Rio Tinto 2009 Pension Fund

Climate change report

A report for members by the Trustee of the Fund

Year ending 31 March 2023

Why have we written this report?

The UK has become the first G20 country to make it mandatory for Britain's largest companies and financial organisations to disclose their climate-related risks and opportunities.

This report provides members the opportunity to find out more about the work carried out by the Trustee in relation to climate change.

It is the first climate change report by the Trustee of the Fund. We hope you find it informative and would welcome any feedback.

Tim Wilcox
Chairman

Overview

The Trustee of the Rio Tinto 2009 Pension Fund (the "Trustee") views climate change to be a potential financial risk for the Fund, over both the short and longer term. It represents a systemic risk to society, the economy and the financial system, although the transition to a low carbon economy also presents opportunities for investors.

These risks and opportunities have the potential to impact the Fund's investments, the financial health of the sponsoring employer and the Fund's funding positions. The Trustee monitors this potential impact and has taken steps to reduce climate-related risks on behalf of members.

This report describes how the Trustee has identified, assessed and managed climate-related risks and opportunities to the Rio Tinto 2009 Pension Fund (the "Fund") during the year to 31 March 2023.

Contents

Published for the Fund year to 31 March 2023 and available at:
https://epa.towerswatson.com/accounts/riotinto/

Key findings

Governance

Climate change has been a key focus for the Trustee over the year. The Trustee has a robust framework for managing the Fund, including setting clear expectations and responsibilities in relation to climate change.

- Clear roles and responsibilities have been defined by the Trustee, as set out in its Climate Governance Statement, and the Trustee is supported by its advisers on climate-related matters.
- The Trustee incorporates its beliefs and policies on climate-related risks into its Statement of Investment Principles, which helps to define the investment strategy for the Fund.
- The Trustee has committed to the regular monitoring and assessment of the climate-related risks and opportunities that are relevant to the Fund, to ensure that its fiduciary and statutory obligations are being met.

Strategy and Risk Management

The Trustee has taken steps to identify and assess climate-related risks and opportunities relating to the Fund and considered the potential impact on the Fund's investment and funding strategy.

- The Trustee recognises that the Fund faces risks and opportunities from both the physical effects of change in the climate, and from the effects of transitioning to a lower carbon economy.
- The Trustee has carried out detailed climate scenario analysis to assess how the Fund may be affected under different climate scenarios, from an investment, funding and covenant perspective. Given the very strong funding position, and low risk investment strategy in place as a result, the funding position is expected to remain strong under all of the climate scenarios considered. There are also not expected to be any further contributions from Rio Tinto given the strong funding position, therefore climate risks faced by Rio Tinto are unlikely to impact the Fund's journey plan.
- In addition, the Trustee regularly reviews the Fund's investment managers' climate practices. The Trustee was comfortable with the assessment of the investment managers' climate practices during the Fund year.
- The Trustee has integrated monitoring of climate-related risks and opportunities into the Fund's wider risk management framework, from an investment, funding and covenant perspective.
- Once the Trustee has identified and assessed the climate-related risks and opportunities for the Fund, it takes a number of different steps to monitor and manage these, including using stewardship and engagement to improve outcomes, where possible.

Metrics and Targets

The Trustee is committed to monitoring and managing climate-related risks and opportunities to the Fund and has set climate-related targets for the Fund's assets.

- The Trustee has collected and reviewed information about the greenhouse gas emissions, carbon footprint, and alignment of the Fund's assets with science-based targets to help it understand the Fund's exposure to climate risks. The Trustee has also reviewed the quality of data provided. At the time of writing, some of the data requested from the Fund's managers was unavailable. We have included further details on the missing data and the steps the Trustee is taking to address this issue later in this report.
- The Trustee has set a target to improve data coverage for its real assets and alternative credit holdings to at least 80% by 2025. The Trustee will monitor progress against this target and provide updates on an annual basis.

Developments since 31 March 2023

- Since the end of the Fund year, the Trustee has purchased a bulk annuity policy with Rothesay Life to cover all of the Fund's pension liabilities. This bulk annuity policy now represents the vast majority of the Fund's assets, with surplus assets invested in a combination of cash and alternative credit.
- As a result, analysis of the Fund's current position would be different to the analysis shown in this paper which covers the Fund year to 31 March 2023.
- The Trustee considered Rothesay Life's approach to managing climate related risks before entering into the bulk annuity policy and was comfortable it has a suitable approach.

Section 1 - Governance

Climate change has been a key focus for the Trustee over the year

The Trustee believes that climate change represents a potential financial risk to the Fund, alongside other environmental, social and governance ("ESG") considerations. However, given the plans strong funding position and low risk investment strategy, the Trustee does not believe climate risk is likely to be financially material. The Trustee has committed appropriate time and resources to ensure that its objectives in this area have been met. This has been driven by the Trustee's belief regarding the potential impact of climate-related risks and opportunities on the Fund, as well as the need to ensure compliance with the Trustee's legal obligations in relation to climate change.

The Trustee undertakes training when necessary to ensure it has sufficient knowledge and understanding of climate change, and related risks and opportunities. These sessions typically include an update on recent developments, with interim training on any time-critical developments, and training in support of specific agenda items at the relevant Trustee, Investment, Funding, and Covenant ("IFC") Committee or Administration, Governance, and Operations ("AGO") Committee meetings. Regular monitoring is carried out by the Trustee's investment advisers on the Fund's investment managers, and these will continue on an ongoing basis. The Trustee also regularly discusses, questions and challenges the information it receives. Examples of steps the Trustee has taken to broaden its knowledge and understanding of climate change include training on climate scenario analysis and climate metrics provided by the Trustee's investment advisers, with robust challenge and discussion from the Trustee. The Trustee also receives an annual report on the responsible investment credentials of the Fund's investment managers from its investment advisers, as well as a quarterly update on any notable manager developments, which are discussed at the quarterly IFC Committee meetings.

Roles and responsibilities

In June 2022, the Trustee agreed a full Climate Governance Statement, which clearly lays out the division of responsibilities between: the Trustee; the Trustee Chair; the AGO Committee; the IFC Committee; its actuarial, investment, covenant and legal advisers; and its investment managers. In particular, the IFC Committee has a wide range of responsibilities to review and challenge information provided by its investment advisers, and then make recommendations to the Trustee as appropriate at the quarterly Trustee meetings. This enables the Trustee to maintain appropriate oversight of the climate-related risks and opportunities relevant to the fund so that the Trustee can be confident that its statutory and fiduciary obligations are being met. The Climate Governance Statement provides further detail on this and is included in Appendix 1.

The role of the Trustee

The Trustee has ultimate responsibility for ensuring effective governance of climate change risks and opportunities in relation to the Fund. This is done by the Trustee Board with support from the AGO and IFC committees, to which the Trustee has delegated consideration of some climate-related matters.

The Trustee has also appointed various advisers to provide support and advice in assisting the Trustee with all aspects of the Fund's governance activities including in relation to climate-related risks and opportunities.

As the Trustee has ultimate responsibility for Fund governance activities, its role is to review and discuss any information, decisions and proposals that have been made by its advisers. Having done so, the Trustee Directors will then confirm or amend any decisions or proposals made, and ensure the decisions are implemented appropriately.

The Trustee also works closely with its advisers in identifying, assessing, monitoring and managing climate-related risks and opportunities.

Further details regarding the role of the Trustee, its governance committees and its advisers are set out in Appendix 1.

The Trustee ensures climate change is addressed throughout the Fund's activities

The Trustee's primary role in respect of climate-related risks and opportunities is to oversee the identification, assessment and management of these risks and opportunities that are relevant to the Fund. It does this by reviewing, discussing and, where appropriate, challenging the information and advice it receives.

The Trustee has established processes to satisfy itself that adequate steps are being taken and that third parties are taking adequate steps to identify, assess and manage those risks and opportunities. These are set out in Appendix 1.

The Trustee regularly seeks input from its advisers to ensure that it and its relevant sub-committees are informed about and are able to identify, assess and manage climate risks and opportunities, and have the necessary knowledge and understanding of climate change to fulfil their statutory and fiduciary obligations. At one or more meetings each year, the Trustee, with the help of the IFC committee, will review the climate competency of its advisers and take appropriate action if any concerns are identified. Whenever reviewing agreements with external advisers, or appointing new advisers, the Trustee will consider and document the extent to which the advisers' climate-related responsibilities are included in the agreements and / or any adviser objectives set.

The Trustee's ongoing investment adviser, LCP, is a member of a number of bodies, such as the Institutional Investors Group on Climate Change, Investment Consultants Sustainability Working Group, Net Zero Investment Consultant Initiative, and Pensions for Purpose. LCP is also a signatory to the Stewardship Code.

With appropriate advisers in place, the Trustee and relevant governance committees will also consider climate-related risks and opportunities as part of any less frequent reviews, such as the actuarial valuation process, investment strategy review and assessment of the sponsoring employer's covenant.

The Trustee ensures that the Fund's actuarial, investment, covenant and legal advisers:

- are set clearly defined responsibilities in respect of climate change;
- have adequate expertise and resources, including time and staff, to carry these out;
- are taking adequate steps to identify and assess any climate-related risks and opportunities which are relevant to the matters on which they are advising; and
- are adequately prioritising climate-related risk.

Section 1 - Governance

How the Trustee incorporates climate-related risks into its Statement of Investment Principles

The Trustee incorporates its beliefs and policies on climate-related risks into their Statement of Investment Principles, which helps to define the investment strategy for the Fund.

Climate beliefs within the Statement of Investment Principles

"ESG factors are sources of risk to the Fund's investments, which could be financially material over both the short and longer term. The Trustee seeks to appoint investment managers who will manage these risks appropriately on their behalf and from time to time review how these risks are being managed in practice.

The Trustee has selected two ESG themes as priorities to provide a focus for its monitoring of investment managers' voting and engagement activities.

> *Climate change - the Trustee believes climate change to be a potential source of financial risk that could have an impact on member outcomes over the short-, medium-, and long-term as a result of the impact of the physical and transition risks on markets and, therefore, investors.*
>
> *Corporate transparency - the Trustee believes that transparency helps to identify risks that could affect company (and ultimately investment fund) performance. A lack of transparency can also mask exposure to other ESG risks that could have potential reputational consequences for companies and affect company performance.*

The Trustee believes stewardship is an appropriate tool to utilise when trying to manage and mitigate the risks identified above as well as other ESG risks. The Trustee has communicated these stewardship priorities to its investment managers and also confirmed its more general expectations in relation to ESG factors and voting and engagement activities, specifically how these factors are taken into account when making investment decisions with the aim of improving risk-adjusted returns."

"The Trustee has determined that ESG factors should be taken into account in the selection, retention and realisation of investments, given the time horizon of the Fund and its members in line with the following principles.

> *The Trustee ensures prospective managers incorporate ESG issues into their investment approach, where possible, by making this part of the selection process.*
>
> *The Trustee has delegated responsibility for the selection and management of investments to its Investment Managers. This includes consideration of financially material considerations (including climate change and other ESG considerations where relevant). The Trustee will seek to appoint managers that have appropriate skills and processes to do this, and from time to time review how its Investment Managers are taking account of these issues in practice."*

Section 2 – Strategy

Introduction

The Trustee has implemented a number of processes and tools for identifying, assessing and managing climate-related risks and opportunities, including climate scenario analysis, monitoring of metrics and targets and stewardship, as well as ensuring its advisers have processes in place to help it research its investment managers' climate-related practices.

The tools are used to identify the key risks that the Trustee should focus on. The Trustee then ensures that these risks are incorporated into its investment decision processes as well as into the covenant and funding processes. Climate-related risks are also included in the Trustee's risk register to ensure all risks are being monitored and managed consistently and proportionately.

The Trustee has used climate scenario analysis as a key tool for identifying, assessing and managing climate-related risks and opportunities. In particular, it has used the analysis to identify the time horizons over which the physical risks and transition risks could materialise. It has then considered what the possible impacts of climate change could be over each of these time horizons and whether the current funding and investment strategies are likely to be robust against these risks (or are able to take advantage of any opportunities).

Climate scenario analysis was carried out in November 2022, using scenario sets as at 30 June 2022 and market conditions as at 30 September 2022. The Trustee will carry out scenario analysis at least every three years and check annually if the review should be carried out sooner.

The results of the analysis influence the integrated risk management of the Fund through specific investment and funding focused considerations and the interaction of these.

Section 2 – Strategy

Identification and assessment of climate-related risks and opportunities relevant to the Fund

The Fund faces risks and opportunities from both the physical effects of short-term and long-term changes in the climate itself – for example, rising temperatures and more frequent storms or flooding – and from the effects of transitioning to a lower carbon economy to limit the extent of climate change – for example, government policies to restrict or discourage the use of fossil fuels, technological advances in renewable energy, and shifts in consumer demand towards "greener" products.

Many of these climate-related risks and opportunities could affect the value of the Fund's assets. Others could affect the sponsor and its ability to provide financial support to the Fund. Some may also affect the Fund's liabilities, for example through affecting members' life expectancy or the inflationary increases made to pensions each year. Climate change could therefore impact the Fund's funding level over time. This was considered within the climate-scenario analysis undertaken by the Trustee.

Time horizons relating to the Fund

The time periods that the Trustee has chosen as short, medium and long term for considering the climate-related risks and opportunities faced by the Fund are set out below.

Time horizons	
Short term	**3 years** – aligns with the usual triennial decision making processes around valuation dates
Medium term	**7 years** – broadly the timescale to expected peak cashflow for the Fund
Long term	**15 years** – aligned with the approximate duration of aggregate liabilities

The Trustee will review these time periods on a regular basis, for example following a material change in membership characteristics.

Section 2 – Strategy

How the Trustee identifies climate-related risks and opportunities

The Trustee seeks to develop its knowledge and understanding of climate change and related risks via training sessions to ensure it is able to identify risks and opportunities that may affect pension schemes and their investments.

The Trustee has received advice from its advisers on how the investment strategy, funding position and sponsor may be affected by climate-related factors. The Trustee then uses a variety of tools to assess the factors it identifies. These include:

- Climate-scenario analysis – undertaking scenario analysis to consider how the Fund may be affected under a range of different climate scenarios and implications for its funding and investment strategies (more detail set out on page 12 and in Appendix 3).

- Assessing investments – The Trustee, with support from its ongoing investment adviser, LCP, periodically considers (including during the Fund Year) the investment mandates it has set in the context of climate-related risks and opportunities. LCP carries out assessments of current and prospective investments and managers, and reports findings to the Trustee. Manager assessments include consideration of climate practices, incorporation of climate-related factors into the investment process and the effectiveness of the management of climate-related risks (more detail set on page 12).

- Covenant review – the Trustee periodically asks its covenant adviser to provide a report on the strength of the covenant and its ability to support the Fund, including how the covenant could be impacted by climate related risks (more detail set out on page 12).

- Monitoring a range of climate-related metrics in relation to the Fund's assets (more detail in Section 4).

The tools are used to identify the key risks that the Trustee should focus on. The Trustee then ensures that these risks are integrated into its investment decision processes and the covenant and funding processes. They are also included in the Trustee's risk registers to ensure all risks are being monitored and managed consistently and proportionately.

The Trustee has identified a range of climate-related risks and opportunities to the Fund

The Trustee has identified and assessed the risks and opportunities to the Fund within each of these time horizons, as summarised below. These risks and opportunities are considered further in the following sections where we discuss further the Trustee's approach to investment, covenant and funding risks and opportunities.

	Risks	*Opportunities*
Short term	**Exposure to climate-related investment risks may be highest while the Fund retains an allocation to growth assets**	**De-risking will reduce the climate-related risks of the Fund further**
Medium term	**Market volatility could cause investment losses and increase timeframe to be able to fully insure liabilities**	**Climate-aware credit mandates could increase the resilience of assets to climate risks**
Long term	**Cost to fully insure liabilities may increase as insurers allow for climate-related risks in their pricing and reserving bases**	**Insuring the Fund's liabilities would be expected to provide greater protection from climate risks for members' benefits**

The Trustee has also identified additional risks relating to the insurance market and the potential implications for fully insuring liabilities:

- **Potential impact on insurance pricing** – in addition to a direct allowance for climate-related risks, the cost of insuring benefits may also be affected by the amount insurers hold in reserve to cover shortfalls caused by these risks.
- **Potential impact on insurers' capacity to meet benefit payments** – climate-related risks could increase the chance that insurers will be unable to pay members their full benefits as promised. This risk is mitigated, however, by regulation, insurer reserves and the financial services compensation scheme, which protect against insurer default.

Section 2 – Strategy

Assessing climate-related risks and opportunities

Climate Scenario Analysis

Scenario analysis is a tool for examining and evaluating different ways in which the future may unfold. During the year, the Trustee used scenario analysis to consider how climate change might affect the Fund's assets and liabilities, funding and investment strategies.

The Trustee has used climate scenario analysis as a key tool for identifying, assessing and managing climate-related risks and opportunities. In particular, it has used the analysis to identify the time horizons over which the physical risks and transition risks could materialise. It has then considered what the possible impacts of climate change could be over each of these time horizons and whether its current funding and investment strategies are likely to be robust against these risks (or able to take advantage of any opportunities).

Climate scenario analysis was carried out for the Fund in November 2022, using scenario sets as at 30 June 2022 and market conditions as at 30 September 2022.

The results of the climate scenario analysis are included in the integrated risk management of the Fund through specific investment and funding focused considerations and the interaction of these. The climate scenario analysis indicated that the Fund's funding position was expected to remain resilient under all climate pathways and timeframes considered, reflecting the low risk investment strategy in place. The Fund's potential exposure to climate risk has been further reduced following the purchase of the bulk annuity policy in August 2023 covering all of the Fund's liabilities, reducing the risk that poor investment performance could result in the Fund not being able to make benefit payments as they fall due. The Trustee will continue to monitor the impact of climate-related risks on the Fund's residual assets. Further information on the results of the climate scenario analysis and modelling approach has been included in Appendix 3.

Assessment of managers' practices

In March 2023 the Trustee, with the support of LCP, its investment adviser, carried out a high-level review of the Fund's managers' climate credentials to identify where the Fund could have the greatest impact on managing climate risks.

While the scenario analysis considered how the Fund might be affected by macro-level climate impacts, the manager assessment considered the portfolio exposures at asset class and manager level.

The Trustee did not identify any issues with the Fund's managers. It wrote to two of its managers in 2022 to encourage them to improve their approaches to managing climate-related risk, and has satisfied itself in the latest assessment that sufficient improvements have been made.

Managers with strong climate expertise and sound climate processes may be able to outperform through taking advantage of market mispricing or investing in companies that are well placed for the climate transition.

Covenant review

The Trustee periodically asks its covenant adviser to provide a report on the strength of the covenant and its ability to support the Fund, including how the covenant could be impacted by climate related risks.

The latest report was completed in May 2023. The report highlighted that:

- Rio Tinto is committed to reducing emissions in accordance with the Paris Agreement.
- The projected cost of meeting emission reduction targets between 2022 and 2030 is $7.5bn, which represents a financially feasible investment for a company of Rio Tinto's size.
- Rio Tinto's climate-related risks are generally medium to long-term in nature

Given the Fund's strong funding position, particularly now that the Trustee has purchased a bulk annuity policy with Rothesay Life to cover all of the Fund's pension liabilities, there are not expected to be any further contributions from Rio Tinto. Therefore climate risks faced by Rio Tinto are unlikely to impact the Fund's journey plan.

Section 3 – Risk Management

How the Trustee monitors climate-related risks and opportunities

The Trustee has established various processes to identify, assess and manage climate-related risks and opportunities in relation to the Fund, and has integrated these within the overall risk management of the Fund. Below we set out some of the Trustee's processes for monitoring risks in more detail:

- **Monitoring within the Fund's wider risk management framework**
  Climate-related risk is specified within the Trustee's risk register to ensure risks are considered on a regular basis, and also in the context of wider risks to the Fund. Risks are regularly assessed according to impact and likelihood, and an overall risk score is assigned, with mitigating actions and next steps then identified to ensure risks are managed and controlled, based on this score.

  The Trustee also considers climate risk within its integrated risk framework and, as part of this, considers risks to the Fund's funding and covenant, supported by the Trustee's advisers.

- **Monitoring climate-related metrics and Fund-specific targets**
  The metrics and targets that the Trustee uses to monitor climate-related risks and opportunities for the Fund are set out in Section 4.

- **Monitoring advisors' and managers' investment practices**
  The Trustee sets objectives for their investment advisers and meets with the Fund's managers on a regular basis. As part of these assessments, consideration is given to support given to the Trustee in managing climate-related risks to the Fund and identifying opportunities. The Fund's investment advisers and investment managers are assessed against their respective objectives regularly.

  LCP, the Trustee's ongoing investment adviser, reports on the Fund's managers' integration of ESG (including climate change risk and opportunities) for each investment mandate used. This typically occurs once every two years. It also presented to the Trustee a paper setting out climate-related risks and considerations of how these can be managed in the context of the Fund's current investment strategy.

- **Review of monitoring and governance framework**
  The Trustee will consider the processes and governance framework it has in place for identifying, assessing and monitoring climate-related risks and opportunities on a regular basis to ensure it remains appropriate and useful.

Section 3 – Risk Management

How the Trustee manages climate-related risks and opportunities

Once the Trustee has identified and assessed the climate-related risks and opportunities for the Fund, it takes a number of different steps to manage these and uses a number of tools and metrics to assess these. These steps include:

- Maintaining strong governance processes and reviewing these regularly;
- Regularly reviewing risks as part of the Fund's integrated risk management approach;
- Ensuring that the Fund's managers incorporate climate risks as part of their investment process;
- Considering whether the Fund's investment managers support relevant climate initiatives;
- Undertaking climate scenario analysis periodically;
- Considering climate-related risks as part of investment strategy discussions and investment manager appointments (when relevant);
- Monitoring metrics for measuring and assessing climate risk, and monitoring progress of them over time;
- Setting a specific target for one of the Fund's climate metrics, and monitoring progress over time;
- Exercising effective stewardship to encourage improved outcomes;

Engagement and Stewardship

The Trustee recognises that investment managers' climate competence and practices are crucial for managing the climate-related risks to the Fund's assets, so the Trustee assesses and monitors these on an ongoing basis. The Trustee seeks to be a responsible steward of the Fund's assets and is currently in the process of evolving its stewardship policies.

In particular, the Trustee has identified climate change as one of its stewardship priorities and will communicate this to its investment managers. Voting and engagement activities are delegated to the individual investment managers. Each manager has its own ESG policy, which includes assessment of climate-related risks and policies on voting on climate-related resolutions.

In order to monitor how the individual investment managers are exercising their voting rights and undertaking engagement on behalf of the Trustee, the Trustee meets with the Fund's investment managers to engage with them on how they have considered ESG issues (including climate change) within their stewardship activities and will seek to challenge the investment managers on these matters where this is considered to be in the best interests of members.

More information on the Trustee's stewardship activities can be found in the Fund's Implementation Statement.

Section 4 – Metrics and Targets

Metrics

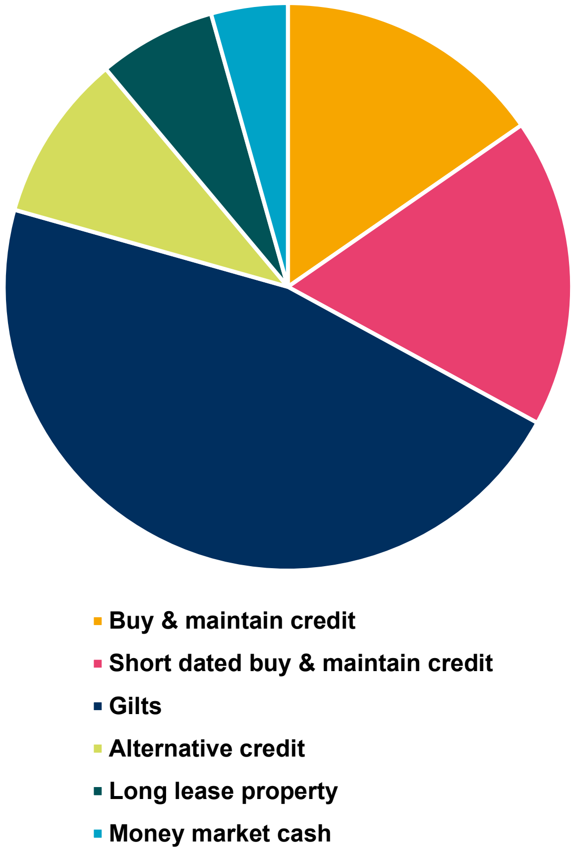
The Trustee has chosen four climate-related metrics to help them monitor climate-related risks and opportunities to the Fund. These are listed below and reported overleaf (as far as the Trustee was able to obtain the data). The data has been calculated using portfolio holdings as at 30 June 2022, using the most recent data available from the Fund's investment managers.

Metric	High-level methodology
Absolute emissions:	The sum of each company's most recent reported or estimated greenhouse gas emissions attributable to the Fund's investment in the company, where data is available. Emissions are attributed evenly across equity and debt investors, reported in tonnes of CO_2 equivalent. This methodology was chosen because it is in line with the statutory guidance.
Emissions intensity:	The total greenhouse gas emissions described above, divided by the value of the invested portfolio in £m, adjusted for data availability. Emissions are attributed evenly across equity and debt investors, reported in tonnes of CO_2 equivalent per £1m invested. This methodology was chosen because it is in line with the statutory guidance.
Portfolio alignment:	The proportion of the portfolio by weight of holdings with science-based targets to reduce their greenhouse gas emissions, demonstrated by a target validated by the Science Based Targets initiative (SBTi) or equivalent. This measures the extent to which the Fund's investments are aligned to the Paris Agreement goal of limiting global average temperature rises to 1.5°C. Reported in percentage terms. The Trustee chose this "binary target" measure because it is the simplest and most robust of the various portfolio alignment metrics available.
Data quality	The proportion of the portfolio for which greenhouse gas emissions data is verified, reported, estimated or unavailable. "Verified" emissions refers to data reported by the emitting company and verified by a third party. "Reported" emissions are reported by the emitting company but not verified. This approach was chosen because it is in line with the statutory guidance.

Portfolio metrics data

The data has been calculated using portfolio holdings as at 30 June 2022 (unless otherwise stated), using the most recent data available from the Fund's investment managers at that time. As at 30 June 2022, the total emissions coverage for the Fund was 68%.

Asset allocation as at 30 June 2022



Asset class (% of portfolio)	Details of missing data or estimations
Buy & maintain credit (15%)	All information was provided by the manager.
Short dated buy & maintain credit (18%)	
Gilts (46%)	Calculated by LCP using the methodology set out on page 33.
Alternative credit (10%)	Climate data is generally lagging in private market investments, due to lower disclosure requirements, a lack of resources and responsible investment practices that lag public market strategies. Direct lending managers have also not previously considered climate-related risks to be material given the relatively short holding period of their assets.
Long lease property (7%)	The managers were unable to provide data on SBTi alignment as this approach is not yet widely adopted in private real asset markets.
Money market cash (4%)	The manager was unavailable to provide emissions data as at the date of analysis. As this is a relatively new requirement for investment managers to provide this information, we understand it could take time for some managers to gather the relevant data and put in place the necessary reporting systems and processes to provide this information to investors.

Section 4 – Metrics and Targets

Manager, asset class and valuation (£m)			Scope 1, 2 and 3 emissions (for holdings with data)			Portfolio alignment	Data source	Date of emissions data
			Coverage	Total emissions (tCO_2e)[1] Scopes 1 and 2 / 3	Carbon footprint ($tCO_2e/£m$)[1] Scopes 1 and 2 / 3	Proportion with SBT (%)		
Alcentra	**Alternative credit**	25.1	34%	10 / Not provided	0.4 / Not provided	34%	Manager	31/03/22
Partners Group	**Alternative credit**	158.0	Not provided	Not provided	Not provided	Not provided	Not provided	n/a
abrdn	**Long lease property**	74.3	84%	0 / 962	0.0 / 12.9	Not provided	Manager	31/12/21
M&G	**Long lease property**	54.2	81%	0 / 1,110	0.0 / 22.7	Not provided	Manager	31/12/20
PIMCO	**Buy & maintain credit**	103.7	Not provided	Not provided	Not provided	Not provided	Not provided	n/a
Insight	**Buy & maintain credit**	190.5	52%	3,791 / 31,623	19.9 / 166.0	34%	Manager	31/03/22[2]
Insight	**Short dated buy & maintain credit**	337.4	57%	6,377 / 54,321	18.9 / 161.0	34%	Manager	31/03/22[2]
Legal & General	**Gilts[3]**	889.7	100%	176,507 / 120,904	198.4 / 135.9	100%	LCP	31/12/18
State Street Global Advisors	**Money market cash**	83.6	Not provided	Not provided	Not provided	Not provided	Not provided	n/a

[1]Figures relate only to the assets for which data is available. Total emissions are for the Fund's assets, not the whole pooled fund. Total carbon emissions have been calculated as at the latest available date using the tonnes CO_2e per £1 million multiplied by assets as at that same date.

[2] With the exception of SBTi alignment data, which is as at 30 June 2022.

[3]Gilts metrics are calculated on a different basis to other mandates shows, so cannot be compared with them. Total greenhouse gas emissions have been calculated as ("value of the Fund's investment in gilts" divided by "value of the UK's public debt") multiplied by "total greenhouse gas emissions produced in the UK" using publicly available data sources. The carbon footprint has been calculated as "total greenhouse gas emissions produced in the UK" divided by "value of the UK's public debt". This is a measure of the UK's reliance on greenhouse emissions. There can be issues of double counting across the portfolio where UK country emissions double count UK company emissions already accounted for within the credit portfolio.

Metrics and Targets

Target

The Trustee has set the following target:

Target	Coverage
To improve data coverage for real assets and alternative credit to at least 80% by 2025 in relation to the Fund’s holdings	Real assets and alternative credit

Following the Trustee’s decision to purchase a bulk annuity policy with Rothesay Life to cover all of the Fund’s pension liabilities, the bulk annuity policy now represents the vast majority of the Fund’s assets, with surplus assets invested in a combination of cash and alternative credit. The Trustee is therefore comfortable that this target remains appropriate as the alternative credit allocations are expected to be held by the Fund for several more years as the underlying loans mature. Having assessed the metrics and targets information provided by the Fund’s investment managers, it was apparent to the Trustee that the main issue was a lack of data coverage across its alternative credit and real asset portfolios. Therefore, the Trustee decided it was sensible to focus on improving data coverage for these mandates in the first instance to improve its ability to analyse climate-related risks and opportunities within the Fund’s surplus asset holding.

Initial performance against the target

The property and alternative credit data coverage was low as at 30 June 2022, which is why the Trustee has set a specific target to improve this data coverage to help better assess climate related risks and opportunities for these mandates.

The following steps are being taken to achieve the target:

- The Trustee, with help from its investment consultant, will communicate the target to its real assets and alternative credit managers.
- Investment managers are routinely invited to present at Trustee meetings as part of the existing monitoring process. When meeting with the investment managers, the Trustee will ask the manager how they expect data coverage to improve over time and encourage them to evolve their data collections and reporting practices.
- The Trustee will review progress towards the target each year and consider whether additional steps are needed to increase their chance of meeting the target.

Appendices

Appendix 1 – Climate governance statement

The Trustee of the Rio Tinto 2009 Pension Fund (the "Trustee") has ultimate responsibility for ensuring effective governance of climate change risks and opportunities in relation to the Fund. This statement documents the governance processes the Trustee has put in place to ensure that it has oversight of the climate-related risks and opportunities relevant to the Fund and that it can be confident that its statutory and fiduciary obligations are being met.

Overview of approach

Climate change represents a potential financial risk to the Fund. It represents a systemic risk to society, the economy, and the financial system, although the transition to a low carbon economy also presents opportunities. These risks and opportunities have the potential to impact the Fund's investments, sponsoring employer and funding position. The Trustee identifies, assesses, and manages them, with some matters delegated to the Investment, Funding, and Covenant ("IFC") Committee and the Administration, Governance, and Operations ("AGO") Committee, and with support from the in-house benefits team and the Trustee's external advisers.

Trustee knowledge and understanding

It is essential that the Trustee has sufficient knowledge and understanding of climate change, and related risks and opportunities, to fulfil its statutory and fiduciary obligations. The Trustee reviews its skills and experience regularly and within this exercise, will consider what climate change training is likely to be required over the coming year, incorporating training sessions as appropriate. These sessions typically include an update on recent developments, with interim training on any time-critical developments, and training in support of specific agenda items at the relevant Trustee, IFC Committee or AGO Committee meetings.

Full details of the training undertaken is documented in the Trustee's training log.

Roles and responsibilities

Trustee Chair

It is the Trustee Chair's responsibility, with support from the IFC Committee Chair and the AGO Committee Chair, as well as the in-house benefits team, to ensure that sufficient time is taken for consideration and discussion of climate matters by the Trustee, the two sub committees and its advisers.

Trustees

In broad terms, the Trustee is responsible for:

- ensuring the Trustee has sufficient knowledge and understanding of climate change to fulfil their statutory and fiduciary obligations, and are keeping this knowledge and understanding up to date. This includes knowledge and understanding of the principles relating to the identification, assessment, and management of climate-related risks and opportunities for the Fund;
- putting effective climate governance arrangements in place;
- incorporating climate-related considerations into strategic decisions relating to the Fund's funding arrangements;

Appendix 1 – Climate governance statement

- incorporating climate-related considerations into the risk register, monitoring framework and contingency planning;
- allowing for climate-related considerations when assessing and monitoring the strength of the sponsoring employer's covenant;
- ensuring that the Plan's actuarial, investment, covenant, and legal advisers have clearly defined responsibilities in respect of climate change, that they have adequate expertise and resources, including time and staff, to carry these out, that they are taking adequate steps to identify and assess any climate-related risks and opportunities which are relevant to the matters on which they are advising, and that they are adequately prioritising climate-related risks;
- considering and documenting the extent to which the advisers' responsibilities are included in any agreements, such as investment consultants' strategic objectives and service agreements;
- reviewing the covenant update from the covenant adviser, noting any changes to how climate related risks and opportunities may affect the Fund's sponsoring employer; and
- communicating with Fund members and other stakeholders on climate change where appropriate, including public reporting in accordance with The Occupational Pension Schemes (Climate Change Governance and Reporting) Regulations 2021, The Occupational and Personal Pension Schemes (Disclosure of Information) Regulations 2013 (together "TCFD reporting"[1]) when required.
- reviewing and commenting on the Trustee's TCFD report, which will be communicated to Fund members.

The Trustee has delegated consideration of some climate-related matters to its IFC Committee and AGO Committee, as outlined below.

IFC Committee

In broad terms, the IFC Committee is responsible for:

- incorporating climate-related considerations into strategic decisions relating to the Fund's investments, before recommending these to the Trustee;
- incorporating climate-related considerations into its investment beliefs and the Fund's investment policies before recommending these to the Trustee;
- ensuring that the Fund's investment managers are managing climate-related risks and opportunities in relation to the Fund's investments, and have appropriate processes, expertise and resources to do this effectively;
- determining the short-, medium- and long-term periods to be used when identifying climate-related risks and opportunities for the Fund;

[1] Note that, for convenience, this Governance Statement refers to the reporting requirements under the climate regulations (which are based on the recommendations of the Taskforce on Climate-related Financial Disclosures) as "TCFD reporting", although in practice it is recognised that the recommendations of the TCFD may change over time and may not always be aligned with the statutory requirements applying to the Fund.

- identifying and assessing the main climate-related risks and opportunities for the Fund over these time periods and documenting the management of them; and
- selecting and regularly reviewing metrics to inform the Trustee‘s identification, assessment and management of climate-related risks and opportunities, and setting and monitoring targets to improve these metrics over time where appropriate.

In addition, the IFC Committee assists the Trustee where appropriate concerning the fulfilment of its responsibilities outlined in the section above, including but not limited to the investment aspects of:

- incorporating climate-related considerations into the Fund’s risk register and contingency planning and monitoring framework; and
- considering and documenting the extent to which the advisers’ responsibilities are included in any agreements, such as investment consultants’ strategic objectives and service agreements.

AGO Committee

In broad terms, the AGO Committee is responsible for:

- considering and proposing to the Trustee appropriate climate governance processes, particularly as they relate to compliance with the TCFD regulations.

In addition, the AGO Committee assists the Trustee where appropriate concerning the fulfilment of its responsibilities outlined in the section above, including but not limited to:

- communicating with Fund members and other stakeholders on climate change where appropriate, including TCFD reporting.

Actuarial adviser

In broad terms, the Fund’s actuarial adviser is responsible, as requested by the Trustee, for:

- advising how climate-related risks and opportunities might affect the Fund’s funding position over the short-, medium-, and long-term, and the implications for the Fund’s funding strategy, long-term objective, and journey plan; and
- working with the Trustee’s other advisers to assist the Trustee in incorporating climate change in its governance arrangements, risk register, contingency planning and monitoring framework, and communication with stakeholders (including, but not limited to, its TCFD reporting) as appropriate.

Appendix 1 – Climate governance statement

Investment advisers

In broad terms, as requested by the Trustee, the Fund’s investment advisers will:

- provide training and other updates to the Trustee, as appropriate, on relevant climate-related matters;
- help the Trustee to formulate its investment beliefs in relation to climate change and reflect these in the Fund’s investment policies and strategy;
- advise how climate-related risks and opportunities might affect the different asset classes in which the Fund might invest over the short-, medium- and long-term, and the implications for the Fund’s investment strategy and journey plan;
- advise the Trustee on the appropriateness and effectiveness of the Fund’s investment managers’ processes, expertise and resources for managing climate-related risks and opportunities, given the Trustee’s investment objectives and beliefs, and engage with the managers to improve their climate-related integration over time;
- assist the Trustee in incorporating climate change in their investment monitoring;
- advise on the inclusion of climate change in the Fund’s governance arrangements and risk register, and contingency planning and monitoring framework, working with the Trustee, the IFC Committee, and the other advisers as appropriate;
- assist the Trustee in identifying, monitoring, and using suitable climate-related metrics and targets in relation to the Fund’s investments, including liaising with the Fund’s investment managers regarding provision of the metrics; and
- lead on the preparation of the Trustee’s TCFD reporting and assist with other communication with stakeholders in relation to climate change, working with the Trustee and its other advisers as appropriate.

Covenant adviser

In broad terms, the Fund’s covenant adviser is responsible, as requested by the Trustee, for:

- considering in periodic covenant reviews how climate-related risks and opportunities might affect the Fund’s sponsoring employer over the short-, medium-, and long-term, and the implications for the Fund’s journey plan;
- noting in the Fund’s covenant monitoring any changes in the policies and practices of the sponsoring employer relating to climate change, and the employer’s progress against any climate-related targets it has set, working with the Trustee and its other advisers as appropriate; and
- working with the Trustee’s other advisers to assist the Trustee in incorporating climate change in its governance arrangements, risk register, contingency planning and monitoring framework and communication with stakeholders (including, but not limited to, its TCFD reporting), as appropriate.

Appendix 1 – Climate governance statement

Legal adviser

In broad terms, the Fund's legal adviser is responsible, as requested by the Trustee, for:

- providing training and other updates to the Trustee on relevant climate-related legal matters;
- ensuring the Trustee is aware of its statutory and fiduciary obligations in relation to climate change and working with the Trustee's other advisers to ensure alignment between these obligations and:
    - any Trustee formulation of its investment beliefs in relation to climate change; and
    - the identification and monitoring of climate-related metrics and targets in relation to the Fund's investments;
- working with the Trustee's other advisers to assist the Trustee in incorporating climate change in its governance arrangements, risk register, contingency planning and monitoring framework, and communication with stakeholders (including, but not limited to, its TCFD reporting) as appropriate; and
- where requested, assisting in the documentation of any contractual requirements to be included in the arrangements with the Fund's investment managers with respect to the governance, management, and reporting of climate-related matters.

Investment managers

In broad terms, the Fund's investment managers are responsible for:

- identifying, assessing, and managing climate-related risks and opportunities in relation to the Fund's investments, in line with the investment management arrangements agreed with the Trustee
- exercising rights (including voting rights) attaching to the Fund's investments, and undertaking engagement activities in respect of those investments, in relation to climate-related risks and opportunities in a way that seeks to improve long-term financial outcomes for Fund members;
- reporting on stewardship activities and outcomes in relation to the Fund's investments, wherever feasible; and
- providing information to the Fund's investment advisers on climate-related metrics in relation to the Fund's investments, as agreed from time to time, and using its influence with investee companies and other parties to improve the quality and availability of these metrics over time.

Any other providers, including those involved in project work, to take climate factors into account when carrying out their role in relation to the Fund.

Appendix 1 – Climate governance statement

Nature and frequency of monitoring

The Trustee and relevant governance committees consider a range of different information about the climate change risks and opportunities faced by the Fund to enable it to fulfil its responsibilities set out above.

Quarterly review

At its regular meetings each quarter, the IFC Committee will receive and review updates on the Fund's investments from the Fund's investment advisers.

Relevant documents will incorporate climate-related risks and opportunities as appropriate, in accordance with the roles and responsibilities set out above.

Annual review

At one or more meetings each year, the Trustee reviews, revises (where appropriate), and approves:

- its governance arrangements in relation to climate change;
- its draft TCFD reporting; and
- a draft business plan for the following year that outlines the main topics due to be discussed at each Board and committee meeting, including climate-related topics, and the papers expected from advisers in relation to each item.

At one or more meetings each year, the IFC Committee will review and may propose revisions to the Trustee (where appropriate) to:

- the Trustee's draft business plan for the following year that outlines the main topics due to be discussed at each Board and committee meeting, including climate-related topics, and the papers expected from advisers in relation to each item.
- its investment beliefs and the Fund's investment policies in relation to climate change as set out in the Statement of Investment Principles;
- a responsible investment report from the Fund's investment advisers that reviews the Fund's investment managers in relation to environmental, social and governance (ESG) factors and climate change;
- data on ESG metrics for the Fund's investments from its investment advisers, including at least three climate-related metrics, and performance against any targets set in relation to these metrics;
- whether to retain or replace any targets set in relation to these metrics;
- whether it is appropriate to carry out scenario analysis that illustrates how the Fund's assets and liabilities might be affected under various climate change scenarios, in years when this is not required because it has been carried out within the previous two years; and

- the advisers' climate competency and assess how they have performed against their climate responsibilities.

At one or more meetings each year, the AGO Committee will review and may propose revisions to the Trustee (where appropriate) to:

- the Trustee's draft business plan for the following year that outlines the main topics due to be discussed at each Board and committee meeting, including climate-related topics, and the papers expected from advisers in relation to each item;
- governance arrangements, as they pertain to climate governance (notably compliance with the TCFD regulations); and
- the Trustee's draft TCFD reporting.

Less frequent reviews

The Trustee and relevant governance committees will consider climate-related risks and opportunities at least every three years whenever the following activities are undertaken:

- review of the Fund's investment strategy;
- actuarial valuation of the Fund; and
- assessment of the sponsoring employer's covenant.

The Trustee, with the help of the IFC Committee, will also at least every three years, and following any major changes in the Fund's position, review:

- its choice of short-, medium-, and long-term time periods to be used when identifying climate-related risks and opportunities to the Fund;
- the results of scenario analysis that illustrates how the Fund's assets might be affected under various climate change scenarios, and the implications for the resilience of the Fund's investment strategies; and
- its choice of metrics to inform its identification, assessment, and management of climate-related risks and opportunities.

Whenever reviewing agreements with external advisers, or appointing new advisers, the Trustee will consider and document the extent to which the advisers' climate-related responsibilities are included in the agreements and / or any adviser objectives set.

Review of this statement

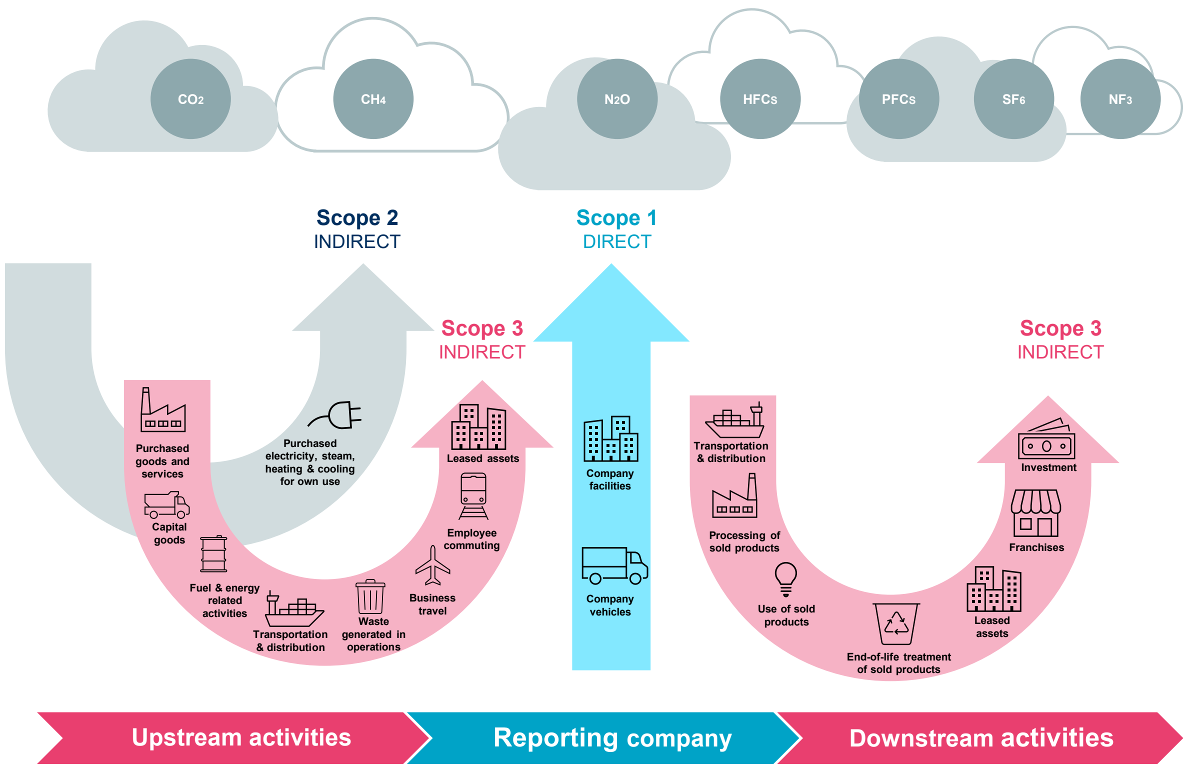
The Trustee approved this statement in June 2022. It will review this statement at least annually.

Appendix 2 – Greenhouse gas emissions explained

Within the ‘metrics and targets’ section of the report, the emissions metrics relate to seven greenhouse gases – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). The figures are shown as “CO_2 equivalent” (CO_2e) which is the amount of carbon dioxide that would be equivalent to the excess energy being stored by, and heating, the earth due to the presence in the atmosphere of these seven greenhouse gases.

The metrics related to greenhouse gas emissions are split into the following three categories: Scope 1, 2 and 3. These categories describe how directly the emissions are related to an entity’s operations, with Scope 1 emissions being most directly related to an entity’s everyday activities and Scope 3 referring to indirect emissions in an entity’s value chain. Scope 3 emissions often form the largest share of an entity’s total emissions, but are also the ones that the entity has least control over.

- **Scope 1** greenhouse gas emissions are all direct emissions from the activities of an entity or activities under its control.
- **Scope 2** greenhouse gas emissions are indirect emissions from electricity purchased and used by an entity which are created during the production of energy which the entity uses.
- **Scope 3** greenhouse gas emissions are all indirect emissions from activities of the entity, other than scope 2 emissions, which occur from sources that the entity does not directly control.



Source: GHG Protocol

Appendix 3 – Climate scenario analysis

Scenarios considered and why the Trustee chose them

The Trustee carried out climate scenario analysis using market conditions as at 30 September 2022 with the support of their investment consultants, LCP. The analysis looked at three possible scenarios:

Transition	Description	Why the Trustee chose it
Failed Transition	Global net zero carbon emissions not reached by 2050; only existing climate policies are implemented and temperatures rise significantly.	To explore what could happen to the Fund's finances if carbon emissions continue at current levels and this results in significant physical risks from changes in the global climate that disrupt economic activity.
Orderly Net Zero by 2050	Global net zero carbon emissions is achieved by 2050; rapid and effective climate action (including using carbon capture and storage), with smooth market reaction.	To see how the Fund's finances could play out if global net zero carbon emissions are achieved by 2050, meaning that the economy makes a material shift towards low carbon by 2030.
Disorderly Net Zero by 2050	Same policy, climate and emissions outcomes as the Orderly Net Zero scenario, but financial markets are initially slow to react and then react abruptly.	To look at the risks and opportunities for the Fund if global net zero carbon emissions is achieved by 2050, but financial markets are volatile as they adjust to a low carbon economy.

The Trustee acknowledges that many alternative plausible scenarios exist, but found these were a helpful set of scenarios to explore how climate change might affect the Fund in future.

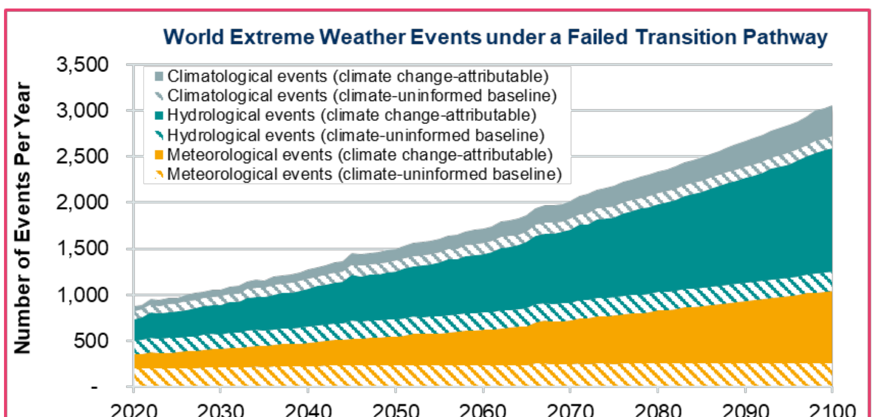
To provide further insight, the Trustee also compared the outputs under each scenario to a "climate uninformed base case", that makes no allowance for either changing physical or transition risks in future.

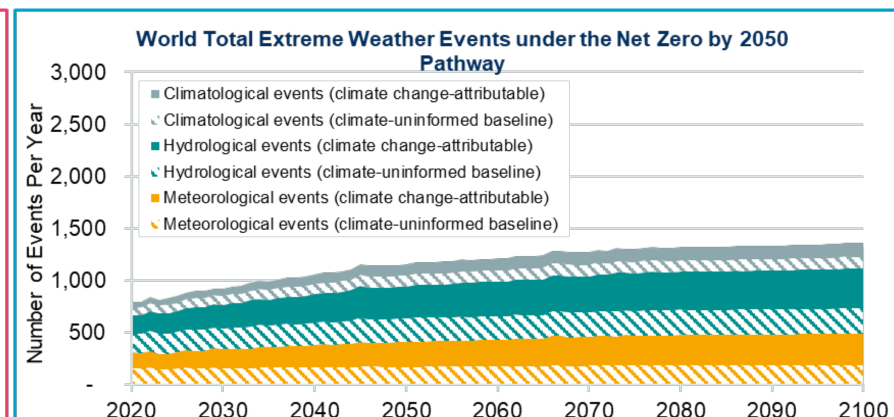
The scenarios' key features are summarised on the next page.

These scenarios show that equity markets could be significantly impacted by climate change with lesser but still noticeable impacts in bond markets. All three scenarios envisage, on average, lower investment returns and these result in a worse funding position.

The climate scenarios considered by the Trustee

Scenarios:	***Failed Transition***	***Orderly Net Zero by 2050***	***Disorderly Net Zero by 2050***
Low carbon policies	Continuation of current low carbon policies and technology trends (eg significant falls in renewable energy prices).	Ambitious low carbon policies, high investment in low-carbon technologies and substitution away from fossil fuels to cleaner energy sources and biofuel. Carbon Capture and Storage also used to achieve global Net Zero by 2050.	
Paris Agreement outcome	Paris Agreement goals not met.	Global net zero achieved by 2050; Paris Agreement goals met.	
Global warming	Average global warming is about 2°C by 2050 and 4°C by 2100, compared to pre-industrial levels.	Average global warming stabilises at around 1.5°C above pre-industrial levels.	
Physical impacts	Severe physical impacts.	Moderate physical impacts.	





Source: Ortec Finance, modelling as at 30 June 2022. The scientific and policy aspects of the modelling are based on information as at 31 December 2021.

Appendix 3 – Climate scenario analysis

Modelling approach

- The scenario analysis is based on a model developed by Ortec Finance and Cambridge Econometrics. The outputs were then applied to the Fund's assets and liabilities by LCP, the Trustee's investment adviser.
- The three climate scenarios are projected year by year, over the next 40 years.
- The results are intended to help the Trustee to consider how resilient the funding and investment strategy are to climate-related risks.
- The Trustee discussed how future planned changes to the investment strategies would change the analysis.
- The three climate scenarios chosen are intended to be plausible, not "worst case". They are only three scenarios out of countless others which could have been considered. Other scenarios could give better or worse outcomes for the Fund.
- The results discussed in this report have been based on macro-economic data at 30 June 2022, calibrated to market conditions at 30 September 2022.

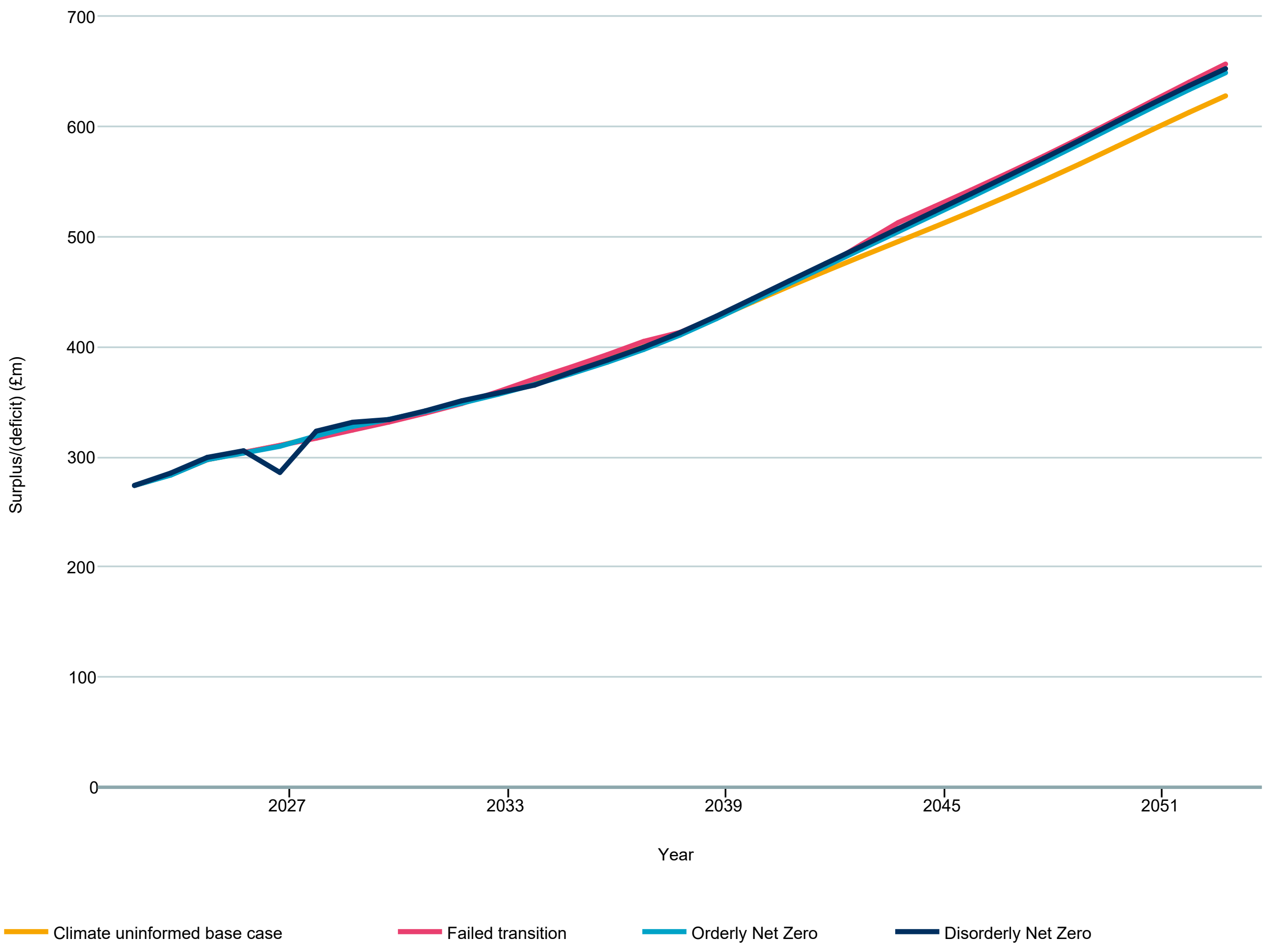
For more information about the modelling approach, see page 32.

Modelling limitations

- As this is a "top-down" approach, investment market impacts were modelled as the average projected impacts for each asset class. This contrasts with a "bottom up" approach that would model the impact on each individual investment held by the Fund's investment portfolio. As such, the modelling does not require extensive scheme-specific data and so the Trustee was able to consider the potential impacts of the three climate scenarios for all of the Fund's assets.
- In practice, the Fund's investments may not experience climate impacts in line with the market average.
- The asset and liability projections shown are as at 30 September 2022, adjusted to reflect expected changes in 2023. No allowance is made for changes that might be made to the funding or investment strategy as the climate pathways unfold, nor for action to be taken in response to the Fund achieving its long-term funding target.
- Like most modelling of this type, the modelling does not allow for all potential climate-related impacts and therefore is quite likely to underestimate some climate-related risks. For example, tipping points (which could cause runaway physical climate impacts) are not modelled and no allowance is made for knock-on effects, such as climate-related migration and conflicts.

Appendix 3 – Climate scenario analysis

The Fund is significantly de-risked, so the impacts of climate change on the funding position are expected to be limited over all future time horizons. At an individual level, assets and liabilities may experience shocks, but these are not expected to deteriorate funding positions significantly. The impact would be even smaller if the Trustee agrees to move to insurance policies for either fund.



Long term funding position

The Trustee has discussed the possible impact of climate change on the Fund's long term funding position. In particular, the Trustee considered how the impact of climate-related risks could cause the funding surplus to vary under differing scenarios over all time horizons. In addition, the Trustee considered how climate change risks could affect insurer pricing for securing pension benefits. A change in insurer pricing levels could have a significant impact on when it will be feasible to secure benefits with an insurer.

Impact of climate change on life expectancy

If a member lives longer, the Fund pays the member's pension for longer and therefore needs more assets to make the payments. Like the economic impacts, the impact of climate change on life expectancy is highly uncertain. For example, in the Paris Orderly scenario, the reduced use of fossil fuels should lead to lower air pollution, increasing life expectancy. But this effect could be countered by economic prosperity generally being lower in this scenario, and this may limit the funding available for healthcare.

Analysis is shown on a Technical Provisions basis. The projections are as at 30 September 2022 using climate scenario information from 30 June 2022.

Appendix 3 – Climate scenario analysis

Modelling approach – more details

- The scenario analysis is based on the ClimateMAPS model developed by Ortec Finance and Cambridge Econometrics, and was then applied to the Fund's assets and liabilities by LCP. The three climate scenarios were projected year by year, over the next 40 years.
- ClimateMAPS uses a top-down approach that consistently models climate impacts on both assets and liabilities, enabling the resilience of the funding strategy to be considered. The model output is supported by in-depth narratives that bring the scenarios to life to help the Trustee's understanding of climate-related risks and opportunities.
- ClimateMAPS uses Cambridge Econometrics' macroeconomic model which integrates a range of social and environmental processes, including carbon emissions and the energy transition. It is one of the most comprehensive models of the global economy and is widely used for policy assessment, forecasting and research purposes. The outputs from this macroeconomic modelling – primarily the impacts on country/regional GDP – are then translated into impacts on financial markets by Ortec Finance using assumed relationships between the macroeconomic and financial parameters.
- Ortec Finance runs the projections many times using stochastic modelling to illustrate the wide range of climate impacts that may be possible, under each scenario's climate pathway. LCP takes the median (ie the middle outcome) of this range of impacts, for each relevant financial parameter, and adjusts it to improve its alignment with LCP's standard financial assumptions.
- LCP then uses these adjusted median impacts to project the assets and liabilities of the Fund to illustrate how the different scenarios could affect its funding level. The modelling summarised in this report used scenarios based on the latest scientific and macro-economic data at 30 June 2022, calibrated to market conditions at 30 September 2022.
- The modelling included contributions assumed to be paid in line with the current Schedule of Contributions, and the Trustee discussed how future changes to the Fund's investment strategy would change the analysis. No allowance was made for changes to the investment strategy or contributions in response to the climate impacts modelled.
- As this is a "top-down" approach, investment market impacts were modelled as the average projected impacts for each asset class, ie assuming that the Fund's investments are affected by climate risk in line with the market-average portfolio for the asset class. This contrasts with a "bottom up" approach that would model the impact on each individual investment held in the Fund's investment portfolio. As such, it does not require extensive scheme-specific data and so the Trustees were able to consider the potential impacts of the three climate scenarios for all of the Fund's assets.
- In practice, the Fund's investment portfolio may not experience climate impacts in line with the market average. The Trustee considers, on an ongoing basis, how the Fund's climate risk exposure differs from the market average using climate metrics (which are compared with an appropriate market benchmark) and its annual responsible investment review which considers the investment managers' climate approaches.
- The Trustee notes that the three climate scenarios chosen are intended to be plausible, not "worst case", and the modelling is based on median outcomes. It therefore illustrates how the centre of the "funnel of doubt" surrounding funding projections might be affected by climate change. It does not consider tail risks within that funnel, nor does it consider how the funnel might be widened by the additional uncertainties arising from climate change. In addition, only three scenarios out of infinitely many have been considered. Other scenarios could give better or worse outcomes for the Fund.
- Uncertainty in climate modelling is inevitable. In this case, key areas of uncertainty relating to the financial impacts include how climate change might affect interest rates and inflation, and the timing of market responses to climate change. ClimateMAPS, like most modelling of this type, does not allow for all climate-related impacts and therefore, in aggregate, is quite likely to underestimate the potential impacts of climate-related risks, especially for the Failed Transition scenario. For example, tipping points (which could cause runaway physical climate impacts) are not modelled and no allowance is made for knock-on effects, such as climate-related migration and conflicts.

Appendix 4 – Data on climate-related metrics

UK government bonds

GHG emissions for government bonds (gilts) are calculated on a different basis from the other asset classes, so cannot be compared with the other emissions figures shown.

The emissions figures were calculated by LCP, the Trustee's investment adviser, using publicly available data sources. As suggested in the statutory guidance, Scope 1+2 emissions have been interpreted as the production-based emissions of the country. Scope 3 emissions have been interpreted as the emissions embodied in goods and services imported by the country and consumed within the country (rather than re-exported).

In line with guidance from the Partnership for Carbon Accounting Financials (PCAF) issued in December 2022, emissions intensity has been calculated as:

$$\frac{UK\ GHG\ emissions}{PPP - adjusted\ GDP\ for\ the\ UK}.$$

GHG emissions have then been calculated as: $Emissions\ intensity\ *\ value\ of\ the\ Fund's\ investment\ in\ gilts.$

Appendix 5 – Glossary

Actuarial valuation – an actuarial valuation is an accounting exercise performed to estimate future liabilities arising out of benefits that are payable to members of a DB pension scheme, typically once every three years. In the actuarial valuation exercise, a liability payout at a future date is estimated using various assumptions such as discounting rate and salary growth rate.

Alignment – in a climate change context, alignment is the process of bringing greenhouse gas emissions in line with 1.5°C temperature rise targets. It can be applied to individual companies, investment portfolios and the global economy.

Asset class – a group of securities which exhibit broadly similar characteristics. Examples include equities and bonds.

Avoided emissions – these are reductions in greenhouse gas emissions that occur outside of a product's life cycle of value chain, but as a result of the use of that product. For example, emissions avoided through use of a wind turbine or buildings insulation.

Bond – a bond is a security issued to investors by companies, governments and other organisations. In exchange for an upfront payment, an investor normally expects to receive a series of regular interest payments plus, at maturity, a final lump sum payment, typically equal to the amount invested originally, or this amount increased by reference to some index.

Buy-in – DB pension scheme trustees may choose to "buy-in" some of their scheme's expected future benefit payments by purchasing a bulk (ie one covering many individuals) annuity contract with an insurance company. This allows the trustees to reduce their scheme's risk by acquiring an asset (the annuity contract) whose cash flows are designed to meet ie "match" a specified set of benefit payments under the pension scheme. The contract is held by the trustees and responsibility for the benefit payments remains with the trustees. Common uses of buy-in arrangements have been to cover the payments associated with current pensioners or a subset of those members. Contracts to meet payments to members who are yet to become pensioners can also be purchased.

Buy-out – DB pension scheme trustees may choose to "buy-out" some or all of their scheme's expected future benefit payments by purchasing a bulk (ie one covering many individuals) annuity contract from an insurance company. The insurer then becomes responsible for meeting pension benefits due to scheme members (effected ultimately by allocating to each scheme member an individual annuity contract). Following a full buy-out, (ie one covering all scheme members) and having discharged all of the trustees' liabilities, the pension scheme would normally be wound up.

Carbon emissions - These refer to the release of carbon dioxide, or greenhouse gases more generally, into the atmosphere, for example from the burning of fossil fuels for power or transport purposes.

Carbon footprint – In an investment context, the total carbon dioxide or greenhouse gas emissions generated per amount invested (eg in £m) by an investment fund. Related definitions are used to apply the term to organisations, countries and individuals

Climate change adaptation – steps taken to adapt to the physical effects of climate change such as improving flood defences and installing air conditioning.

Climate change mitigation – steps taken to limit climate change by reducing greenhouse gas emissions, for example by shifting to renewable sources of energy – such as solar and wind – and by using less energy and using it more efficiently.

Covenant – the ability and willingness of the sponsor to make up any shortfall between a DB scheme's assets and the agreed funding target.

Credit – long-term debt issued by a company, also know as corporate bonds. Corporate bonds carry different levels of credit risk which is indicated by their rating and credit spread.

Defined Benefit (DB) – a pension scheme in which the primary pension benefit payable to a member is based on a defined formula, frequently linked to salary. The sponsor bears the risk that the value of the investments held under the scheme fall short of the amount needed to meet the benefits.

Appendix 5 – Glossary

Debt – money borrowed by a company or government which normally must be repaid at some specified point in the future.

Environmental, social and governance (ESG) – an umbrella term that encompasses a wide range of factors that may have been overlooked in traditional investment approaches. Environmental considerations might include physical resource management, pollution prevention and greenhouse gas emissions. Social factors are likely to include workplace diversity, health and safety, and the company's impact on its local community. Governance-related matters include executive compensation, board accountability and shareholder rights.

Equity – through purchase on either the primary market or the secondary market, company equity gives the purchaser part-ownership in that company and hence a share of its profits, typically received through the payment of dividends. Equity also entitles the holder to vote at shareholder meetings. Note that equity holders are entitled to dividends only after other obligations, such as interest payments to debt holders, are first paid. Unlike debt, equity is not normally contractually repayable.

Ethical investment – an approach that selects investments on the basis of an agreed set of environmental, social and governance (ESG) criteria that are motivated by ethical considerations. These can be positive – eg choosing companies involved in water conservation or negative – eg not choosing companies involved in the arms trade.

Fiduciary obligations – a legal obligation of one party (a fiduciary) to act in the best interest of others. Fiduciaries are people or legal entities that are entrusted with the care of money or property on behalf of others. They include pension scheme trustees.

Fossil fuels – fuels made from decomposing plants and animals, which are found in the Earth's crust. They contain carbon and hydrogen, which can be burned for energy. Coal, oil, and natural gas are examples of fossil fuels.

Funding position – a comparison of the value of assets with the value of liabilities for a DB pension scheme.

Gilts – bonds issued by the UK government. They are called gilts as the bond certificates originally had a gilt edge to indicate their high quality and thus very low probability of default

Greenhouse gas (GHG) emissions (scopes 1, 2 and 3) – gases that have been and continue to be released into the Earth's atmosphere. Greenhouse gases trap radiation from the sun which subsequently heats the planet's surface (giving rise to the "greenhouse effect"). Carbon dioxide and methane are two of the most important greenhouse gases. See also Appendix 2.

Gross Domestic Product (GDP) – this is the value of all goods and services produced in a country over a given period, typically a year.

Investment mandate – see pooled mandate and segregated mandate

Integrated risk management – Integrated risk management is an approach used by DB pension scheme trustees to identify, manage and monitor the wide range of risks (relating to investment, funding and covenant) which might impact the chances of meeting their scheme's overall objectives

Liabilities – obligations to make a payment in the future. An example of a liability is the pension benefit 'promise' made to DB pension scheme members, such as the series of cash payments made to members in retirement. The more distant the liability payment, the more difficult it often is to predict what it will actually be and hence what assets need to be held to meet it.

LDI (Liability Driven Investment) – an investment approach which focusses more than has traditionally been the case on matching the sensitivities of a DB pension scheme's assets to those of its underlying liabilities in response to changes in certain factors, most notably interest rate and inflation expectations.

Net zero – this describes the situation in which total greenhouse gas emissions released into the atmosphere are equal to those removed. This can be considered at different levels, eg company, investor, country or global.

Appendix 5 – Glossary

Offsetting – the process of paying someone else to avoid emitting, or to remove from the atmosphere, a specified quantity of greenhouse gases, for example through planting trees or installing wind turbines. It is sometimes used to meet net zero and other emission reduction targets.

Paris Agreement – the Paris Agreement is an international treaty on climate change, adopted in 2015. It covers climate change mitigation, adaptation and finance. Its primary goal is to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels.

Physical risk – these are climate-related risks that arise from changes in the climate itself. They include risks from more extreme storms and flooding, as well as rising temperatures and changing rainfall pattens.

Pooled mandate – a feature of a collective investment vehicle whereby an investor's money is aggregated (ie "pooled") with that of other investors to purchase assets. Investors are allotted a share of those assets in proportion to their contribution. Ownership is represented by the number of "units" allocated – eg if the asset pool is worth £1m and there are 1m units then each unit is worth £1. Pooled funds offer smaller investors an easy way to gain exposure to a wide range of investments, both within markets (eg by buying units in a UK equity fund) as well as across markets (eg by buying units in both a UK equity fund and a UK corporate bond fund).

Portfolio alignment metric – this measures how aligned a portfolio is with a transition to a world targeting a particular climate outcome, such as limiting temperature rises to well below 2°C, preferably to 1.5°C, as per the Paris Agreement. Assessments using these metrics consider companies' and governments' greenhouse gas (GHG) emissions reduction plans and likelihood of meeting them, rather than current, or the latest reported, GHG emissions.

Purchasing Power Parity (PPP) – the PPP is a theory of long-term equilibrium in exchange rates based on relative prices. For example, if the price of a basket of goods in the UK is £100 and the same basket costs $200 in the USA, then the PPP exchange rate would be £1:$2. The PPP rate and the actual market exchange rate can differ.

Responsible Investment (RI) – the process by which environmental, social and governance (ESG) issues are incorporated into the investment analysis and decision-making process, and into the oversight of investments companies through stewardship activities. It is motivated by financial considerations aiming to improve risk-adjusted returns.

Science-based targets – targets to reduce greenhouse gas emissions that are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement.

Science-Based Targets initiative (SBTi) – an organisation that sets standards and provides validation for science-based targets set by companies and investors.

Scenario analysis – a tool for examining and evaluating different ways in which the future may unfold.

Scope 1, 2 and 3 – a classification of greenhouse gas emissions. See Appendix 2.

Segregated mandate – a segregated investment approach ensures that an investor's investments are held separately from those of other investors. This approach offers great flexibility – for example, the investor can stipulate the precise investment objective to be followed and can dictate which securities can or cannot be held.

Stakeholder – an individual or group that has an interest in any decision or activity of an organisation. The stakeholders of a company include its employees, customers, suppliers and shareholders.

Statutory obligations – statutory obligations are those obligations that do not arise out of a contract, but are imposed by law.

Stewardship – stewardship is the responsible allocation, management and oversight of capital to create long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society. It is often implemented via engagement with investee companies and exercising voting rights.

Appendix 5 – Glossary

Stranded assets – assets that have suffered an unanticipated loss of value before the end of their expected useful economic life. The term is most often applied to fossil fuel investments in the context of climate policy, where legislative and market developments may result in assets being worth less than the value recorded on company balance sheets.

Sustainable investing - an approach in which an assessment of the environmental and social sustainability a company's products and practices is a key driver in the investment decision. ESG analysis therefore forms a cornerstone of the investment selection process.

Taskforce on Climate-related Financial Disclosures (TCFD) – a group of senior preparers and users of financial disclosures from G20 countries, established by the international Financial Stability Board in 2015. The TCFD has developed a set of recommendations for climate-related financial risk disclosures for use by companies, financial institutions and other organisations to inform investors and other parties about the climate-related risks they face.

Transition risk – these are climate-related risks that arise from the transition to a low-carbon economy and can include changes in regulation, technology and consumer demand.