




# Aligning your Pension Scheme with the TCFD Recommendations

## Part III - Scenario analysis

January 2021

The Pensions Climate Risk Industry Group



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## What this section will cover

- An introduction to Scenario Analysis
- Expectations of trustees when adopting scenario analysis, including minimum legal requirements
- Different approaches to conducting scenario analysis
- Things to consider for different scheme types and sizes
- Which scenarios to use, how to analyse them and how to report them
- A scenario analysis case study

## Scenario Analysis – resilience of the pension scheme to different climate scenarios

### Key Considerations

- Scenario analysis is a key tool for testing the strategic resilience of the pension scheme to different future plausible climate states.
- Carrying out scenario analysis will be a required action under proposed regulations pursuant to changes made by the Pension Schemes Bill 2021. But even for schemes not in scope of that legislation, it will still be a valuable step in trustees meeting their broader legal duties to manage climate-related risks. It is therefore relevant for all pension schemes, whatever their size or circumstances.
- The TCFD recommendations for asset owners, including pension scheme trustees, requires them to consider how resilient the scheme's strategies are to a range of climate related scenarios, which illuminate the possible impacts of both transition and physical risks and opportunities. These should include transition to a lower-carbon economy consistent with a high probability of a temperature rise of less than or equal to 2°C.<sup>1</sup>
- A simple approach is for trustees to ask their asset managers for details of any climate scenario analysis they have carried out and actions taken as a result.
- There are also free tools and resources that trustees can use, such as The Paris Agreement Capital Transition Assessment (PACTA)<sup>2</sup>, the Prudential Regulation

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<sup>1</sup> The work of the TCFD, and the publication of its recommendations in July 2017, took place before the publication of the Intergovernmental Panel on Climate Change (IPCC)'s special report on Global Warming of 1.5°C in 2018. Since that IPCC report, the focus of the international community has increasingly been on limiting warming to 1.5°C, including in the UK Government's commitment to reach net zero emissions by 2050, and pension schemes would be well advised to keep this in mind when carrying out scenario analysis.

<sup>2</sup> <https://2degrees-investing.org/resource/pacta/>

Authority's (PRA)<sup>3</sup> stress test and guidance from The Institutional Investors Group on Climate Change (IIGCC)<sup>4</sup>. Alternatively, a consultant or a third-party provider can be asked to conduct the scenario analysis.

- It may be easiest to start with qualitative approaches that describe how climate-related impacts could crystallise over time. This should, however, be followed up with quantitative analysis as soon as practicable.
- Climate scenario modelling is inevitably subject to limitations due to the uncertainties and complexities involved. Trustees should not place too much weight on any single set of results, but instead use the analysis as a tool to build understanding of climate risks and make better-informed decisions.
- Analysis might initially focus on assets only and cover the impacts on limited asset classes, such as listed equities and corporate bonds. Over time, it should be extended to the rest of the scheme's assets and (for DB schemes) the impact on the liabilities, covenant, and funding position.
- In all cases, it is important that disclosures specify the scenarios used, methodology and related assumptions, as well as to state the conclusion regarding the strategic resilience of the scheme under different plausible scenarios.
- Climate scenario analysis tools and the information and data behind them are evolving rapidly. Trustees should keep developments under review and consider on an annual basis whether to update their analysis.

## 1 Introduction to climate scenario analysis

1. Scenario analysis is a well-established tool for understanding possible alternative futures, "challenging conventional wisdom about the future"<sup>5</sup>, and developing strategic plans that are more flexible or robust to a range of plausible future states. In a world of uncertainty, scenarios are intended to explore alternatives that may significantly alter "business-as-usual" assumptions.
2. For pension schemes, scenario analysis is the process of estimating the expected financial position after a period of time in different scenarios, and identifying mitigating actions to minimise the risks, or positive actions to exploit the opportunities under different scenarios. It might be carried out for a range of interest rates, exchange rates, or broader macroeconomic scenarios. In this guide, we outline the use of scenarios as a tool to help trustees assess and

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<sup>3</sup> <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2019/life-insurance-stress-test-2019-scenario-specification-guidelines-and-instructions>

<sup>4</sup> <https://www.iigcc.org/resource/navigating-climate-scenario-analysis-a-guide-for-institutional-investors/>

<sup>5</sup> Quote from page 2 of the TCFD technical supplement on "The use of scenario analysis in disclosure of climate-related risks and opportunities" (2017) <https://www.fsb-tcf.org/wp-content/uploads/2017/06/FINAL-TCFD-Technical-Supplement-062917.pdf>

manage the financially material risks that climate change may pose to their scheme.

3. Due to the nature of the risks posed by climate change, past performance of the markets cannot provide meaningful information about future impacts. Forward looking scenario analysis is therefore a key tool for assessing the risks and opportunities that climate change presents. In particular, scenario analysis might consider economic, environmental, social, technological and regulatory impacts.
4. Scenario analysis may include the consideration of stress testing, which can be a useful approach to understanding the potential impacts of a more extreme or more sudden re-pricing event (shock) linked to climate change, such as the introduction of more aggressive policies to accelerate the timeframe to becoming carbon neutral, which could have a significant impact on the outlook for certain asset classes and/or sectors.
5. The TCFD framework requires asset owners, including pension schemes, to use scenario analysis to assess their resilience to climate-related risks and opportunities, including:
  - asset-side changes such as potential earnings impairment or enhancement of companies in which they invest and to whom they lend – for example, as a result of transition policies, demand changes, physical impacts, and other factors such as litigation risks.
  - (in the case of DB schemes) liability-side changes such as inflation, interest rates, longevity and the strength of the sponsoring employer covenant.
6. Carrying out climate scenario analysis will be a required action under proposed regulations pursuant to changes made by the Pension Schemes Bill 2021. But even for schemes not in scope of that legislation, it will still be a valuable step in trustees meeting their broader legal duties to manage climate-related risks. It is therefore relevant for all pension schemes, whatever their size or circumstances. Light touch approaches are possible and may be appropriate for some schemes, such as smaller schemes with limited resources. Chapter 4 indicates how the approach adopted may vary depending on the scheme's circumstances.
7. Modelling of this type is inevitably subject to limitations due to the uncertainties surrounding climate change and the difficulties of modelling such a complex phenomenon. Whatever approach they adopt, trustees should bear in mind that climate scenario models are not forecasts or predictions. The model outputs will be highly uncertain, especially for longer range and more extreme scenarios, and so should not be used as the sole basis for investment decisions. Nonetheless, the modelling can be valuable in illustrating possibilities, building understanding, and helping trustees to make climate-informed investment and (for DB schemes) funding decisions.
8. Data, methodology and tools are evolving rapidly in the area of climate scenario analysis. Schemes should keep developments under review and consider on an annual basis whether to update their analysis. For small schemes, such a review

could be light touch, but larger schemes should consider a fuller update as models and portfolios change.

## **2 Expectations of trustees**

### **2.1 Getting started**

9. Trustees are already subject to a legal duty to manage climate-related risks. Carrying out scenario analysis in line with the TCFD recommendations will help trustees meet the minimum legal requirements in respect of climate change.
10. Chapter 3 outlines several approaches that trustees can use to conduct climate scenario analysis: asking your asset managers, appointing a consultant or third-party provider, or doing it yourself.
11. One place to start is by asking your asset managers and this is something all schemes should do. The managers' analysis is likely to be carried out at security level ("bottom-up") for each fund or mandate. Trustees should therefore seek ways of complementing this with consideration of scheme-level ("top-down") risks that arise from aggregation of portfolio-level impacts, macro-economic impacts and (for DB schemes) covenant and liability impacts. Such analysis may be done qualitatively at first, although trustees should improve the analysis over time and move to quantified approaches as soon as practicable.
12. It should be noted that all pension scheme modelling makes assumptions about climate change, even though these assumptions are usually implicit. When consultants present any modelling, trustees should ask them what allowance is being made for the physical and transition risks of climate change. Consultants should be able to justify their approach, including if they are making no allowance for risks beyond those already reflected in market prices.

### **2.2 Minimum requirements for large schemes**

13. Subject to consultation and approval by Parliament, regulations will come into force in October 2021 requiring trustees of schemes in scope of the measures to:
  - As far as they are able, undertake scenario analysis which assesses the potential impact on the scheme's assets and liabilities of the effects of the increase in temperature and the resilience of the scheme's investment strategy and, where it has one its funding strategy, in at least two global average temperature increase scenarios, one of which must be a scenario where the increase is by a temperature between 1.5 °C and 2 °C inclusive above pre-industrial levels.
  - In their annual TCFD report, describe the potential impacts on the scheme's assets and liabilities which they have identified and the resilience of the scheme's investment strategy and, in the case of DB schemes, funding strategy in at least two climate-related scenarios, including at least one scenario with an average temperature rise of between 1.5°C and 2°C inclusive.

14. Trustees would be required to undertake scenario analysis in the first scheme year during which they are subject to the climate change governance requirements in the regulations and every three years thereafter. However, in the intervening years, trustees would be required to review annually whether or not circumstances have changed such that they should carry out new scenario analysis before the end of the 3-year period. If they decide not to do so, the regulations would require them to explain why in their TCFD report.
15. The Government is consulting on accompanying draft statutory guidance<sup>6</sup> which sets out in further detail expectations regarding what trustees should do to fulfil these and other requirements. This includes the expectation that:
- For dual section hybrid schemes, scenario analysis should be carried out separately for the DB and DC sections of the scheme. (However, trustees would not need to carry out scenario analysis for a DC section that consists solely of Additional Voluntary Contributions).
  - For DC schemes, scenario analysis should be carried out for the default arrangement. For DC schemes with multiple default arrangements, trustees should as a minimum carry out scenario analysis for those defaults in which 250 or more members are directly invested, irrespective of whether they are actively contributing.

### **2.3 Best practice**

16. Some schemes will choose to go beyond the minimum requirements set out in regulations, although this may not be until their second year of TCFD reporting or later. They are likely to seek to address data shortcomings and modelling limitations identified in their initial rounds of climate scenario analysis. Trustees may wish to increase the sophistication and granularity of their modelling, incorporating the latest thinking from across the industry. They may find it helpful to compare results from several different models and increase the number of scenarios considered.

## **3 Choice of approach**

17. A variety of approaches to climate scenario analysis are available. When selecting their approach, trustees should consider:
- the resources available to them (e.g. the extent of in-house support and services offered by their consultants); and
  - their objectives for the modelling (e.g. increasing the trustees' understanding of the scheme's climate risk exposure; informing investment or funding strategy decisions; identifying ways of reducing climate risk exposure in their

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<sup>6</sup> <https://www.gov.uk/government/consultations/taking-action-on-climate-risk-improving-governance-and-reporting-by-occupational-pension-schemes>



most-exposed mandates; or identifying priority securities for stewardship activities).

18. Where resources are not available for all sectors or all assets, it may be best to begin by focusing on some higher risk sectors or asset classes and reporting on the assets which are considered – but working towards including all assets over time.
19. The rest of this section considers three choices: qualitative versus quantitative analysis; top-down versus bottom-up models; and who carries out the analysis.

### **3.1 Qualitative versus quantitative analysis**

20. The TCFD suggests that asset owners might start with qualitative scenarios and develop more quantitative analysis over time.
21. Qualitative approaches are essentially narratives that describe how climate-related risks and opportunities may crystallise over time. They can help trustees understand how the world may look different in the future. Rather than developing their own scenarios from scratch, trustees could use the descriptions of publicly available reference scenarios as the basis of a qualitative exercise<sup>7</sup>.
22. Qualitative scenarios are particularly useful for aspects that are hard to model in a quantitative manner, for example:
  - longer term scenarios (e.g. 2050 onwards) where the impacts are highly uncertain;
  - higher temperature scenarios (e.g. 4°C warming pathway), due to the likelihood that conventional economic approaches will underestimate the impacts; and
  - the effects on asset classes for which a company-level approach is not feasible due to lack of data, such as property, infrastructure and other private market investments.
23. It is expected that most trustees will find quantitative analysis useful as this will help them assess the materiality of climate-related risks and put the results in context, relative to other risks that the scheme faces. However, it is important that they understand the limitations of the analysis and do not place undue emphasis on model outputs that are inevitably uncertain. If trustees use quantitative analysis, narrative descriptions are still likely to be helpful in building their understanding of the scenarios and judging the appropriateness of the numerical results.

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<sup>7</sup> See, for example, 'Climate scenarios demystified. A climate scenario guide for investors' from Cicero, <https://www.cicero.oslo.no/en/publications/internal/2867>

## 3.2 Top-down versus bottom-up models

24. Climate scenario analysis can be carried out by adopting a “top-down” or “bottom-up” approach<sup>8</sup>. Each approach has its advantages and disadvantages and the two approaches are not mutually exclusive. Trustees should consider combining these approaches to give a broader perspective on the impacts of climate change.
25. Top-down models enable schemes to consider the implications of climate change for strategic asset allocation. They seek to incorporate macro-economic impacts of climate change on economic growth, inflation and interest rates, and use this to model the impacts on pension scheme assets broken down by asset class. More granular models may look at breaking down the impacts on returns by sector.
26. Top-down modelling can also be used to analyse the effect of variation in macro-economic factors on defined benefit liabilities, potentially combined with longevity impacts. This permits DB schemes to consider climate-related impacts on assets and liabilities in a consistent way. The scheme’s consultants may offer this type of analysis.
27. Bottom-up models seek to analyse the impact of climate change on individual securities and aggregate these to the level of company, sector, region or whole portfolio (see box). This enables identification of the securities which are contributing most to climate-related risk exposures, concentrations of climate risk and companies to target for stewardship activities.

### Types of bottom-up scenario analysis

Company level analysis – this is the most granular approach and allows for a high degree of company-specific tailoring, such as a company’s future strategic direction and ability to adapt. However, it will typically require a large amount of data and resource. It is more suited for use by investment analysts that are studying individual companies in an investment portfolio than for trustees in-house, except possibly, in the case of DB schemes, for the impact on the sponsoring employer. When the results are aggregated across all investee companies in a particular sector, it becomes a form of sector-level analysis.

Sector level analysis – this offers the ability to home in on an individual ‘at-risk’ sector. Whilst the approach disregards effects in the broader portfolio which might offset the impairment in those sectors being analysed, this is probably the easiest type of analysis for pension schemes taking an in-house approach. When applied across all sectors that make up a fund, it becomes a form of portfolio-level analysis. The PACTA tool described below is a form of ready-made sector level analysis.

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<sup>8</sup> The classification here uses the IIGCC’s Navigating climate scenario analysis: A guide for institutional investors <https://www.iigcc.org/download/navigating-climate-scenario-analysis-a-guide-for-institutional-investors/> as a start point.

Portfolio level analysis – this typically uses a bottom-up approach to aggregate climate impacts on individual securities. The data needed to apply such an approach may be most readily available for listed equity and corporate bond portfolios. The high-level view may understate the importance of sectoral or regional impacts, if these are ‘netted out’ in the end results, so it is worth unpacking the results to look at the implications for individual sectors and asset classes. The scheme’s asset manager may well offer this kind of analysis.

28. Trustees may find both approaches useful. For example, top-down analysis can help them assess their overall exposure to climate-related risks and opportunities and identify the mandates which are likely to have the highest exposure. Bottom-up analysis can then drill into the exposure of those mandates, enabling them to question their asset manager about the steps they are taking to manage the risks and their rationale for holding the most-exposed securities.

### **3.3 Which party should carry out the analysis**

29. All schemes should ask their asset managers about providing climate scenario analysis. However, unless the manager is responsible for all the schemes’ assets, it is likely that the trustees will need to supplement this with additional analysis to enable a consistent scheme-wide view. This additional analysis could be carried out by the trustees’ existing consultants, a third-party provider and/or the scheme’s in-house team. The PRI has produced a list of free-to-use and commercially available climate scenario tools<sup>9</sup>, although other tools are also available.

30. Whichever approach they adopt, trustees should ensure they have access to sufficient expertise to fully understand the results of the analysis and its limitations, asking challenging questions as appropriate.

#### **Ask your asset manager/s**

31. All schemes should ask their asset managers whether they carry out scenario analysis in relation to portfolios which they administer on the scheme’s behalf, whether as pooled funds or segregated mandates. Where the manager carries out scenario analysis, trustees should ask for details of the scenarios (including the methodology and assumptions) as well as the output of the analysis in relation to the scheme’s portfolio. Such analysis is likely to be bottom-up.

32. Scenarios and underlying assumptions may differ between asset managers. Trustees who obtain scenario analysis from more than one manager should exercise care when analysing the outputs. It is unlikely to be appropriate to aggregate them unless the managers have used the same scenario tool.

33. Where portfolio-level scenario analysis is not available, trustees should ask for the results of any other analysis that the asset manager is using to identify and assess climate-related risks in relation to the portfolio, such as carbon footprint

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<sup>9</sup> <https://www.unpri.org/climate-change/directory-of-climate-scenario-tools/3606.article>

data. They should also ask what the asset managers are doing differently as a result of the analysis, to mitigate the risks.

34. Where no scenario analysis is taking place, particularly for easier-to-analyse asset classes such as listed equities and corporate bonds, trustees should ask about their managers' plans for adopting scenario analysis and encourage faster action if this is not ambitious enough.

### **Appoint your consultant or a third-party provider**

35. Schemes may wish to ask their consultant or a third-party provider (some of whom specialise in this area) for scenario analysis. A wide variety of approaches is available. Trustees should ensure they understand the key features and limitations of the analyses on offer, to help them select the one(s) most appropriate for their objectives and budget.

36. Consultants and third parties may be able to provide scheme-level analysis that is applied consistently between different asset classes and assets managed by different asset managers. Depending on the provider, the analysis could be top-down, bottom-up or a combination of both.

37. When selecting a provider, trustees may wish to consider the following questions:

- Which types of assets does the analysis cover? What proportion of the scheme's assets would the analysis cover?
- Does the analysis consider the scheme's actual holdings or make high-level assumptions about the impacts on whole asset classes or sectors?
- (For DB), does the analysis include impacts on the scheme's liabilities and/or covenant strength?
- What climate and economic modelling expertise does the provider have (or access from third parties)?
- What steps has it taken to ensure the robustness of its modelling?
- What is the timeframe of the analysis?
- Does the analysis consider both physical and transition risks?
- Which features are modelled and which are not?
- What is the expected likelihood of different scenarios? Do the assumptions (e.g. regarding climate policies and technologies) seem appropriate and consistent with this likelihood?
- What are the limitations of the modelling? Are those limitations acceptable, given the trustees' objectives?
- Do the results look plausible and consistent with the magnitude of the risks implied by the scenario narratives?

- How is the provider incorporating the latest thinking into its modelling, in relation to climate science, climate policies, technological developments and improved modelling techniques? How often does it update its analysis?
- How much will it cost, both for the initial analysis and subsequent updates?

### Carry out the analysis in-house

38. Where schemes do not wish to incur consultancy fees, or wish to carry out an analysis in-house, some free-to-use tools are available. We outline four of them in the box. Like all modelling tools, they have strengths and weaknesses, and inclusion of them here should not be interpreted as an endorsement. The IIGCC has produced guidance on climate scenario analysis and related topics that trustees might find helpful.<sup>10</sup>

**2 degrees of separation** – analysis from the Carbon Tracker Initiative of the risk to individual oil and gas firms of the transition to a low carbon economy, based on the economics of their potential oil and gas projects. It provides detailed analysis of the percentage of potential capital exposure that is inconsistent with certain low carbon scenarios, helping trustees to understand the transition risks facing one high-risk sector in their portfolios.

**PACTA** (Paris Agreement Capital Transition Assessment) – the PACTA tool, developed by the 2 Degrees Investing Initiative and backed by the PRI, will produce a free report on upload of a portfolio of equities and bonds by their International Securities Identification Number (ISIN). It does not directly show the financial risk to portfolios from climate change, but instead shows the degree to which the strategies of the firms in which the scheme has invested are aligned with a given climate scenario. Analysis uses asset-level data and is available for over 40,000 companies.

**PRA stress tests** – in 2019, the Prudential Regulatory Authority produced three hypothetical climate scenarios with assumed impacts by sector, for use by life insurers as an exploratory part of the PRA’s annual stress test exercise. They consist of data-driven hypothetical narratives are presented, along with a set of assumptions designed to help quantify the impacts on assets in different sectors using simple metrics. These could be used by a scheme to calculate possible effects on its asset values. Where trustees cannot obtain asset data that is split into these sectors, they may find it necessary to use estimates or ranges. .

**NGFS scenarios** – in 2020, the Network for Greening the Financial System published a set of eight scenarios, focusing on three “representative” scenarios chosen to show a range of lower and higher risk outcomes. They were developed to provide a common starting point for analysing climate risks to the economy and financial system. While developed primarily for use by central

<sup>10</sup> <https://www.iigcc.org/resource/navigating-climate-scenario-analysis-a-guide-for-institutional-investors/>

banks and supervisors, they may also be useful to trustees, although they are not comprehensive and so would need supplementing with additional assumptions before they could be used for quantitative analysis. The NGFS has said it will continue to develop the scenarios and the Bank of England is planning to employ the reference scenarios in its 2021 Biennial Exploratory Scenario for banks and insurers<sup>11</sup>.

39. Some tools, such as PACTA, rely on detailed knowledge of fund holdings. Trustees can ask asset managers for this information or request that managers use the free tools themselves and supply the output.

## **4 Considerations for different scheme sizes and types**

### **4.1 Extent of resource available**

40. Managing risk and return is an essential part of trustees' duties whatever the nature of benefits offered by a scheme, its size or time horizons. However, the resources available for schemes to carry out scenario analysis will necessarily vary by scheme size.
41. For large schemes, proportionate assessment and management of the risks associated with climate change through scenario analysis would permit the expenditure of more significant time and resource.
42. Schemes with lower levels of resource should still carry out a proportionate and effective analysis, and the expectation is that all schemes will make use of qualitative and quantitative analysis where possible. Chapter 3 outlines some free-to-use tools that schemes may wish to use if they have appropriate in-house support.

### **4.2 Defined contribution schemes**

43. For DC schemes, scenario analysis should focus on the effect of different warming and transition scenarios on members' pension pots. It is particularly important to apply scenario analysis in the design of default strategies before these are offered to members, and to continue to monitor them as investment strategies, economic conditions and scenario analysis models evolve.
44. Current members of open DC schemes – the vast majority of whom will be invested in the default – may well be exposed to climate-related investment risks well into the 2060s and beyond, meaning that they will be retiring into a world of very different asset valuations. This should be borne in mind when selecting the time horizon for the scenario analysis (see Chapter 5 below).

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<sup>11</sup> The Bank consulted on its plans between December 2019 and March 2020; for details, see <https://www.bankofengland.co.uk/paper/2019/biennial-exploratory-scenario-climate-change-discussion-paper>. In November 2020, it announced that the exercise would launch in June 2021, following a delay due to the Covid-19 pandemic.

### 4.3 Defined benefit schemes

45. Climate scenario analysis is likely to be useful to DB schemes, whatever their level of maturity. For example, even closed DB schemes that are aiming to wind up in the next few years are vulnerable to climate-related risks which could affect the value of assets such as corporate debt and annuity pricing. Such risks could materialise over short time periods, for example, as governments make policy announcements, markets price in technological change and insurers allow for climate change in their modelling.
46. In line with The Pensions Regulator's guidance to use an integrated risk management approach<sup>12</sup>, DB schemes should seek to conduct scenario analysis that combines climate impacts on investment, covenant and funding. This will enable them to explore the extent to which the liability impacts might be hedged by corresponding asset impacts, and how climate change might affect the employer's ability to meet future contribution requirements.
47. Modelling climate impacts on the funding position will necessarily require a top-down approach that incorporates possible impacts on real discount rates. Such analysis is subject to considerable uncertainty due to the challenges of modelling macroeconomic impacts such as interest rates and inflation, but it can nonetheless be a valuable exercise. Ideally, the analysis would also incorporate impacts on demographic variables, particularly mortality rates<sup>13</sup>. Any modelling of the covenant impacts should use the same scenarios for consistency, although the scenarios may need extending to include the variables of most relevance to the sponsoring employer. For example, assumptions may be needed about legislative interventions and technological innovations affecting the employer's sector (e.g. automotive). Input from the employer and/or covenant advisers is likely to be needed.
48. In the near term, DB schemes may find it easiest to start with bottom-up analysis of their listed equity and corporate bond investments (for which data tends to be more readily available) alongside high-level consideration of the covenant impacts, perhaps using scenario analysis that the employer has prepared for its own risk management.
49. Scenario analysis can be used to inform journey planning by illustrating how climate-related impacts may affect the cost of the scheme's long-term objective and the time taken to reach it. For example, if a scheme plans to buy out its liabilities with an insurer, it should consider how climate change might affect future annuity pricing (through its impacts on asset values, liability cashflows and reserving requirements). If a scheme has a "self-sufficiency" target with low reliance on the sponsor covenant, it should consider whether the target is

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<sup>12</sup> See The Pensions Regulator's regulatory guidance on Integrated Risk Management, <https://www.thepensionsregulator.gov.uk/en/document-library/regulatory-guidance/integrated-risk-management>

<sup>13</sup> See, for example, 'Resource and Environment Issues for Pension Actuaries: Implications for Setting Mortality Assumptions' from the IFoA, <https://www.actuaries.org.uk/documents/environment-issues-pension-actuaries-implications-setting-mortality-assumptions>



adequate in light of the additional uncertainties arising from climate change and how climate change might affect the availability of future funding from the employer if the target is not adequate.

## 5 Which scenarios should trustees use?

50. It is important to avoid relying on a single scenario (otherwise the analysis risks being interpreted as a prediction), and that the scenarios used are plausible yet challenging. Trustees should look to analyse their scheme's position over a range of scenarios which illuminate future exposure to both transition and physical climate-related risks and opportunities.

51. Three broad types of scenario that are likely to be of interest are:

- **Orderly transition, 1.5-2°C scenario** – emission reductions start now and continue in a measured way in line with the objectives of the Paris Agreement and the UK government's legally binding commitment to reduce emissions in the UK to net zero by 2050. Investors and companies face disruption from physical climate-related risks, yet these are expected to be much less severe than under a no transition scenario.
- **An abrupt transition, 1.5-2°C scenario** – little climate action in the short term, followed by a sudden and unanticipated tightening of policy as countries rush to get on track with the Paris Agreement. The falling cost of the solutions may mean companies and investors face a double policy and technology shock<sup>14</sup>
- **No transition, pathway to 4+°C scenario** – a continuation of historic emission trends and a failure to transition away from fossil fuels. Physical climate-related risks are severe, and increase over time, causing widespread social and economic disruption. (Note that conventional economic approaches are very likely to underestimate the impacts<sup>15</sup>.)

52. Other possible scenarios include those with an intermediate temperature rise of, say, 3°C in line with the expected outcome if governments' current climate policies are implemented<sup>16</sup>, or with a disorderly transition that does not take place until it is too late to keep temperature rises below 2°C.

53. It should be noted that many variations are possible under each of these broad headings. Different combinations of government action and technological change

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<sup>14</sup> This draws on analysis by Cambridge University and DNB (2018), An energy transition risk stress test for the financial system of the Netherlands, [https://www.dnb.nl/en/binaries/OS\\_Transition%20risk%20stress%20test%20versie\\_web\\_tcm47-379397.pdf](https://www.dnb.nl/en/binaries/OS_Transition%20risk%20stress%20test%20versie_web_tcm47-379397.pdf) (page 18)

<sup>15</sup> The climate scientist Kevin Anderson has warned that four degrees of warming is "incompatible with any reasonable characterisation of an organised, equitable and civilised global community". (Source: "Climate Change Going Beyond Dangerous – Brutal Numbers and Tenuous Hope," Development Dialogue 61, September 2012). For more detailed information, see World Bank (2012), Turn Down the Heat: Why a 4°C Warmer World Must be Avoided, <https://www.worldbank.org/en/topic/climatechange/publication/turn-down-the-heat>

<sup>16</sup> <https://www.unenvironment.org/resources/emissions-gap-report-2019>



may result in the same global average warming, but with differing impacts on the scheme's assets, liabilities and employer.

54. Trustees should be aware of the potential limitations of the scenarios being considered and also consider the likelihood of achieving the warming indicated by a particular scenario. Trustees should pay particular attention to the underlying assumptions for scenarios designed to represent more ambitious warming outcomes (e.g. 1.5°C) including, for example, the expected probability of achieving the warming outcomes given the assumed level of emissions, the credibility and impartiality of the source of the data underlying the scenarios, assumptions about the reliance on or use of technology that is not yet proven, and the alignment of the scenario with the Paris Agreement.
55. Trustees should consider the time frame over which the analysis is done, as climate-related risks will evolve over time. It is recommended that trustees assess exposure to climate change within and beyond the normal timeframe of their investment strategy.
56. With further warming effectively pre-loaded into the earth's climate system<sup>17</sup>, the impact of physical risks from climate change that pension schemes might face over the immediate decades is largely independent of the emission scenario selected<sup>18</sup>.
57. While transition risks are likely to emerge over shorter timescales than physical risks, the latter will be relevant over all time horizons considered. Not only are some physical impacts already being felt, but market pricing may anticipate the effects of higher temperature rises many years in advance. For both types of risk, disruption to asset values may be rapid and unpredictable.

## 6 Interpreting and using the results

58. Once complete, investors face the question of how to interpret climate scenario analysis. Results will vary according to the tool used, but the outputs are likely to be in the form of:
  - metrics illustrating the alignment (or non-alignment) of the portfolio to a given scenario; and/or
  - financial analysis such as an illustration of the change in asset value or funding position over a specific time period.

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<sup>17</sup> See Zickfeld and Herrington (2015) "The time lag between a carbon dioxide emission and maximum warming increases with the size of the emission" <https://iopscience.iop.org/article/10.1088/1748-9326/10/3/031001>

<sup>18</sup> See for example the graphs on page 27 of the IPCC's 5th Assessment Report (2014) [https://www.ipcc.ch/site/assets/uploads/2018/02/SYR\\_AR5\\_FINAL\\_full.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf)

59. Trustees may find it helpful to test how sensitive the model results are to different investment and funding strategies, as well as different climate scenarios, to see how much impact they can have on the outcomes.

60. Some points for trustees to consider may include<sup>19</sup>:

- What does the analysis show about the likely impacts on different asset classes and sectors?
- Where in the investment portfolio are climate-related risks most concentrated?
- Over which time frame are climate-related risks and opportunities likely to materialise?
- What are the trends and drivers that could influence exposure to climate-related issues in the near to mid-term?
- What the key dependencies and limitations with the analysis?
- (For DB), what are the key climate-related factors (whether through transition risk or physical risk) which will affect the strength of the employer covenant? What are the climate indicators of particular relevance to the sponsoring employer that could be used in covenant monitoring and contingency planning frameworks?

61. Trustees should consider the implications of their scenario analysis at each stage of the investment process (as outlined in Part II of this guidance) in order to identify key actions. Examples include revisiting investment beliefs, considering adjustments to strategic asset allocation and mandates for asset managers and advisers, as well as voting and stewardship priorities.

## 7 Reporting the analysis

62. When trustees report climate scenario information to beneficiaries and other stakeholders, they should consider the needs and expertise of their audience, and layer the information appropriately.

63. The TCFD recommends that asset owners should report:

- the climate-related scenarios and associated time horizon(s) considered;
- the critical input parameters, assumptions and analytical choices for the scenarios used;

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<sup>19</sup> Adapted from “Navigating climate scenario analysis a guide for institutional investors by IIGCC 2019 page 51 <https://www.iigcc.org/resource/navigating-climate-scenario-analysis-a-guide-for-institutional-investors/>

- how their strategies may be affected by climate-related risks and opportunities;
- how climate scenarios are used, e.g. to inform investments; and
- how their strategies might change to address potential risks and opportunities.

64. In addition, trustees should indicate the external factors which have limited their ability to do scenario analysis, such as data gaps, and the steps they are taking to address these.

65. As stated earlier, in making such disclosures, trustees should apply the TCFD's seven principles for effective disclosure (see Part II).

66. Schemes might consider structuring their disclosures as follows:

- **Summary** – an overview of the type and extent of analysis carried out; a single paragraph narrative summary of how resilient the scheme is to each scenario considered; and a summary of actions taken as a result.
- **Detail** – more detail on the climate-related scenarios considered; data on results (e.g. potential asset value reductions) under the different scenarios, by asset class, sector or geography as appropriate; and more detail of how the scenarios have been and will be acted on.
- **Technical annex** – the technical detail of the scenarios used; any other technical information which is judged relevant but too complicated for the large majority of possible readers – e.g. detail of quantitative measures and assumptions underpinning the analysis.

### Case study





























An example of what can be achieved from a top-down perspective is shown below for the Lloyds Banking Group (LBG) pension schemes. Their trustee started with a simple question: How robust is the investment portfolio to climate-related risks?



To answer this, the internal executive team worked with their strategic investment advisor to assess, at a broad level, the impact on each of the asset classes held in their schemes' portfolios under two of the four climate change scenarios constructed by the Inter-governmental Panel on Climate Change - known technically as Representative Concentration Pathways 2.6 and 6.0 but re-labelled 'Globally Co-ordinated Action (GCA)' (a below 2°C scenario) and 'Lowest Common Denominator (LCD)' (probably above 2°C but below 4°C) respectively.

The advisor applied numerical stresses to each asset class (and liabilities for a fully-integrated analysis). However, to reduce reliance on numerical assumptions and to create a more compelling visual, each asset class was then mapped to one

of three risk groups (red, amber and green in order of decreasing severity) that revealed three general principles:

- i. developed nations (including the UK Government) should be capable of repaying sovereign debt in all but the most extreme climate scenarios, over the time horizon considered. For emerging market sovereign debt, the picture is more nuanced.
- ii. The higher the asset is in a company's capital structure, the lower the risk of permanent loss of capital arising from climate change. So broadly, equities are riskier than corporate bonds.
- iii. The pace and impact of climate change is uncertain, therefore lending for longer periods is riskier than lending for shorter periods.
- iv. Illiquid assets (e.g. property) are riskier because of the inability to sell quickly (if at all) in the event that the asset is impaired by climate change outcomes.

Asset Class	Current SAA	Risk Assessment	
		GCA	LCD
<b>Liability hedging</b>			
LDI	35%		
Cash	2.5%		
<b>Secure Income</b>			
Highly liquid credit	2.5%		
'Buy & maintain' Bonds	5.5%		
Global corporate bonds	8%		
Collateralised loans	4%		
Other contractual cash flows	2.5%		
<b>Alternative Credit</b>			
Emerging market debt	4%		
Liquid credit opportunities	12%		
Illiquid credit opportunities	4%		
<b>Return Seeking</b>			
Global equities	5%		
Private equity	2.5%		
Hedge funds	7.5%		
Real estate & infrastructure (non-core)	5%		
	100%		

**Key :**  = no material risk,  = moderate risk,  = significant risk

The LBG trustee was able to draw the following conclusions from this work in relation to its defined benefit schemes

1. Climate change is a risk that could impair the trustee's ability to meet the schemes' funding objectives

2. The asset portfolio is reasonably robust to a 2°C warming scenario, but more exposed to higher warming scenarios.

3. The asset classes most at risk of climate change are those that the schemes are likely to divest from in the medium term as part of their de-risking 'journey'.

4. Further (bottom-up) analysis should focus on the bond assets as these will form the vast majority of the schemes' assets over the period in which climate change plays out.

For the defined contribution scheme, whilst the above risk assessment holds, a different strategy is required to manage climate risk. This is because defined contribution members are typically younger, with longer investment time horizons (running deeper into the period over which climate change is expected to play out) and members' pots tend to be significantly invested in equities rather than bonds.

# Appendix A – Case Study



This case study has been provided by The Prince's Accounting for Sustainability Project (A4S) and the pension scheme in question, who is a member of [A4S's Asset Owners Network](#).

## BBC PENSION TRUST: OUR APPROACH TO SCENARIO ANALYSIS

The BBC Pension Trust is a defined benefit pension scheme with over 47,000 members and assets under management of £17.3 billion.

### WHAT

Scenario analysis was a critical first step in addressing the impact of climate change on our investment strategy, and it has informed our approach to other areas such as governance and risk management. We started by taking part in a 2015 Mercer study, which modelled the impact on asset returns across all asset classes for three warming scenarios: 2°C, 3°C and 4°C. Mercer updated and expanded the analysis in 2019, incorporating stress testing of transition risks to examine what could happen if the transition happened sooner than expected.

Taking part in these studies helped develop our understanding of climate scenario analysis and how to translate this information back into our investment strategies. So in 2019 we introduced climate scenario analysis into our existing annual scenario analysis, which we outsource to our investment consultant. As well as looking at asset returns, we model the impacts on scheme liabilities and our funding position. In future years, we plan to disclose the results in our annual report.

Having a scenario analysis at the beginning of our TCFD journey has proven to be a valuable investment. The process has given us a strong business case to enhance our overall governance processes and approach, which has in turn strengthened our climate-related risk management. We have gained a good understanding of our exposure to climate risks and a strong base on

which to develop other aspects of our TCFD reporting.

### HOW

**Getting the right expertise:** As we have a small in-house team, we commission our investment consultant to conduct our annual scenario analysis, which now includes climate scenarios. We then review the quantitative data and analysis we receive, asking questions when we see surprising results. Our investment consultant uses two climate scenarios: a below 2°C scenario and a 'business as usual' scenario above 2°C. These are based on a combination of pathways used by the Intergovernmental Panel on Climate Change (IPCC). Getting independent, expert input has allowed us to focus our resources on using that input to improve our policies and processes, and it adds credibility to our reports.

**Reporting to the trustees:** Our investment committee commissions the scenario analysis report each year. Our investment consultant then prepares a tailored report that they present to the committee for review and discussion. Following this, the investment committee reports to the trustee board, taking salient points from the scenario analysis report and adding them into an annual review paper on responsible investment. The trustee board is responsible for authorizing our responsible investment policy. To help trustees review the scenario analysis, we have training sessions for the wider trustee board, supported by our

investment consultants who come in to present their reports.

**Understanding our climate-related risk:**

It's not only the data that comes out of scenario analysis that is useful. For us, much of the value comes from the discussions with trustees, consultants and asset managers that have been sparked by the annual scenario analysis process and its results. Our work on scenario analysis has enabled us both to embed climate-related risk management into our work and to dive deeper into our asset managers' policies and processes on climate-related risk.

**Making changes:** Following recommendations from scenario analysis reports, we have updated our risk register, our investment beliefs and our responsible investment policy. Embedding climate change considerations into our ongoing governance and risk management processes means that climate change considerations will always inform our work.

Going through the scenario analysis process has also reinforced our commitment to collaborative climate initiatives such as the Institutional Investors Group on Climate Change (IIGCC) and Climate Action 100+.

**NEXT STEPS**

We already publish TCFD disclosures within our annual report. Now we're looking at how we can develop this further in our 2021 report, such as including information a climate scenarios and how we do our modelling.

Scenario analysis is now part of our annual governance process and included in annual business planning for our investment committee. So we will continue to renew our scenario analysis periodically, and use this to inform discussions about our responsible investment priorities.

**TOP TIPS**

**GET STARTED**

We found it helpful simply to get started on what we could and go from there. Beginning TCFD work with scenario analysis can also help you to improve your governance structures and develop your thinking about climate-related risk, which will pay off later.

**BRING IN EXTERNAL ADVISERS**

If you don't know how to start, ask the people that advise you. A lot of consultants work in this area and can offer support with analysis and reporting. Think carefully about their advice and ask questions about anything you don't understand.

**DON'T OVERCOMPLICATE IT**

Quantitative analysis is helpful, but this is a complex area and the numbers are imprecise. So don't get tied up in an overly complex analysis. Be mindful of the assumptions you've made, and treat the numbers as a tool to guide your thinking about managing climate risk for your portfolios.

**TALK TO YOUR ASSET MANAGERS**

Scenario analysis also offers a useful framework and evidence for talking to your asset managers about climate change. It can empower you to exercise more oversight over asset managers' work and the extent to which they operate in line with the Principles for Responsible Investment (PRI).

## Appendix B – Further Reading

- [IFoA \(2020\) – Climate Scenario Analysis for Pension Schemes: A UK Case Study](#)
- [IFoA \(2020\) – Climate Scenario Analysis for Pension Schemes: An illustration of potential long-term economic & financial market impacts](#)
- [Carbon Tracker \(2019\) – 2 degrees of separation: Transition risk for oil & gas in a low carbon world](#)
- [NGFS \(2020\) – Guide to climate scenario analysis for central banks and supervisors](#)
- [CFRF \(2020\) – Climate Financial Risk Forum Guide](#)
- [IIGCC – Understanding Physical Climate Risks and Opportunities: A Guide for Investors](#)