



GAD Comment

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The financial risks of climate change

Why talk to us about climate change?

Climate change is likely to have a significant impact on the development of our society in the coming decades. For risk managers it will impact on: their ability to meet liabilities, their investment stock selection, the macro-economic factors which affect their business (such as inflation and earnings growth), and how they contribute to the development of a more sustainable planet.

Our experts in the Government Actuary's Department (GAD) help clients understand complex challenges around risk and uncertainty. This includes the longer-term implications of climate change which has the potential to affect many areas where we provide advice, analysis and assurance, including:

- > **Pension schemes:** by affecting mortality and morbidity rates, asset returns and the strength of sponsoring employers for funded schemes.
- > **Insurance claims:** through climate-related property losses, business continuity risks and liabilities to third parties.
- > **Insurance and investment markets:** where new and innovative products may be introduced as society adopts new technologies and looks to move to a low-carbon economy (also known as 'decarbonisation').
- > **Risk management processes:** where an increasing number of organisations explicitly recognise climate change in their risk management plans. These plans might include any potential changes to: regulation, policy, and financial disclosures as well as legal, ethical and fiduciary requirements.
- > **Financial modelling:** where presenting modelling results using scenarios rather than point estimates can help understand the possible effects of climate-related risks and consider how adaptation methods might change these.

We believe that organisations which take a proactive approach to managing such risks will be better prepared and may be viewed more positively by stakeholders.

Our actuaries contribute to the [resources made available by the UK's actuarial profession](#), the Institute and Faculty of Actuaries (IFoA), on resource and environment issues. We are also involved in actuarial research groups and other cross-government initiatives to gain wider insights into the impact of climate change.

Context

The increased burning of fossil fuels and the corresponding release of greenhouse gases, such as carbon dioxide (CO₂) and methane, is generally accepted to have led to man-made 'global warming'. The consequences of the increase in average global temperatures is already being felt worldwide. In the UK the results of the [UK Climate Projections 2018 study](#) (published in November 2018) show that the UK climate is continuing to warm and that sea levels continue to rise.

The [2015 Paris agreement](#), the first comprehensive global climate deal, set out an action plan to help the world avoid dangerous climate change. It calls on the 195 signatory countries to limit warming to no more than 2°C above pre-industrial levels, with the target being no more than 1.5°C.

Warming above 1.5°C is expected to lead to long-lasting or irreversible changes, such as the loss of some ecosystems.

A [special report from the UN's Intergovernmental Panel on Climate Change](#) (the IPCC), highlights the latest science and projections. This report makes clear that humanity has very little time (possibly only 12 years) to prevent further irreversible damage and limit warming to the 1.5°C target.

The UK's framework for tackling and responding to climate change is set out in the [Climate Change Act 2008](#) and its [Clean Growth Strategy](#) outlines its commitment to decarbonisation. Following the IPCC report the UK government has asked its independent advisers, the [Committee on Climate Change](#) if additional action is needed on top of the current policy commitments to meet the ambitious goals of the Paris Agreement.

Risks & opportunities

There is uncertainty around the timing and outcomes of climate change. Key factors will be how we, as a society, mitigate future greenhouse gas emissions and reduce the impact of any climate change. [Mark Carney, Governor of the Bank of England](#), categorised the risks to financial stability in the UK from climate change as follows:

- > **Physical risks:** the financial risks from weather-related events, such as heatwaves, droughts, floods, storms and sea level rise, putting pressure on the economy as public assets need protecting, health costs may rise and events cause business disruption.
- > **Transition risks:** the financial risks from the process of adjustment towards a lower-carbon economy (also known as decarbonisation). A shift in policy, technology, sentiment and physical risks could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent. An example of such a change in policy in the UK is the ban on the sale of fossil-fuel-powered cars from 2040.
- > **Liability risks:** the financial risks arising from the cost of third parties who have suffered damage or losses from the effects of climate change seeking compensation from the carbon extractors and emitters.

A **faster transition** to a low-carbon economy will reduce the physical risks in the longer-term but increase the transition risks in the short-term. A **slower transition** will see the physical risks increase but the transition risks reduce in the short-term.

How climate change may impact on our advice

1. Investments

Current asset pricing may be under or over estimating the emerging climate risks, this means assets may be mispriced and there is the potential for future price volatility. As an example, markets may be underestimating the risk that lower economic growth and uncertainty in the economic outlook due to climate change, leads to lower returns on equities, property and other assets. This could have a particular impact on long-term investor holdings, such as those held by funded pension schemes. [More details can be found in a working paper produced for the IFOA.](#)

High-carbon assets, such as shares in fossil fuel producers, are more greatly exposed to the risks from climate change and any attempts to reduce carbon emissions more quickly.

To reduce the risks investors might consider diversifying their portfolios. For example, they might reduce their holding in high-carbon assets and increase their holding in low-carbon alternatives, such as renewable energy. This should offer some protection if markets are underestimating climate change impacts, but might lead to relative underperformance if markets are overestimating them.

Asset managers and owners can also engage with corporate management to ensure that companies are responsibly managing climate change issues.

2. Life expectancy

Research shows that, all else being equal, a warming in temperatures in the UK may in the short to medium term lead to people living longer. This is because fewer people will die from cold-weather related causes. An increase in the life expectancy of the members of a pension scheme will in isolation increase the cost of the scheme.

The actuarial valuations of public sector pension schemes use mortality rate assumptions based on population projections from the Office for National Statistics (ONS). These projections consider overall trends in mortality rates based on a variety of factors. At present, temperature related mortality risks are not considered significant enough to warrant explicit allowance. We work closely with the ONS and will continue to consider this issue and keep clients informed of changes in approach.

3. Insurance and risk transfer

Climate change is expected to increase the prevalence and severity of extreme weather events in the UK, for example flood and drought, which might lead to the damage of public assets such as schools, hospitals and infrastructure. Government and local authorities will need to consider how best to protect their assets and manage the risk of volatile losses. Asset owners might consider the following:

- > **Understanding the risk:** risk modelling can help understand how exposed an asset is to such events, including the geographic vulnerability and how this might change over time. By quantifying the potential losses this can support better analysis of options and support planning.
- > **Preparedness and resilience:** putting in place infrastructure improvements ahead of an event, and building back better after an event can reduce the long-term financial cost of the risk.
- > **Insurance and risk transfer:** it may be efficient to transfer the risk of losses to the insurance or capital markets. The effectiveness of these products will depend on the coverage and price offered.

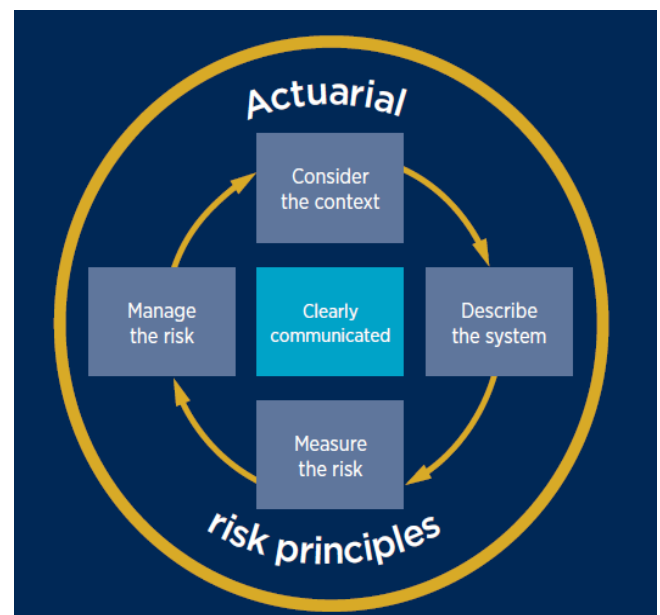
Government will want to ensure the commercial insurance markets are providing products that meet the evolving needs and requirements of consumers. This might incentivise government to step in and facilitate the availability of risk transfer to manage contingent liabilities relating to climate change, for example in the event of displacement due to rising sea level.

4. Risk management

Effective risk management can help us better understand what the future might look like by considering the key risks, opportunities and uncertainties.

By incorporating the risks from climate change into an organisation's risk management approach this will ensure associated impacts are considered across the business, in turn supporting the appropriate prioritisation of risk management resources and better decision making.

A working party for the IFoA, led by a GAD actuary, produced a high-level guide to measuring and managing risks, '[Risk management- an actuarial approach](#)'. The figure to the right provides a simple illustration of the actuarial risk management framework, which can be used as a structure and communication tool when considering how best to manage new and existing risks. The guide includes a case study to highlight how such an approach could be applied to the issue of climate change.



To find out more about how we can assist with identifying and understanding the financial risks of climate change, please contact Chris Paterson at Chris.Paterson@gad.gov.uk or Richard Haines at Richard.Haines@gad.gov.uk.

Further reading

Here are some further resources and references on this topic which might be helpful:

- > [IFoA Intergenerational Fairness Bulletin - Climate Change](#)
- > IFoA Resource and Environment issues for pensions actuaries:
 - [A practical guide for Pensions Actuaries](#)
 - [Considerations For setting Financial Assumptions](#)
 - [Implications for Setting Mortality Assumptions](#)
 - [Implications for Sponsor Covenant Assessments](#)
- > [Further relevant IFoA research papers from working parties](#)
- > IFoA [Climate change – an inevitable policy response \(IPR\)?](#)
- > International Actuarial Association [Decarbonisation – A briefing for actuaries](#)
- > Green Finance Initiative <http://greenfinanceinitiative.org/green-finance-institute/>
- > Task Force on Climate-related Financial Disclosures <https://www.fsb-tcfd.org/>
- > Sustainable Development Goals <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- > Institutional Investors Group on Climate Change – [Navigating climate scenario analysis](#)

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For details of our management team and office address please visit: www.gov.uk/gad

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