

CLIMATE RISK

BY **BEN CARR**

The Paris Agreement came into force on 4 November 2016 and has been ratified by 185 countries to date. It aims to strengthen the global response to the threat of climate change by keeping global temperature rises to well below 2°C above pre-industrial levels.

The Financial Stability Board's Taskforce on Climate-related Financial Disclosures (TCFD), chaired by Michael Bloomberg, published its recommendations on 29 June 2017¹. These voluntary disclosures cover how companies take into account climate-related risks and opportunities in their governance, strategy and risk management, as well as the metrics and targets that they use to do this. In particular, organisations are urged to perform scenario analysis to analyse the resilience of the company's business model and strategy.

The European Commission has integrated the TCFD's recommendations into its guidelines on non-financial

reporting², including taking into consideration the impact of different climate-related scenarios over different time horizons, including at least a 2°C or lower scenario and a greater than 2°C scenario.

Following on from this, the European Insurance and Occupational Pensions Authority (EIOPA) has issued an Opinion on the supervision of the use of climate change scenarios in the Own Risk and Solvency Assessment (ORSA) setting out its expectations on the integration of climate change risk scenarios by insurers in their ORSA³ and the Network for Greening the Financial System (NGFS) have recently published the second iteration of their climate scenarios⁴.

¹ <https://www.fsb-tcfd.org/>

² European Commission's Guidelines on non-financial reporting – Supplement on reporting climate-related information, Communication from the Commission, OJ C 209, 20.06.2019, p. 1.

³ [EIOPA issues Opinion on the supervision of the use of climate change risk scenarios in ORSA](#)

⁴ [NGFS Climate Scenarios for central banks and supervisors](#)



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These scenarios have been created through a suite of models, supported by a consortium of world leading climate scientists and modelling groups. They include nearly 1,000 economic, financial, transition and physical variables. The variables are calibrated to the latest available data and all variables are made available for free on the NGFS website so that anyone can take advantage of information they provide.

Climate change risk scenario analysis enables the potential impact of transition and physical climate change risks to be evaluated by insurers. Transition risks and opportunities include the projected costs of policy action related to limiting greenhouse gas emissions as well as projected profits from green revenues arising from developing new technologies and patents. Physical risks cover the financial impact of climate change through extreme weather as well as the impact of rising sea levels and mean temperatures.

The Inter-governmental panel on climate change (IPCC) Global warming of 1.5°C report⁵, published in October 2018, indicates the need to take dramatic action now to keep warming below 1.5°C and the potential severe consequences if this is not achieved. The scale of change needed to meet the 1.5°C target is unprecedented; industry will have to slash their CO₂ by 65% to 90% by 2050 and investments in low-carbon energy technology and energy efficiency will need to increase

5-fold by 2050 versus 2015 levels. Buildings and transport will also need to shift heavily towards green electricity and tools to remove CO₂ emissions from the atmosphere, such as carbon capture and storage (unproven at scale), will be needed to store 100 to 1,000 gigatons of CO₂ over the century.

The NGFS explore a set of six scenarios covering the following dimensions:

- **Orderly scenarios** assume climate policies are introduced early and become gradually more stringent. Both physical and transition risks are relatively subdued.
- **Disorderly scenarios** explore higher transition risk due to policies being delayed or divergent across countries and sectors. For example, carbon prices would have to increase abruptly after a period of delay.
- **Hot house world scenarios** assume that some climate policies are implemented in some jurisdictions, but globally efforts are insufficient to halt significant global warming.

In hothouse scenarios one can expect increased precipitation, coastal and river flooding, periods of extreme heat and cold, wildfires and droughts. In addition, sea levels could rise significantly resulting in major displacement of populations as well as spread of diseases currently typical

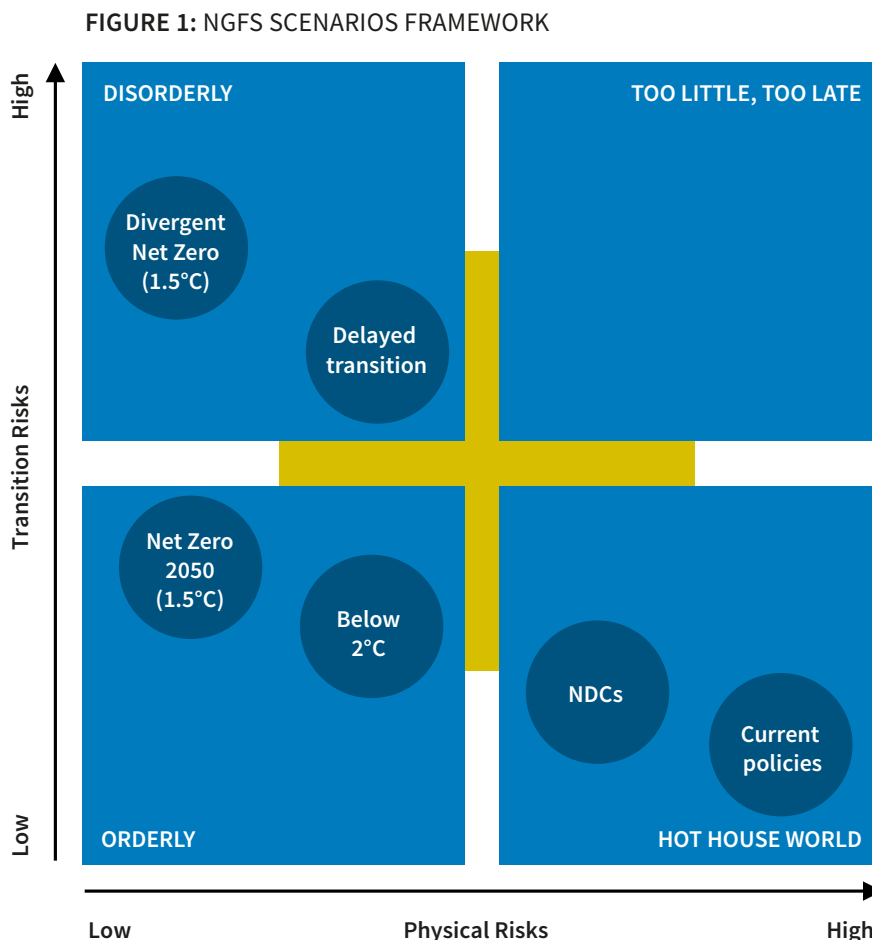
⁵ [The Inter-governmental panel on climate change \(IPCC\) Global warming of 1.5°C report](#)

only in tropical areas to more temperate areas and the likelihood of tipping points being reached is much higher.

Finally, particularly in the more extreme warming scenarios it is also important to consider whether climate may trigger changes in social attitudes which result in increased litigation against companies for failing to reduce emissions or to disclose climate risks transparently.

Along with nineteen other institutional investors from eleven countries, Aviva participated in a United Nations Environment Programme Finance Initiative (UNEP FI) Investor pilot project which published a Changing Course report⁶. In the report they presented a Climate Value-at-Risk (Climate VaR) measure developed in conjunction with Carbon Delta⁷. This Climate VaR measure provides a holistic forward-looking view of the impact of climate-related transition and physical risks and opportunities on investors' equity and corporate bond portfolios.

Aviva has extended the Climate VaR approach to enable it to be applied to our whole balance sheet⁸. To support this initiative, we set-up an internal inter-disciplinary team with representation from across the business to manage the project day-to-day and an expert panel was set-up to review and challenge the main assumptions made in the selection,



Positioning of scenarios is approximate, based on an assessment of physical and transition risk out to 2100.

development and modelling of the scenarios.

The initial result of Aviva's Climate VaR analysis compares a plausible range of outcomes (5th to 95th Percentile) from the different scenarios considered. In this analysis, our exposure is greatest to hothouse scenarios where physical risk dominates, negatively impacting long-term investment returns on equities, corporate bonds, real estate, real estate loans and sovereign exposures.

In orderly and disorderly scenarios the physical risk impacts are much more limited but there is still downside risk

⁶ See www.unepfi.org/wordpress/wp-content/uploads/2019/05/TCFD-Changing-Course-Oct-19.pdf

⁷ Carbon Delta is an environmental FinTech research firm that specialises in identifying and analysing the climate change resilience of publicly traded companies which recently became part of MSCI.

⁸ For further details on Aviva's Climate VaR methodology, please see [Aviva's 2020 Climate-related Financial Disclosure](#).

on long-term investment returns from carbon intensive sectors (for example utilities) as a result of transition policy actions. This is offset partially by revenues on new technologies from some sectors (for example motor vehicles).

When aggregated together to determine an overall impact of climate-related risks and opportunities across all scenarios, the plausible range is dominated by the results of the higher temperature scenarios, reflecting that neither existing nor planned policy actions are sufficiently ambitious to meet the Paris agreement goal.

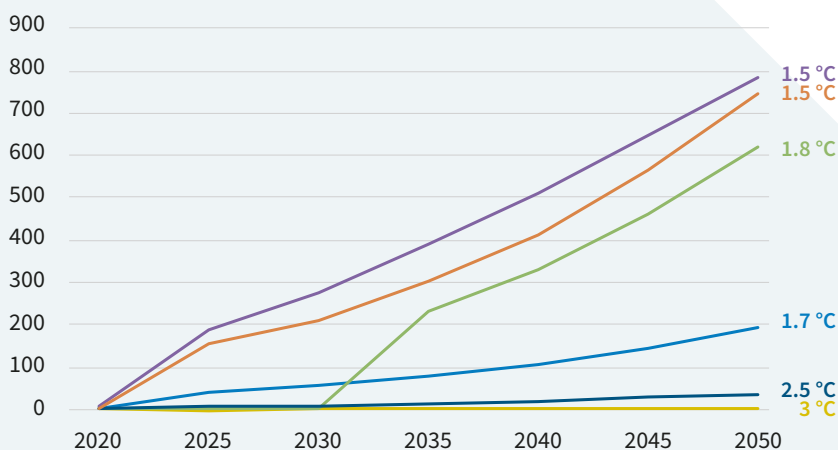
In all scenarios the impact on insurance liabilities is more limited than on investment returns. However, there is potential for some impact on life and pensions business as a result of changes in mortality rates in different scenarios either from physical effects such as more extreme hot and cold days or transition effects related to changes in pollution levels.

The impact on general insurance liabilities is relatively limited because of the short-term nature of the business and the ability to re-price annually and mitigation provided by our reinsurance programme. However, the physical effects of climate change will result in more risks and perils becoming either uninsurable or unaffordable over the longer term.

The development of tools such as Climate VaR is just the beginning of the journey to increase understanding of the impact of climate-related

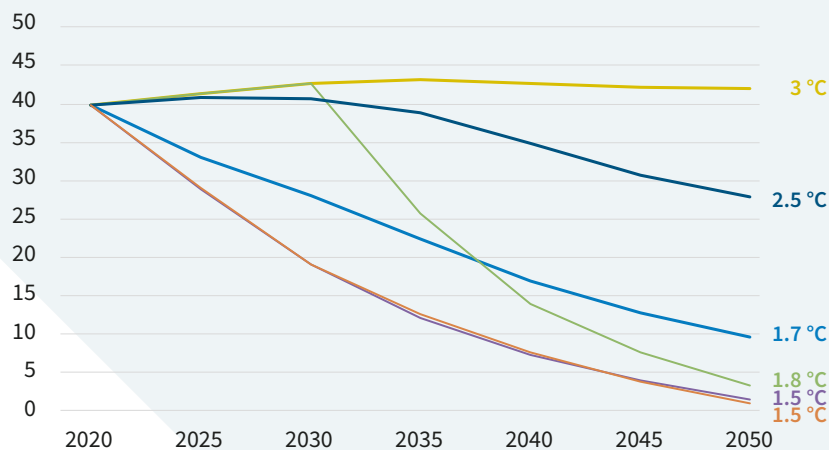
risks and opportunities and approaches will undoubtedly evolve and improve in the light of new research and data becoming available.

FIGURE 2: CARBON PRICE DEVELOPMENT USD(2010) /tCO₂



Source: IIASA NGFS Climate Scenarios Database, REMIND model. Carbon prices are weighted global averages.

FIGURE 3: CO₂ EMISSIONS BY SCENARIO Gt CO₂/YEAR



Source: IIASA NGFS Climate Scenarios Database, REMIND model. End of century warming outcomes shown.

- Below 2°C
- Current Policies
- Delayed transition
- Divergent Net Zero
- Nationally Determined Contributions (NDCs)
- Net Zero 2050 (1.5 °C)