



Government
Actuary's
Department

Climate scenario analysis guidance for departments, ALBs and public bodies

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Glossary

Key terms along with those that may be less familiar to the audience are defined throughout the report as appropriate. Other acronyms and abbreviations are defined here for completeness.

Stakeholders

CCC	Climate Change Committee
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
HMRC	HM Revenue and Customs
MOD	Ministry of Defence
MOJ	Ministry of Justice
OBR	Office for Budget Responsibility
UKEF	UK Export Finance

Climate modelling

CMIP	Coupled Model Intercomparison Project
RCP	Representative Concentration Pathway
SSP	Shared Socioeconomic Pathways
UKCP	UK Climate Projections

Other relevant bodies

ALB	Arms Length Body
A4S	Accounting for Sustainability
DBT	Department for Business and Trade
DWP	Department for Work and Pensions
FCA	Financial Conduct Authority
FRAB	Financial Reporting Advisory Board
FRC	Financial Reporting Council
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
NGFS	Network for Greening the Financial System

Climate reporting

ARP	Adaptation Reporting Power
CCRA	Climate Change Risk Assessment
NAP	National Adaptation Programme



Executive summary

- Executive summary
- General considerations and next steps



Executive summary

In this report we set out recommendations for guidance around climate scenario analysis for government and public entities. In producing this analysis, we have considered the current Task Force on Climate-related Financial Disclosures (TCFD) scenario analysis reporting landscape, spoken to expert government departments and arms length bodies (DESNZ, Met Office, CCC, OBR, Defra) and early adopters of TCFD-aligned disclosure and climate scenario analysis within government (UKEF, MOD, MOJ, HMRC).

We have identified eight factors that feed into climate scenario analysis and set out our recommendations around the guidance for each of these factors, summarised below and covered in detail throughout the report. We have also included our views on some other general considerations and background information that could be taken into account in drafting the scenario analysis, and wider Strategy, guidance for entities.

- 1. Scenario definition:** Scenarios for physical risk will be defined either by referring to particular SSP-RCP combinations, or temperature pathways (2 and 4 degrees by the end of the century). Transition scenarios are to be defined by entities if they are to be explored.
- 2. Scenario provider:** IPCC SSP-RCP scenarios will form the base for physical risk analysis, providing information relating to emissions (and associated temperature rise) and socioeconomic development for different levels of temperature rise. Met Office data (currently the most up to date of which is the UKCP18 and UK SSP) provides UK specific downscaled climate metrics following SSP-RCP scenarios so this will be useful for entities.
- 3. Scope of analysis:** Analysis should cover the full departmental operations.
- 4. Timeframes:** Short, medium and long timeframes should be considered. Specifically for scenario analysis, it is recommended:
 - Short – to be defined by the entity in line with their business planning cycle
 - Medium – 2050
 - Long – end of century
- 5. Frequency:** Scenario analysis should be updated every 3 to 5 years, or more frequently if there are any significant developments or events that mean the assumptions used are no longer suitable.
- 6. Number of scenarios:** All entities should consider one low physical risk scenario (2 degree aligned) and one high physical risk scenario (4 degree aligned). Where entities have a material exposure to transition risk they should consider low/high transition risk scenarios as appropriate.
- 7. Quantitative or qualitative:** Quantitative scenario analysis is preferred and recommended.
- 8. Entity on climate impact:** The impact of climate risks and opportunities on the entity should be the main focus of the scenario analysis. The impact of the entity on climate risks and opportunities can be considered but will likely need to be qualitative.



General considerations and next steps

General considerations in drafting the guidance for scenario analysis are summarised below.

1. Using **publicly available data sources** to underpin the scenario analysis is preferential for transparency and consistency.
2. The establishment of a **cross-entity team** to develop and undertake scenario analysis is vital.
3. Due to the complex nature of scenario analysis it is likely that reporting entities would benefit from **additional training on scenario analysis**.
4. Entities may find it helpful to buy in modelling solutions and technical support to aid their scenario analysis. Where entities choose to do so, they should **ensure existing reporting processes and principals around modelling, including those in the Aqua Book are followed**.
5. In order to highlight good practice and inspire reporting entities it would be helpful to provide **case studies and examples** alongside the guidance on scenario analysis.
6. Best practice would be that the same **timeframes are used consistently throughout a TCFD report**.

The suggested **next steps** of this project are set out below.

- 1 Sub-committee to discuss and agree recommendations set out in this report (7 March). Provide recommendation to FRAB.
- 2 Discuss with Met Office their future plans for climate data provision to allow GAD to firm up recommendation about physical climate scenario definitions (SSP-RCP-aligned or temperature-aligned). Discuss with other relevant stakeholders as required.
- 3 Summarise the results of this report for FRAB to discuss and agree (21 March).
- 4 Incorporate recommendations into first exposure draft to be presented and agreed at June FRAB meeting.
- 5 Consider a training program for the roll out of the strategy guidance to departments. GAD could assist in the technical aspects.

Background

- Introduction and background to the project
- Considerations to keep in mind when reading this report
- Context and consistency insights from meetings with stakeholders



Introduction and background to the project

This report has been prepared for HMT for the purpose of informing guidance to government entities on climate scenario analysis as part of the TCFD roll out in the public sector. TCFD strategy recommendation (c) requires organisations to undertake scenario analysis.

Strategy (c): Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Key objectives for having government entities complete and report climate scenario analysis in 2025-26 include:

1. Accountability to Parliament
2. Transparency to the public
3. Management information for decision-making
4. Public record
5. Financial information for the purpose of resource allocation

This project aims to address the question of **how government/public sector bodies can conduct TCFD-compliant scenario analysis in the most effective way**, recognising that the key objectives of scenario analysis for government entities are different to those of most private sector organisations.

The analysis and recommendations contained in this report will feed in to HMT's first draft of guidance for Phase 3 of the TCFD roll out to central government entities.



Considerations when reading this report

The guidance around scenario analysis will be based on a “comply or explain” basis

- The TCFD framework is principles-based. Existing HMT Phase 1 and 2 guidance confirms entities must apply a “comply or explain” basis for disclosure; complying with each of the required TCFD’s recommended disclosures; or explaining non-compliance against each of the requirements.
- This approach is also to be adopted for scenario analysis, with the expectation that entities comply with the recommendations set out, or explain where and why they have chosen not to.
- This is particularly important for scenario analysis:
 - The complex nature of the analysis may mean it takes entities several rounds of disclosures to meet the expected standard.
 - Entities may have other regulatory reporting requirements that include specific details of the scenarios that should be chosen.
 - Some entities may have already completed significant work on scenario analysis and hence it may be more appropriate to use their alternative scenarios, rather than our recommended approach.

Whether climate risk is a principal risk determines whether entities will be required complete scenario analysis

- Scenario analysis will only be required where entities have identified climate as a principal risk.
- However, entities may find the process of scenario analysis useful to help them better understand their exposure to climate risk, even if climate change isn’t currently deemed a principal risk. In this case the recommendations outlined in this report would still represent good practice.

The project’s scope has been limited to exclude consideration of changes to future policy that would feed into transition risk analysis

- The impact of future policy would be considered when assessing transition risks (risks that occur due to our transition to a low carbon economy, and the speed of that transition).
- However, future policy is incredibly uncertain, hard to model and potentially politically-sensitive.
- Hence the project scope was refined through discussion with HMT and other stakeholders to exclude policy implementation within scenario analysis guidance. As such, our recommendations focus on temperature based scenarios.



Context and consistency insights from stakeholders

To inform context and areas for consistency we have gathered insights from relevant experts and TCFD report preparers across government and the public sector.

Who we met with

Experts:

- CCC
- Defra
- DESNZ
- Met Office
- OBR

TCFD report preparers:

- HMRC
- MOD
- MOJ
- UKEF

These preparers were chosen due to their more advanced TCFD-related progress and useful experience.

What we learned

Key lessons from **experts** included:

- There is a lot of work going on across government and the public sector around climate risk (particularly risks around adapting to climate change). There are many teams working on different climate related projects, which may directly or indirectly affect scenario analysis. Timeframes on projects vary (with many in situ i.e. Met Office projects to update their climate scenario analysis) and guidance should be flexible enough to reflect this.
- Some existing climate-related reporting guidance, standards or policies include information relating to scenario analysis. Experts outlined the work they have done in this area, to whom their guidance and policies were aimed at and hence consistency with this should be considered.
- The Intergovernmental Panel on Climate Change (IPCC) -style scenarios were often cited. Numerous scenario and data provider options were discussed although IPCC work was commonly quoted as a starting point for scenario analysis work on physical climate risks.

Key lessons from **TCFD report preparers** included:

- There isn't a consistent baseline. Both between departments, and within departments, there is significant disparity in the level of work done directly on, or in support of climate scenario analysis.
- External support has often been required. Generally, where departments have been able to make significant progress on scenario analysis, and supporting work, they have done so with a degree of external support (i.e. private sector consultants). However, the importance of internal upskilling was also noted, especially as the work becomes business as usual.
- Internal stakeholder engagement is vital. The importance of having the correct people engaged from the start is vital, this should include senior representation across the breadth of the organisation. This applies to the wider TCFD implementation as well as our focus, scenario analysis.
- Communication is key. Scenario analysis can be complex and the people completing it may not be climate experts, and so the importance of simple, informative communication and knowledge sharing both within the organisation and externally is vital. Examples and case studies will be particularly important in this regard.

Options for scenario analysis guidance

- Specific factors – summary assessment
- Specific factors – detailed discussion of individual factors
- General considerations for scenario analysis



Specific factors – summary (1)

The summary below sets out our assessment of consistency, complexity and conviction for each of the eight scenario analysis factors that we have identified. Each of these factors are explored in more detail in the following slides.

Consistency	Low	Medium	High	How important is this factor in generating consistent and comparable results across entities and consistent results with other climate change guidance.
Complexity	High	Medium	Low	What is the level of complexity that our recommendation introduces for entities completing scenario analysis.
Conviction	Low	Medium	High	How high is GAD’s conviction in our recommendation for this factor. Where our conviction is low, there are likely other reasonable routes to take.

		Consistency	Complexity	Conviction
Detail and sophistication of scenario definition	Scenarios for physical risk will be defined either by referring to particular SSP-RCP combinations, or temperature pathways (2 and 4 degrees by the end of the century). Transition scenarios are to be defined by entities if they are to be explored.	High	Medium	High
Scenario data provider	IPCC SSP-RCP scenarios will form the base for physical risk analysis, providing information relating to emissions (and associated temperature rise) and socioeconomic development for different levels of temperature rise. Met Office data (currently the most up to date of which is the UKCP18 and UK SSP) provides UK specific downscaled climate metrics following SSP-RCP scenarios so this will be useful for entities.	Medium	Medium	High
Scope of scenario analysis within entities	The recommended scenario analysis should cover the full reporting entity’s operations.	High	Medium	Medium



Specific factors – summary (2)

The summary below sets out our assessment of consistency, complexity and conviction for each of the eight scenario analysis factors that we have identified. Each of these factors are explored in more detail in the following slides.

Factor	Recommendation	Consistency	Complexity	Conviction
Timeframes for scenarios	Short, medium and long timeframes should be considered. Specifically for scenario analysis, it is recommended: <ul style="list-style-type: none"> • Short – to be defined by the entity in line with their business planning cycle (Spending Reviews, election cycles, funding and investment rounds or other) • Medium – 2050, noting that this is a key date that it is important to consider • Long – end of century 	Medium	High	Medium
Frequency of scenario analysis	Scenario analysis should be updated every 3 to 5 years, or more frequently if there are any significant developments or events that mean the assumptions used are no longer suitable.	Medium	Low	Medium
Number of scenarios	All entities should consider one low physical risk scenario (2 degree aligned) and one high physical risk scenario (4 degree aligned). Where entities have a material exposure to transition risk they should consider low/high transition risk scenarios as appropriate.	Medium	Low	Medium
Quantitative or qualitative analysis	Quantitative scenario analysis is preferred and recommended.	Medium	High	High
Impact of entity on environment	The impact of climate risks and opportunities on the entity should be the main focus of the scenario analysis. The impact of the entity on the environment, economy or public (with respect to climate change) can be considered but will likely be qualitative.	Low	Low	High



Detail and sophistication of scenario definition

Recommendation

Scenarios for physical risk will be defined either by referring to particular SSP-RCP combinations (e.g. SSP1-2.6) , or temperature pathways (2 and 4 degrees by the end of the century). To confirm this which of these two approaches we recommend, we recommend we discuss further with the Met Office the approach that they plan to take as their data will likely be used by many entities. Entities will supplement this data with entity-specific data points in order to quantify their risk exposure.

Transition scenarios are to be defined by entities if they are to be explored in scenario analysis, with some high-level additional guidance from HMT. Transition risk could be particularly important for entities which have made a net zero commitment earlier than the government's 2050 timeline or are ministerial policy-setters.

Consistency

Low Medium High

It is important that there are good definitions of the scenarios to have consistency across entities.

Using 2 and 4 degree aligned scenarios is consistent with existing guidance including the Defra adaptation risk assessment guidance. Defra also sets out possible SSP-RCP combinations for their temperature aligned scenarios. Further, DWP, DBT and the TCFD recommend that one scenario should be 2 degrees of warming or lower.

Complexity

High Medium Low

Providing scenarios to use for physical risk analysis will reduce the initial exploratory work for entities.

However, for entities who choose to look at transition risk scenarios, they will have to define these themselves, which could add to the level of complexity of their analysis (versus transition scenarios being defined by HMT).

Conviction

Low Medium High

To ensure a level of consistency we believe it is vital to define at least some high-level aspects of the scenarios considered (e.g. by referring to IPCC SSP-RCPs and/or temperature pathways).

Benefit to entities

Reduces the scope of the work for entities. However, where entities have already done some scenario analysis these scenarios may not be consistent, although we expect this to in only a limited number of cases. Given the 'comply or explain' nature of the guidance, if an entity believes that their scenarios are more appropriate, they will be able to continue to use these.

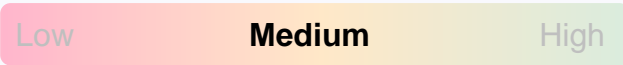
Scenario data provider

Recommendation

Given transition risk is less material for government entities than in the private sector (due to the public sector's service delivery nature and role in setting climate transition policies), the focus of the scenarios will be on physical risk. IPCC SSP-RCP scenarios will likely form the base for physical risk analysis, providing information relating to emissions (and associated temperature rise) and socio economic development for different levels of temperature rise. Met Office data (currently the most up to date of which is the UKCP18 and UK SSP) provides UK specific downscaled climate metrics for different temperature scenarios so this will also be useful for entities.

These physical risk scenarios do not consider the policy response required to enable the transition. Therefore, where entities consider low/high transition risk scenarios, NGFS, IEA and/or other data could be used as a basis for setting transition scenario narratives. Ultimate consistency for transition risk scenarios would come from developing a set of narratives (and corresponding metrics) that can be consistently used across entities. Without this it will be for each entity to develop their own narratives in a way which is relevant to the scope of analysis they are undertaking and the impacts that they want to assess. However, HMT could point towards relevant data sources (NGFS, IEA) that entities could use to develop their own scenarios.

Consistency



Defining physical risk scenario providers will help promote consistency across entities for the key physical risk scenarios. Without this there could be significant discrepancy in the key data used.

However, entities will always need some additional, more bespoke data/information which could still lead to some discrepancies.

There is also a greater likelihood of inconsistency in the low/high transition risk scenarios considered as these will be up to the entities to define, if they decide to explore them.

Complexity



By recommending physical risk scenario providers this will reduce the initial exploratory work required by entities.

However, entities will always have to translate the climate risk data points into what that means for them.

Further, where entities consider low/high transition risk scenarios they will need to research suitable scenario data providers and develop a plausible narrative. Some of this work could be reduced if HMT points to suitable providers of transition scenario data, such as NGFS and IEA.

Conviction



From analysis we believe that there is no single scenario provider that can provide all of the data necessary for all entities to complete scenario analysis of physical and transition risk.

However, given the focus on physical risk scenarios, IPCC and Met Office data should provide entities with many of the climate data points they need to enable them to quantify their climate risk under different scenarios.

Benefit to entities

Using publicly available data sources defined by HMT, entities are less likely to have to spend significant time and resources defining their own scenarios. However, some entities, particularly those who are very advanced in their thinking on this subject could feel that they have less flexibility to develop their own scenarios, although the 'comply or explain' basis should help to mitigate this.

Scope of scenario analysis within entities

Recommendation

The recommended scenarios should cover the full departmental operations (subject to materiality assessments discussed in Phase 2 guidance).

Within entities, it may be preferable to limit the scope of the analysis initially to the most significant climate risks or the operations most significantly impacted by climate risk. This may allow a higher quality of analysis while capacity and capability within the entity are established. However, in time analysis should be extended to cover the full operations of the entity in order to be fully compliant with these recommendations.

Consistency

Low Medium High

In time, covering the full extent of departmental operations will mean there is consistency across entities. Only in the initial years will the level of coverage that entities use within their analysis impact consistency.

Allowing entities to augment the scope of their analysis over several years is consistent with other guidance, including that from DBT, the FRC and A4S.

Complexity

High Medium Low

Including the understanding that entities may limit the scope initially, analysis complexity can be increased over a number of disclosures.

Conviction

Low Medium High

We want to ensure that the aim for full disclosure is clear but understand this may be challenging initially and hence have added flexibility to the recommendation.

Benefit to entities

Including the full departmental operations in the analysis will help ensure a consistent approach across the department, and ensure that all risks and opportunities are considered appropriately, including those that could be material in the future. Flexibility on scope allows entities to build up their capacity over a number of years which should make this easier.

Timeframes for scenarios

Recommendation

Short, medium and long timeframes should be considered. Specifically for scenario analysis, it is recommended:

- Short-term – to be defined by the entity in line with their business planning cycle (Spending Reviews, election cycles, or otherwise)
- Medium-term – 2050, noting that this is a key date that it is important to consider
- Long-term – end of century

These are relatively long to reflect the nature of government entities.

Specifying the timeframes for scenario analysis ensures greater potential for comparability between reporting entities than allowing entities to choose their own timeframes. Although the risk profile of different entities (and different risks within the same entity) will vary, using the recommended timeframes should allow reporting entities to consider exposure to a range of climate related risks and opportunities over a long enough horizon for those risks to materialise (particularly physical risks).

Consistency

Low

Medium

High

In order for the results of the analysis to be consistent across departments it is important that the timeframes considered are similar, as the impact of physical and transition risks can vary greatly depending on what timeframe is being looked at.

However, most existing guidance does not specify timeframes and hence this recommendation (of specific timeframes) is less consistent with other sources like TCFD, DWP, DBT etc.

Complexity

High

Medium

Low

The timeframes recommended are relatively long compared to those used by some private sector organisations. The longer the timeframes the greater the complexity and uncertainty due to increased time for changes to develop, the potential for tipping points to be crossed and the greater range of potential outcomes.

Conviction

Low

Medium

High

We understand that 2050 is a key date and believe it is important for entities to consider.

However, we know that there can be some benefits in allowing entities more flexibility to align timeframes with other risk and strategic planning activities. This has influenced our recommendations for the flexibility in the short and long timeframes.

Benefit to entities

For scenario analysis it is necessary to define timeframes broadly to have any degree of consistency across departments. Thinking longer term will allow departments to get a fuller appreciation of potential risks.

Frequency of scenario analysis

Recommendation

Scenario analysis should be updated every 3 to 5 years, or more frequently if there are any significant developments, external events, changes in market practice or it is deemed that the assumptions used are no longer suitable. Examples of such events include Spending Reviews, political cycles, alignment with other reporting processes (NAP, ARP, CCRA), updates to underlying data (by the IPCC, Met Office or other providers).

It will be the responsibility of the entity to determine whether this is the case.

Consistency

Low

Medium

High

By not precisely defining the dates when scenario analysis should be undertaken, entities will likely end up doing analysis at different dates which could lead to inconsistency.

However, the underlying data of the scenarios may not change materially from year to year, so this may not be as important.

The approach is largely consistent with other existing guidance.

Complexity

High

Medium

Low

Our recommendation offers greater flexibility than some other guidance (for example DWP and DBT guidance that states scenarios should be updated at least every 3 years).

We have made this recommendation on the understanding that aligning scenario analysis with strategic planning rounds (that may operate at different timescales across entities) should enable more useful and impactful analysis for entities.

It should also reduce the

Conviction

Low

Medium

High

There is significant flexibility in the recommendation, this could be tightened to ensure scenario analysis was updated at least every 3 years and coordinated across entities.

However, tightening this recommendation may strain entities capacity and resources limiting the quality of the analysis produced. The proposed flexibility in the recommendation should hopefully allow for high quality analysis.

Benefit to entities

Flexibility means that entities can align updating their scenario analysis with other suitable business-as-usual activities. This should help make the analysis more decision-useful and easier to embed successfully in the entity operations.

Number of scenarios

Recommendation

All entities should consider one low physical risk scenario (2 degree aligned) and one high physical risk scenario (4 degree aligned). Using the IPCC SSP-RCP and/or Met Office climate data will mean that these scenarios ignore transition risk.

Where entities have a material exposure to transition risk they should also consider low/high transition risk scenarios (such as orderly and disorderly transitions) as appropriate.

Consistency

Low Medium High

To comply with TCFD recommendations entities have to consider at least 2 scenarios. Using at least 2 scenarios is also consistent with DWP guidance.

As the focus is on physical risk, we believe that there would likely be little value added in considering a third scenario (e.g. 3 degrees).

However, general accepted best practice is that at least 3 scenarios are considered, to show the potential variability in outcomes. This leads to the recommendation that where transition risks are material for an entity additional scenarios should be considered.

Complexity

High Medium Low

TCFD recommendations only require 2 scenarios. However 3 (or more) is standard across the market.

Conviction

Low Medium High

Requiring 2 scenarios ensures TCFD compliance. Using widely accepted "low" and "high" physical risk scenarios also helps entities to get a feel for their spread of exposure.

However, using a greater number of scenarios could lead to a fuller understanding of the climate related risks and opportunities that may impact the entity, particularly if the range of outcomes under the 2 and 4 degree scenarios is wide.

Benefit to entities

The recommendation lets entities compare "low" and "high" physical risk scenarios, which should provide an understanding of the potential range of possible impacts. It also provides entities some flexibility to add a transition risk scenario based on their own risk exposure.

Quantitative or qualitative analysis

Recommendation

Quantitative scenario analysis is preferred and recommended albeit with the understanding that some aspects will have to be qualitative (particularly around the impact of the entity on climate risk, as opposed to the impact of climate risk on the department).

We understand that entities may not be able to deliver full quantified analysis initially so instead may focus on a qualitative disclosure. However, it is expected that entities have a plan to achieve quantitative analysis in order to be fully compliant with these recommendations.

Consistency

Low

Medium

High

Consistency can be achieved with quantitative and qualitative scenarios. However, qualitative scenarios would need to be very well defined to achieve consistency in the results of the scenario analysis.

Quantitative scenarios may be easier to define and achieve consistency in the results.

Aiming for quantitative analysis is consistent with other guidance including from TCFD.

Complexity

High

Medium

Low

Quantitative analysis is likely to be more complex than qualitative analysis.

Conviction

Low

Medium

High

Both quantitative and qualitative analyses have their benefits but, for analysis to be useful for resource allocation and entities decision making, quantification is preferred.

Benefit to entities

Quantification of risks can help to ensure adequate mitigation strategies are in place, including using the quantification as evidence when requesting adaptation funding or similar. Decision making can be improved through quantification as considered in the Green Book. Quantification can also help engage senior leadership and a range of stakeholders across the department.

Impact of entity on environment

Recommendation

The impact of climate risks and opportunities on the entity should be the main focus of the scenario analysis.

However, entities should consider the primary users of their annual report and accounts (Parliament) and their interest in policy outcomes for accountability and decision making. Therefore, the impact of the entity (particularly for entities who are policy setters, and less so for policy implementers) on climate risks and opportunities can be considered but will likely be qualitative.

Consistency

Low

Medium

High

There will be a high degree of consistency across entities in analysing the impact of climate on the entity.

However, the recommendation is ranked low in terms of the consistency it will bring because entities are likely to focus on the impact of climate on the entity anyway so defining the two-way impact (impact on the entity, and from the entity) scope is unlikely to add much more consistency across entities.

Complexity

High

Medium

Low

By focussing initially on the climate's impact on the entity and not vice versa, analysis complexity is significantly reduced.

Conviction

Low

Medium

High

It will be challenging to assess the impact of the entity on the climate due to significant uncertainty, including dependence on future policy decisions.

However, entities that have a significant impact on the environment would be encouraged to think about this, qualitatively at least.

The best practice recommendation would be that all entities should consider their impact on the environment.

Benefit to entities

Flexibility on [consideration of the impact of the entity on the environment](#) allows entities to concentrate on the impact of climate risk on the entity, and not on the entity's impact on the climate e.g. through policy setting. This should be easier for entities to analyse and quantify and hence the quality of the analysis produced should be higher.

General considerations for scenario analysis

The issues on this page don't fit into any of the eight factors considered in the previous pages, but we feel that they are important and some have been mentioned several times during our stakeholder interviews.



Using **publicly available data sources** to underpin the scenario analysis is preferential for transparency and consistency. In some situations there may be reasons to use non-publicly available data however publicly available data should be considered first.



The establishment of a **cross entity team** to develop and undertake scenario analysis is vital. Climate risks and opportunities will impact the different areas of an entity's operations and hence it is important that there is a diverse team involved from the initial development of scenarios through to reporting and disclosure and beyond.



Due to the complex nature of scenario analysis it is likely that reporting entities would benefit from **additional training on scenario analysis**, particularly how scenarios and data sources can be tailored and made relevant to an entity's operations.



Entities may find it helpful to buy in modelling solutions and technical support to aid their scenario analysis. Where entities choose to do so, they should **ensure existing reporting processes and principals around modelling, including those in the Aqua Book are followed**.



In order to highlight best practice and inspire reporting entities it would be helpful to provide **case studies and examples** alongside the guidance on scenario analysis.



Best practice would be that the same **timeframes are used consistently throughout a TCFD report**, for example, the timeframes set under Strategy disclosure (a) should align with those used for scenario analysis.

Next steps



Next steps

This report sets out our eight recommendations for guidance around climate scenario analysis for public entities. We have also included our thoughts on several other general considerations that could be taken into account in drafting the scenario analysis (and wider Strategy) guidance for entities.

After considering the recommendations set out in this report, we have set out a series of immediate next steps in order these recommendations into guidance for departments.

1

Sub-committee to discuss and agree recommendations set out in this report (7 March). Provide recommendation to FRAB.

2

Discuss with Met Office their future plans for climate data provision to allow GAD to firm up recommendation about physical climate scenario definitions (SSP-RCP-aligned or temperature-aligned). Discuss with other relevant stakeholders as required.

3

Summarise the results of this report for FRAB to discuss and agree (21 March).

4

Incorporate recommendations into first exposure draft to be presented and agreed at June FRAB meeting.

5

Consider a training program for the roll out of the strategy guidance to departments. GAD could assist in the technical aspects.



Appendix 1

- Methodology and assessment criteria



Methodology and assessment criteria

- We have broken down the question of “how to set scenario analysis guidance” into specific components, or factors, of scenario analysis on which HMT could provide guidance. We have set out relevant considerations and our recommendation for each.
- We have assessed these recommendations against criteria agreed with HMT in setting this guidance, namely consistency of approach and output, and complexity for entities.
- Additionally, there are many factors where several approaches are appropriate and could be justified. Therefore we have also provided a measure for our level of conviction in our recommendation. When our conviction is low, we would likely be comfortable with alternative approaches.

Consistency	Low	Medium	High	How important is this factor in generating consistent and comparable results across entities and consistent results with other climate change guidance.
Complexity	High	Medium	Low	What is the level of complexity that our recommendation introduces for entities completing scenario analysis.
Conviction	Low	Medium	High	How high is GAD’s conviction in our recommendation for this factor. Where our conviction is low, there are likely other reasonable routes to take.

- As well as assessing each of the factors against these three criteria, we have set out the benefits (or drawbacks) to entities of taking the recommended approach.



Appendix 2

- What is climate scenario analysis?
- Risks and opportunities in scenario analysis
- What are climate scenarios?
- What are the IPCC scenarios?
- Data that can help climate scenario analysis



What is climate scenario analysis?

There is no single accepted definition of climate scenario analysis and it means different things to different people. Below we have set out both how TCFD defines scenario analysis and GAD's view of climate scenario analysis in the context of this project.

TCFD's definition

“Scenario analysis is a **process for identifying and assessing the potential implications of a range of plausible future states under conditions of uncertainty.**

Scenarios are hypothetical constructs and not designed to deliver precise outcomes or forecasts. Instead, scenarios provide a way for organizations to consider **how the future might look if certain trends continue or certain conditions are met.**

In the case of climate change, for example, scenarios allow an organisation to explore and develop an understanding of how various combinations of climate-related risks, both transition and physical risks, may affect its businesses, strategies, and financial performance over time.

Source: [TCFD Final Recommendations](#)

GAD's view

Climate scenario analysis is a tool for assessing what could happen to different aspects of the entity (costs, income, policy, asset values, liability, workforce etc) under different future plausible outcomes of climatic conditions and macro- and micro-economic development in response to climate change and transition to a low carbon economy.

The use of scenario analysis to explore the impacts of climate change on these aspects is continuously evolving. What was done 5 years ago likely looks very different to what can be done today. As climate related risks and opportunities begin to be thought about in more detail, the sophistication of analysis will increase along with its ability to provide decision useful outputs.

Scenario analysis is a tool to enhance critical strategic thinking and an initial single analysis is unlikely to capture all climate-related risks at the required level of granularity. Scenario analysis should be an iterative processes where the objectives and scope of each analysis are well defined and tailored to ensure the output of decision useful information is maximised.

Often there will be a trade off, as in all types of scenario analysis, between:

- Incredibly well defined but near impossible to quantify narrative scenarios
- Scenarios that can be quantified, but in doing so need simplifying assumptions which may be unrealistic



Risks and opportunities in scenario analysis

TCFD breaks down climate related risks and opportunities into physical and transition risk (and opportunity), with further breakdowns and examples. Additionally, in the Exposure Draft for Phase 2, HMT has defined other climate-related risks which are specific to government. These are summarised below.

Physical		Transition				Government specific
Acute	Chronic	Policy and legal	Technology	Market	Reputation	
<ul style="list-style-type: none"> River and coastal flooding Surface water flooding Storm events – cyclone etc Storm sea level surge 	<ul style="list-style-type: none"> Change in precipitation Rising mean temperatures Sea level rise 	<ul style="list-style-type: none"> Increasing price of GHG emissions Enhanced emissions reporting requirements Regulation of products and services Exposure to litigation 	<ul style="list-style-type: none"> Substitution with lower emitting products and services Unsuccessful investment in new technologies Costs to transition to lower emission technology 	<ul style="list-style-type: none"> Change in customer behaviour Uncertainty in market systems Increased cost of raw materials 	<ul style="list-style-type: none"> Change in customer preferences Stigmatisation of sector Increased stakeholder concern or negative stakeholder feedback 	<ul style="list-style-type: none"> Policy leadership – failure to address climate risk Value for money – delayed action or hasty decisions leading to increased costs Accountability - unclear responsibility for meeting climate goals Coordination / delivery - inadequate collaboration and knowledge sharing
<ul style="list-style-type: none"> For government entities, policy-related transition risks are generally less relevant than for the private sector, due to the position as a policy setter, rather than policy taker. In addition, unlike the customers of private companies, users of Government services generally lack options for “customer substitution”. However, Government entities are exposed to some of the same transition risks as private entities, such as changing energy use, costs and efficiency (e.g. retrofitting buildings to make them more energy efficient). Government entities could also be exposed to potential litigation risks (e.g. in the event that they prevent overheating in public buildings like schools and hospitals). On the other hand physical risks tend to be much more material for government given their very long term outlook (compared to the private sector), and significant ownership and responsibility for real estate and infrastructure. However, each entity will be exposed to different levels and types of risks and therefore flexibility of approach is required. In particular, ministerial departments (policy setters) will have a different risk exposure to some non-ministerial departments, ALBs and public bodies (policy takers). 						

What are climate scenarios?

The IPCC is the United Nations body for assessing the science related to climate change. Their purpose is to provide governments with scientific information that they can use to develop climate policies. Thousands of people from all over the world contribute to the work of the IPCC. Experts volunteer their time as IPCC authors to assess thousands of scientific papers published each year to provide a comprehensive summary of what is known about the drivers of climate change, its impact on future risks, and how adaptation and mitigation can reduce those risks.

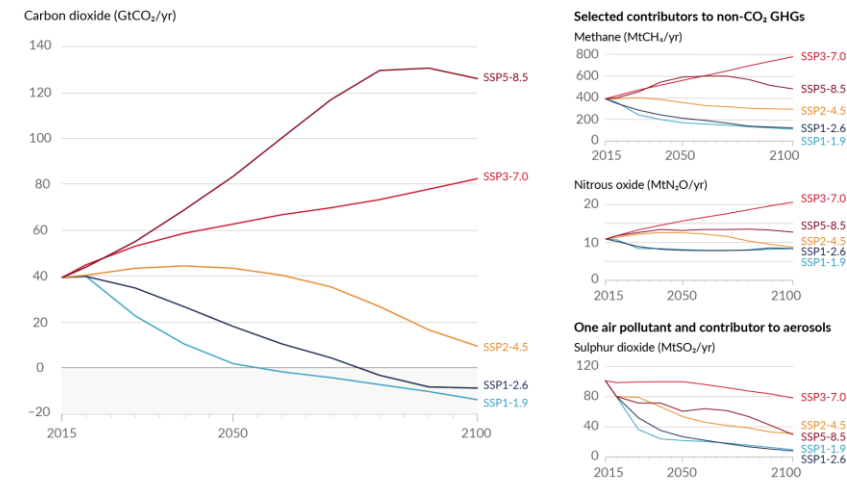
The Coupled Model Intercomparison Project (CMIP) coordinates the global climate modelling community to undertake a common set of climate scenario simulations which are used as the basis for IPCC climate change assessments. These scenarios are defined in terms of pathways for emissions and socioeconomic factors.

Representative Concentration Pathways (RCPs)

These are different projections of atmospheric concentration of greenhouse gasses up to 2100. The RCPs correspond with different levels of total atmospheric “radiative forcing” (a direct measurement of the greenhouse effect) meaning that they each produce different degrees of future global temperature increase.

Future emissions cause future additional warming, with total warming dominated by past and future CO₂ emissions

(a) Future annual emissions of CO₂ (left) and of a subset of key non-CO₂ drivers (right), across five illustrative scenarios



Shared Socioeconomic Pathways (SSPs)

These five scenarios outline different ways societal choices may affect greenhouse gas emissions and are based on different possible trajectories of socioeconomic development. These are aligned with different RCPs and named SSPx-y where x refers to the SSP (1-5) and y represents the corresponding RCP.



What are the IPCC climate scenarios?

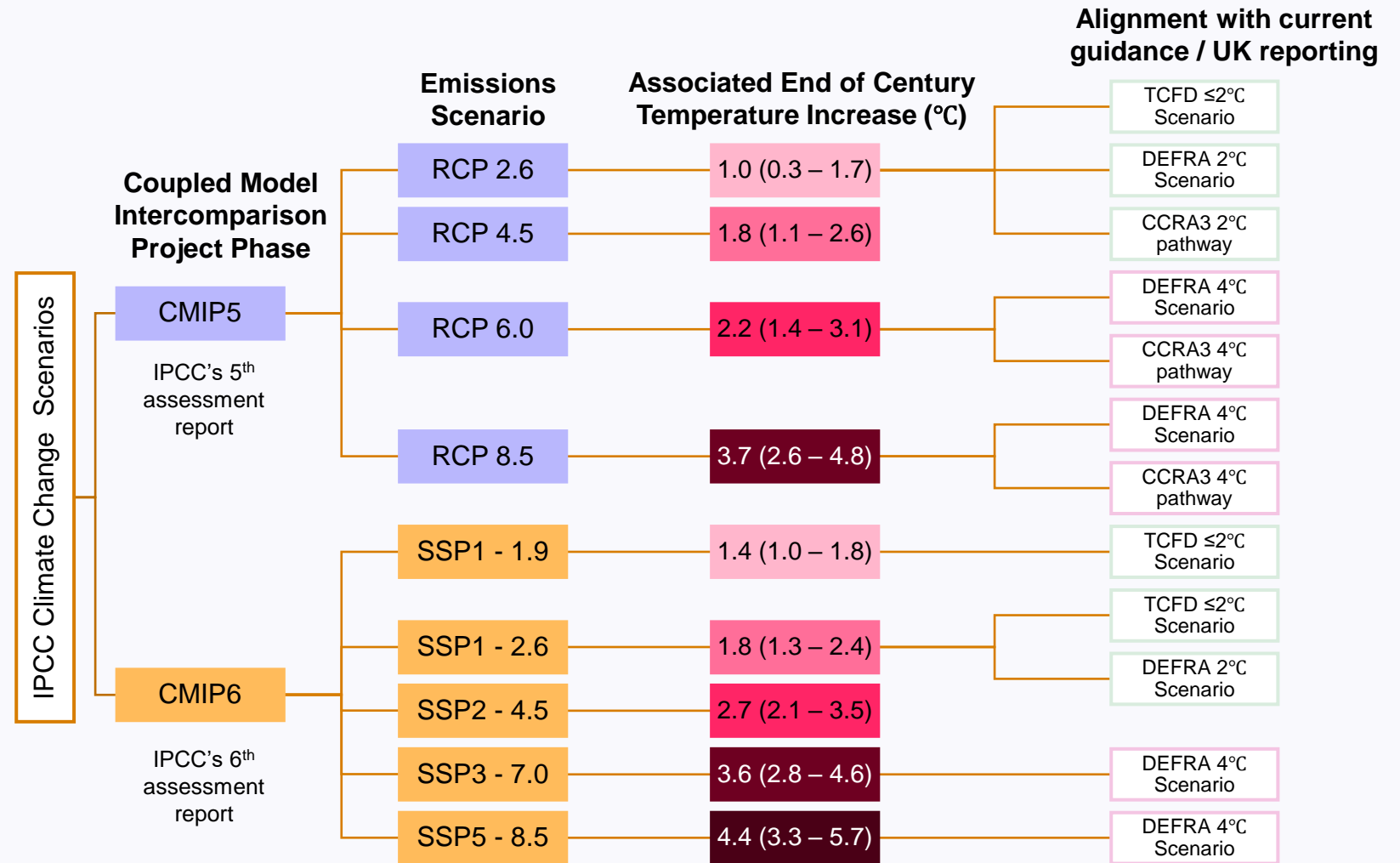
The scenarios reported in the last two IPCC assessments are based on model simulations from the 5th and 6th “coupled model intercomparison project”, CMIP5 and CMIP6 respectively.

CMIP5 models focussed only on concentration pathways and associated temperature rises e.g. RCP 2.6 provides an end of century temperature rise of 1.0°C with a range of 0.3-1.7°C.

CMIP6 introduced the SSPs. For example, SSP1-1.9 is shared socioeconomic pathway 1 combined with RCP1.9 which leads to an expected end of century temperature rise of 1.4°C and a range of 1.0 – 1.8°C.

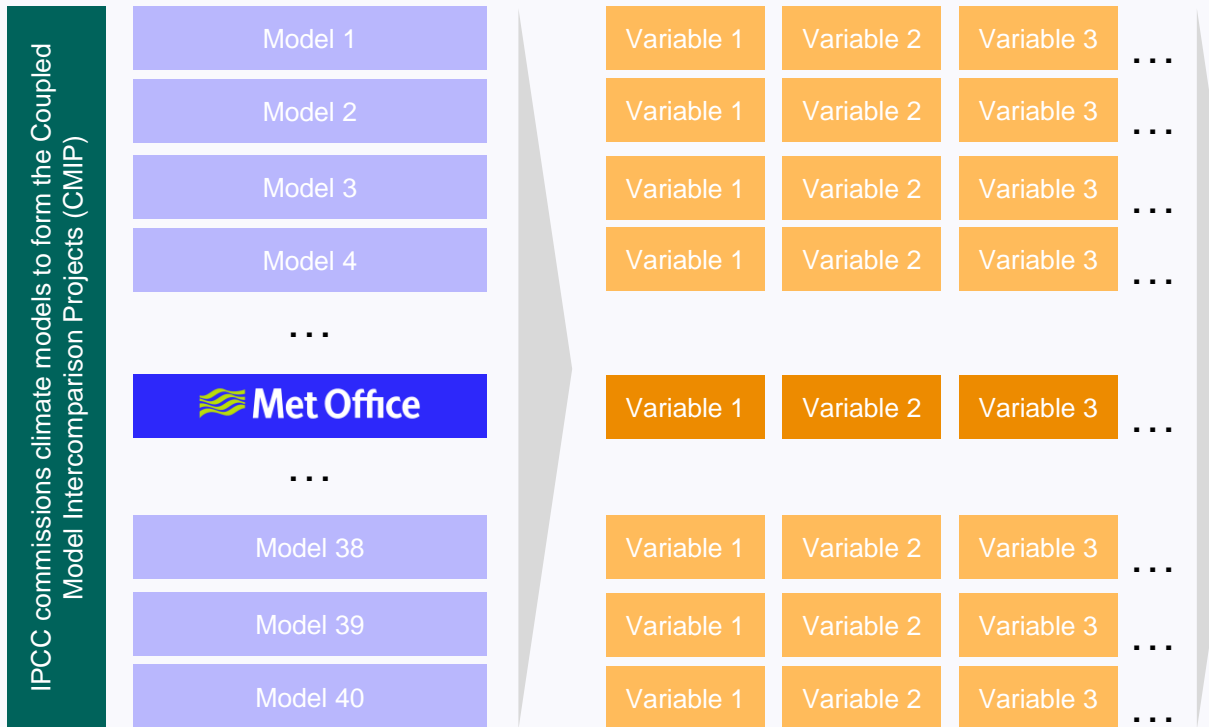
On the right hand side of this chart, we have shown how TCFD guidance, Defra’s Adaptation Reporting Power (ARP) guidance and the Climate Change Risk Assessment 3 (CCRA3) align with the IPCC’s models. You can see that some RCPs/SSP-RCP combinations are referenced more frequently than others.

The Met Office provides the UK Climate Projections (UKCP18) data which is based on regional climate model simulations driven by their global HadGEM3 model (see next page for more details). HadGEM3 simulations were part of CMIP5, whereas the latest IPCC report is based on CMIP6. Instead of looking at different RCP scenarios the data is presented using global warming levels and available for temperature rises of 1.5°C, 2°C, 3°C and 4°C under RCP8.5.



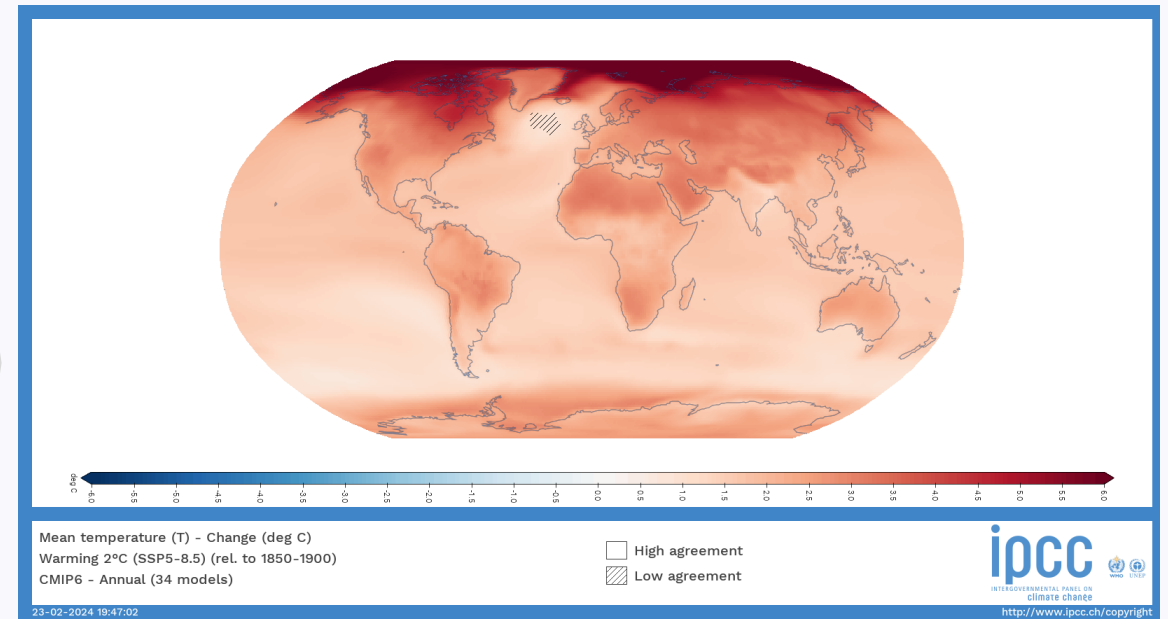
Data points provided that can feed into entities' scenario analysis

The CMIP suite of models provide thousands of climate change related variables that can feed into entities' climate scenario analysis, such as minimum and maximum temperatures, precipitation etc. However, it does not provide transition risk-related variables other than population and GDP.



40 different models make up CMIP6, including the Met Office's HadGEM3 model.

Each model produces thousands of different variables under different climate scenarios. These variables are often adjusted towards observed data and downscaled to give increased granularity.



The variables from the climate models are then used to calculate more useful climate impact metrics (for example number of days where temperature are above 35°C). Each metric is often aggregated across several models to provide an overall assessment which includes model uncertainty.

The Met Office provides their own model's output as part of their UKCP18 dataset as detailed on the previous slide.



Appendix 3

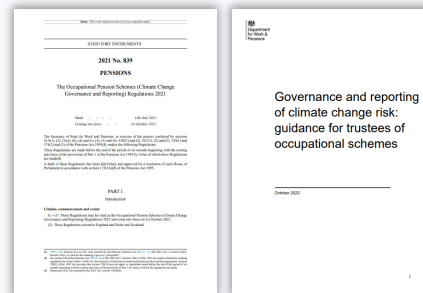
- Summary of comparable scenario analysis regulations and guidance from industry
- Summary of Defra's Adaptation Reporting Power guidance



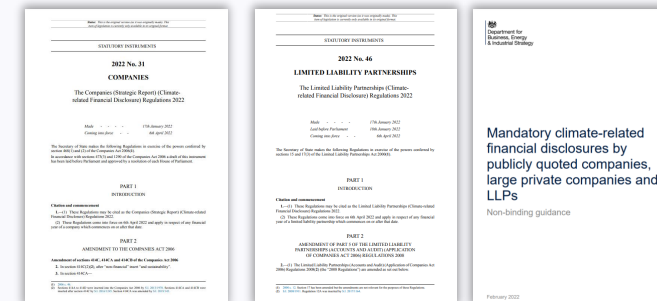
Overview of the TCFD reporting landscape in 2024



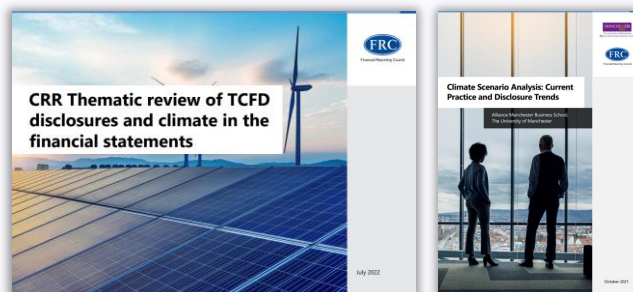
TCFD initially published reporting requirements in 2017. This was followed up with additional guidance on reporting and sector-specific guidance. The TCFD reporting guidance has been incorporated into reporting requirements from many regulators, legislators and policy makers.



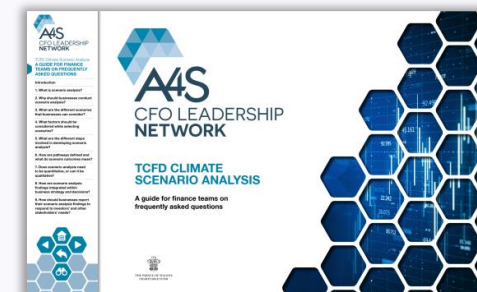
The **Department for Work and Pensions (DWP)** brought in regulation for private sector pension schemes to complete TCFD reporting in 2021.



The **Financial Conduct Authority (FCA)** updated their listing rules (in 2020 for premium listed and 2021 for standard listed companies), and **Department for Business and Trade (DBT, previously BEIS)** amended the Companies Act in 2022 to bring in TCFD aligned reporting requirements for publicly listed companies and LLPs in the UK.



The **Financial Reporting Council (FRC)** has completed a thematic review of the TCFD reports for 25 premium listed companies and set out what they were doing well and where they were lacking. Additionally, they published a review of current practice and trends in scenario analysis.



Accounting for Sustainability (A4S) has published guidance for finance teams on frequently asked questions on scenario analysis which is useful for preparers of TCFD reports, although targeted towards the private sector.

Summary of guidance by factor

	TCFD	DWP regulations and guidance	DBT regulations and guidance	FRC review of TCFD reports and best practice guidance	A4S scenario analysis guidance	Defra adaptation reporting
Details and sophistication of scenario definition	One should be 2 degrees of warming or lower.	One scenario must have global average temperature increase between 1.5-2 degrees.	One scenario must have global average temperature increase between 1.5-2 degrees.	N/A	N/A	Mid-century 2 degree rise, end-century 2 degree rise, end-century 4 degree rise.
Scenario data provider	N/A	N/A	No specific details, however states that this should be disclosed and justified.	States that scenario choice should be justified.	Public data providers are useful but sometimes limited by their global nature. Choice and justification should be disclosed.	Focus on physical risk - use RCP-SSPs in their adaptation reporting guidance.
Scope of scenario analysis within entities	Important to disclose things that could be material in the future.	All asset types within a pension scheme's investment portfolio are within scope. This point is not hugely relevant for government departments.	Organisations may wish to limit the scope to focus on their main operations before building up to the whole organisation.	Some organisations restricted scenario analysis to a sub-section of their organisation.	Prioritising key business areas and building on the analysis each year can help, although should aim to encompass the whole organisation.	All risks that could affect delivery of functions and objectives.
Timeframes for scenarios	Doesn't define short, medium and long. Challenges organisations to think longer term than traditional planning horizons.	Doesn't define short, medium and long.	Doesn't define short, medium and long.	Most organisation used short (0-1 year), medium (2-4 years) and long (5-10 year) time frames. However, others looked over a significantly longer timeframe, up to the year 2100.	Trade off between allowing time for developments to take place versus the greater uncertainty when dealing with longer terms. Notes it will depend on the nature of the organisation.	Mid-century, end-century.
Frequency of scenario analysis	Suggests updating every 3-4 years.	Updated at least every 3 years.	Updated at least every 3 years.	N/A	N/A	Updated every 5 years.
Number of scenarios	At least 2. The range of scenarios should be sufficiently diverse in order to create challenging "what if" analyses and capture a wide range of assumptions about uncertain futures.	At least 2.	N/A	Suggests that 3 are often chosen but using 4 can mitigate the tendency to see one as a middle ground.	Suggests 2 could be chosen to start with but 3 or 4 can allow for a better and broader assessment of risk.	3 scenarios.
Quantitative or qualitative analysis	Quantification at some level should be a goal in a mature scenario process.	Analysis may be qualitative or quantitative. Start out with qualitative analysis and progress towards developing sophistication to using quantitative analysis.	Analysis should be at least qualitative in nature. However notes that some organisations may find a quantitative approach useful.	N/A	Analysis should start simple, potentially qualitative only. However should aim for quantification over time.	Qualitative or quantitative (anecdotally, most ALBs report qualitatively).
Impact of entity on environment	N/A	N/A	N/A	N/A	N/A	N/A
More details	Pages 37-38	Page 39	Page 40	Pages 41-42	Page 43	Pages 44-45

Taskforce for Climate Related Financial Disclosures (TCFD)

Scenario analysis falls under the strategy pillar of the TCFD recommendations, in particular strategy recommendation (c) (circled in pink to the right) specifically makes reference to scenario analysis.

To comply with the recommendations, organisations must include at least one scenario with under 2°C warming, in line with the 2015 Paris Agreement. Where relevant, organisations should also consider a scenario with higher physical and transition risk.

The TCFD guidance stresses the importance of:

- feeding the results of scenario analysis into other areas of the TCFD recommendations, including the impact on strategy, risk monitoring and management and financial health.
- discussing the scenarios and the time horizons over which the analysis is done.
- Making disclosures comparable among organisations within a sector, industry, or portfolio. The benefits of this include allowing meaningful comparisons and the benchmarking of risks.

The TCFD also publishes specific guidance for those operating in some sectors particularly at risk from the impacts of climate change.

Strategy

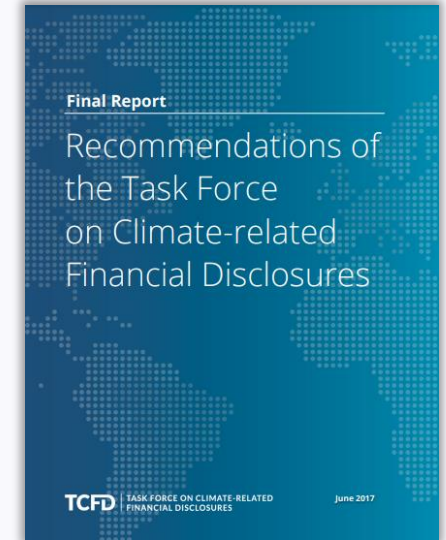
Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.

Recommended Disclosures

a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.

b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.



TCFD guidance for non-financial companies

Further [guidance](#), aimed at non-financial companies notes that:

- the number of scenarios considered should be sufficiently diverse to capture the breadth of future uncertainty, in particular the guidance recommends **three or four scenarios** be considered.
- scenarios should be **exploratory** in nature and consider **both physical and transition risks** as well as the interplay between them.
- while quantification should be the goal, companies should not rush there, instead noting it is **important to have a strong narrative in place for each scenario**.
- **time horizons should be carefully chosen**; organisations should challenge their thinking about traditional planning horizons which are often rather short term.
- there should be specific **caution around the use of orderly pathways**, noting that they are not intended to be predictions of realistic outcomes with the guidance recommending that companies consider adding some disorderly transitions into some scenarios.
- companies generally update scenarios **annually to every three or four years**.
- disclosure should include information regarding their scenario analysis, **how it informed company strategy and related financial implications**.
- it is important to disclose things that **could be material in the future**, even if they are not material at the publication date, materiality thresholders should also be disclosed.



Department of Work and Pensions (DWP)

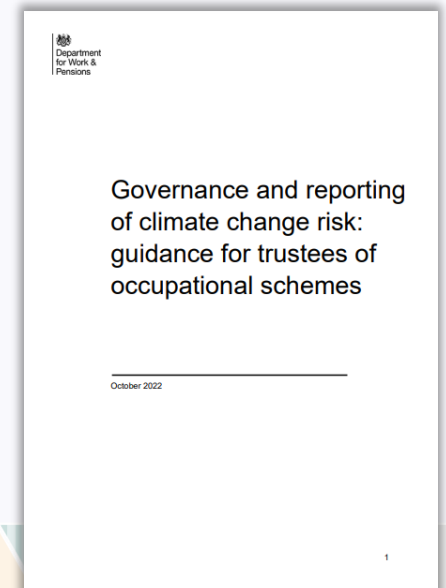
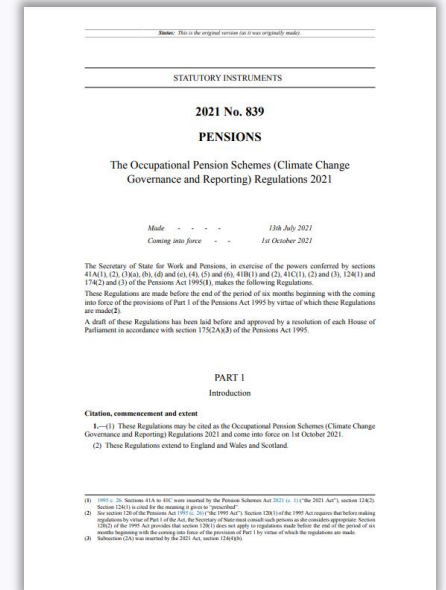
DWP sets out, in 2021 [regulation](#) and [guidance](#), some principles of scenario analysis specifically for pension schemes.

Schedule part 1.6 aligns with the TCFD recommendations in that pension schemes must consider two (or more) scenarios, one of which must have warming of 2°C or lower. However, it goes further to state that this scenario must have global average temperature increase between 1.5°C and 2°C.

The regulations also stipulate reviewing the scenario analysis **annually (after the first year) and updating where the trustees either believe it is appropriate to do so, or where they have not updated it in the two previous years**. Reasons for not updating must be disclosed.

The DWP guidance also:

- encourages pension schemes to ensure **sufficient resources** are being allocated in light of scenario analysis.
- discusses **the value in qualitative versus quantitative analyses** and recommends that initially schemes may find qualitative disclosures more accessible, although notes that over time the aspiration should be to make these quantitative in nature.
- suggests that in-house, **simpler scenario analysis can be more insightful if better understood by those undertaking scenario analysis**, compared to more complex analysis that may be possible if out-sourced to third-parties.
- states that pension schemes may want to assess the impact under their chosen scenarios using the same time horizons used elsewhere in the strategy disclosure, and these time horizons should be specified in the report.
- asks schemes to outline their **reasons for choosing the scenarios they have used**.
- suggests **key assumptions and limitations** of the scenario modelling are disclosed.

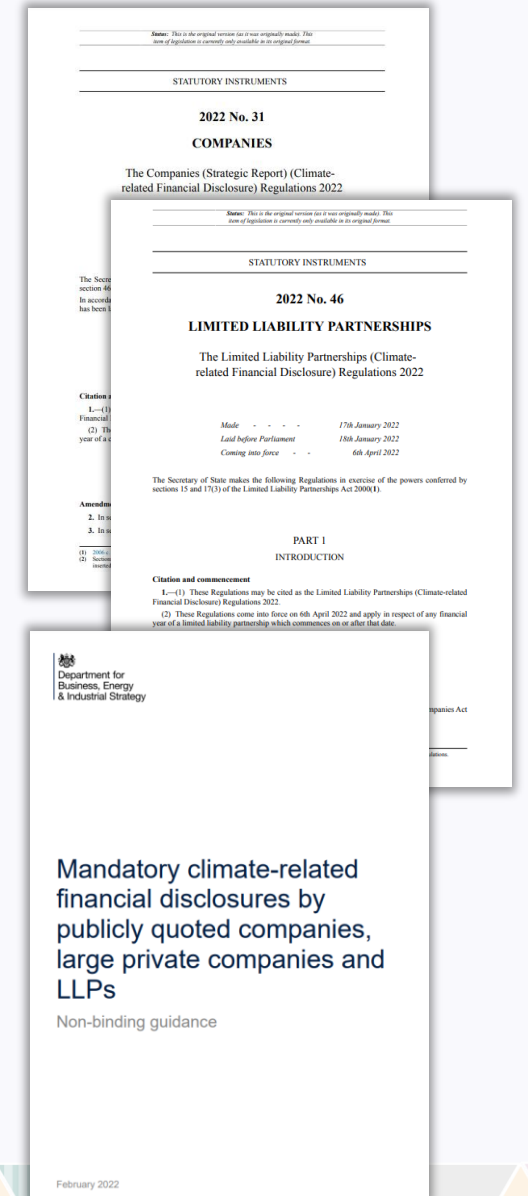


Department of Business and Trade (DBT)

In 2022, the entity of Business and Trade (previously BEIS) published regulations amending the [Companies Act 2006](#) and [LLP Regulations 2008](#). The regulations focused on climate-related financial disclosure and stated that different climate-related scenarios could be used to analyse the resilience of a company's business model and strategy.

Alongside these regulations, non-binding [guidance](#) was published. This guidance:

- states that the scenarios selected should be those **most relevant to the business**, noting that this will depend on the nature of risks and opportunities the business is most exposed to.
- makes reference to the Paris Agreement and the use of a scenario consistent with 1.5°C-2°C warming, this is in line with the TCFD recommendations.
- advises companies to **include the source of any scenarios used and the justification for their scenario choice**.
- suggests that where mitigations are being put in place the disclosures should **allow the reader to understand the extent of the mitigation measures and residual risk**.
- notes the importance of disclosing the **estimates and assumptions used in scenario analysis** and any improvement in these estimations over time.
- sets the expectation that as best practice develops, scenario analysis methodologies will converge
- states that scenario analysis should be **at least qualitative in nature**, however notes that some organisations may find a quantitative approach useful.
- suggests that, as a starting point, organisations may wish to limit the scope of their scenario analysis to focus on their **main operations** before building up to the whole organisation.
- confirms that while it may not be necessary to update the analysis every year, **it should be updated at least every 3 years** or whenever there is a significant change in assumptions.



Financial Reporting Council (FRC)

From the FRCs 2022 [review](#) of 25 premium listed companies, notable points around scenario analysis include:

- while most companies undertook scenario analysis, **only a quarter disclosed quantified outcomes**.
- it was often **unclear how scenario analysis had informed financial planning, the company's strategy or any actions taken as a result**, this is an expectation of the FRC.
- that some organisations had done **sensitivity analysis to show the impact of assumptions** used in scenario analysis, and stated that this could be an interpretation of some International Financial Reporting Standards.
- that a number of the companies restricted scenario analysis to a **sub-section of their organisation**.
- some companies had not explained **why the particular scenarios were chosen, the assumptions used and how the analysis was done**, these are expectations of the FRC.
- the FRC expects explanations of how the scenarios, assumptions, outputs and sensitivities used **correspond to discussions in the financial statements**.
- better practice examples showed **how carbon pricing may impact the businesses strategy**, through incorporating this into scenario analysis.

In 2021 the FRC (in partnership with the University of Manchester) published a [paper](#) looking at scenario analysis specifically. Four specific, best practice observations the paper makes are:

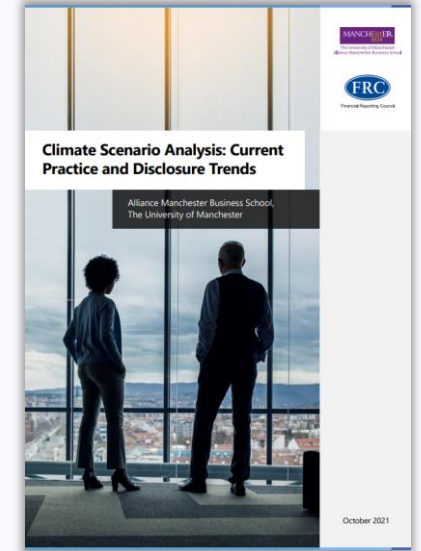
- establishing a **senior, cross-functional climate change working group** helped ensure effective climate governance and successful scenario implementation.
- using the outcomes of scenario analysis to help **shape future iterations**, noting that it will be a learning experience.
- noting the importance of **sector specific guidance, initiatives and best practice**, with these helping organisations translate global scenarios into business-level impacts.
- using climate scenario analysis to inform **strategic business planning**.



Financial Reporting Council

Additionally, the [paper](#) raises the following points:

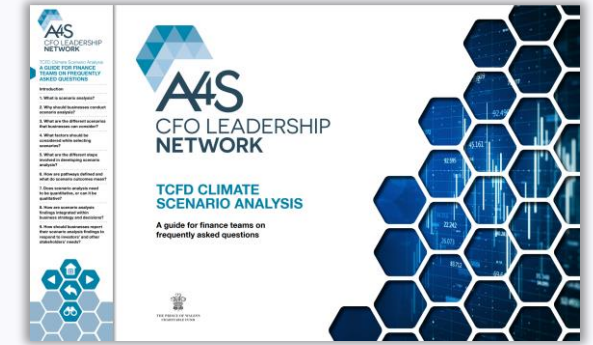
- as well as approaches discussed in other sources there was also a ‘tick-box’ approach discussed, however this was not encouraged due to the significant resource commitment required (including from external consultants).
- ensuring there is the correct balance of **internal development and external support**.
- **three scenarios were typically chosen** including one Paris-aligned, one where there is limited action to tackle climate change and the third often reflecting current policies. However, it suggests **four scenarios may be advantageous** as it mitigates the tendency to see one of the scenarios as a middle ground.
- on time horizons, most companies used **short (0-1 year), medium (2-4 years) and long (5-10 year) time frames**; however, others looked over a significantly longer timeframe, up to the year 2100.
- the importance of developing a **narrative for each scenario** which is in line with the scientific basis of the scenario.
- **baselines used in scenario analysis are important**, assuming a static baseline prevents the organisation making assumptions about their future agility whereas a dynamic baseline encourages the organisation to think actions they can take to adapt.
- modelling often involved **acquiring external support** due to its technical nature.
- the lack of granularity in data sources and **accessing data related to the supply chain were noted as challenges**, but that these were improving over time.
- the **challenge of gaining engagement with longer-term climate impacts falling outside normal planning cycles** but that this was eased by framing analysis in terms of investment decisions that could be made today.
- that best practice involves disclosing information regarding the governance of climate scenario analysis, the scenarios used including **assumptions and any external sources used, plus alignment with TCFD recommendations**.
- that **often the scenario analysis wasn’t assured**, noting that there was limited guidance against which assurance could be provided.



Accounting for Sustainability

The [guidance](#) Accounting for Sustainability released on climate scenario analysis includes:

- that in order to best help strategic decision-making **scenario analysis should encompass the whole organisation;** however, noting that this can be incredibly complex instead it may be appropriate to **prioritise key business areas** and develop the analysis each year.
- the trade off when choosing time horizons between allowing time for developments to take place versus the greater uncertainty when dealing with longer terms. The guidance also notes that the **most suitable time horizons for analyses will depend on the objectives of such analyses and the nature of the business.**
- discussion on the number of scenarios considered noting that organisations **often chose 2 to start with**, but that 3 or 4 can allow for a broader assessment of risk.
- discussion about the sources of scenarios, noting that **publicly available sources can be very useful but are limited by their often global nature** and that an organisation may therefore wish to develop its own set of scenarios that suit its requirements.
- ensuring that the assumptions and parameters used in scenario analysis are **in line with other financial processes including long-term forecasts.**
- that organisations should **start with simple analysis, potentially only qualitative in nature**, before moving onto the aim of more sophisticated quantitative models.
- a consideration that **scenarios should be used to guide strategy and decision making** which requires continual improvement and development of the scenarios, the analysis done and the action taken as a result.
- details what disclosures should incorporate, which includes the **scenario narrative, time horizons, rationale of scenario choice, sources of the scenarios** as well as **important features of the scenario** (e.g. assumptions, limitations, data, models) and how these link to the business in question. Organisations may also wish to disclose the internal processes, governance, management and flow of information associated with scenario analysis.
- that the results of scenario analysis should be **considered in other areas of the financial statement** as appropriate.
- modelling should be **(internally) assured** to ensure rigour of disclosure.



Defra's Climate Adaptation Reporting Power

- Round 4 of Defra's Adaptation Reporting Power (ARP4) requires organisations to provide a climate change risk assessment which identifies direct and indirect climate risks that could affect delivery of functions and objectives. Risks considered should include: **physical assets, staff and the workplace, supply and demand, finance, business processes, the regulatory and policy context** etc.
- Entities are invited to report according to the Government's strategy for that round of reporting. Arms length bodies included in round 4 include the Environment Agency, Food Standards Agency, Natural England, Network Rail, NHS England etc.
- Reporting cycle is usually 5 years and ARP4 is aligned with the Climate Change Risk Assessment (CCRA) and the National Adaptation Programme (NAP).
- ARP4 guidance requires clear **explanation of timeframes and levels of warming that have been used in scenario analysis**.
- Minimum requirement is for **Present day, Mid century – 2°C rise, end century 2°C rise, end century 4°C rise**. See acceptable proxy scenarios on next slide based on IPCC CMIP5 and CMIP6 emissions scenarios.
- Guidance requires submissions to specify if information used is national or local sub-national. Uncertainty should be explored (e.g. by looking at 10th and 90th percentiles).
- Current advice for climate change adaptation is to consider impacts associated with 4°C temperature rise by 2100 as a way of capturing a worse case scenario. This is equivalent to RCP6.0 or RCP 8.5.
- Organisations are expected to describe current and future likelihood of a risk impacting upon functions (qualitatively or quantitatively), the consequence of the impact including cascading risks and interdependencies, the overall risk and whether it will in future become unacceptable requiring adaptation action.
- Where possible an estimate of financial impact (both direct to organisation to society) and of each risk should be given.
- **Compared to TCFD, ARP requires a more granular assessment of risk and action through an adaptation lens**. The Climate Change Committee (CCC) sees TCFD to be more focussed on financial risks and opportunities related to climate more generally. However, there is significant overlap between ARP and TCFD reporting requirements. Overlaps occur in each of the four TCFD pillars.
- ARP guidance provides a table listing risks according to sector that can support risk identification and prioritisation which may be a useful resources.



Scenarios used in Defra's Climate Adaptation Reporting Power guidance

Table 1: Acceptable climate scenario proxy parameters

Scenario	Range of timeframes	Levels of warming / pathways
1: Present-day (near-term)	Past, present and near future (to 2030)	Historic observed warming levels/trends, existing climate and weather records, experienced extremes (past and present), and near-term projections to 2030.
2: Mid-century (medium-term) – a 2°C rise	By 2050 (range could include 2040-2060)	Projections for the mid-century are broadly similar irrespective of the emissions scenario. Therefore, consider the conditional probability range, specifically the 10th to 90th percentiles for chosen pathway e.g. RCP2.6.
3: End of century (long-term) – a 2°C rise	By 2100 (range could include 2080 - 2100)	A 2°C rise by 2100 or a pathway consistent with this - such as RCP2.6 (as in CCRA3) or SSP1-2.6
4: End of century (long-term) – a 4°C rise	By 2100 (range could include 2080 - 2100)	A 4°C rise by 2100 or a pathway consistent with this such as RCP 6.0 (as used in CCRA3), RCP8.5 (if previously used or with justification) or SSP5-8.5 or SSP3-7.0.

Note: RCP 2.6 and SSP1-1.9 are unlikely to provide sufficiently conservative information for robust adaptation planning, though these pathways are useful to illustrate baseline impacts associated with a rapid decarbonisation and thus illustrate the avoided impacts vs higher emissions scenarios

Resources:

- Met Office's [Climate Data Portal](#) provides organisations the ability to access climate data in a GIS (spatial) format. The portal contains 55 different data layers, as well as guidance and information to analyse a range of climate risks. Spatial analysis can be performed at a global, regional or local level enabling location-specific action plans to be developed. The tool presents complex scientific climate projections in easy-to-use formats, ready to visualise and analyse in GIS and non-spatial applications
- [UK Climate Projections 2018](#), which illustrates the potential changes in climate for the UK until 2100, the [UKCP User Interface](#), and the Met Office UKCP [guided training course](#) offer (next available dates June 2024)
- [BBC Postcode Checker](#) tool, which was developed collaboratively between BBC and Met Office
- UK Climate Resilience Programme [Climate Risk Indicators](#) and guidance on [using the UK Climate Risk Indicators](#)
- Environment Agency's [Climate Impacts Tool](#)
- ONS's [climate change statistics portal](#) including [impacts](#) and [adaptation](#) dashboards





The Government Actuary's entity is proud to be accredited under the Institute and Faculty of Actuaries' [Quality Assurance Scheme](#). Our website describes [the standards we apply](#).

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