Institute
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IFoA GIRO Conference 2024

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Institute and Faculty of Actuaries

IFoA Climate Change Stress and Scenario Testing Working Party

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IFoA GIRO Conference 2024

Agenda

- Overview of working party paper
- Proposal for a climate scenario analysis framework
- Worked example

Overview of working party paper

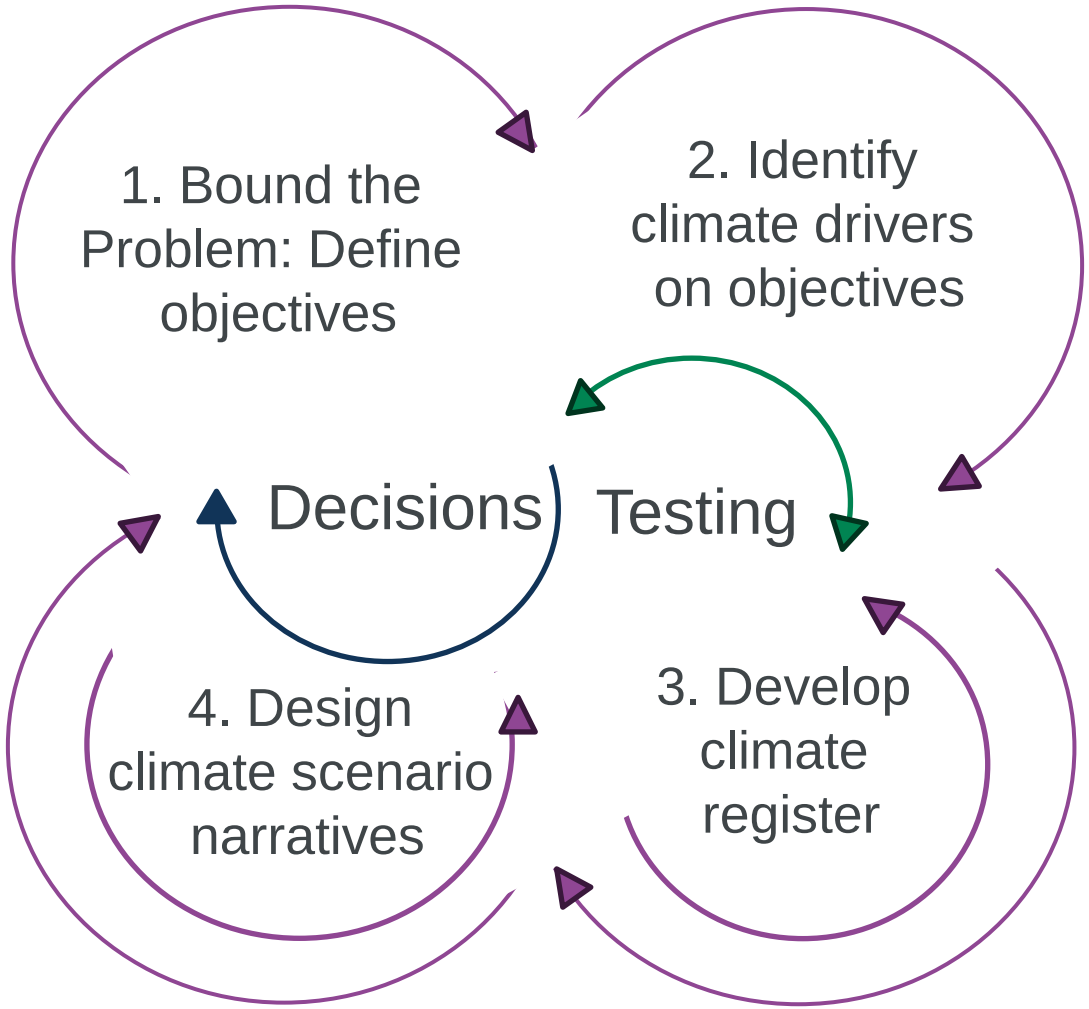
Purpose

- Develop a framework to assess potential financial impact of physical and transition climate-related risks and opportunities beyond the short to medium term horizons typically used by companies e.g. within the ORSA.
- This will be a multi-disciplinary investigation looking at insurance liabilities and assets backing insurance business.

Deliverable

- Framework for developing good climate narrative scenarios that are bespoke to an organisation
- A structure for enabling the ongoing evolution of stress testing and scenario analysis that is transparent and adaptable
- References to further information throughout the stress and scenario testing cycle

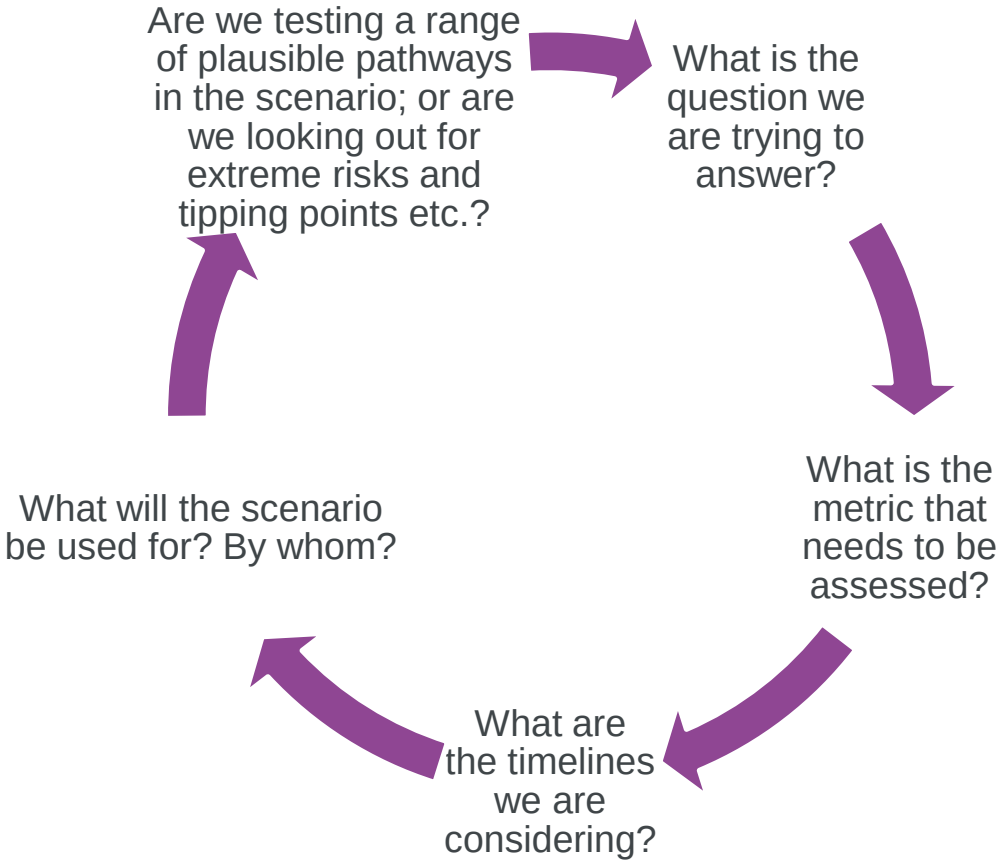
Overview of working party paper



Proposal for a climate scenario analysis framework

1. Bound the problem: Define objectives

- Focus attention
- Enable understanding of the uncertainty



Example

How could the claim profile of a non-life insurance product change because of climate change?

Simplifying assumptions

- Only sells home insurance policies
- Only has policyholders in the UK

1. Bound the problem: Define objectives

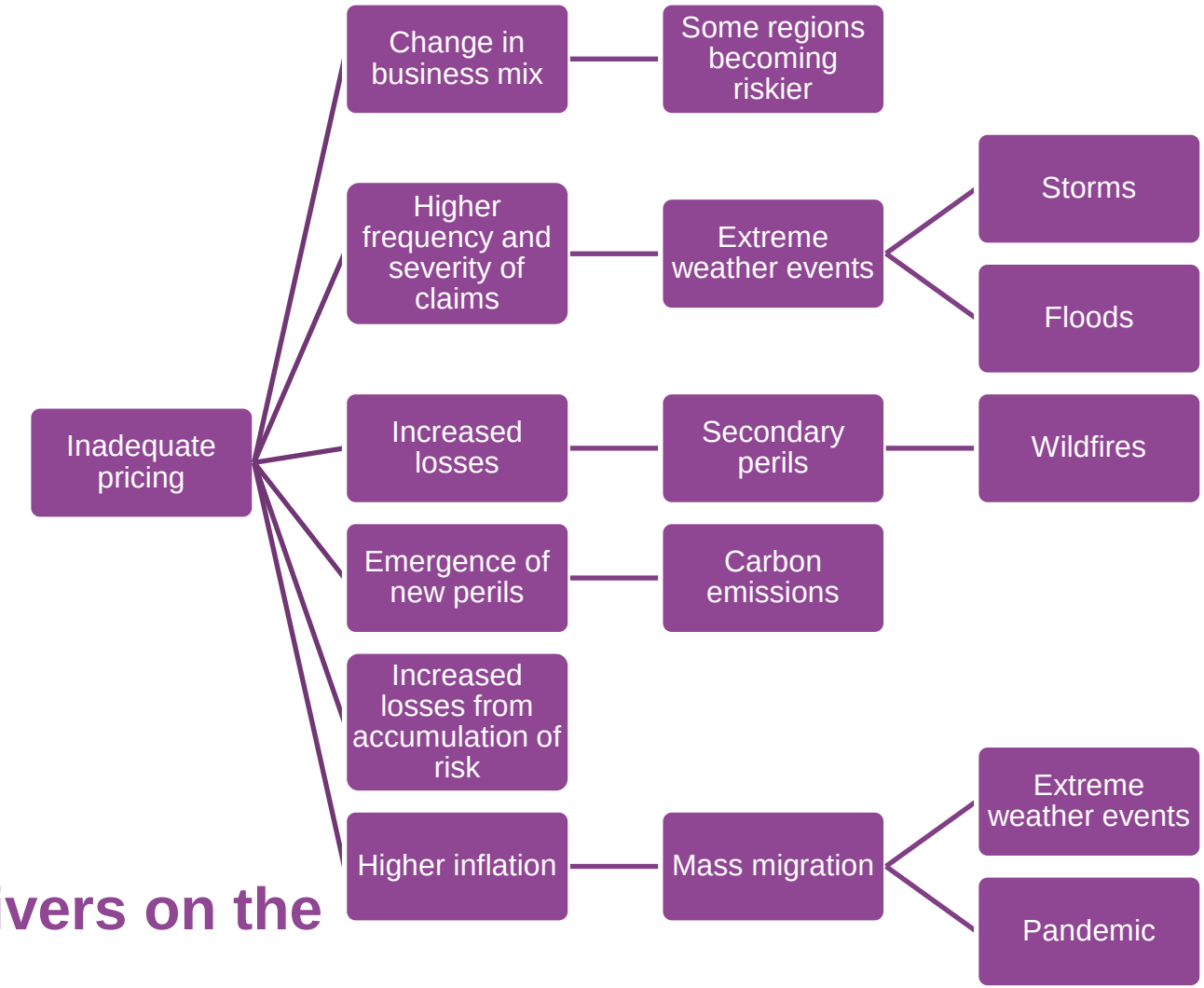
- Changes in:
  - Risk profile
  - Claim severity
  - Claim frequency
  - Accumulation of risk
- Assess the impact on short & long term strategy
- Considering different climate pathways; including more extreme tipping point scenarios

Proposal for a climate scenario analysis framework

2. Identify climate drivers on the objective

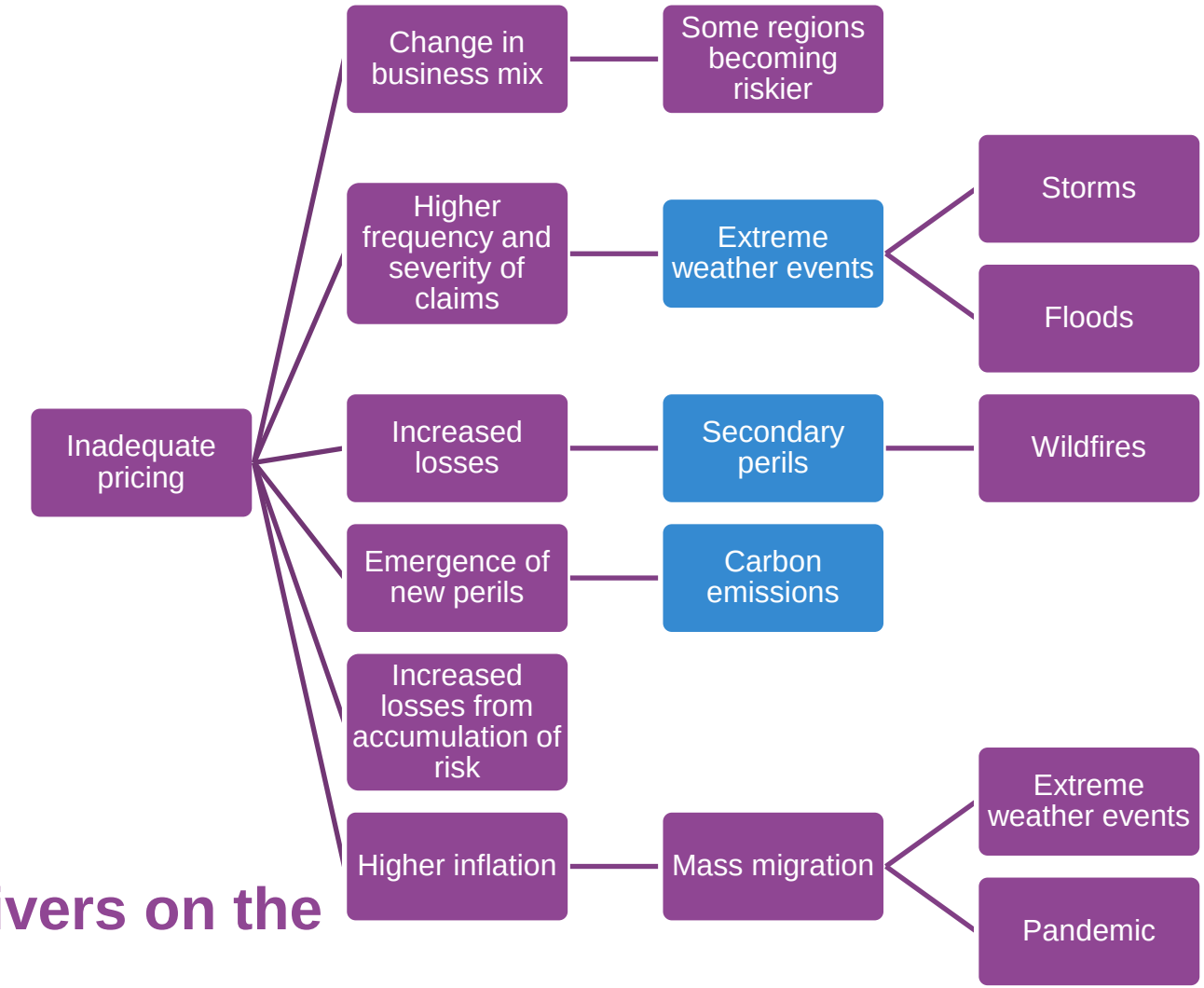
- Start with things that could impact the objective; step back to attach it to a climate driver
- Threats and opportunities
- Identify the building blocks for a climate register
- Identify interconnected and overlapping effects

Example



2. Identify climate drivers on the objective

Example



2. Identify climate drivers on the objective

Proposal for a climate scenario analysis framework

Column	Description
Column driver	Event/series of events attributable to climate change that may impact the insurer
Impact on objectives	Transmission channel(s) that lead to an impact to the insurer
Time Horizon	Estimate of the time horizon over which each risk is defined in each transmission channel is expected to arise
Materiality	Description of the materiality in terms of the qualitative impacts on the business (could be split by product)
Which underlying risks does the climate driver impact	Mapping transmission channels to insurer risks. This could include a direct mapping to regulatory solvency risk groups (ie., SII risk modules)
Expert opinion on impact	Current views of business and climate experts (generated via discussions / interviews etc)
Research	Current research on the topic relating to the climate driver

3. Develop a climate register

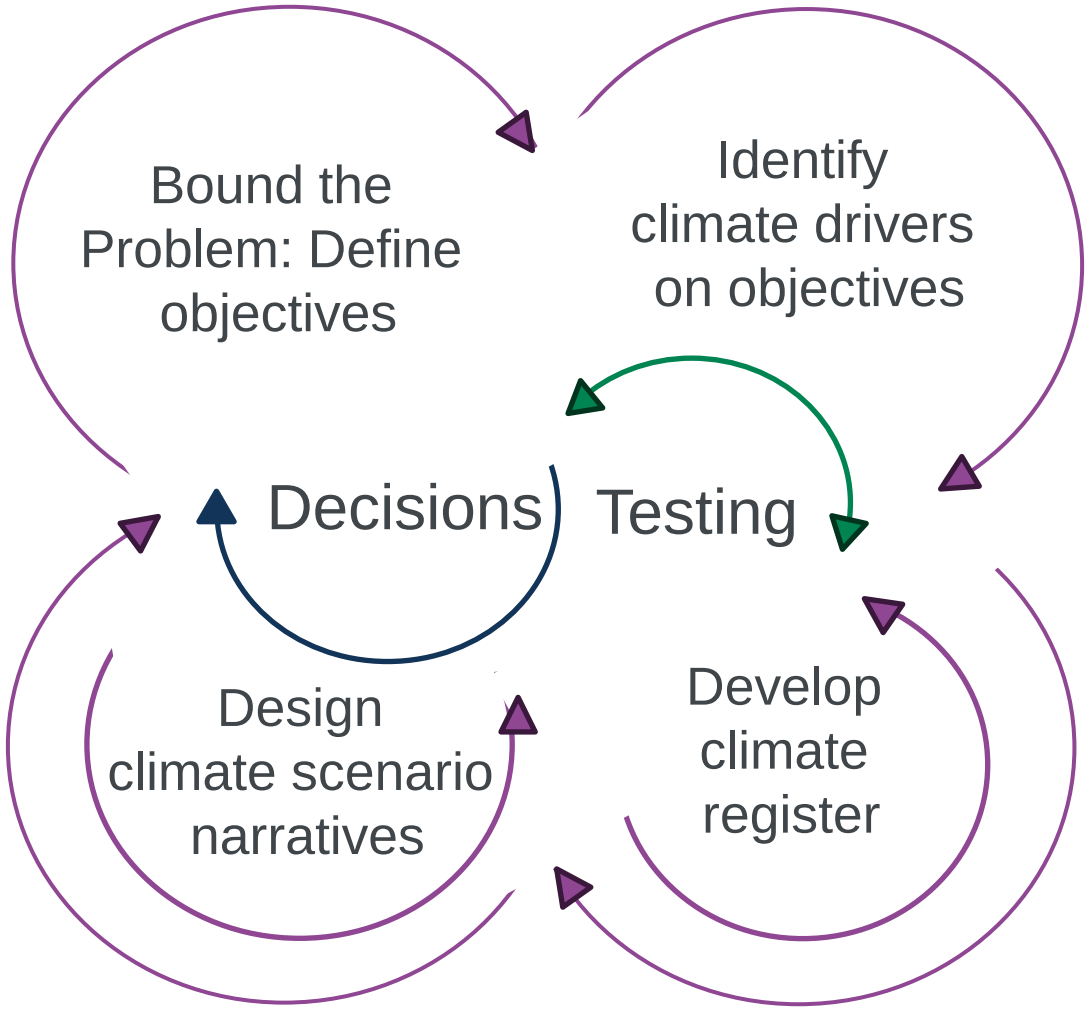
- A structured approach to enable expert judgements to be made on potential risk drivers or opportunities
- Set out in a way that is transparent and allows for updating
- Aim is to identify key elements to include in a climate narrative

Example

3. Develop a climate register

Climate driver	Impact on objectives	Time horizon	Materiality	Underlying risks	Expert opinion on impact	Research
Extreme weather events	Could result in **increased frequency and severity of claims** and worse than expected impacts of catastrophe events. Secondary perils become more prominent	The impact is already being seen	High impact Severity: 7-10bn USD and 30-50bn USD impact from Hurricane Helene and Milton respectively	• Claim severity • Frequency • Accumulation of risk	Extreme weather events are likely to have a major impact on claim severity and frequency	*Verisk*
Secondary perils	Could result in the **loss amount** of high frequency, low severity claims to be consistently **higher than expected**	The impact is already being seen	Global Cat loss trends show a 5-7% p.a. increase in last 30 years	• Claim severity	Worse than expected loss amounts for secondary perils	*Swiss Re Institute*
New perils e.g. carbon emissions	Emergence of claims which were not expected and not included in premium calculation and hence leading to **inadequate pricing.** Could also lead to **high litigation costs**	The impact is already being seen	Medium to High impact Class actions could lead to high impact	• UW risk • Litigation risk	Emergence of new perils could lead to unexpected losses for insurers	*Global_trends_in_climate_change_litigation_2023_snapshot.pdf (lse.ac.uk)*

Overview of working party paper



Proposal for a climate scenario analysis framework

4. Design climate scenario narratives

- Design informed scenario narratives that will help provide information on the problem statement that can help drive decisions
- Based on expert judgement of exposures for the specific organisation and objective

Scenario	Title describing the crux of the scenario
Scenario narrative	Narrative for the scenario and how it emerges; focusing particularly on implications for the problem statement
Risk exposures	Describe the exposures because of the scenario narrative. These should be for the firm specifically but should also describe exposures within the environment in which it operates as relevant
Under which climate pathway/s is this scenario able to manifest?	Consider if the scenario is more or less likely along a particular climate pathway; or how it could differ under different climate pathways
What does this mean for us?	• What are the implications for our business? • Would we have seen it coming through our current controls / structures?
Decisions	• Is there something we need to do to manage the risk or take advantage of an opportunity? • Are there KRI's we need to introduce to get early warnings that this scenario could be emerging? • Are there any low cost / low regret decisions we can make today to increase our resilience?

Example

4. Design climate scenario narratives

Scenario	UK Floods
Narrative	Scenario has been designed for an insurer who writes property and casualty business in the UK. As a result of climate change, the **frequency and severity** of UK floods has increased significantly over the last few years leading to worse than expected results for the insurer for a few consecutive years. Major reinsurers have refused to take on UK exposure leading to **increased reinsurance costs**. Meanwhile, UK economy is experiencing **higher inflation** due to increased demand of goods and services while there isn't enough supply due to recent catastrophic events. Additionally, the insurer has been hit by the **stranded assets** in the investment portfolio as many areas in the UK are deemed unliveable by the residents. Consequentially, new and existing policies are being **repriced** and premiums have been increased significantly to an extent that it is unaffordable for many residents. Sales have significantly dropped making it even more expensive to underwrite and reduced exposure and hence **reduced diversification** of the portfolio. The high inflation environment raises concerns about the UK government's ability to address the economic repercussions of the catastrophic events, credit rating agencies **downgrade UK debt**. This results in UK asset values falling. Insurer is having to hold **higher reserves** for catastrophe events due to increased frequency and severity of the claims. Regulators are expecting the insurer to hold a **higher solvency capital required** (SCR) due to increased uncertainty of claims and reduced diversification.

Example

4. Design climate scenario narratives

Scenario	UK floods	
Risk exposures	• Increased frequency and severity of claims • Increased re-insurance costs • Increased uncertainty of claims • Repriced new and existing policies	• Increased premiums • Reduced diversification • Higher demand-pull inflation • Falling asset values
Under which climate pathway/s is this scenario able to manifest?		
What does this mean for us?		
Decisions		

NGFS Scenarios

Disorderly

Delayed Transition assumes annual emissions do not decrease until 2030. Strong policies are needed to limit warming to below °2C. Negative emissions are limited.

Too-little too-late

Fragmented World assumes a delayed and divergent climate policy response among countries globally, leading to high physical and transition risks. Countries with net zero targets achieve them only partially (80% of the target), while the other countries follow current policies.

NEW

Orderly

Net Zero 2050 limits global warming to 1.5 °C through stringent climate policies and innovation, reaching global net zero CO_2 emissions around 2050.*

Below 2 °C gradually increases the stringency of climate policies, giving a 67% chance of limiting global warming to below 2 °C.

Low Demand assumes that significant behavioural changes – reducing energy demand – in addition to (shadow) carbon price and technology induced efforts, would mitigate pressure on the economic system to reach global net zero CO_2 emissions around 2050.*

NEW

Hot house world

Nationally Determined Contributions (NDCs) includes all pledged targets even if not yet backed up by implemented effective policies.

Current Policies assumes that only currently implemented policies are preserved, leading to high physical risks.

* In these scenarios, some jurisdictions such as the US, EU, UK, Canada, Australia and Japan reach net zero for all GHGs.

Source: https://www.ngfs.net/en/ngfs-climate-scenarios-phase-iv-november-2023

Example

4. Design climate scenario narratives

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Risk exposures	• Increased frequency and severity of claims • Increased re-insurance costs • Increased uncertainty of claims • Repriced new and existing policies	• Increased premiums • Reduced diversification • Higher demand-pull inflation • Falling asset values
Under which climate pathway/s is this scenario able to manifest?	• Could probably occur under all scenarios, but under a hot house world, and too little too late the pressures, the environmental impact due to carbon emissions would be the worst	
What does this mean for us?	• Stranded assets in the investment portfolio as many areas in the UK are deemed unliveable by the residents • UK asset values falling • Higher reserves held for catastrophe events due to increased frequency and severity of the claims • Higher solvency capital required (SCR) due to increased uncertainty of claims and reduced diversification	
Decisions		

Example

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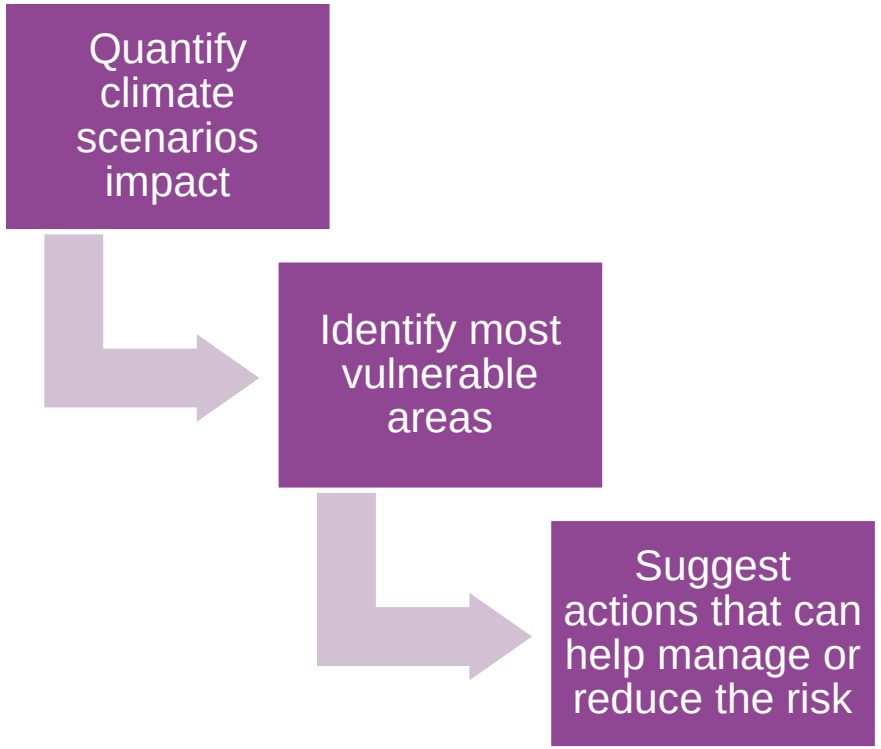
Use the exposures identified to determine how parameters in our models need to be stressed

Use the discussion around climate pathways to understand how the parameters might need to be changed under different pathways and can be linked to climate pathways from providers like the NGFS

Proposal for a climate scenario analysis framework

5. Climate scenario testing and decision making

- Quantify climate scenarios
- Identify and assess most vulnerable areas
- Vulnerable areas will vary based on your own portfolio of customers, investments, risk appetite, etc.



Example

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Decisions	• Withdraw from areas prone to floods, hence change business mix to have better risk • Engage in public private partnerships – have a backstop so that insurers can cap their maximum amount • Parametric based instead of indemnity based – payout is faster and helps reduce inflation risk and legal risk	

Quantify the impact on P&L, balance sheet, SCR, etc. to understand the impact on profitability, reserves, capital requirements

Quantify the impact on different climate pathways to understand how the change in parameters impacts the results

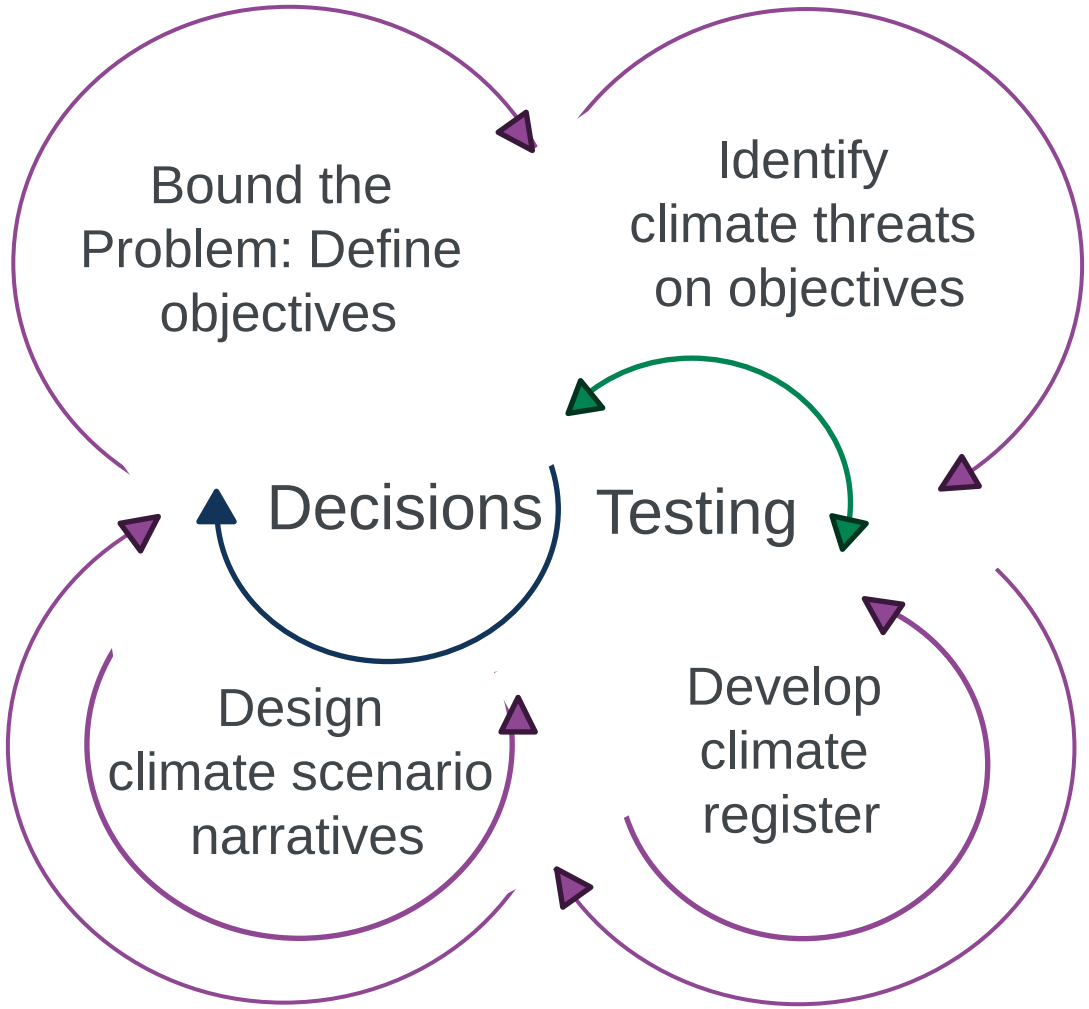
Covered in next slide

Proposal for a decision making framework

5. Climate scenario testing and decision making

- Monitoring on relevant KPIs e.g. fraudulent claims, updated property values, policyholders plans for limiting or monitoring carbon emission (environmental impact)
- Holding higher solvency buffer
- Investment in index-linked assets
- Improved understanding of uncertainties in liabilities

Climate scenario analysis framework



Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

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Thank you

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