72 of the 100 shareholder resolutions related to climate issues. We supported these

where the requests were deemed not to be overly restrictive on company management and where it supported our requests of companies. For example, we supported a request for Scope 3 emissions data being included in a company’s disclosures.

In some instances, for example Shell in the 2022 season, this meant supporting both management’s ‘Say on Climate’ progress resolution and a shareholder resolution to include Scope 3 data. We sent a letter explaining our voting to Shell, which outlined our reasons for these votes.



Risk management
Continued

6.4 How we manage scheme and asset-level risk
Continued

Figure 13: Climate Risk Framework

Physical risk (low risk – 10/10)	Transition risk (medium – low risk – 9/10)
<p>Global warming, rising sea levels and extreme weather may pose a degree of flood, landslide and/or wildfire risk to Company XYZ.</p> <p>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.</p>	<p>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 we will have to diligence this and any associated ‘minimum standard’ costs.</p> <p>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.</p> <p>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.</p>
Physical risk assessment	Climate risk assessment
<p>1-2 (High risk) High exposure to assets located in areas with high physical risk incidence 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 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 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 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 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 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>

Risk management

Continued

6.4 How we manage scheme and asset-level risk

Continued



Investing in low-carbon alternatives

There is a strong focus in the TCFD framework around how climate change risk is managed. However, climate change, and the steps governments around the world are putting in place to support the transition to a low-carbon future, provides opportunities for pension funds like ours to invest in the transition to a low-carbon future. We have been investing in renewable energy and clean technologies for over 15 years. 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, which we acquired when the UK government sold the Green Investment Bank and its assets.

Sustainable Growth mandate

Another initiative that supports our Net Zero ambition is the [Sustainable Growth mandate](#) we launched in early 2022. 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

2023, we have approximately £2bn of renewable energy and green technologies exposure. The Sustainable Growth mandate is managed by the Private Markets Group within USSIM. While currently benefitting the Retirement Income Builder (the DB part), we also expect it to benefit the Investment Builder (the DC part) in the near future. The first asset in the fund is our investment in TPG Rise Climate (see [case study below](#)). 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 focuses on five climate sub-sectors: clean energy, enabling solutions, decarbonised transport, greening industrials, and agriculture and natural solutions.

TPG Rise Climate: pursuing climate-related opportunities

As part of the £500m Sustainable Growth mandate, USS invested in TPG's dedicated climate investment strategy, TPG Rise Climate. The strategy focuses on pursuing climate-related opportunities, such as clean energy, natural resources, and green industrials. TPG review carbon

yield (CO₂ per £ invested) and carbon aversion before they invest, and they monitor them both throughout the investment. Examples of the types of innovative technologies the fund supports include electric powered aviation (BETA Technologies) and

improved carbon capture and storage (Summit Carbon Solutions). Further examples and details of the TPG Rise Climate fund can be found on their [website](#).

Risk management

Continued

6.4 How we manage scheme and asset-level risk

Continued

Private Market funds carbon exposure

For our Private Markets funds, we have identified the top 100 contributors to the carbon footprint for our externally managed private markets universe. To get these data, emissions were estimated asset by asset, based on average emissions intensity for sector and location using data provided by S&P Trucost. We then aggregated the data by General Partner (GP) to help prioritise our engagement strategy, enabling us to focus our engagements on those managers contributing the most to our carbon exposure. We have decided to focus on the top six GPs who represent more than 80% of emissions of the top 100 assets (the remaining 20% being split across more than a dozen other managers). We also contacted all GPs within our Private Equity portfolio requesting emissions data for underlying portfolio companies using the ESG Data Convergence Initiative data submission template (available at <https://www.esgdc.org/>). We plan to use the results and analysis to inform our private equity engagement programme and TCFD reporting.

Stewardship of assets

During the acquisition process for direct assets, and once we have invested, we work on an asset management plan for each portfolio company. Where we have identified material ESG and climate issues, these issues are integral to this asset 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 ESG factors including climate change.

For co-investments where we invest alongside a partner fund, 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)⁷ 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, continue to challenge the managers on how they manage climate issues as part of our external manager monitoring programme.

Property

The vast majority of our property assets are UK-based directly held assets, although we do have some exposure internationally via funds.

We always undertake site visits and ESG due diligence for all new purchases, which are presented to internal USSIM oversight committees. For the acquisition of new assets, given the potential physical risks posed by climate change on property assets (for example, flood risk, storm damage, heat stress), we always assess such elements alongside a third-party advisor. This also considers climate resilience. 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. This acquisition due diligence process also considers carbon emissions, in particular where the landlord is directly responsible for those emissions. We also continue to enhance ESG provisions in new leases whenever possible, ensuring our direct tenants are obliged to provide energy performance data and comply with future legislative requirements.

We have had an active Responsible Property Investment (RPI) programme in place for well over 15 years. The RPI programme has focused on reducing energy consumption, and therefore potential carbon exposure, in some of our major property assets. A RPI Working Group meets regularly to review targets

and strategy relating to energy consumption and Net Zero carbon initiatives, and also considers improvements on water consumption and waste management, together with socio-economic initiatives. The programme has been successful in reducing energy consumption on our core long held multi-let assets by 46% for electricity and 22% on gas. This has been driven by initiatives such as:

- LED lighting replacement
- Replacement of heating and air conditioning equipment with non-fossil fuel-based systems
- Voltage optimisation

The team is also committed to a continual programme of reviewing and improving our operational efficiency of heating and cooling systems.

Fixed Income

Sovereign debt

We use a proprietary tool, first developed in 2008, that ranks countries based on ESG factors. For the Emerging Market Debt (local currencies) portfolio, the composite index ranking is one of the core tools used in portfolio construction. The results of the composite country score are combined with a fundamental credit assessment and integrated with two other factors to formulate the investment strategy. 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](#) and 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, or did not sign up. This is because we view signing up to the Agreement as an indicator of willingness to transition.

Note

⁷ LP (Limited Partner) is the investor, for example, the pension fund. GP (General Partner) is the fund manager.

Risk management Continued

6.4 How we manage scheme and asset-level risk Continued

Credit (corporate debt)

Given the breadth of issuers in the bond market (more than 3,000 issuers in the main benchmark alone), our Credit team adopts a screening-based approach to assess environmental factors including climate-related issues as part of their ESG integration process. The process uses risk scores from external rating providers including the three major credit rating agencies. The screening for any 'ESG red flags' is automated by the team and run at the start of each month, so that it captures the latest available data. It considers each of the group of risks (Environmental, Social or Governance) separately. This helps to avoid aggregated scores masking poor performance in a particular area and highlights any pockets of risk to the respective sector analysts. If, for example, 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.

Additional fundamental ESG research is also undertaken for those companies with weak scores, those that lack ESG scores and companies where we have a large credit exposure (>£50m). For large exposures, an additional quarterly forum exists to discuss ESG issues at both an industry and company level. ESG factors are also a standard topic of discussion during company meetings.

While ESG issues have become a standard topic of discussion during investor calls with increasing disclosure expected as standard, compared to public equity investors, credit investors are somewhat limited in their ability to engage with issuers on ESG matters.

The Fixed Income team (FIT) Net Zero Working Group also faces significant data issues:

1. There are challenges mapping the FIT investment universe to Trucost data because debt can be issued out of subsidiaries with different carbon profiles
2. A significant number of issuers are private companies with inferior disclosure

The overall FIT portfolio has seen a degree of change, with Public Inflation-Linked Credit (PILC) and Emerging Markets Debt (EMD) Hard portfolios being new since 2019. EMD Hard is carbon intensive, while PILC is low intensity. The Global Credit portfolio saw an increase in emissions between 2019 and 2021, meaning that a faster rate of decarbonisation will be required for the team to meet 2025 targets.

Integration of carbon into FIT investment processes will be a key focus going forward.

Externally managed funds

Approximately 35% of our assets are managed externally. Our Net Zero ambition applies to all our assets, irrespective of asset class and whether those assets are managed internally or externally. We therefore 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.

While we have had our external manager due diligence and monitoring programme in place for some 15 years, our processes continue to evolve. For example, in 2022, we introduced a set of Gateway RI Indicators (see box above) for USSIM's manager selection teams to consider early in the shortlisting or due diligence process. The metrics reflect USSIM's experience of commonplace key performance indicators (KPIs) that illustrate manager adoption of RI and alignment to USS. The Gateway Indicators (outlined in the box above) are considered by manager selection teams to provide a high-level early indication of likely RI capabilities and alignment on ESG and Net Zero. Importantly, one of these gateways indicators is a manager's commitment to Net Zero – as USS cannot achieve Net Zero unless all our assets do.

There are more details under *Principle 8: Monitoring managers and service providers* in our [Stewardship Code Report 2023](#).

Gateway RI Indicators

The indicators below should be applicable to the proposed mandate's strategy/assets (answer Yes/No):

- RI/ESG Policy available
- Annual ESG report available
- ESG Lead named
- Participation in RI Initiatives/ Benchmarks, for example, PRI, GRESB, [ESG Data Convergence initiative](#), UK Stewardship Code
- Net Zero ambitions
- Low risk of USSIM Exclusions (for pooled and blind-pool funds)
- Mercer score ESG 3 and under (for public markets, where covered)

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. As noted above where we invest in direct assets, whether property, companies, or infrastructure, we will undertake an assessment of exposure to physical climate risk.

We have established Key Risk Indicators to assess how physical risk associated with climate change could affect the scheme. As a result, we will have more data on the exposure of our assets going forward. 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.

Risk management
Continued

6.5 Case studies

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

USSIM continues to be 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 a very carbon-intensive industry, with 60 to 70% of the sector’s CO₂ emissions coming from the chemical processes associated with producing cement. To decarbonise, it needs to not only look at alternative fuel sources, but also alternative technologies for its processes.

Building on our discussions with Cemex in 2021, in 2022 the company submitted its carbon reduction targets to the Science Based Target initiative (SBTi). In December 2022 it reported that the SBTi had validated its 2050 roadmap to Net Zero across its supply chain. The company expects to reach its 2030 interim target five years earlier than scheduled.

Other developments include:

- Five plants that are operating below the required Scope 1 SBTi level to meet a 1.5°C scenario
- The company is one of 65 members of the First Movers Coalition, with a combined market value of approximately \$8 trillion. As such it is committed to purchasing green technologies to help decarbonise the sector. Cemex is purchasing heavy duty electric trucks as well as introducing new lower carbon products such as its Vertua Net Zero CO₂ concrete
- The company joined the Race to Zero challenge and signed the Business Ambition for a 1.5°C programme led by the We Mean Business Coalition, in partnership with the UN Global Pact and SBTi

Cemex is dependent upon several breakthrough technologies throughout its value chain to reach its Net Zero target and has therefore set up several pilot projects

to test these technologies. In 2023, the Climate Action 100+ engagement is hoping to discuss the results of the pilot projects and whether the new technologies can be scaled up to production level. If not, the collaboration will be asking for the company’s backup plan for reaching its 2050 target.

Global Investor Statement to Governments on the Climate Crisis

USS was again a supporter of the [2022 Global Investor Statement](#), which called for clear policy frameworks that encourage capital flows towards urgent climate action. We were one of 604 signatories of a statement, representing almost US\$42trn in Assets Under Management (AUM), that was released in advance of the 27th United Nations Climate Change Conference (COP27) held in Egypt in November 2022.

The key asks of the statement included:

- Ensure that the 2030 targets in their Nationally Determined Contributions align with the goal of limiting global temperature rise to 1.5°C. If their targets are not aligned, governments must enhance and strengthen their 2030 targets before COP27, considering different national circumstances
- Implement domestic policies and take early action to ensure that their 2030 greenhouse gas emissions are aligned with the goal of keeping global temperature rise to 1.5°C. This will require governments to accelerate the development, deployment and dissemination of technologies that enable the transition towards a Net-Zero emissions economy, including:
 - Contribute to the reduction in non-carbon dioxide greenhouse gas emissions
 - Strengthen climate disclosures across the financial system through, for example, requiring mandatory TCFD-aligned reporting for the largest companies and financial institutions to report on climate-related risks and opportunities, backed by a robust global taxonomy.

Integrating carbon price scenarios into discounted cash flow analysis

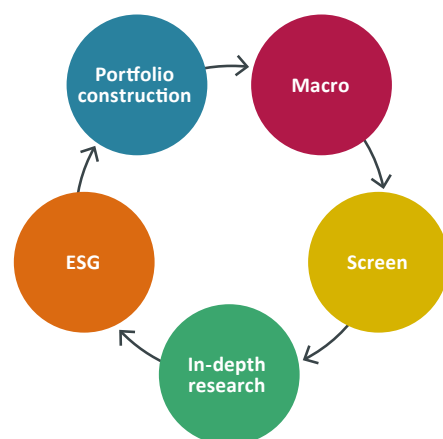
USS’s Global Emerging Market Equities team conducts bottom-up carbon analysis to model how climate-related risks can impact the value of a company. This carbon analysis is generally focused on transition risk – introducing carbon prices is a tool to transition the economy to a lower emissions pathway.

The benefit of carbon analysis is that it can be integrated into existing discounted cash flow models, a tool used to value a business. Using carbon intensity data, a carbon price can be used to model the impact on a company’s valuation. As with any scenario analysis, carbon pricing is not about forecasting the future but more about understanding a range of possible outcomes.

The team identifies a range of different carbon price scenarios on the discounted cash flow valuation. This is then fed into an ESG score and assessment, along with other factors such as emission reduction plans and carbon transition.

Where possible, the team also factors in physical risks. This is done qualitatively, unlike the quantitative analysis approach for carbon prices. ESG risks are built into the team’s investment modelling and research to ensure that material financial issues are integrated into investment decisions. This helps to drive the agenda of our engagement with the companies we invest in and can contribute to the overall investment decision making process.

Figure 14: USS Global Emerging Market equity team carbon analysis process



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.

In this year’s Report, in addition to the Scope 1 and 2 emissions data we reported last year, we have also included an estimate of our Scope 3 emissions. While we have been able to obtain estimates for

a large proportion of our universe, the availability and reliability of Scope 3 data remains poor.

To support access to carbon data, we have been a supporter of the [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. And as already noted, we are also supporting the Climate Action 100+ efforts to engage with high emitting companies to disclose more climate data and include transition planning.



During 2022, following a review of the data, further research and experience applying emissions data to our investments, we have made some improvements to our measurement methodology.

What are Scope 1, 2 and 3 emissions?

Scope 1

covers emissions from sources that an organisation owns or controls directly – for example, from burning fuel in a fleet of vehicles.

Scope 2

are emissions that a company causes indirectly when the energy it purchases and uses is produced. For example, the generation of electricity would fall into this category

Scope 3

encompasses emissions that are not produced by the company itself. They are not the result of activities from assets owned or controlled by them, but by those that it is indirectly responsible for, up and down its value chain. An example would be the emissions associated with holiday flights: these emissions would be Scope 3 for the oil and gas company that provides the aircraft’s fuel

7.1 Data sourcing and methodology

A critical step in managing and reducing our exposure to climate change risk is understanding both our starting point and where we are at a particular point in time. With these data points we can track our transition to Net Zero. As a result, we need to ensure that we have appropriate data to both fulfil our requirements for TCFD reporting and, more importantly, to feed into our investment and risk analysis so that we can manage our transition.

Therefore, to support our Net Zero activities and TCFD reporting, in 2021 we conducted a detailed review of carbon data providers using both qualitative and quantitative factors to assess their capabilities. 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.

Metrics and targets

Continued

7.1 Data sourcing and methodology

Continued

Improvements in data

During 2022, following a review of the data, further research and experience applying emissions data to our investments, we made some improvements to our measurement methodology. This has enabled us to obtain better estimates of their associated financed emissions. In addition to improving the coverage of data captured, the methodological changes can be broadly categorised as follows:

1. Where we use estimates for a company's emissions based on its regional and/or industry classification (applied extensively in our private market funds investment universe), we use a smaller, more representative peer group to obtain a more accurate estimate for that specific company.
2. In line with recommendations from the [Partnership for Carbon Accounting Financials](#) (PCAF) we have reweighted our corporate bond allocations by their book value⁸ within a portfolio. This better reflects the funding provided to a company for a given issue, while retaining consistency with our balance sheet.
3. When aggregating the emissions intensities across multiple portfolios, portfolios are weighted based on their full net asset value rather than the asset value for which data were available, resulting in a more accurate estimate for the full scheme emissions.

The implications of these improvements in our data capture and analysis mean that we are restating the carbon intensity number for both our 2019 baseline year and for our 2021 carbon footprint.

- The impact of these adjustments to our 2019 baseline year, and therefore our decarbonisation trajectory, are marginal. The intensity of the scheme in 2019 reduced from 93 tCO₂e per £m invested to 90 tCO₂e per £m
- However, the impact to our 2021 intensity was more pronounced: our carbon footprint reduced from an estimated 90 tCO₂e per £m invested to an estimated 78 tCO₂e per £m

These changes were almost entirely driven by more accurate estimates being applied to our Private Markets' investment universe, where lower intensity investments such as renewables are estimated more accurately. Previously a renewable energy producer would have

been classified as a 'Utility' using a peer group including fossil fuel-based energy generators. Whereas it will now be estimated using a peer group containing only renewable energy producers, which obviously have a much lower emissions profile.

These different data are illustrated in the following chart:

7.1.1 Previously reported 2021 emissions data

31 December 2021	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)
Non-sovereign	47,388	4,243,411	89.5
Sovereigns	35,039	25,375,617	724.2
Data unavailable	9,800	–	–
Total	92,227		

7.1.2 Updated 2021 emissions data

31 December 2021	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)
Non-sovereign	57,096	4,433,158	77.6
Sovereigns	35,039	25,375,617	724.2
Data unavailable	92	–	–
Total	92,227		

*Emissions reported are Scopes 1 and 2 only

Note

8 The value of the bond as it appears on a company's balance sheet as opposed to the value at which it is trading in the market.

Metrics and targets

Continued

7.1 Data sourcing and methodology

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 may change in the future. Therefore, 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 remains rare** and the data available via S&P Trucost may not reflect the data available from public disclosures. Scope 3 is particularly important for some sectors, for example, oil and gas where it makes up approximately 85% of emissions

- **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, for example, 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 each asset class separately

7.2 Our Net Zero ambition and targets

In May 2021, we announced our [ambition for our investments 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 [IGCC 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. To achieve Net Zero by 2050, this would suggest we need to reduce emissions by 6%-8% each year. In 2022, we [announced interim targets](#), aiming to cut the intensity of emissions from the corporate assets in our portfolio by 25% by 2025, and by 50% by 2030 (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. Given the methodological updates and restatement of emissions intensities discussed above, we have recalibrated our interim targets to align with our new estimate of our 2019 emissions intensity.

In addition, while our internal investment teams are expected to decarbonise their portfolios at the rate set for the scheme, each team has developed targets and delivery approaches for each asset class. This ensures that each investment team contributes to our shared ambition.

Our Net Zero Steering Group (consisting mainly of USSIM asset class leads) is responsible for making sure the sum of asset class targets achieves our overall Net Zero ambition.



Metrics and targets

Continued

7.3 Metrics

There is 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 four metrics (with a fourth mandatory metric introduced by the DWP in 2022) that we use to measure and track climate-related performance. We are required to disclose both our absolute emissions and an intensity of emissions metric, plus at least another two metrics. For these, we are reporting the percentage of assets aligned to a well below -2° pathway and data quality. As noted in the Governance section, we voluntarily reported information on the quality of the climate data we were utilising in 2022, and we have decided to report this as our fourth mandatory metric.

While for internal measurement and tracking purposes, we may use a broader range of metrics, the details of the four metrics we are reporting publicly are as follows:

Metric	Example	Further detail
Absolute emissions	Total portfolio emissions	Tonnes of carbon dioxide and equivalents (tCO ₂ e). This includes Scope 1 and 2, plus material Scope 3 emissions from 2023 where they are available.
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.
Data quality	Percentage of data obtained via different sources, grouped by estimated accuracy of those sources	Having grouped different sources of Scope 1 emissions data by an estimate of its accuracy, we report the proportion of our investments for which the emissions data was sourced using that method.

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. The alignment metric provides us with more forward looking data: an indication of how assets in the portfolio are describing how they are going to transition (see section 7.3.1 below). Finally, the data quality metric tracks how well companies are disclosing their carbon exposure and climate plans, giving us more confidence to be able to use this in our investment decision making.

7.3.1 Alignment with the transition to Net Zero

We believe that, for the world 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

as it is in the financial interests of the scheme. We believe that a low-carbon world is likely to be a world that is more financially stable.

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 ‘less than 2°C scenario’. S&P Trucost calculate a company’s alignment to a given warming path based on its individual profile and 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 used to model them 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 The fourth metric – data quality and coverage

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 externally 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 Retirement Income Builder (DB) assets. Compared to our 2022 data set, we have noticed a significant improvement in the reporting available from our third-party managers and expect this to continue to improve.

Metrics and targets

Continued

7.3 Metrics

Continued

A fourth metric

During 2022, an update from the DWP required funds covered by the TCFD Regulations to publish a fourth climate metric that in some way measures alignment with the Paris Agreement/ Net Zero. While we already publish an alignment metric (% portfolio emission attributable to assets aligned with a well below 2°C pathway) we are still required to publish an additional metric.

The DWP proposed several options, and USS chose a measure of the quality of climate data as our additional metric. Having already reported figures on data quality in our 2022 TCFD Report it seems

appropriate to continue disclosing this information. Furthermore, some of the other metrics proposed by DWP required either significant subjective judgements and modelling assumptions, such as VaR and carbon pricing, or the collection or procurement of significant amounts of additional data, which may be costly and in itself have questionable accuracy. We believe that data quality is the least subjective metric and, over time, should demonstrate the improvement in the reliability of the other metrics we are already reporting.

Scope 1 emissions data for 40% of our assets, excluding sovereign debt, are based on information reported by companies or managers directly. This is illustrated in Table 1 below. This information is classified as 'verified' if we receive it through S&P Trucost, meaning it has been through rigorous quality assurance checks. We classify it as 'unverified' if we have taken the number from a company publication or disclosure but cannot be certain as to its reliability, or if it was reported to us by one of our third-party managers. For our sovereign debt investments, our service provider was able to provide data covering 99.9% of the assets, although we do not have a data quality rating for this portion of our assets.

We continue to expect that both data quality and coverage will increase over time as reporting on emissions improves and methodologies are agreed upon by industry experts. While it may appear from Table 1 that the quality of data has reduced compared to last year (40% reported data vs. 45% last year) this is in fact predominantly caused by increased coverage using lower quality sources. The shift from verified reported emissions in favour of unverified is due to increased disclosures from third-party managers, which, although currently reported as 'unverified', we believe to be a better estimate of the fund intensity.

For the Investment Builder (the DC part), the assets are primarily managed passively (tracking a defined index or set of companies) by external managers. As a result, we use calculated intensities of the implemented portfolio's benchmark rather than the portfolio itself as we believe this provides an appropriate proxy to the relevant index. The exceptions are for internally managed active portfolios such as Emerging Market Equity or private market funds, or funds where emissions data was provided by the manager. For these portfolios we used the same intensity calculated for the individual portfolio in the Retirement Income Builder (the DB part) or the data from the manager.

7.3.3 Data mapping risks

We have 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.

Table 1: Proportion of non-sovereign AUM by Scope 1 emissions source quality

Scope 1 Emissions Source Quality	% Assets
1. Verified Reported Emissions	8.4
2. Unverified Reported Emissions	31.5
3. Estimates derived from partially reported emissions	12.4
4. Estimates based on modelling of consumption and production	10.3
5. Estimates based on emissions per unit of value typical to that region and/or sector	30.3
6. Estimates based on emissions per unit of value typical to that portfolio	7.2

Metrics and targets

Continued

7.3 Metrics

Continued

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 datapoints 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

These assets account for approximately £2.2bn of our investments (around 3% of the scheme assets).

7.3.5 Data sourcing by asset class

Company footprints

S&P Trucost has many years' experience in 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 below shows the top ten contributors to our financed Scope 1 and 2 emissions from our public market equities and credit portfolios, where data are available. This is as at 31 December 2022, and they are listed in order of contribution to our carbon footprint.



Metrics and targets

Continued

7.3 Metrics

Continued

Table 2: Top ten contributors to our non-sovereign financed emissions (Scopes 1 and 2)

Company name	Sector	Company Scope 1 + 2 emissions (tCO ₂ e)	USSIM public market portfolio holdings (£)	Company Scope 1 + 2 intensity (tCO ₂ e/£m)	Data source
China Resources Power Holdings Company Limited	Utilities	156,673,371	£17,542,301	6,644	Scope 1: Verified reported emissions Scope 2: Verified reported emissions
NTPC Limited	Utilities	268,246,833	£15,240,164	6,971	Scope 1: Verified reported emissions Scope 2: Verified reported emissions
POSCO Holdings Inc.	Materials	78,504,579	£27,706,120	2,998	Scope 1: Verified reported emissions Scope 2: Estimates derived from partially reported emissions
Eskom Holdings SOC Limited	Utilities	212,319,166	£8,123,767	6,319	Scope 1: Estimates derived from partially reported emissions Scope 2: Estimates based on modelling of consumption and production
Holcim Ltd	Materials	127,001,193	£14,482,341	2,730	Scope 1: Verified reported emissions Scope 2: Verified reported emissions
Perusahaan Perseroan (Persero) PT Perusahaan Listrik Negara	Utilities	184,238,010	£13,171,908	2,537	Scope 1: Estimates derived from partially reported emissions Scope 2: Estimates based on modelling of consumption and production
Hindalco Industries Ltd	Materials	–	£13,499,641	2,447	Scope 1: Estimates based on emissions per unit of value typical to that region and/or sector Scope 2: Estimates based on emissions per unit of value typical to that region and/or sector
Petróleos Mexicanos S.A. de C.V.	Energy (Oil + Gas)	54,634,864	£35,097,055	657	Scope 1: Estimates derived from partially reported emissions Scope 2: Verified reported emissions
Shell plc	Energy (Oil + Gas)	73,657,535	£70,957,235	314	Scope 1: Estimates derived from partially reported emissions Scope 2: Estimates derived from partially reported emissions
Nevada Power Company	Utilities	10,690,143	£12,038,433	2,389	Scope 1: Estimates based on modelling of consumption and production Scope 2: Estimates based on modelling of consumption and production

Metrics and targets

Continued

7.3 Metrics

Continued

As with our 2022 Report, the majority of the scheme's highest emitting companies are energy users – notably utilities and steel companies. The only Oil and Gas companies are Petroleos Mexicanos and Shell. These positions are a reflection that while we are reporting Scope 3 separately this year, the footprints above only cover Scopes 1 and 2. If it included Scope 3, the Oil and Gas sector number is likely to 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 continued to engage with CEMEX (see the case study on page 37) and other companies as part of the international Climate Action 100+ collaborative engagement. We have also been engaging with other companies on the list and will continue to do so. Many of these assets are in our GEMs portfolio and, as such, have been the focus of a specific engagement programme by our internal investment team (see details in the Risk management section).

Property

While we do have some international property holdings via fund investments, 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 are 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 accept 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 (i.e., it introduces an element of double counting).

There is also no obvious benchmark for the carbon footprints of real estate portfolios. One suggestion was that [GRESB](#), an industry-led organisation that provides actionable and transparent ESG data to financial markets and that USS helped found, 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 has also been 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 or 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.

While we have not been able to incorporate emissions data from our General Partners (GPs) in this year's Report, we are already seeing increased reporting from those with whom we have engaged and are hopeful to be able to use reported data next year.

Metrics and targets

Continued

7.3 Metrics

Continued

Sovereign debt

As we noted in last year’s TCFD Report, 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. 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 a country’s 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 its 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 50% of the assets in the Retirement Income Builder (the DB part) that we can measure the carbon footprint for. But apparently, according to our carbon footprint, 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 impact 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 vastly outweigh corporate emissions.

We will therefore continue to 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, we 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

As previously noted, this year we are reporting against four 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
Data quality	Estimated reliability of the sourced data for proportions of our investments

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 2022.

Metrics and targets

Continued

7.4 Our GHG emissions summary

Continued

7.4.1 Retirement Income Builder (defined benefit) investment emissions

The Retirement Income Builder (the DB part) has by far the greater share of assets at c.£71.4bn (as at 31 December 2022). Our total assets under management (AUM) are c.£73.4bn – the remaining c.£2bn is made up of DC assets in the Investment Builder. The Retirement Income Builder allocates to a much broader range of asset classes than is found in the Investment Builder. The following tables provide GHG emissions and alignment data from our December 2021 and December 2022 footprinting processes for the DB part of the scheme.

Table 3: Greenhouse gas (GHG) emissions and intensities for DB part in tonnes of carbon dioxide equivalent (tCO₂e)

31 December 2021 (calculated on 11 February 2022 and based on 31 December 2021 data)	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)	Well below 2°C aligned** (%)
Non-sovereign	47,388	4,243,411	89.5	24
Data unavailable	9,800	–	–	
Total	92,227			
31 December 2022 (calculated on 15 February 2023 and based on 31 December 2022 data)				
Non-sovereign	£46,414	3,282,904	70.7	27
Data unavailable	£2,240	–	–	
Total	£48,654			

* Emissions reported are Scopes 1 and 2 only.

**Proportion of the £14.9bn of assets for which S&P Trucost has Paris Alignment data available.

For the well below 2°C alignment metric, we have seen an increase in alignment in the assets covered by the analysis from 24% aligned to 27% aligned. We expect this to rise as a result of increased investor engagement with companies (for example, via the Climate Action 100+) encouraging their adoption of Paris aligned transition plans.

Sovereign debt

During 2022, we reduced our exposure to sovereign debt from c.£35bn to £27.8bn. The carbon intensity of our sovereign debt portfolio has also reduced from 724 tCO₂e per £m invested to 685 tCO₂e per £m. This is primarily due to a shift from US to UK exposure, as well as reduced exposure to Russia (following the invasion of Ukraine), China and Ukraine.

Table 4

Sovereigns	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity (tCO ₂ e/£m)
December 2021 data	35,039	25,375,617	724.2
December 2022 data	22,773	15,605,143	685.3

Scope 3

We were only able to obtain Scope 3 data for approximately £23bn of our corporate assets. These emissions data are calculated using the regular methodology across public equities and credit. For our private markets assets, while we only have data for a portion of our direct assets, this information is directly calculated and reported by the assets themselves.

Table 5

31 December 2022	AUM (£) where data available*	Financed emissions* (tCO ₂ e)	Emissions intensity (tCO ₂ e/£m)
Equities	£13.4bn	3m	225
Credit	£4bn	1.5m	386
PMG direct assets	£5.5bn	2.7m	482

* Over 95% of the emissions data associated with Scope 3 emissions is estimated and is therefore expected to be very unreliable.

This means that for those assets where we have data, the Scope 3 carbon intensity of USS's holdings is approximately 314 tCO₂e per £m invested.

Metrics and targets

Continued

7.4 Our GHG emissions summary

Continued

A number of our direct assets make their carbon footprints including Scope 3 data public. These include:

- NATS which provides 1.5m tCO₂e
- Moto which provides 0.5m tCO₂e
- Heathrow which provides 0.25m tCO₂e

We have concerns about how Scope 3 data are calculated and reported. There are a number of different 'categories' of Scope 3 data, so ensuring that we obtain and report the correct data requires careful consideration to avoid discrepancies in the data.

7.4.2 Investment Builder (DC) investment emissions

The TCFD Regulations require that we report the 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 6 below. Given our DC portfolios are predominantly managed externally, and we take data reported from our managers for these funds, we are only able to report on the first two GHG metrics for these. We are also only reporting Scopes 1 and 2 for these assets.

Table 6: GHG emissions and intensities for each popular DC part, calculated on 15 February 2023 and based on 31 December 2022 data in tonnes of carbon dioxide equivalent (tCO₂e)

31 December 2022	AUM (£m)	Financed emissions* (tCO ₂ e)	Emissions intensity* (tCO ₂ e/£m)
USPO03 – Growth Fund	£1,158.52	–	–
Non-sovereign	£964.14	66,086	68.5
Data unavailable	£115.08	–	–
Sovereigns	£79.30	–	–
USPO04 – Moderate Growth Fund	£245.67	–	–
Non-sovereign	£187.69	12,599	67.1
Data unavailable	£29.33	–	–
Sovereigns	£28.66	–	–
USPO05 – Cautious Growth Fund	£127.56	–	–
Non-sovereign	£84.81	5,764	68.0
Data unavailable	£15.06	–	–
Sovereigns	£27.69	–	–
Grand Total	£1,531.76	–	–

* Emissions reported are Scopes 1 and 2 only.

Metrics and targets

Continued

7.5 Targets and progress

As we have noted, our ambition is for our investments to achieve Net Zero by 2050 or earlier, if possible. 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 from our baseline year of 2019, 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 7, between 2019 to 2022, based on the latest available restated data, for our non-sovereign debt assets, we have achieved a total reduction in carbon intensity of 21% over three years, or 7.6% a year.

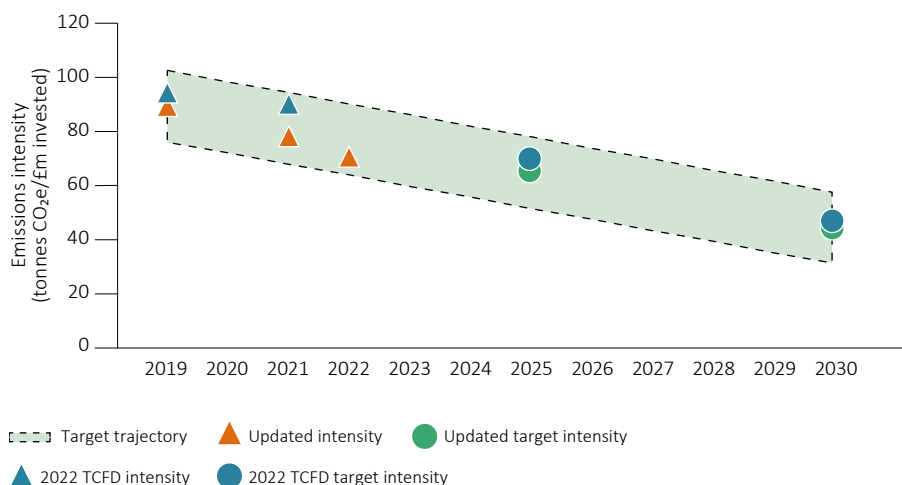
Table 7: 2021 vs. 2019 emissions intensity of non-sovereign assets

TCFD Group	2019 emissions intensity (tCO ₂ e/£m)	2022 emissions intensity (tCO ₂ e/£m)	Reduction from 2019 to 2022 (%)	Annualised reduction (%)
Non-sovereign	89.5	70.7	21	7.6

As shown in Figure 15 below (depicted by the red triangles), we are currently ahead of the straight-line path from our 2019 baseline (red triangle) to our 2025 or 2030 target intensities (the green diamonds). For reference, we have included (in blue) the datapoints shown in last year’s TCFD Report, before recalibrating the trajectories for the updated base year.

Our emissions intensity is currently 7 tCO₂e per £m invested lower than where it would be if we were to follow a smooth path from 2019 to our 2025 ambition of a 25% reduction. It is over 3 tCO₂e per £m invested lower than the smooth path to our 2030 ambition of a 50% reduction.

Figure 15: Actual emissions intensity vs. targets



The change from 2021 (reported in our 2022 TCFD Report) was primarily driven by reduced intensities within our Global Emerging Market (GEMs) equities portfolio (which has a high carbon intensity), the corporate component of our Emerging Market debt portfolio, and an increased weight in property (which, because of the way its carbon intensity is measured, has a very low carbon intensity) relative to other assets. For example, in our GEMs portfolio we sold some of our cement holdings. As cement is a very carbon-intensive sector, this contributed to the reduction in the overall GEMs carbon footprint and intensity.

While we are currently ahead of our trajectory, as discussed last year, we are aware that our decarbonisation rate is 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 shown tramlines (as illustrated in Figure 15) to illustrate how our carbon footprint might vary over time.

Metrics and targets

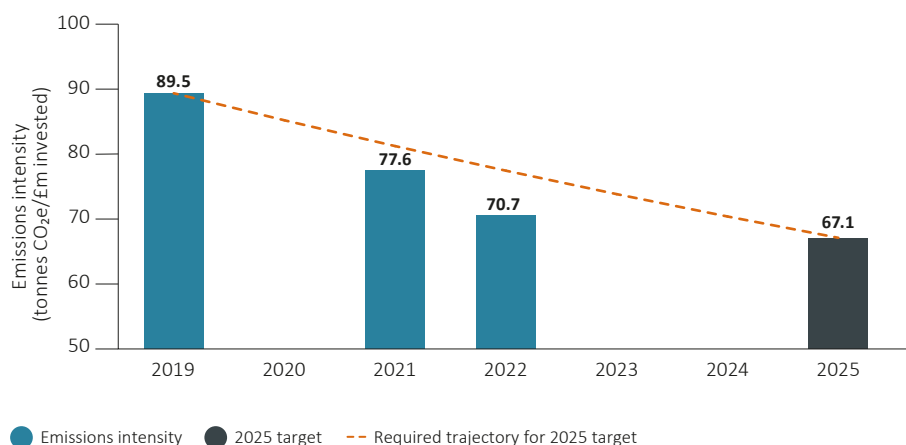
Continued

7.5 Targets and progress

Continued

In a more simplified graphic (see Figure 16), you can see that following our restatement of 2019 and 2021 data, and including 2022 data, we are below the trajectory required to achieve our revised 2025 interim target.

Figure 16: Trajectory to our 2025 target



Our emissions intensity as at 31 December 2022 was 21% lower than in 2019 and our estimated financed emissions are down 26%. This implies that the scheme's forward glidepath over the next three years will need to achieve a reduction of 1.7% annually. This is based on a 2022 figure of 70.7 and a 2025 target of 67.1. For our 2030 target of 44.8, the required reduction rate is now 5.6% per year.

It is also worth noting that the emissions intensities of our assets are not equally spread across different asset classes. As Table 8 below illustrates, the emissions associated with our Credit portfolio are significantly higher per £ invested than other asset classes, in particular our private assets.

Table 8

Values	Credit	Equity	PMG
2022 AUM (£)	4,145,791,783	13,677,359,287	28,590,910,059
2022 emissions (tCO₂e)	592,810	1,265,375	1,424,719
Intensity (tCO₂e/£m)	143.0	92.5	49.8

Our Credit (corporate debt) portfolio invests across a wide range of companies, including oil, gas and mining companies, whereas our Private Market assets tend to be invested in less carbon-intensive assets.

Finally, it is also worth noting that small underlying changes can have a much larger than expected impact on carbon footprints. The following table shows the impact on the scheme's carbon intensity from small changes to exposure to a Chinese cement stock and an Emerging Market Debt manager:

Table 9

Asset	Scheme allocation	Contribution to scheme intensity
Chinese Cement Company	+1bp	+100bps
EM Credit Manager	+35bps	+700bps

Given the significance individual assets or funds can have in contributing to the scheme's carbon exposure, it makes sense to focus resources on the small number of managers or assets where transition is likely to be most needed.

8 Our future plans

We established our ambition for our investments to be Net Zero in May 2021, produced our first mandatory TCFD Report in 2022 and, as you can see from this Report, have continued to improve our investment practices with respect to climate-related risks, building on the policies and processes put in place to deliver on that ambition.

Delivering our ambition to achieve Net Zero for our investments by 2050, along with our associated interim targets, is a complex matter. It requires nothing less than a shift in how the world produces and uses energy – a transition away from fossil fuels to low-carbon alternatives. This will take time, as policymakers, companies, civil society and investors such as USS work through what this means.

Our 2022 carbon footprint seems to indicate that we are on track to achieve

our interim targets (to cut the emissions intensity of the companies in our portfolio by 25% by 2025 and by 50% by 2030 relative to the 2019 baseline). However, our 2025 target is just a milestone on the path to deliver Net Zero, and arguably it will become more difficult to deliver carbon reductions over time. As such, we recognise that we will need to do more to ensure that the reductions we deliver are sustainable and that we establish the processes to deliver our ambition in the future.



We are always looking for opportunities to both add to and maximise the value of our investments in climate solutions.

We plan to take the following five steps to continue our progress in delivering Net Zero.

<p>1. Improved integration</p>	<p>We will continue to improve the integration of carbon and other climate data, including transition planning, into our investment decision making and stewardship processes across all asset classes. One area we plan to focus on is our Credit (corporate debt) portfolios – we hold corporate debt in both public and private companies. In general, credit managers are finding it more complex to integrate climate into their investment processes. The nature of this asset class also means that fund managers have less influence over companies as they are not technically owners, so they do not have, for example, the ability to vote at company meetings. So, in many ways, credit investors are largely like banks in that they simply provide finance directly to companies.</p>
<p>2. Stewardship of our assets</p>	<p>As is common in diversified portfolios, a large proportion of our emissions are concentrated in a small number of investments. This means we can have the largest impact on reducing global emissions by engaging with our highest emitters around their carbon footprint.</p> <p>Using the data we have obtained from our carbon footprinting and other sources (for example, our work with private equity and other private markets managers), we will continue to focus on the more carbon-intensive assets and their managers (if externally managed). This includes, for example:</p> <ul style="list-style-type: none"> • Engaging with our external private markets managers that hold companies in the top 100 contributors to the carbon footprint in the PMG portfolio to ensure that climate risks are being addressed • Continuing to engage with the top equities’ emitters • Working with the Credit team to reduce their intensity as it is the highest across all the asset classes <p>Finally, where engagement is ineffective, or emissions reduction is not feasible, we can seek alternative investments that offer similar return characteristics for our members at a lower carbon cost.</p>

Our future plans

Continued

<p>3. Improved scenario analysis</p>	<p>We believe that climate-related scenario analysis can be made more relevant to investment decision making. To explore this, we will continue to work with the University of Exeter on improving the utility of climate scenario analysis for pension fund decision making. This includes assessing whether we can bring the scenario analysis closer to industrial sectors or even individual companies, as well as building in climate tipping points and focussing on more likely or realistic scenarios – for example, the Inevitable Policy Response scenario. Once this work is complete, we plan to make the outcomes public, contributing to the debate and helping other funds to tackle the same issue.</p>
<p>4. Improved data collection and management</p>	<p>Restating our carbon footprints from 2019 and 2021 has reinforced to us the importance of both collecting the most accurate data we can, and how we manage and use those data.</p> <p>The collection and analysis of climate-related data – including not only footprint but also transition data – is extremely complex and time consuming. We need systems that not only enable us to report accurately on our carbon and climate exposures but, more importantly, provide our investment teams with the data they need to integrate these factors into their investment process and stewardship activities.</p> <p>To date this has been highly manual, driven by our Quant Equities team. We are planning to accelerate automating the production of carbon data and analysis, which will result in greater consistency in both the production and analysis of data.</p>
<p>5. Allocating our assets</p>	<p>We will increase allocation to renewables and other low-carbon assets where possible, and we are always looking for opportunities to both add to and maximise the value of our investments in climate solutions. This includes energy infrastructure like wind farms and solar PV installations.</p> <p>In addition to the climate ‘tilt’ introduced to £5bn of equity investments, we are also allocating another tranche of developed market equities to a Long-Term Real Return (LTRR) strategy, which will have a lower carbon footprint than the broad equity market. Its approach looks for high-quality companies with resilient revenues, high margins, high returns on capital and low leverage. The portfolio will naturally screen out high-carbon-intensity assets such as utilities, steel companies, cement companies and the oil and gas sector.</p>

“

In conclusion, we believe that the activities outlined above will help us continue to deliver our Net Zero ambitions. The Trustee Board and executive of USS are committed to delivering the changes required, so that we both manage climate change risks effectively and look for opportunities. We very much want to see a world worth retiring into, and will aim to deliver both the pensions our members expect and a low-carbon future.



9 Glossary

AUM	Assets Under Management. An amount of money managed or invested.	Physical risks	Physical risks are those that relate to the physical impacts associated with a changing climate, such as temperature effects on productivity, and increase in frequency and severity of extreme weather events.
Carbon dioxide equivalent (CO₂e)	Metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential.	Science Based Target initiative (SBTi)	An initiative providing companies with a clearly defined path to reduce emissions in line with the Paris goals.
Carbon footprint	A carbon footprint refers to greenhouse gases (GHG) associated with some particular activity, investment or portfolio, measured in terms of the amount of GHGs emitted per £m invested.	Scope 1 emissions	Emissions from sources that an organisation owns or controls directly – for example, from burning fuel in a fleet of vehicles.
Climate tipping point	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.	Scope 2 emissions	Emissions that a company causes indirectly when the energy it purchases and uses is produced. The generation of electricity, for example, would fall into this category.
Double counting	Double counting occurs when the emissions from one entity are accounted for more than once, for example, the emissions of an airline being included in the emissions of an airport.	Scope 3 emissions	Emissions that are not produced by the company itself but those that it is indirectly responsible for, up and down its value chain. An example would be the emissions associated with holiday flights: these emissions would be Scope 3 for the oil and gas company that provides the aircraft's fuel.
Emissions intensity: tCO₂e per £m invested	Tonnes of CO ₂ equivalent emitted per million pounds of USSIM investments. This is a method of apportioning carbon emissions to the amount invested by USSIM.	Sovereign debt/ non-sovereign debt	Sovereign refers to the debt issued by governments (for example, UK gilts) to fund their activities. Non-sovereign assets are all other investments including company, equity and debt, and property.
ESG	Environmental, Social and Governance.	Stewardship	The responsible management and oversight of investments to create long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society. It involves the use of a range of approaches including engagement, voting and advocacy to encourage change in corporate behaviour.
Financed emissions	An estimate of the emissions generated as a result of the scheme's investments.	Transition risk	Risks associated with the pace and extent at which an organisation manages and adapts to the internal and external pace of change to reduce GHG and transition to a renewable, Net Zero carbon economy. Transition risk impacts are driven by the combination of policy drivers and technological innovation. They allow for feedback loops such as (carbon) tax revenue recycling as well as interactions within and between sectors and regions.
Greenhouse gases (GHGs)	The six gases listed in the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride. These contribute to the greenhouse effect and climate change.		
Paris Agreement	A legally binding international treaty on climate change, signed in Paris in December 2015. Its overarching goal is 'to hold the increase in the global average temperature to well below 2°C above pre-industrial levels' and pursue efforts 'to limit the temperature increase to 1.5°C above pre-industrial levels'.		
Paris aligned	Activities, for example financing or emissions targets, consistent with the objectives of the Paris Agreement.		



For members, for the future.

