



Policy opportunities on the road to net zero underwriting

Highlighting three key
areas of influence for
the insurance industry

The University of Cambridge Institute for Sustainability Leadership

The University of Cambridge Institute for Sustainability Leadership (CISL) is a globally influential Institute developing leadership and solutions for a sustainable economy. We believe the economy can be 'rewired', through focused collaboration between business, government and finance institutions, to deliver positive outcomes for people and environment. For over three decades we have built the leadership capacity and capabilities of individuals and organisations, and created industry-leading collaborations, to catalyse change and accelerate the path to a sustainable economy. Our interdisciplinary research engagement builds the evidence base for practical action.

ClimateWise

ClimateWise supports the insurance industry to better communicate, disclose and respond to the risks and opportunities associated with the climate-risk protection gap. This is the growing divide between total economic and insured losses attributed to climate change.

Representing a growing global network of leading insurance industry organisations, ClimateWise helps to align its members' expertise to directly support society as it responds to the risks and opportunities of climate change.

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Executive summary

ClimateWise members are committed to tackling the challenges and opportunities presented by climate change within their own business and contributing to wider local and global efforts to achieve the goals of the Paris Agreement. The role of the industry's investment activities in achieving net zero has been well articulated, yet its underwriting activities far less so.

This white paper is a first step by the ClimateWise membership to showcase the vital role of insurance underwriting in meeting global climate goals, supporting the transition and enabling societal change and resilience. The intention is to raise awareness among policy makers and other decision makers of the unique expertise of insurance underwriting, its role in achieving net zero and potential barriers limiting the industry from maximising its role in the green transition. We do this through highlighting three key areas of contribution:

- Sharing data and expertise
- Product development to support green innovation
- Encouraging sustainable choices

Relating to these, we propose the following opportunities for policies and regulations, knowledge exchange and collaboration supporting consistency, partnership and mainstreaming resilience.

Policy and regulation opportunities

1. *Strengthen supportive and consistent industrial strategy, policy guidelines and public funding opportunities for innovative net zero technology, especially at its infant stage.*
2. *Provide public or enable public-private funding mechanisms to cover resilience measures which enable and incentivise households and businesses to make sustainable choices to improve societal resilience.*
3. *Clarify liabilities associated with climate transition risk with predictable legal outcomes.*
4. *Mandate the inclusion of relevant resilience measures in insurance policies that address climate-related disasters.*

Knowledge exchange opportunities

5. *Standardise public data capture and processing, building indices to measure climate resilience factors.*
6. *Share publicly funded data with modellers, the insurance industry and wider finance sector to help refine underlying assumptions of catastrophe models.*
7. *Increase public research of the potential impact of climate change under a greater range of climate scenarios to improve scenario analysis and public planning under certainty.*

Collaboration opportunities

8. *Build permanent forums to facilitate ongoing dialogue and collaboration between government and insurers in enhancing global climate resilience.*
9. *Acknowledge the instrumental role of insurers in technology innovation enabling net zero and integrate insurers into technology innovation policy frameworks and forums.*
10. *Collaborate between multilateral stakeholders and across jurisdictions in order to ensure consistency of legal treatment and outcomes for the cross-border nature of many climate-related risks, for example through the Sustainable Insurance Forum.*

Whilst the membership of ClimateWise, and indeed its scope and remit, is global, this white paper focuses deliberately on the UK in its role as both President of COP 26 and the G7 in 2021, recognising that strong leadership and ambition in this twin role will influence policy and action on a much wider scale.

The UK's Climate Change Committee's (CCC's) Sixth Carbon Budget states that its implementation will need to be 'largely funded and delivered by private companies and individuals' and that 'all parts of society will need to play their part'. This paper will show opportunities for policymakers to enhance insurance underwriting expertise and thereby society's understanding and mitigation of climate risks, enabling industrial decarbonisation and contribute to behavioural change of individuals.

Finally, the paper serves as a springboard for further ClimateWise engagement and specification of insurance industry opportunities to support and steward the transition to a net zero and resilient society. In 2021, we will produce a set of strategic recommendations for COP 26 to optimise the contribution of insurance systems by countries, regions and sectors in the transition to the low-carbon, resilient economy for the climate decade and beyond.

Introduction

The science is clear. We are on the brink of missing the opportunity to limit global warming to 1.5°C above pre-industrial temperatures. Warming is already at 1.1°C¹ and we are seeing the devastating effects of climate change on people, landscapes, on biodiversity and the natural world, as well as an increasing number of extreme weather events.^{2,3} Whilst the global frameworks and pledges to tackle climate change are in place and ambition is increasing, there remains a stark lack of progress.⁴

In 2020, Covid-19 initially diverted attention from the climate change crisis and resulted in the postponement of the UN climate change conference (COP 26) until November 2021.⁵ However, the clear parallels between the impact of the pandemic and the systemic global risks posed by climate change may ultimately galvanise climate action, and the paths chosen by policymakers for Covid-19 recovery have the potential to reshape our approach to the climate emergency.

The imperative of a green recovery has been widely understood and articulated, but a recent study by Vivid Economics highlights that in the global economic response to the pandemic ‘most governments have chosen not to use economic stimulus to enhance nature or tackle climate change.’⁶ However, this picture is not uniform and there is a clear opportunity for governments to demonstrate global leadership and innovation with respect to a sustainable recovery from Covid-19.

In 2021, the UK, as president of both COP 26 and the G7, has the opportunity to do just this and, in November 2020, set out its ambition for a green recovery from Covid-19 – the Ten Point Plan for a Green Industrial Revolution.⁷ The plan’s ambition is to serve as ‘a global template for delivering net zero emissions in ways that create jobs and preserve our lifestyles.’⁸ The delivery of the plan will require stakeholder collaboration on an unprecedented scale. The insurance industry’s underwriting activities have a crucial, yet under-articulated role to play in achieving the transition to net zero.

The UK’s Climate Change Committee (CCC) has welcomed the government’s commitment to publish a net-zero strategy but is calling on the government to take a further step in committing to make recovery from the pandemic a defining moment in tackling climate change. The CCC is concerned that, formal statements aside, practical policy responses and actions to date have been inadequate.⁹ When viewed in conjunction with the letter in June 2020 to the Prime Minister, signed by 200 businesses, calling for immediate action to reduce greenhouse gases,¹⁰ as well as mounting pressure from civil society, it is clear that expectation is growing for an integrated, strategic response from the government.^{11,12,13,14}

There is considerable scope for collaboration and cooperation within the insurance sector, in terms of identifying collective solutions to and mitigants against the anticipated impacts of climate change. This paper, in itself, represents a collaborative effort by ClimateWise to begin an examination of the challenges posed by climate risk, the solutions identified by the market and the support required by policy(makers) at national and supranational level.

Report outline

The first section of the white paper recognises the unique contribution the insurance industry can make in confronting climate risks and the significant role of policy in supporting the insurers to be an integrated part of the green transition. The next section focuses on the existing risk understanding and capacity of the insurance industry and the policy required to enhance climate risk assessment, mitigation and adaptation. Thirdly, we look at the ways in which insurance products can drive technology innovation enabling net zero and outline how policy can encourage and support insurers to do so. This is exemplified by discussion on four

key technologies which are also included in the UK Ten Point Plan for a Green Industrial Revolution. Then we explore how sustainable choices could be encouraged by the insurance industry through their offering of underwriting insurance products. It discusses how policy could support the industrial capacity building and empower the insurance sector to move toward increased environmental resilience. Finally, we draw conclusions for matching insurance industry and policy objectives and next steps.

Methodology

This report is developed by a task group of the ClimateWise membership with additional input from consultation with a broad range of stakeholders from the insurance industry and beyond.

The concept for the report was developed over a series of meetings with the task group which explored industry expertise and potential barriers to insurer contributions in achieving net zero.

Insurers' role in a changing climate: How policy can support sustainable underwriting practices

The insurance industry has long been uniquely aware of the risks associated with climate change, given the nature of its core underwriting activities and its direct exposure to these risks in investment. Indeed, as far back as the 1990's, members of the reinsurance industry have been attending UN climate conferences.¹⁵ In 2014, Corporation of Lloyd's called on the sector to incorporate climate change into their models, with John Nelson, then-Chairman of Lloyd's, stating that 'Climate change is a reality and the vast majority of scientific research concludes that it is being driven by human activity... Catastrophe models are what the insurance and other industries use to quantify our understanding of the natural world and predict the impact of the weather. We need to be able to model and understand these events better and help mitigate the impact climate change is having on communities and businesses.'¹⁶

The Association of British Insurers has also been vocal about the impact and action needed,¹⁷ highlighting the issue again in June 2020 via the Climate Financial Risk Forum (CFRF), a group chaired by the Bank of England and the Financial Conduct Authority (FCA) and dedicated to developing and sharing best practices across the financial services industry with the aim of advancing responses to financial risks arising from climate change.¹⁸ With the potential for systemic risk arising from climate change moving ever-higher up policymakers' and regulators' agenda,¹⁹ there is a clear and growing imperative for the insurance industry to work collaboratively with these stakeholders in developing practical and actionable responses to climate risk.

The role of insurers in a changing climate

Whilst insurers are accustomed to dealing with extreme weather events and natural disasters, by virtue of their long acquaintance with catastrophe risk cover, the frequency of climatic natural disasters has increased by as much as threefold since 1980.²⁰ The challenge faced by underwriters, in this instance, is associated with the forward-looking nature and profile of these risks and the extent to which they will become magnified over time. The Bank of England identifies three types of risk rising from climate change as having a material impact for financial institutions - physical risk, transition risk and liability risk.²¹ The ClimateWise Principles form a framework for climate-related disclosure specifically for the insurance industry²². Particularly through ClimateWise Principle 3, members must address how their organisations are leading on the identification, understanding and management of climate risks.

Physical Risk – Physical risks are defined as those arising from extreme weather, such as increased flooding, storm damage and wildfire.²³ Economic damage from flooding alone, in 2019, was estimated to cost US\$82bn, only US\$13bn of which was reportedly insured.²⁴ Climate change will lead to more frequent flooding events including the coastal flooding driven by rising sea level and more intensive storms. The ClimateWise Physical Risk Framework demonstrates how the expertise and tools of the insurance industry can support other parts of the financial system to understand their physical risk exposure²⁵. To date in the UK, FloodRe has temporarily helped spread the burden for underwriters which is only intended to serve as a catalyst for market developments and further policy measures prior to their departure from the market by 2039.

Transition Risk – Insurers have a role to play in helping ensure a smooth transition to climate resilience, both through the underwriting of projects needed to reduce carbon emissions, and through direct engagement with policyholders at a range of levels to support their own transition, raise awareness of the impacts of their decisions and incentivise sustainable product choices. The ClimateWise Transition Risk Framework is an example of how the insurance industry can support the financial sector to further understand transition risks

and opportunities within infrastructure investment portfolios²⁶. As regulators and customers increasingly demand, better assessment and management of climate risks could be facilitated by refined risk tools and the industry corporate disclosure.

Liability Risk – The Insurance sector also faces potential climate legal liability risk, as institutions of all kinds may face increased risk of climate litigation. While this paper does not discuss this issue, it does recognise that there are also clear paths the insurance sector can take on developing and leading best practices and good governance on the issue of climate change, as well as further collaboration within the sector itself, which is critical to ensure the most efficient and effective industry-wide action.

Certain insurance and reinsurance firms are already drawing lessons learned from dealing with the Covid-19 pandemic, and its fall-out, when seeking inspiration for ways to manage risk in the future. “Climate change is one of the greatest long-term risks in the insurance industry, and the early impacts are already here—right now,” says Raghuvier Vinukollu, Nat Cat Strategic Products Team Lead at Munich Re US. “As the COVID-19 pandemic has illustrated, the best course of action is preparation on an ex-ante basis rather than an ex-post one... Extreme events, such as a pandemic or a natural catastrophe, may seem like they are once-in-a-lifetime black swan events, but they are not.”²⁷

The role of policy in supporting a green transition for insurers

There has also been significant discussion on these topics within financial fora. In September 2020, Anna Sweeney, Executive Director co-leading the Bank of England’s Insurance Directorate and leading the strategic review of the Prudential Regulation Authority (PRA), outlined the Bank of England’s strategy to help the insurance industry respond to the climate challenge²⁰. The Bank of England has also published their Regulatory Initiatives Reform Grid, with HM Treasury as an observer, for the financial sector more widely. David Rule, the PRA’s Director of Insurance Supervision, set out the prudential regulator’s approach to climate change, highlighting that although the PRA’s remit does not include tackling of climate change itself, it was clear that the insurance industry was ‘looking for leadership and does want change’.²⁸ The call is echoing loudly across the sector, for Government to create a more consistent regulatory foundation that complements and supports industry initiatives and provides a more secure path to achieving climate resilience.

Policy developments thus far have been encouraging. In 2019, the UK Government Actuary’s Department (GAD), which helps Government manage climate-related financial risks, recognised the need for continued work on risk management around climate change and began building networks across government to examine the role of scenario analysis as a risk management tool. At the recent GAD Forum for Public Actuaries, the PRA and Pensions Regulator both spoke about the steps being taken to ensure that insurance companies and other financial institutions can effectively manage climate-related risks. Also, in 2019, the Institute and Faculty of Actuaries issued a practical guide on climate change for insurers.²⁹ In August 2020, the UK government launched plans to ensure pension providers consider the risk of climate change on their investments.³⁰

It is our belief that there remains further scope for Government to work with the insurance sector in developing further relevant specific initiatives to achieve climate resilience. In this paper, we set out a number of opportunities for the UK Government to consider in developing policy that complements and supports the insurance sector in its unique and critical role in creating a climate-resilient economy.

Sharing data and expertise to enhance climate resilience

In this section, we look at the foundations – built across decades of experience - on which the insurance industry can further develop the capabilities to fully address the challenges posed by climate-related risks. From this we make opportunities around the policy measures required to support the development of these capabilities.

Applying existing expertise to novel climate risk problems

Insurers have a key business interest in understanding the impact of climate change. Changes in climate and weather patterns, such as warmer atmosphere, stronger water cycle peaks and troughs and its interaction with warmer sea-surface, alter the frequency and severity of extreme weather events against which they insure clients. For example, of ten wettest UK winter over 250 years, 4 have happened since 2007 and 7 since 1990 according to Met Office Review.³¹ The UK insurance market will not escape exposure to this type of physical risk – not only due to the increased number of severe weather patterns over the past few years, but also due to the global exposure of multinational insurers to extreme weather events.

The modelling of catastrophe risk has been a mainstay of insurance underwriting for some time and has made a key contribution to enhancing a wider understanding of physical climate risks. When assessing the probability and impact of these events, insurers rely on probabilistic catastrophe models ('Cat models'), which help to quantify insurers' understanding of the natural world. Insurers and specialist modelling companies develop and maintain Cat models by harnessing loss and hazard observations, building upon existing data using simulation, testing existing models and incorporating these lessons into future catastrophe modelling advances. Each modelling company has their own proprietary cat model version.

Cat models are an integral part of any organisation that deals with natural catastrophes. They facilitate activities such as risk selection and underwriting, reserving and ratemaking, event response, exposure and aggregate management, reinsurance decision making, capital setting and development of mitigation strategies.

However, Cat models' reliance on historical data means that the long-term impacts of climate trends have typically not been incorporated in future projections. Cat models have been purposefully designed to reflect risk based on the assumption of current weather patterns or risks that may crystallise in the very near future. As many of the impacts of climate change are not reflected in past data, future climate-related risks cannot be fully understood and captured within Cat models in their current form.

Combining existing, historical data with the latest climate science, to develop forward looking, recalibrated Cat models, offers a valuable starting point for embedding climate resilience into wider economic and planning decisions. This approach is exemplified by the ClimateWise Physical Risk Framework,²⁵ a practical guide based on natural catastrophe models to help investors and lenders understand changing physical risks and the impacts on their portfolios. In addition, the Geneva Association, an international insurance think-tank, has highlighted the importance of leveraging learnings and innovations from catastrophe risk modelling, when building climate resilience into insurance product offerings.³²

However, uncertainties remain as to both the degree and speed at which the climate will change and how it will impact the frequency and severity of natural catastrophes. To date the models are also generally

incapable of representing the dynamics of the nonlinear climate risks. Consequently, predictions are typically included as a separate model component, rather than as part of the core, licensable model.

In order to resolve the uncertainties and nonlinearities of climate risks, access to data and development of new models are crucial in building forward-looking analysis capabilities within the insurance industry. Expanding the industry's Cat modelling capabilities to look at long-term future risk requires a re-think of the way in which data is acquired and shared. ClimateWise has recognised the insurance industry role through Principle 3 to lead in the identification, understanding and management of climate risk and Principle 5 to support climate awareness amongst our customers/clients.

Sharing data and expertise to enhance climate risk assessment, mitigation and adaptation

Government, scientists, academics and public agencies can provide the tools and the enhanced data that will enable modellers and (re)insurers to incorporate the latest scientific thinking into Cat models. Through taking an active role, public agencies provide public goods creating spillover effects and signalling to wider market actors the importance of climate risk management. In turn, closer alignment between government and insurers could underpin the creation of risk management capabilities, insurance practices and public policies to help drive refinement of risk management strategies and improvement of climate resilience across the economy. Building on multi-stakeholder forums and public-private partnership, such as the UK Centre for Greening Finance and Investment (CGFI),³³ to align the actions of public and private sectors and collaborate solutions in tackling climate change, would therefore help develop more effective resilience strategies.

The key step towards this vision would be to open up publicly-funded data for access by insurers, as well as other government and financial market stakeholders, enabling them to refine their understanding of the impact of climate effects on future events and losses. Describing the data and standardising accessibility to all datasets - particularly government-owned ones such as the UK database of riverine and coastal flood protections, which includes age, maintenance and planned flood protections - will encourage access and use of the data. Leading to the development of more resilient stochastic models with greater potential for adaptability and guidance for policymakers, commercial investors and communities on the impact of these natural catastrophes.

A shared data approach, as proposed by Icebreaker One “allows stakeholders to publish their data descriptions and their licensing options per type of use (aka 'preemptive licensing')”. Other stakeholders can then access it —compliant to their respective licensing requirements.”³⁴ Broader access to government-owned data, in a machine-readable, standardised, consistent format, would provide vital inputs for use in refining the assumptions underpinning climate change models.

The Insurance Development Forum (IDF) also recently highlighted that “the use of open risk analytics principles and platforms can overcome cost and other barriers to access, while increasing confidence in the analysis”, helping “countries and cities integrate invaluable local knowledge with global research, and most importantly develop their own view of risk for strategic risk management and operational risk finance.”³⁵

Public information could be standardised through the creation of indices to benchmark and track resilience. These indices could include (but are by no means limited to) measurement of (1) efficacy of natural defences, (2) asset maintenance levels, (3) emergency response times and (4) critical resource levels.

These and other critical datapoints have the potential to greatly enhance the decision-making capabilities of underwriters, planners, developers and communities, improving their resilience and risk management potential. Production of such indices requires a standardised approach to data capture and measurement, which should be developed in a clear and formal dialogue with the insurance industry.

Access to public data, in conjunction with collaborative architecture for development of Cat models, can greatly improve visibility of the risks of climate change. Open architecture systems for catastrophe modelling, such as the OASIS Loss Modelling Framework,³⁶ promote a standardised architecture for models and interoperability. The collaborative development and maintenance of Cat models can help improve resilience by drawing on insights from a wider pool of contributors. As the number of models and volume of data available increases, so does the potential for stakeholders other than insurers to use that information to make risk assessments and to anticipate the potential impacts of hazards, as well as for their experiences and learnings to feed in turn into the evolving body of data and tools in this field.

Policy opportunities

Greater focus of government resources on researching the impact of climate change would be a welcome development in encouraging the multilateral approach described above. Governments are best placed to spearhead intelligence gathering around the cost of inaction and changes to the risk landscape associated with the latest assumptions of the scientific community, such as IPCC emissions scenarios. In turn, this will encourage the insurance industry to adopt a wider range of transition scenarios as a guide for their exposure management strategies. Understanding the full extent of the impact of a 4°C transition scenario will be a necessary first step towards improving global risk management capabilities and pricing them such that the Paris Agreement goal of 1.5°C is successfully achieved.

Faced with uncertainty, resilience requires collaboration. Improved access to standardised data processing abilities will challenge and refine the assumptions underpinning Cat models and facilitate their rapid development through constant scrutiny and iteration. Greater public resourcing of research on the potential impacts of climate change is required in order to facilitate the exchange of information and data between governments, regulators, industry and the scientific community. The establishment of joint forums to support decision-making in resilience planning and public policy, based on actionable, consistent data, is also necessary. Combined, these measures can markedly improve global resilience to the effects of climate change.

Specifically, we identify the following policy opportunities to support the insurance industry in building its capabilities around understanding and modelling climate-related risks:

Standardise public data capture and processing, building indices to measure climate resilience factors.

Share publicly funded data with modellers, the insurance industry and wider finance sector to help refine underlying assumptions of catastrophe models.

Increase public research of the potential impact of climate change under a greater range of climate scenarios to improve scenario analysis and public planning under certainty.

Build permanent forums to facilitate ongoing dialogue and collaboration between government and insurers in enhancing global climate resilience.

Product development to support technology innovation needed for net zero targets

In this section, we look at the role of insurance product development in supporting the wider economy's journey towards adaptation and resilience outcomes in light of climate change as well as towards greater adoption of net-zero enabling technologies, through creative ways of using underwriting as a means of supporting policy.

However, insurance is not the only enabler for innovation. Policy and regulatory structure need to be in place and keep pace with the evolving technology. We conclude with opportunities around the ways in which policy and policymakers can encourage and support the role of insurers in enabling innovation and adoption of technologies supporting the net zero pathway.

The role of underwriting in supporting net zero technology innovation

The high-risk nature of early stage transformational innovation, large-scale application and adoption of any new technologies and products proves challenging. This is especially the case with emerging technologies in achieving net zero given their infant stage, evolving marketplace and the urgent needs to upscale the deployment. Through both underwriting and investment, the insurance sector is a critical enabler in net zero innovative technologies, empowering industries and companies to develop, implement and expand them.

Underwriting, in this net zero context, provides a mechanism for managing and mitigating the risk associated with technology innovation. In the case of large-scale infrastructure projects, for which extensive capital is required upfront, often leverage across a range of sources. Underwriting can provide confidence for investors and project developers to explore and secure capital for the use of carbon technologies in infrastructure and other projects in which their use might otherwise be perceived as too high-risk.

Direct support for new products and services enabling net zero

Insurers can help to speed up the development of new products and services by ensuring that their risk models do not inhibit growth due to a lack of historical data against which to assess risk. This can help to promote innovation in areas ranging from transportation, energy generation and innovative construction methods, through to new manufacturing processes.

Insurers can further bolster their support for innovation by focussing on the *risk reduction benefits* that they may bring. Electric cars, for example, have fewer mechanical parts and often incorporate exceptionally new technologies, among which autopilot systems contributes towards reducing and minimising the risks associated with owning and driving them. The same rationale applies to many other sustainable technologies that in return provide risk reduction benefits. If supportive policy structure and aligned industrial policy and strategy are in place, the predictability could bring down the cost of underwriting of innovations supporting net zero, making innovation a preferred choice to carbon intensive options.

Creating space for innovation to occur

Insurers must be more proactive in thinking progressively about the direct and systemic risks that older technologies present their broader underwriting portfolios and their own exposure to transition risk. A strategic, phased shift towards underwriting new and net zero technologies can enable management of this transition risk, as well as send strong signals to incumbent product and service providers that their existing models are no longer fit for purpose. This helps to deter further development in unsustainable practices and

technologies, and to redirect capital and investment towards net zero innovation, which can emerge to fill the space.

With government to step forward

With global renewable energy consumption predicted to increase from 25% in 2017 to 85% by 2050,³⁷ more ambitious renewable energy targets are being set across the globe. Governments are making bold announcements, such as the recent plan to power all UK homes with wind by 2030.³⁸ Insurance plays a critical role in ensuring technology innovations are climate resilient and aligned with net zero target. The insurance industry is needed to secure the construction of such projects against natural disaster, such as earthquakes, floods and storms. Evidence has shown insurers' role in supporting green technology deployment in this space, as in the case of the Formosa II and Great Changhua 1 & 2a wind turbines in the Taiwan Strait, where their support has proven invaluable.^{39,40}

Further areas in which insurance underwriting can play a role in helping to advance the development and adoption of technologies enabling net zero include many aspects of the UK Ten Point Plan for a Green Industrial Revolution (refer brackets):

- **Carbon Capture and Storage** – CCS deployment will benefit from positive underwriting support. In order to meet global net-zero targets, the IPPC's 1.5°C scenario envisages deploying CCS for 'residual emissions', which will need support from a consistent policy and regulatory framework and investment, led by Government. Clear liabilities associated with climate transition risk could also enhance predictability to the energy transition process. This is explored in detail as a case study below. (8. Carbon capture)
- **Electric vehicles** – Insurance could play a role in product development as well as in constructing widespread charging point infrastructure. The latter will help address 'range anxiety' for electric vehicles, which is needed in order to upscale the usage of electric vehicles. (4. Electric vehicles)
- **Unmanned Aerial Systems** –The potential of wider application of Unmanned Aerial Systems to agriculture,⁴¹ mass transportation and commercial use make it a promising green solution to replace carbon heavy practices, such as helicopter flights. Insurance for Unmanned Aerial Systems remains an area worth exploring and requires further product development and respective regulation to set clear guidance and to clarify liabilities. (6. Jet Zero and greener maritime)
- **Transition from fossil fuels** – The insurance sector is well-placed to limit fossil fuel risk exposure through underwriting design and placement. By limiting their insurance underwriting capacity, phasing out existing coverage and setting up underwriting guidelines to new fossil fuel powered plants, the insurance sector can incentivise traditional oil and gas companies themselves to decarbonise.^{36,42} In addition, insurance sector could play a more active role of engaging existing customers to advance environmental measures and adopting more efficient energy technologies.⁴³ In complement to underwriting, phasing out investment in fossil fuel activities, such as coal powered fireplants and new Arctic energy exploration, could be another channel for the insurance sector to foster transition. (10. Innovation and finance)

Case study: Carbon Capture and Storage and Insurance: the need for a global framework

For the development and large-scale deployment of new technologies, certainty and clarity around policies, regulations and the potential of risk sharing with government is needed to scale up and to manage the associated liabilities. This is especially the case for CCS given the long timeframe expected of projects,⁴⁴ innovation policy preferences for 'technology neutrality' and uncertainty around the extent it will be required in a new, renewables-based and circular-by-design industrial system. Moreover, attention will need to be afforded to likely 'residual emissions'. Governments are making inroads into support for carbon technology through grant and operational subsidies; for instance, the EU CCS Directive and the £800m funding promised for regional cluster infrastructure in the 2020 UK Budget. However, clearer policy instruction is needed around how this funding intends to support the development of the sector. Another challenge faced by insurers lies in the fact that finding a price point for premiums that is affordable, and that accurately reflects the risks associated with CCS over the longer-term, is far from straightforward.

It is critical to establish clear CCS regulation to clarify liabilities associated with the adoption of the technology, in which leakage of carbon dioxide is the main source of risks.⁴⁵ As documented in the IPCC Special Report on CCS, there are various possible pathways for carbon dioxide release, including escaping from the injection well or migration via faults.⁴⁶ A clear and transparent liability system increases the public propensity to access information and to understand the associated risks. In addition, a clear regulation framework encourages appropriate measures to be taken to avoid carbon leakage and prevent potential harms to health and environment. Insurers are willing to offer our risk expertise to support transition agenda from the private angle and the industry welcomes a clear (and preferably global) public framework that enables that development.

In light of pledges to achieve carbon neutrality by 2050, and to meet the Paris Agreement goals of a 1.5 degree world, CCS remains a key tool in the box to decarbonise industrial and power sectors and to ensure permanent storage of CO₂. Political will appears to have stalled, however, with fears around the upfront cost and concerns that CCS may serve to further the role of the carbon-intensive industries. In practical terms, only 19 large-scale CCS facilities are operational around the world to date, with four more under construction. Despite the recommendation from International Energy Agency that 21,400 Mt of CO₂ should be captured and stored by 2030 to limit global warming to 2°C, only 442 Mt had been injected and stored by the end of 2017.

Policy opportunities

The insurance industry stands ready to support product and service innovation enabling net zero. What is needed, from a policy perspective, is the commitment to and support for the underlying technologies, so that the industry has certainty of longer-term adoption of these technologies. Furthermore, global cooperation is required in order to develop an appropriate framework addressing the cross-border challenges arising from these new technologies and processes, and to define the boundaries around associated liabilities and responsibilities.

We identify the following policy opportunities as crucial for enabling the insurance industry to better support innovation and the transition to a net-zero economy:

Acknowledge the instrumental role of insurers in technology innovation enabling net zero and integrate insurers into technology innovation policy frameworks and forums.

Strengthen supportive and consistent industrial strategy, policy guidelines and public funding opportunities for innovative net zero technology, especially at its infant stage.

Clarify liabilities associated with climate transition risk with predictable legal outcomes.

Collaborate between multilateral stakeholders and across jurisdictions in order to ensure consistency of legal treatment and outcomes for the cross-border nature of many climate-related risks, for example through the Sustainable Insurance Forum.

Enabling and encouraging sustainable choices

Awareness of sustainability issues and environmental impacts is at an all-time high. Retail consumers are increasingly looking to businesses to help them make a difference.⁴⁷ Similarly, the commercial sector looks to their insurers to provide economic resilience combined with sustainable solutions.

Insurers have a key role to play in helping to promote more sustainable approaches among consumers to improve climate resilience. Insurers can support policyholders to help homes and businesses adapt and become more resistant to and resilient in the face of environmental perils. In this section, we explore some of the ways in which insurance providers can offer underwriting products that encourage sustainable choices and outcomes for the buyers of insurance. We also set out opportunities for policy interventions that can help the insurance industry build robust knowledge and capabilities in this space, whilst empowering the move towards increased environmental resilience.

Encouraging climate adaptation through resilient reinstatement

Insurers have a role to play in promoting sustainable approaches to climate-resilience, for example, in reducing the impacts of physical, climate change-related events such as flood, wildfires and tropical storms. Insurers can support policyholders in making their homes and businesses more resistant and resilient to environmental perils; however, this is not currently the norm. There are obvious benefits for insurers in this action – more resilient infrastructure, buildings and homes reduce the value of future claims. Likewise, it is beneficial to customers for protecting their properties and livelihoods. Resilient reinstatement, as these measures are collectively termed, is an emerging concept that is increasingly gaining acceptance across the insurance industry.

The following are ways in which insurers support sustainable choices on the part of policyholders.

Collaborate in using industry data to form an evidence base for the value of resilience measures

There is a lack of confidence on the part of some policyholders and professionals regarding the extent to which recoverable measures will deliver desired outcomes. Regardless, there are research providing evidence to support the benefits of resilience and show the effectiveness of community-based resilience measures through case studies.^{48,49} The challenge is that there is insufficient translation and communication to practitioners and policy makers in a concise, systematic and quantifiable manner. With better forms of evidence base available and accessible to decision makers, this may unlock the opportunity to foster evidence-based decision making and offer lower premiums where resilience measures have been taken, thus further incentivising uptake of such policies.

Communication on resilience measures and their benefits, thus driving the normalisation of resilient reinstatement

Success of integrating resilience reinstatement measures will be dependent on raising awareness of the climate-related risks faced by demand side households and businesses within the supply chain and influencing social attitudes and acceptance towards resilience measures. Communicating the benefits associated with resilient repair to policyholders can be challenging; some will take a long view and seek greater resilience, whilst others may focus entirely on minimising the immediate disruption to their households or businesses.

Case study

UK flood resilience measures

Research by Flood Re,⁵⁰ a joint initiative between the UK Government and the UK insurance industry which is due to end in 2039, states that there is virtually no link between the action of individuals in protecting their properties against floods and the insurance premium that they are charged by insurers. Reduced premiums could potentially play a part, along with other measures, in incentivising positive uptake, if not by encouraging, then at least by recognising and rewarding responsible behaviour by householders in the same way as in other areas such as installation of smoke detectors or mortice locks. In other words, further work on exploring the mechanism to support flood resilience measures is still needed to be done. Flood Re Quinquennial Review (QQR),⁵¹ including technical changes to enable the scheme to offer discounted premiums to households with fitted flood resilience measures, has been brought forward to Government consultation in February 2021.⁵²

Furthermore, clear definition and effective implementation of such measures would require access to insight on flood claims and a commitment to share data on flood claims and what interventions work. These interventions could take the form of support for any Flood Re initiatives but also for property not eligible for Flood Re or not ceded to Flood Re. More evidence that demonstrates the impact of resilient reinstatement on claims cost and duration is required.

Building back better

NFU Mutual, a mutual insurance owned by its policyholders, provides flood resilience repairs as standard across its home insurance policies with buildings cover. Flood victims can claim up to £5,000 to protect their home from future damage, in instances where the initial flood caused at least £10,000 worth of damage.⁵³ Policies include support for measures such as moving plug sockets higher up the wall and installing one-way valves on waste drains to stop backflow coming through toilets and sinks.

Embedding property resilience in the underwriting process

Tokio Marine Nichido Fire (TMNF)'s Oct. 2019 revision of "Total Assist," the company's flagship homeowner's policy, demonstrates how property resilience can be built into underwriting pricing models. TMNF increased the premium reduction for relatively younger structures, which can be seen as an effort to align the rate towards more risk-based pricing.

Choices around enhancing resilience can be made at multiple points, both before and after an event. The inclusion of resilient measures prior to an event, or in recovery, can be facilitated by clear understanding on the benefits of resilience as well as the cost of inaction. All stakeholders – including surveyors, loss adjustors, contractors and all parts of the supply chain - must be informed and educated about the benefits of resilience measures in order for the implementation of resilient reinstatement to be effective.

Resilience measures working in conjunction with policy

Government can embed resilience education to the industry through complementary policy. Take building industry for example: policy measures could be revising local building codes to normalise resilience as a building construction and an insurance industry default in areas at risk. Research found that 51 percent of houses in Paradise, California built with the state's updated 2008 building codes survived the 2018 Camp Fire; by contrast, only 18 percent of houses without the updated building codes survived.⁵⁴

The Insurance Information Institute's paper 'Fighting wildfires with innovation' identifies a number of ways in which US insurers are working to help educate individuals and communities on the steps that they can take to reduce the destructive potential of wildfires. This includes actions such as: building back to newer and higher building standards, maintaining defensible space to reduce the likelihood of ignition from wind-borne embers or surface fires e.g. by clearing dead vegetation, removing plants within five feet of a structure and undertaking home-hardening measures through incorporation of fire resistant construction materials (e.g. fire-rated roofs, use of metal screens in vents and tempered glass windows). Chubb employs a team of risk consultants trained in wildfire prevention and mitigation techniques to meet with customers and to provide advice on property protection.

Sustainable claims

Claims servicing can constitute a significant source of emissions within insurers' own supply chains; servicing of claims can lead to waste or ongoing emissions through carbon-intensive energy consumption. Sustainable claims solutions are those that seek to minimise ongoing carbon emissions through energy efficient practices and waste reduction, for example, by encouraging repair instead of replacement and use of recycled rather than new parts.

From 2021, household appliances including TVs, lighting and large white goods will become easier to repair due to new 'right to repair' standards being adopted across the EU under the Eco-design and Energy Labelling Directive⁵⁵. This aims to make it easier to fix household electrical goods, make spare parts available to extend their life, encourage longer product lifespans and ensure that products are designed with dismantling and / or repairability in mind, therefore reducing waste. There is potential for such an approach to be extended beyond household appliances to vehicles, which would help promote a "repair over replace" philosophy in the motor industry.

Examples of evolving sustainable claims:

- Tokio Marine Group's Japanese operations promotes environment-conscious auto repairs following accidents, by asking policyholders for their consent to use recycled auto parts. In October 2011, the General Insurance Association of Japan set up an industry-wide declaration to promote the use of recycled parts. Nichido Fire also offers "Asante" (thank you in Swahili), an auto insurance policy which provides a 10% discount on insurance premiums if a car is repaired using recycled parts at one of the specified repair shops.

- RSA Insurance Group encourages a 'repair over replace' policy across claims. For example, they have worked with suppliers such as Autoglass to carry out over 40,000 windscreen chip repairs a year, avoiding 1,500 tonnes of carbon emissions and 540 tonnes of waste glass going to landfill.
- Hiscox works with AnyJunk in the UK, to take away waste arising from claims. AnyJunk uses smart technology to partner with local waste collection companies to provide a low carbon footprint and environmentally responsible clearance service for bulky waste.
- Tokio Marine Kiln uses drones to assess damage during large natural catastrophe events, such as wildfires and hurricanes, when loss adjusters are unable to physically access these areas. This enables the company to pay claims early, and also helps communities to rebuild faster, whilst reducing the environmental impact of loss-adjustment.

Policy opportunities

In terms of supporting the insurance industry in incentivising and encouraging sustainable choices and behaviours on the part of buyers of insurance, whether households or businesses, we have identified the following areas in which policy can play a crucial role to create a level playing field:

Provide public or enable public-private funding mechanisms to cover resilience measures which enable and incentivise households and businesses to make sustainable choices to improve societal resilience.

Mandate the inclusion of relevant resilience measures in insurance policies that address climate-related disasters.

Conclusion

In recent years, significant consideration has been given, by policymakers, central banks and regulators, to the many climate-related risks facing the insurance industry specifically and financial services in general. It is increasingly apparent that a step-change in risk management is required on the part of insurance market participants if they are to more comprehensively understand, assess and mitigate these risks. Risk management, in this context, refers not only to the impact of climate change on specific risks being underwritten by insurers – the focus of this paper – but also to the systemic risks facing insurers from climate change and the transition.

In this paper, we have explored the ways in which insurers can make the transition to net zero aligned, environmentally sustainable underwriting practices by drawing on their existing knowledge and expertise and applying it to the novel problems posed by climate change. We have looked at the role played by data and data sharing, in enabling development of climate-ready risk models and insurance products. Recognising that the role played by underwriters in managing and transferring risk is crucial to technological innovation, we have considered the ways in which product innovation can help support the transition to a green economy. Finally, we have examined the ways in which insurers can encourage and incentivise desirable behaviours, such as making sustainable choices or adopting adaptation and resilience strategies by policyholders. Our case studies have demonstrated the clear benefits associated with each of these strategies and mechanisms for effecting a sustainable transition. However, it is abundantly clear that without appropriate policy support, industry participants on their own can only go so far. As the UK demonstrates, there is an urgent need for the UK government to create a credible policy framework that motivates and supports the insurance sector in making more climate resilient choices.

The paper serves as an introduction for further policy engagement and detailing of insurance industry opportunities to support and steward the transition to a low-carbon, resilience society. In 2021, we will produce a set of strategic recommendations for COP26 to optimise the contribution of insurance systems by countries, regions and sectors in the transition to the low-carbon, resilient economy for the climate decade and beyond.

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