



The Risks Associated with Climate Change

Physical Risks Associated with Climate Change

There is no dispute that the climate is changing. Greenhouse gas emissions are at the highest levels seen for millennia. These changes are affecting multiple areas of our climate system; namely sea-levels, the atmosphere, the oceans, the cryosphere and carbon and other biogeochemical processes. However, the impacts of these changes on the risks and the opportunities we are exposed to as an industry are complex and represent a serious challenge to accurately constrain.

As mentioned previously, as an industry, we think about risk as a function of hazard, exposure and vulnerability. A common misconception is that the year-on-year changes in losses we see are driven purely from the hazard. This is not the case: the changes are a function of all these components. The science is clear that the hazard is changing for different climate-related perils, but the direction and order of magnitude of these changes is usually slow and, in many instances, highly uncertain. There also tends to be a one-way narrative about the increases in risk from climate change when, in fact, there will be instances where we will see risk (through combination of hazard, exposure and vulnerability) decrease. Understanding when and where these changes are likely to occur present opportunities for our industry.

Where we do have climate projections of the expected change in hazard, these are mostly at time scales that are at a time horizon too far away and a resolution too coarse in terms of how we think about managing our business. Climate Projections most often exist out to 2050 or 2100 at coarse resolutions making inferences about ocean basins or large areas of land. When looking at our underwriting, business and capital planning we are most interested in a short-term view of around 3-5 years and need high resolution modelling to allow us to understand the impact that these changes in the hazard will have on the risks that we face.

Continued ➔

By Andrew MacFarlane – Physical Risk
Katie Lennon – Transition, Liability Risk



The complicated relationship that exists between the components of the risk equation means it is not clear how risk will change in the future.

With this insight, it is therefore critical that we look to understand comprehensively the factors contributing to the risk from climate-driven perils. Recent work we have carried out suggests that the biggest driver of changes in losses in the past 10 years has come from changes in exposure. These changes have been generated by increases in property values, economic growth and population dynamics, among other things. We have strong confidence that these exposure factors will continue to change and be key drivers in changes in risk in the near-term. Focusing on exposure over this timeframe will also more easily allow us to constrain the hazard impacts that we may see in a changing climate. Similarly, the vulnerability or resilience of a community in a specific region from a certain peril will likely see changes as communities adapt to become more resilient to natural perils through the implementation of climate defences and/or more robust building codes and restrictions. It is clear that focusing on the three components of the risk equation is essential when trying to understand the impact that a changing climate has on the risk we face as an industry.

As an industry we are exposed to less frequent but more severe losses driven by extremes in the weather. We need to understand the difference between weather and climate. Climate encompasses broad scale averages either in space or time or both space and time, whilst weather refers to short-term, relatively regional events. When discussing the impacts of climate change for the industry, it is important to distinguish between weather and climate because weather is most often a more complex and chaotic variable to understand. This requirement to focus on weather leads to increased uncertainty when trying to assess the impact of climate change but, somewhat unfortunately, it is these short-term relatively regional weather events that most impact the industry.

The science in many instances is clear in terms of the long-term direction relating to certain climate phenomena, such as global average surface temperature, that changes in the climate will present. What is much harder to estimate is the likely short-term timing and the more granular/ precise location of the extreme weather impacts relating to these larger-scale background climate signals that we as an industry are likely to see. Whilst technology and science have improved to allow us to arrive at these longer-term conclusions, our ability to make short-term climate predictions e.g. 10-20 years or weather extremes e.g. 6-12 months,

is affected by the chaotic nature of the climate system and the natural variability that exists within our global climate system.

It is clear from previous comments that the climate is changing. However, the complicated relationship that exists between the components of the risk equation means it is not clear how risk will change in the future. The continued accumulation of exposure in areas impacted by climate related hazards means that risk continues to increase without any change in the hazard. But we know there are underlying changes in the climate which will affect how these localized extreme events occur in the future, though currently there is no clear science at the high resolution we need depicting the magnitude or direction of these changes. We also know that technology will advance and communities will adapt, so we need to factor these into the risk we face. What is clear is that this is a multi-dimensional problem that we as an industry are well placed to help inform.

Transition Risks

Transition risks related to climate change are the risks associated with a move towards a low- or net-zero carbon economy and typically arise from changes in three areas:

- Policy
- Technology
- Consumer preference and societal pressure

The severity of the financial risk and opportunity arising from policy, technology and preferential changes is markedly dependent on the speed at which these transitions take place. Regulators around the world are quickly realizing the potential impact that a transition to a low- or net-zero carbon economy might have and are working quickly to develop scenario tests of both an orderly and disorderly transition over various time periods. They are focusing on all industries that are likely to be affected to determine the resilience of their local financial systems.

The insurance sector will primarily feel the impact of transition risks through the impact on products sold driven by changes in demand, regulatory pressures, the activity of insureds and the nature of their assets.

There are however other unique risks that the insurance industry must adapt to depending on the nature of the transition, which will impact the risk profile of our clients and our portfolios, such as:

- Increased rate of bankruptcy of companies in carbon-intensive industries in a rapid or disorderly transition could lead to increased moral hazard.
- Reducing capital expenditure (“CAPEX”) in carbon-intensive assets due to gradual asset devaluation could arise in an orderly transition, with potential to impact both attrition and large loss experience. Severe CAPEX reductions could also be felt in a disorderly transition, resulting in the same risks but over a longer period.
- General financial uncertainty will likely give rise to an increasingly litigious environment.
- Positive press on the support of low-carbon industries and new products could drive an influx of capital in support of products with limited market size, meaning that support of these products could be unsustainable for carriers, a risk which will need to be considered by clients benefiting from short term low-prices.
- The wider social impact of our future actions needs to be considered if we choose to stop supporting carbon-intensive assets with insurance, such as ensuring companies and sites are sufficiently funded to rehabilitate the environment.

Despite these increased risks, there is also a huge opportunity on the horizon. Estimates of the investment required to achieve the low-carbon transition range from USD 1.6 trillion to USD 3.8 trillion annually until 2050, for supply-side energy system investments alone (Inter Governmental Panel on Climate Change (IPCC) 2018), while the Global Commission on Adaptation (GCA 2019) estimates adaptation costs of USD 180 billion annually from 2020 to 2030¹. The majority of Climate Financing is concentrated in mitigation activity, with low-carbon transport and renewable energy anticipated to attract the most investment whilst adaptation (water management, agriculture etc.) currently attracts much lower volumes of financing.

Whether or not the mix between mitigation and adaptation changes, the required investment in infrastructure and new technology is undeniable, which offers a huge opportunity for the Specialty Insurance market, particularly in areas such as energy, construction, transport, liability and trade credit.

Today, there are over
1,700
live litigation cases
related to Climate Change
around the world,
with over
1,300
filed in the US².

Within AXA XL we have conducted detailed reviews and discussions with our underwriting teams across insurance and reinsurance to highlight the key transition risks for consideration:

- Asset devaluation and changes in energy sources could drive a change in risk profile and premium volume for the carbon-intensive energy portfolio.
- Rapid changes in policy could lead to high rates of bankruptcy across a broad range of industries triggering trade credit claims and a rapid increase in frequency and severity of D&O and Professional Indemnity claims.
- Change in the valuation of assets with new technology introduces new risk profiles to traditional lines e.g. electric vehicles are worth a lot more than diesel vehicles and have longer repair times.
- Changes in regulatory and industry policy could impact property valuations as we look for assets to be more sustainable and resilient. A rapid transition could lead to undervaluation of physical damage and business interruption values as demand for new and less accessible materials increase.
- Consumer preference and/or an increase in carbon tax could reduce demand for certain products e.g. “flight shame” impacting the aviation industry and lead to a changing risk profile.

The time horizon and likelihood of these risks materializing is highly uncertain. Despite this, we need to contemplate their potential impacts through stress testing, continuing to improve our understanding of these risks whilst keeping our underwriters informed of changes both near-term and long-term to ensure that our underwriting reflects changes in risks arising from regulatory and industry policy, technology and consumer preference.

Liability and Litigation Risks

Liability risks associated with Climate Change are the risks that arise from actions initiated by claimants who have suffered loss or damage due to Climate Change. Today, there are over 1,700 live litigation cases related to Climate Change around the world, with over 1,300 filed in the US². This number is ever increasing, and as a new and relatively untested area of law, progress to date has been quite slow. We can, however, learn from some recent rulings on the potential exposure that could be felt by the insurance industry.

Lawsuits for contribution to climate change have most commonly been launched on the basis of public/private nuisance or negligence but we are also increasingly seeing activity in product liability lawsuits.



Background on Climate Litigation

The majority of climate change related litigation has been brought by municipalities, states and even countries, with cases ranging from individual loss, corporate loss and class actions.

As with all litigation risks, the territory in which lawsuits are filed are a strong indication of exposure for insurance companies and the potential for an increase in related or “copy-cat” cases where there are strong litigious environments. Litigious environments currently highlighted in Climate Change litigation include the US, Germany and Australia. Whilst politics are left outside of the court room, actions taken by governments and pro-activeness in governments in fighting the physical impacts of climate change can all be drivers for increasing litigation. Therefore, the political landscape of litigious regions should be closely monitored in considering exposure to insurance companies.

Lawsuits for contribution to climate change have most commonly been launched on the basis of public/private nuisance or negligence but we are also increasingly seeing activity in product liability lawsuits. Such claims are often reliant on some of the longest chains of causation ever to be argued in courts, and yet the courts are increasingly willing to listen. Notably, claims are increasingly being sought to mitigate against future losses, as well as for current and direct impacts. Again, courts in some jurisdictions are showing willingness to listen to such arguments and where rulings come down against claimants, we are seeing cases being escalated through court of appeals, due to the unwillingness of those claimed against to settle and set a precedent of admission of liability.

The Future of Climate Change Litigation

In November 2019, Ralph Regenvanu, the foreign minister of the Pacific nation of Vanuatu, stated: “My government is now exploring all avenues to utilize the judicial system in various jurisdictions, including under international law, to shift the costs of climate protection back onto the fossil-fuel companies, the financial institutions and the governments that actively and knowingly created this existential threat to my country.” Vanuatu is widely regarded as a nation that will feel the physical impact of climate change strongly and this stance from a political leader will likely be well received by the community and activists alike. Such urgent action and exploration of numerous avenues will undoubtedly lead to high legal costs for both the government and the defendants from whom they seek damages. Whilst this is not “new” litigation – an increasing number of US states taking similar action will only accelerate the time in which it takes for this new area of law to be determined, at the high cost of defendants and – potentially – their insurers.

The increasing sophistication of climate change litigation should also be noted. There has been a marked shift in the expertise and capability of climate change litigators, such as the emergence of Client Earth, a charity and campaign group consisting of well-respected lawyers with impressive capability and effectiveness. Client Earth’s work in China is particularly notable, where they helped the government to write new environmental laws and trained lawyers and judges to support individuals and campaign groups to litigate to protect the environment. This is a demonstration of governments welcoming climate-related litigation and the use of the law to create positive environmental change.

As society continues to encourage climate change related financial disclosures, through the Network for Greening the Financial System and the Task Force for Climate-Related Disclosures (TCFD) recommendations, we are moving towards a much more transparent environment where climate change

risk is concerned. Whilst these disclosures are a step in the right direction in addressing the impact of climate change on our financial system, disclosures and advertising campaigns can expose companies to litigation from inaccurate or inadequate disclosure claims and even advertising liability claims related to greenwashing if companies advertise that their green credentials are better than they are. The industry needs to be mindful of the changing risk profile that comes with increasing disclosure and the desire to be seen as “green” with increasing social movements in this space.

The actions of individual activists and campaign groups should not be underestimated in the evolution of climate litigation and liability. As social pressure mounts on governments and industries to take action on both the impacts of climate change and our impact on climate change, litigation is increasingly being used as a tool for change. The 2019 Urgenda decision and the November 2020 McVeigh v. Retail Employees Superannuation Trust (REST) settlement are examples of climate litigation concluding in significant actions being ordered and agreed respectively which then translate into transition risks. The Urgenda decision enforced a reduction in greenhouse gas emissions on the Dutch government of 25% compared to 1990 levels, to be achieved

The actions of individual activists and campaign groups should not be underestimated in the evolution of climate litigation and liability.

by 2020 and REST committed to being net-zero by 2050 and incorporating climate impacts into their investment strategy, not present prior to this settlement. All of these actions contribute to the local and global accelerations in the energy transition.

We cannot only consider the physical, transition and liability risks associated with climate change independently but instead must realise how they are entwined, and that the changing profile of each of these risks will both directly and indirectly affect the risk profile of the others. The use of litigation in enforcing action in the transition is an early demonstrator of this and considering how these risks are connected has supported AXA XL’s development of climate change related stress tests.

- 1 Buchner, B. et al: Buchner, B. et al. Global Landscape of Climate Finance 2019 <https://climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2019/>
- 2 Litigation figures - <http://climatecasechart.com/about/>

About the Authors

Katie Lennon graduated with a Masters in Earth Sciences from Oxford University in 2012 before starting her insurance career in US Property Underwriting. During her time at AXA XL, Katie has held a variety of roles in Underwriting, Strategy and now Underwriting Management, with a focus on underwriting performance and governance. Katie is the Deputy Chair of the International Underwriting Association Climate Committee and leads the AXA XL UK Climate Change working group. Katie is based in the UK and can be reached at katie.lennon@axaxl.com.

Andrew MacFarlane has a BSc. Hons Actuarial Science & Statistics and FIA. He is Head of Pricing & Analytics for London & Bermuda for Reinsurance at AXA XL and a Partner on AXA XL’s Leadership Council. In his Head of Pricing & Analytics role he manages the actuarial team across London and Bermuda supporting underwriters across a broad range of business lines and products. Andrew was involved in setting AXA XL’s CSR strategy and is a member of the AXA XL CSR Steering Group. Andrew plays an instrumental role in looking to expand AXA XL’s involvement in closing the protection gap and leads the Public Sector Partnership practice group at AXA XL. The aim of the group is to strengthen partnerships with the public sector in order to bring socially impactful insurance solutions to the market. Andy is based in Bermuda and can be contacted at: andrew.macfarlane@axaxl.com.