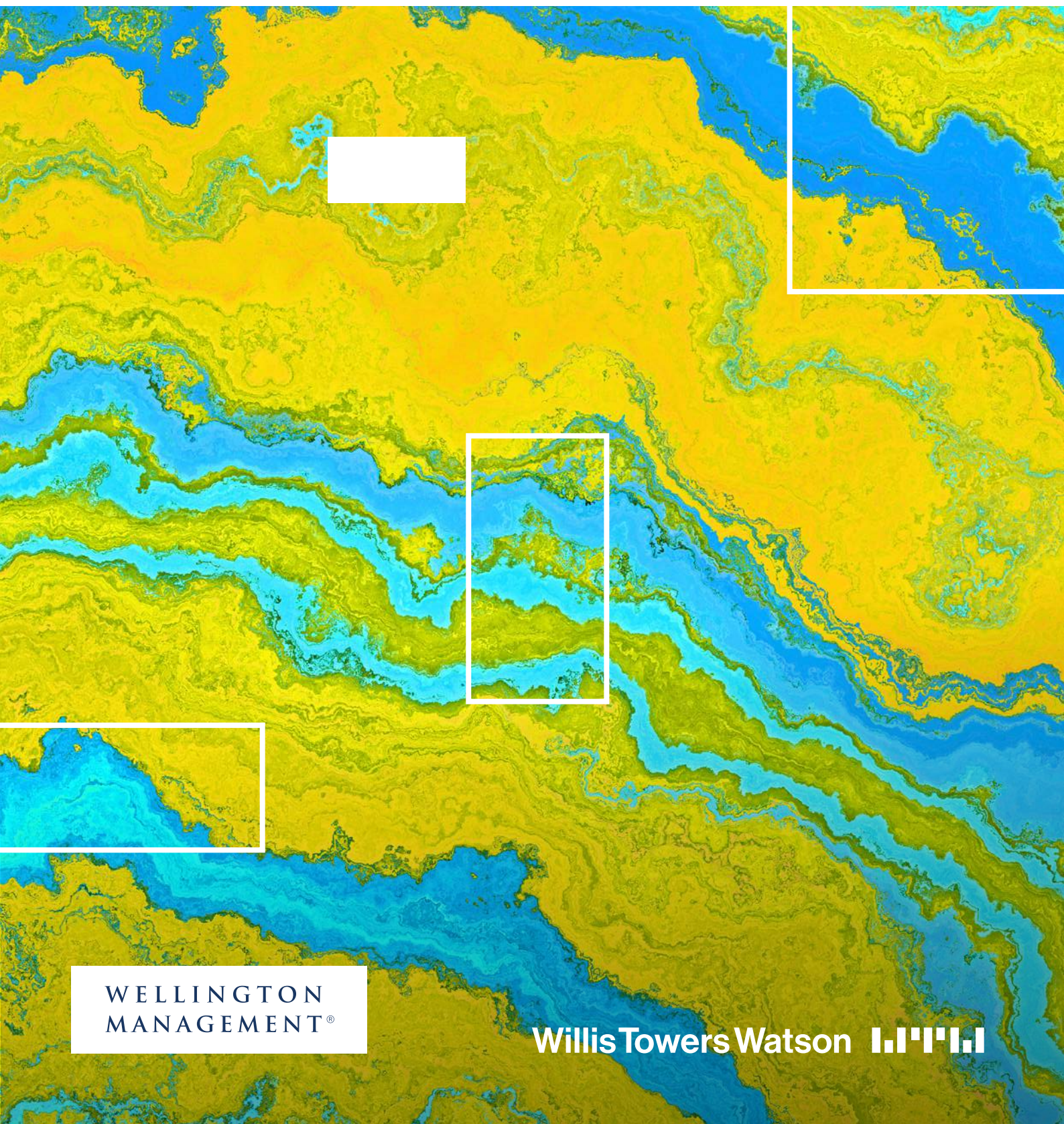


# The journey to net zero

An insurer's guide to navigating climate risks and opportunities



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## Executive summary

For as long as weather and natural catastrophe models have existed, insurers and reinsurers have been responsible for the commercial assessment of natural disasters, primarily through underwriting and reserves management. Today, amid increasingly devastating consequences and rapidly rising costs of climate-related perils, (re)insurers are expected to play a larger role in helping society mitigate the effects of climate change, build resilience to its effects and support the transition to a low-carbon economy.

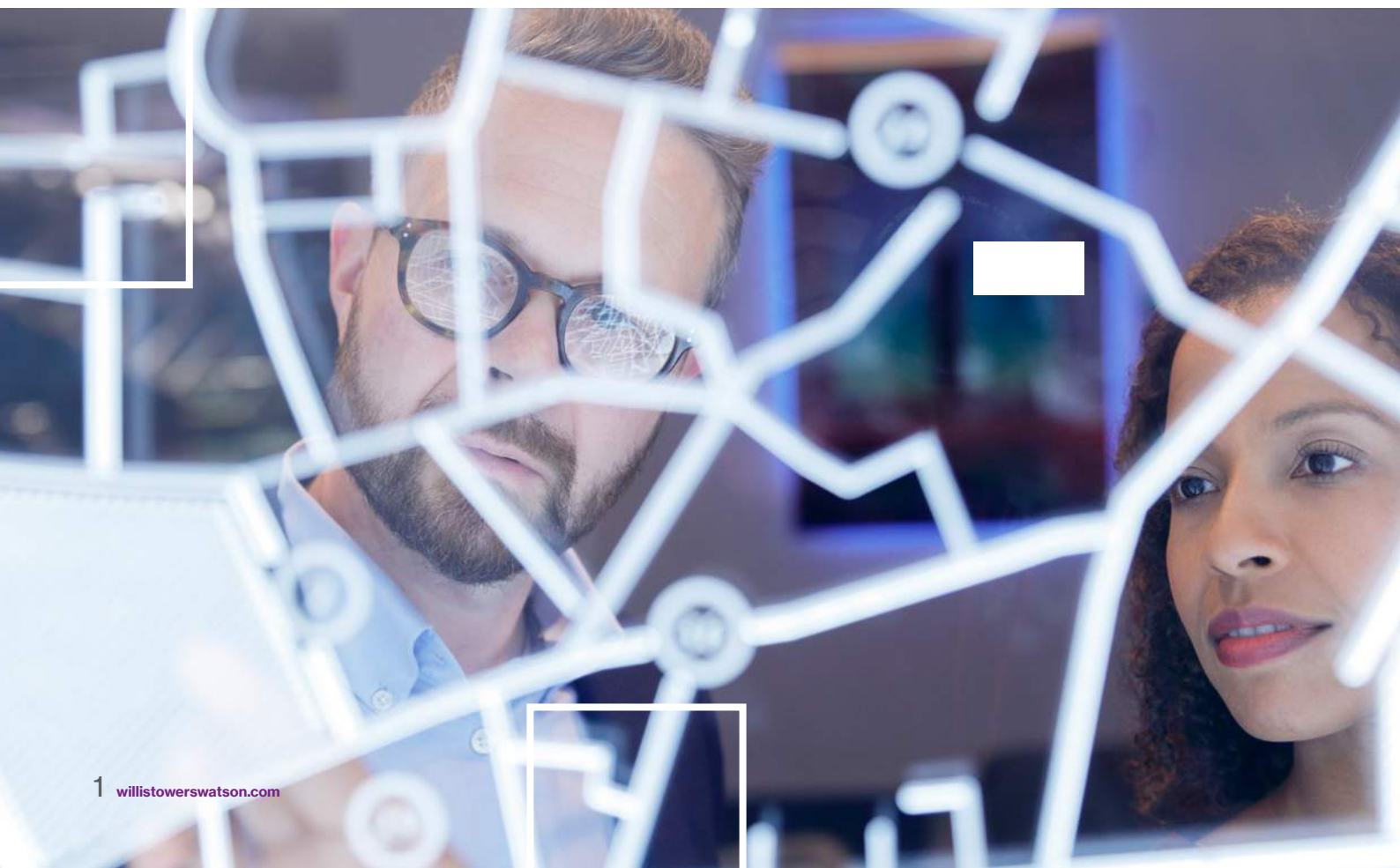
(Re)insurers have an opportunity to lead on these issues, building on their deep knowledge of physical risk, and strengthen their position in the marketplace by taking an enterprise-wide approach to climate change. Climate change is going to impact different parts of the business and hence it is important to take a holistic view of the business approach.



**By understanding and managing climate risks on the assets and liabilities sides of the balance sheet and advancing climate awareness in their own organisations, insurers can effectively navigate climate change.**

The increasing volatility of loss-causing climate-related events, along with growing financial risks to assets in investment portfolios, present a dual threat. However, climate uncertainty and the wide range of outcomes associated with climate change also present opportunities to develop a sustainable, progressive and commercially successful strategy for the business.

This paper, a collaboration between Willis Towers Watson and Wellington Management, is intended to be a pragmatic guide for insurers and reinsurers as they steer their organisations on the journey to net zero.



# Climate risk equals enterprise risk

The paper seeks to reinforce that climate risk is an enterprise risk for insurers, and is divided into eight short sections plus an introduction (page 3), that provide practical and pragmatic insights into the challenges of defining, quantifying and managing climate risks – without forgetting the opportunities that climate transition will present.



## 1. Understand climate risks and opportunities ..... 3

This section looks to build insurers' working knowledge of climate-related risks and opportunities, including their potential impacts on invested assets and underwritten liabilities, that will provide the foundation of a climate action plan.

## 2. Develop climate risk scenarios ..... 10

The property and casualty (P&C) side of the industry has long modelled physical climate risk to portfolios based on past and projected events. In establishing a strategic approach to climate risk management and resilience, insurers will need to understand how to develop and integrate climate scenarios into their risk modelling.

## 3. Stress test exposed assets ..... 17

After determining a framework for the application of a set of climate scenarios, insurers can then begin to integrate climate research and insights into their financial analyses, stress testing assets for climate exposure.

## 4. Develop a climate strategy for liabilities ..... 23

Intrinsically, climate change creates uncertainties around insurers' liabilities in the coming decades and has implications for individual insurers' portfolios in the long, medium and short term. How do (re)insurers adapt liability management and extend risk assessment for factors such as changing frequency and severity of climate-related perils, shifting consumer behaviour and evolving regulatory and rating agency approaches?

## 5. Develop a climate-aware strategic investment plan ..... 27

Investment planning must evolve to account for and capture the range of outcomes – positive and negative – related to the effects of climate change. Insurers needn't disregard the time-tested strategic asset allocation processes that have served them well; rather, they can make certain climate-specific modifications that supplement and enhance those approaches.

## 6. Join the dots – holistic asset and liability management ..... 30

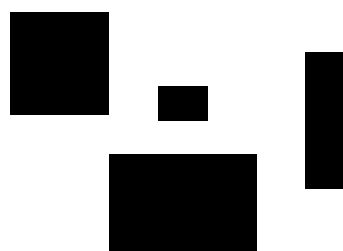
The systemic and long-tailed nature of climate-related physical, transition and liability risks make a compelling, and we would say, indisputable, case for addressing those effects holistically and with a common approach to quantification and analysis. Cohesive, integrated asset and liabilities strategies, with consistent oversight, will be the way forward.

## 7. Bring your people with you ..... 32

Climate risk will require an approach that not only better identifies and quantifies physical, transition and legal risks, and that brings a holistic climate lens to liability and asset management, but one also where people are the advocates and enablers of the strategy. Climate is no different from any other driver of significant organisational change – insurers have to bring their people with them.

## 8. Next steps: Some questions to think about in relation to climate risk ..... 36

Improving understanding of climate risks and opportunities is an essential part of the journey to net zero, but how do (re)insurers turn that into an integrated, forward-looking climate strategy? Exploring answers to these questions – ranging from issues of accountability and culture to disclosure and underwriting strategy – should help.

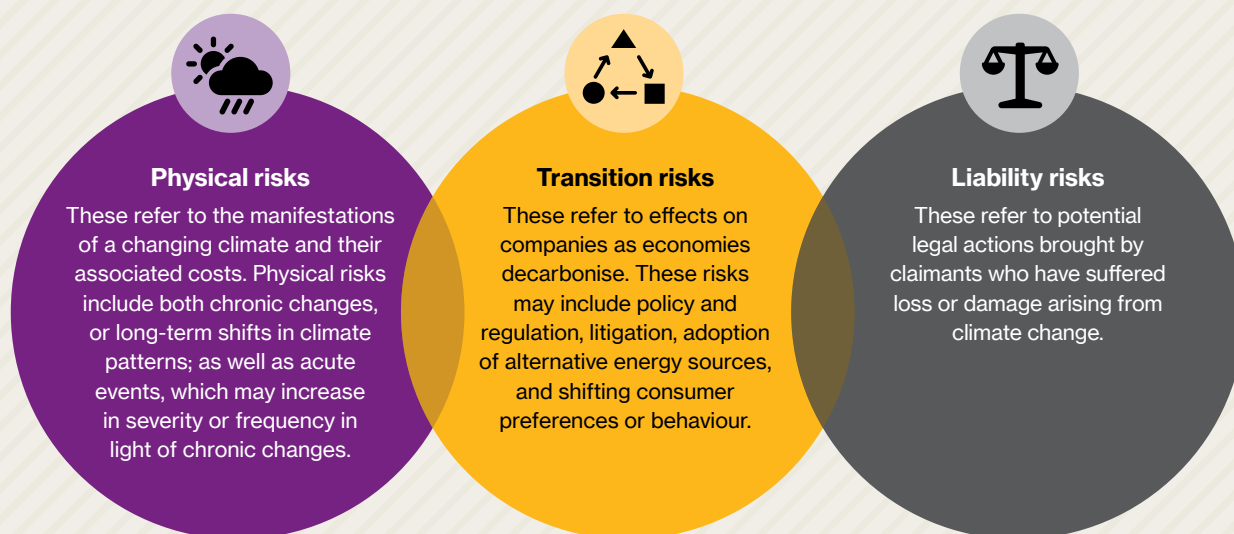


# Introduction

## Climate risk = enterprise risk

### Defining climate risks

The Task Force on Climate-related Financial Disclosures (TCFD) and other standard setters have delineated three main categories of climate-related financial risks, which together create enterprise-level risk for insurers.



These risks are interrelated and potentially cumulative. Physical risks are the primary cause for transition and liability risks; after all, without perils caused by physical climate change there would be little need for, say, carbon emissions regulations, climate-resiliency changes to building codes or other policy, property and casualty (P&C) claims filed in the wake of climate-driven natural disasters, and so on. This may sound intuitive, but we suspect that insurers still view these various forms of climate risk in separate siloes and therefore approach them independently.

For example, insurers generally view physical risks according to their potential impact on liabilities in an underwriting portfolio. Transition risks, on the other hand, have been viewed as having more of an impact on investment portfolios, where associated costs can lower security values. It is increasingly clear, however, that each risk category can affect both sides of insurers' balance sheets and influence strategic business considerations such as earnings, product development, capital management, investments, and acquisitions or divestments. A solid understanding of the connections between physical, transition and liability risks is therefore essential.

### Climate's triple threat

A recent example of the chain of climate-risk transmission is Pacific Gas & Electric (PG&E), an investor-owned utility in California. PG&E was blamed for a series of devastating wildfires and is now regarded as the largest climate-related bankruptcy to date. While the wildfires (physical risk) affected the company's revenues and operating expenses following power outages, the outrage from customers and regulators (transition risks) ultimately led the company to file for bankruptcy following the class-action lawsuits filed (liability risk).

In many ways, however, the risks are not new to insurers; they map onto existing categories of financial and non-financial risk such as credit, market, business, operational and legal risks that insurers have been managing for many years. But, given the uncertainties of climate change, climate-related risks do present new challenges.

## The quantification challenge

To get a more accurate picture of enterprise risk, quantifying each underlying form of climate risk – physical, transition, and liability – is fundamental.

Insurers need proven analytics tools and methods that reflect the latest science, as well as climate change scenario datasets to quantify enterprise-level climate risk. Examples of the types of outputs needed will include hazard and climate-risk scoring and mapping, determination of hazard and climate-adjusted financial losses, and integration of analysis into existing tools and models to support areas like underwriting, risk management and the actuarial function. Insurers also need experts who can interpret this data and provide context for how business decisions interact with climate risks.

From this solid quantification base, insurers will need to deal with the truly multi-dimensional nature of climate risk (see *Figure 1*). Potential ramifications that may not be grabbing the headlines yet could have potentially devastating consequences in years to come. Equally, new pathways for mitigating climate risk and resilience could offer respite from threats and generate new business and investment opportunities.



Figure 1. **The multi-dimensionality of climate risk**



Source: Willis Towers Watson



## Risk management and governance implications

Because climate change intersects with so many risk categories, insurers' and reinsurers' risk-management frameworks will need to be holistic.

Enterprise risk management (ERM) is likely to require explicit consideration of:

- **Governance** – including the board's role in providing oversight of climate risk responses and defining management responsibility for climate risk and environmental, social and governance (ESG) integration.
- **Risk identification** – identifying the key channels through which climate risks can impact the company, including its reputation, and how these are articulated, monitored and communicated on an ongoing basis.
- **Risk tolerance** – forming a view as to the acceptable levels of risk, including whether climate risk should be considered as a separate element or part of aggregate risk.
- **Risk measurement and reporting** – including how to incorporate climate risk into financial risk models and reports and deciding on relevant metrics for decision making, a key element of TCFD requirements.
- **Mitigating and capitalising on risks** – aligning underwriting and investment strategies with both the near-term and long-term risks and opportunities. This could include dedicated investments in companies deemed to have a credible transition plan or developing innovative new products to provide coverage for green industries, many of whom are in their infancy.
- **Adaptation impacts** – assessing how business risks and opportunities may evolve through solutions that help the company build resiliency to physical climate risks.

## A call to broader action

In a relatively short time span, climate change has developed from insurers principally using data to model the physical risks that might potentially impact liabilities – or an issue for corporate conscience – to a much broader set of issues relating to asset management, prudential safety and soundness, and supporting stability across the financial system.

This will require the insurance industry to up its game and embed a strategic approach; an approach that takes a whole balance sheet view of the risks and opportunities but also seeks to steward a whole economy transition to a low carbon and resilient future. Climate risk is likely to involve action across the people, risk and capital dimensions of the business.

### What do insurers have to gain from being in the front line on climate issues?

Beyond strengthening both sides of the balance sheet, by taking a proactive approach to climate considerations, an insurer can potentially provide assurance to all stakeholders, including a company's own investors, that it understands and is managing climate-related risks and opportunities. A climate-forward stand may also help attract and retain talent, as more professionals seek purposeful careers aligned with their values.

Having long been in the vanguard of applying climate knowledge to business, there are few industries as well placed as insurance to forge a path towards a more strategic way to manage climate risk and seize the opportunities that lie ahead.

“

...climate risk is likely to involve action across the people, risk and capital dimensions of the business.”



## Step 1

# Understand climate risks and opportunities

Developing a working knowledge of climate-related risks, including their potential impacts on invested assets and underwritten liabilities, is the foundation of a climate action plan.

Transition risks include changing climate policy, regulations, laws, and social mandates aimed at reducing greenhouse gas (GHG) emissions amid the transition to a lower-carbon economy. Physical risks refer to climate-related perils, both

acute and chronic, that are increasing in frequency and/or severity as global temperatures rise. Insurers need to consider the enterprise costs associated with mitigating the former and adapting to the latter. Resiliency is the watchword of climate preparedness.





Figure 2. The source and potential implications of transition and physical risks

Transition risks	Examples	Potential implications
<b>Policy/regulation</b>	<ul style="list-style-type: none"> <li>Energy efficiency regulations</li> <li>Carbon taxes</li> <li>Land-use regulations</li> </ul>	<ul style="list-style-type: none"> <li>Older real estate is devalued</li> <li>Carbon-intensive industries are devalued</li> <li>Sovereigns with fossil fuel exposure are downgraded</li> <li>Sustainable land use devalues less sustainable supply chains, such as timber</li> </ul>
<b>Liability/litigation</b>	<ul style="list-style-type: none"> <li>Environmental malpractice</li> <li>Class-action lawsuits</li> </ul>	<ul style="list-style-type: none"> <li>Egregious polluters are found liable for contributions to climate change</li> <li>Inaccurate climate disclosure triggers lawsuits, increasing financial risk</li> <li>Governments are sued for failing to protect citizens from climate change</li> </ul>
<b>Technology/Innovation</b>	<ul style="list-style-type: none"> <li>Renewable energy production and storage</li> <li>Electrification</li> <li>Artificial intelligence (AI) and machine learning</li> </ul>	<ul style="list-style-type: none"> <li>Renewable energy producers accrue lower costs of capital and attract investment dollars</li> <li>Fossil fuel-dependent industries encompass stranded assets</li> <li>Climate event projection improves, exposing at-risk holdings</li> </ul>
<b>Consumer/reputation</b>	<ul style="list-style-type: none"> <li>Changing consumer behaviour or preference</li> <li>Reputational risk</li> </ul>	<ul style="list-style-type: none"> <li>Consumers prefer sustainable financial/investment solutions</li> <li>Consumers shun entities perceived to have negative climate externalities</li> </ul>
<b>Market/valuation</b>	<ul style="list-style-type: none"> <li>Spread narrowing</li> <li>Devaluation</li> <li>Lower discount rates</li> </ul>	<ul style="list-style-type: none"> <li>“Brown” entities have higher weighted average costs of capital</li> <li>Climate-adjusted yields lead to spread tightening across corporate credit or sovereign bonds</li> </ul>
Physical risks	Examples	Potential implications
<b>Acute events</b>	<ul style="list-style-type: none"> <li>Floods</li> <li>Wildfires</li> <li>Hurricanes</li> <li>Extreme precipitation events</li> </ul>	<ul style="list-style-type: none"> <li>Real estate; building or transportation infrastructure; property, plant, and equipment; supply chains are damaged</li> <li>As event probabilities rise, entities with a history of costly damage or high potential exposure are downgraded</li> <li>Government adaptation spending increases</li> <li>Issuers at high climate risk see credit spreads widen</li> <li>Countries with greater climate risk become more volatile</li> <li>Geographic regions become increasingly uninsurable</li> </ul>
<b>Chronic changes</b>	<ul style="list-style-type: none"> <li>Rising temperatures</li> <li>Droughts</li> <li>Water scarcity</li> <li>Sea-level rise</li> <li>Rainfall variability</li> </ul>	<ul style="list-style-type: none"> <li>Climate migration causes economic disruption, from lower tax revenues to higher borrowing, health care, and social services costs</li> <li>Mortality and morbidity in affected regions increase</li> <li>Health care systems become stressed</li> <li>Coastal communities face economic devastation</li> <li>Agricultural land and crop yields are threatened</li> <li>Utilities are hampered; power generation is interrupted</li> <li>Decreasing biodiversity, habitat loss/degradation leads to more zoonotic pandemics, increasing economic costs</li> </ul>



# Climate-related opportunities

Like any form of risk, climate change also presents opportunities. Insurers should become familiar with the processes, systems, and products that will help society adapt to or mitigate the negative consequences of climate change. While these solutions are constantly in flux given ongoing scientific discovery and technological advancement, a basic understanding can potentially help insurers avoid risks and seize opportunities. Within asset classes, sectors, and regions, assets with material climate-risk exposure will likely struggle with higher costs of capital, while sustainable alternatives could capture a “green” market premium and accrue more value long term.

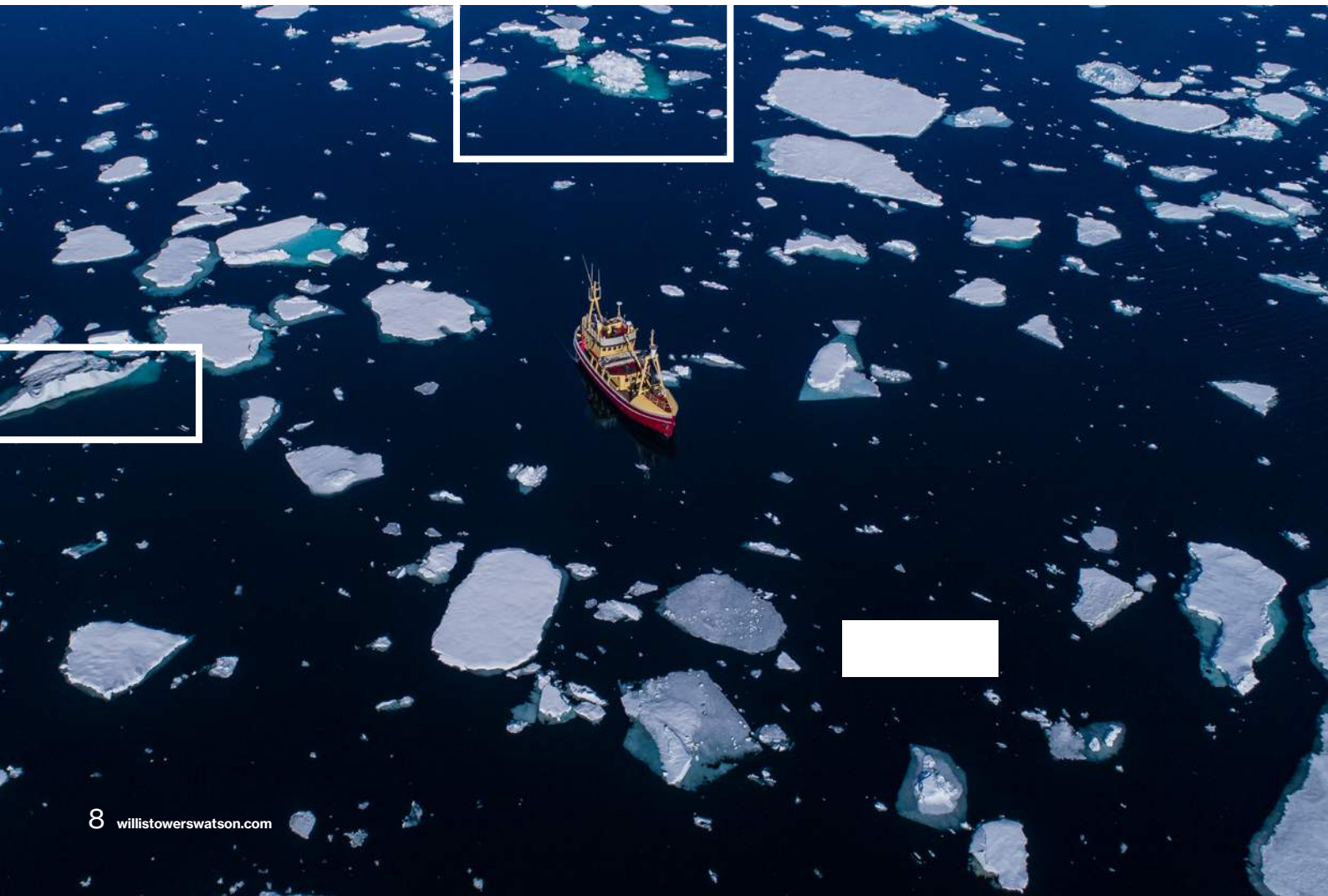
## Mitigating transition risks

Mitigation efforts help set the world on a path to lower greenhouse gas (GHG) emissions and a “net-zero” global economy. Most regulations in place today stem from the 2015 Paris Agreement, now endorsed by 197 countries, which legally binds signatories to limit global warming to 1.5°C above pre-industrial levels. To comply with this accord, many countries and a growing number of the world’s largest companies have set a target to zero out their carbon

emissions by 2050 or sooner. The range of mitigation tactics is still relatively narrow, but expanding quickly:

- **Carbon taxes and emissions trading systems (ETS):** To date, 64 countries have some form of carbon taxation or ETS, covering 22% of global GHG emissions.<sup>1</sup> The ability to pass through carbon taxes depends on pricing power and abatement costs. Carbon border taxes could make geographic revenue exposure a more accurate proxy for this risk than country of operations.
- **Emissions disclosure:** Companies will be increasingly required to disclose their contribution to climate change by quantifying emissions from operations and all along their supply chains.
- **Early flood warning systems:** Several U.S. cities prone to flooding have implemented round-the-clock systems that monitor rainfall, water levels and low-water crossings, alerting civic leaders and residents of potential flood risks.
- **Wildfire risk mitigation:** Wealthy individuals and insurers in the western U.S. have employed private firefighters to ensure an immediate response to their properties in the event of a wildfire.

<sup>1</sup>“State and Trends in Carbon Pricing 2021,” The World Bank.



## Adapting to physical risks

Mitigation efforts are aimed at stemming the costs associated with climate transition risk. By and large, these efforts do not address secular climate risks, that is, the inalterable progression of physical climate change. The GHG already in our atmosphere will impact the climate for centuries, regardless of which climate pathway the world pursues. Over time, normalised policy, regulation, and laws should have structural efficacy advancing the net-zero economy. However, adaptive solutions are needed, regardless of mitigation advances, to protect society from inevitable acute and chronic physical risks.

Public spending and update investment – on orders of magnitude higher than current levels – will be required to protect at-risk infrastructure, ensure public safety, and safeguard GDP. While significant capital has been spent on mitigation in the last decade, much less has been spent on adaptation.

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**We believe much more investment will be made into climate adaptation solutions in the coming decades. The world cannot afford not to.**

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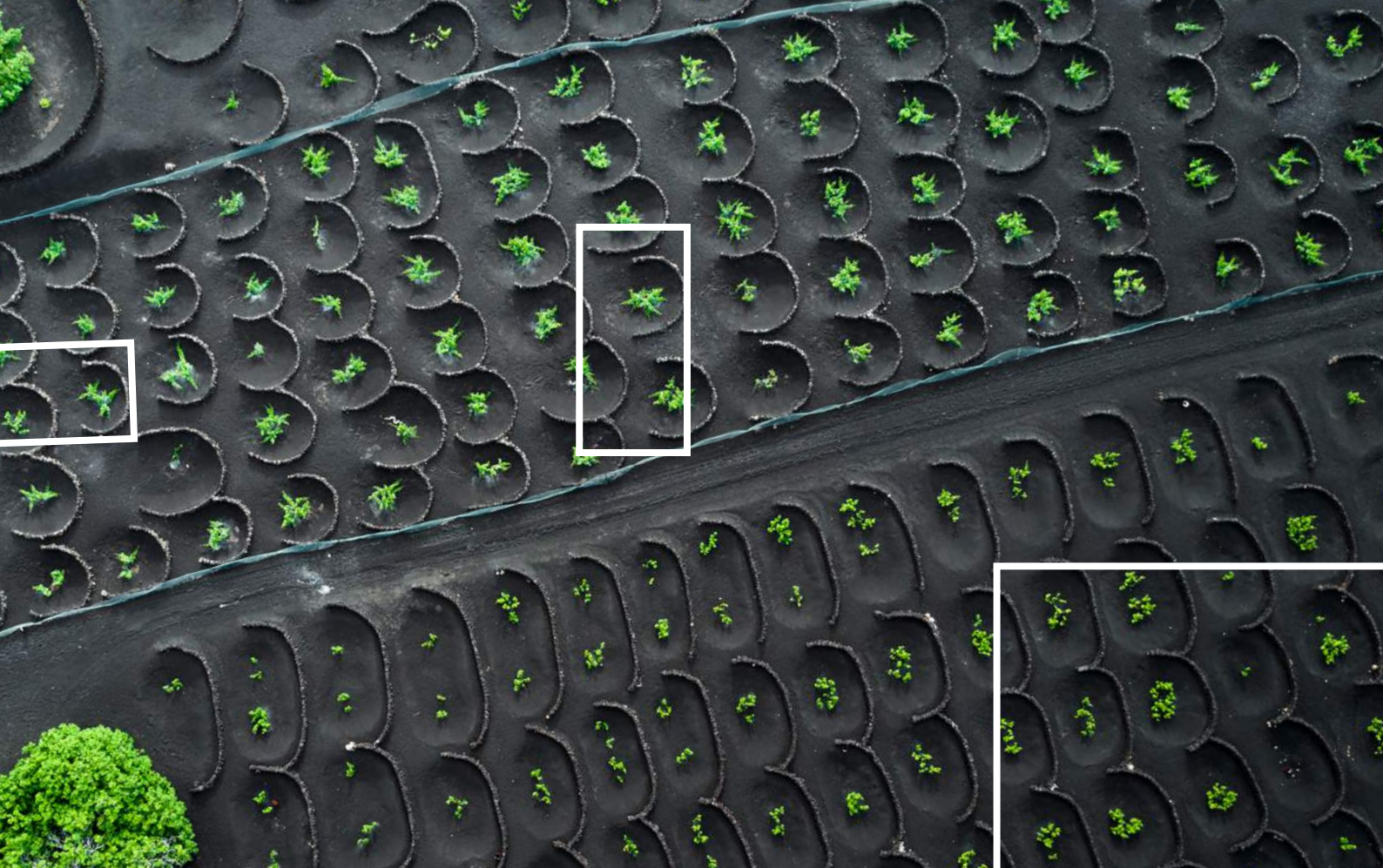
Examples of climate adaptation projects already underway include:

- **Land creation and infrastructure resiliency:** In many low-lying coastal areas, sea-level rise, erosion, and subsidence are prompting the need for land creation. The Philippines recently began a EUR 1.5 billion project to create land for the Manila International Airport, and Denmark has announced a US\$ 34 billion plan to build an “energy island” 80km (50 miles) out to sea. The man-made island will house 200 huge offshore wind turbines to provide electricity across the Nordic region.
- **Sponge cities:** Changing precipitation patterns and rising risks of coastal and pluvial flooding will require municipalities in many parts of the world to upgrade wastewater and stormwater management systems. Since 2010, China has implemented a campaign to adopt green infrastructure in 30 “sponge cities.” These programmes increase the proportion of absorptive to impervious surfaces (more green space, less pavement), which helps prevent and alleviate flooding and prevent resultant pollutant-rich storm runoff.



- **Natural barriers:** Mangrove forests are estimated to prevent more than US\$80 billion of losses from coastal flooding and protect 18 million people around the world. The Global Mangrove Alliance aims to increase mangrove cover 20% by 2030, which will require significant investment from public and private institutions alike. The Global Commission on Adaptation has calculated a nearly 6:1 benefit-cost ratio for investing in mangrove protection, with US\$1 trillion net returns on investment possible by 2030.
- **Agricultural assistance:** More than 50% of the continent of Africa's population is considered to be suffering from lack of access to reliable food sources. Extreme precipitation, floods, and prolonged droughts have significantly interrupted the continent's ability to produce food. One example of successful adaptation to combat these issues comes from Ethiopia, which implemented the Productive Safety Net Programme for its citizens in 2005, and the success of the cash for work programme allowed it to cover 18.5 million citizens during a drought in 2016 that in turn provided food and resources at a critical time. The programme focuses its resources on landscape restoration, irrigation infrastructure, and agroforestry. Funding of these initiatives both from public and private players will become all the more critical in the years ahead.





## Step 2

### Develop climate risk scenarios

In establishing a strategic approach to climate risk management and resilience, insurers need to understand how to develop and integrate climate scenarios into their risk modelling.

The property and casualty (P&C) side of the industry has long modelled physical climate risk to portfolios based on past and projected events. A turning point came in 1992, when Hurricane Andrew caused unprecedented losses and led to the insolvency of several (re)insurance companies. Andrew's massive destruction triggered demand for more sophisticated modelling techniques.



**Today, catastrophe models are used to estimate probable maximum losses from likely climate-related events – the volatility of which is likely to increase, according to our combined ongoing research.**

In areas where no models are available, other tools are used to quantify risk, such as scenario models. These methodologies help form a view of the baseline physical risk, to which climate impact can be added.



## Forming a baseline view of risk

The industry has pioneered analytical tools and models that are now in use for risk quantification in the current climate, with advantages and limitations to what is available (Figure 3, below). These building blocks of a climate-related toolkit generally provide a view on physical risk, which transition and liability analyses then build on.

Scenario development for climate change focuses on two parts. First, the determination of selected temperature, temporal and transition pathways (i.e. climate scenarios), which refer to the amount of warming within a certain period of time, and the ability of policy and the economy to keep pace with the rate of change desired. Second, these impacts need to be translated into a format that can be applied to the baseline risk from tools and models that we already use, to translate a climate impact to a financial impact (i.e. climate risk or loss scenarios).



**Even if the world stopped producing carbon emissions today, projections indicate that global temperatures would still rise 1.5°C by 2100.**

The purpose of scenario development is to simplify the understanding of risks so that they are more tangible and understandable. This enables companies to evaluate strategic options in the face of a range of anticipated physical, transition, and liability risks, to ensure their business is resilient and future-proof, but also to capitalise on new opportunities.

Figure 3. Risk quantification analytical tools and models

Baseline risk assessment tools	Approach	Benefits for climate analysis	Current limitations for climate analysis
<b>Risk indices or layers</b>	Overlay exposure onto regional hazard or peril risk indices to identify accumulations of risk for exposure management and underwriting.	<ul style="list-style-type: none"> <li>Identify drivers of risk quickly with a consistent approach across all territories within portfolios.</li> <li>Useful for broad-brush approaches when portfolios are not yet analysed for physical or transition risk, e.g. investment portfolios.</li> </ul>	Climate impact can be added, however this does not accurately quantify the magnitude of risk nor produce any financial loss metrics.
<b>Vendor models</b>	Projection of past events and trends into the future to obtain financial metrics regularly used in economic and regulatory capital management.	<ul style="list-style-type: none"> <li>Ability to form baseline view comparable with climate-adjusted view where vendors or others have provided the latter.</li> <li>Probabilistic, simulate losses across all return periods to produce a range of financial metrics.</li> <li>Some ability to customise Own View of Risk, dependent on vendor methodology and licence.</li> </ul>	<ul style="list-style-type: none"> <li>It is unclear if baseline models capture some climate signal, adding to model uncertainty.</li> <li>Reliant on vendors to release climate-adjusted views.</li> <li>Unable to sense check vendor view.</li> </ul>
<b>Scenario models</b>	Simulate realistic events against portfolios to stress test the business for risk management and governance.	<ul style="list-style-type: none"> <li>Visualise what future potential events may look like; more tangible analysis for C-suite audiences.</li> <li>Cover perils and regions where there are no models.</li> <li>Produce financial loss metrics.</li> <li>Easier to customise if developed internally or with collaborators.</li> </ul>	May be difficult to relate back to probabilistic models for a holistic portfolio view.
<b>Mortality models (life/health insurance)</b>	Assess likelihood of life expectancy, typically based on published mortality tables.	Help project the longer-term nature of liabilities and support asset matching decisions.	Few, if any, encompass climate factors to any meaningful degree.



# The role of the IPCC and regulators

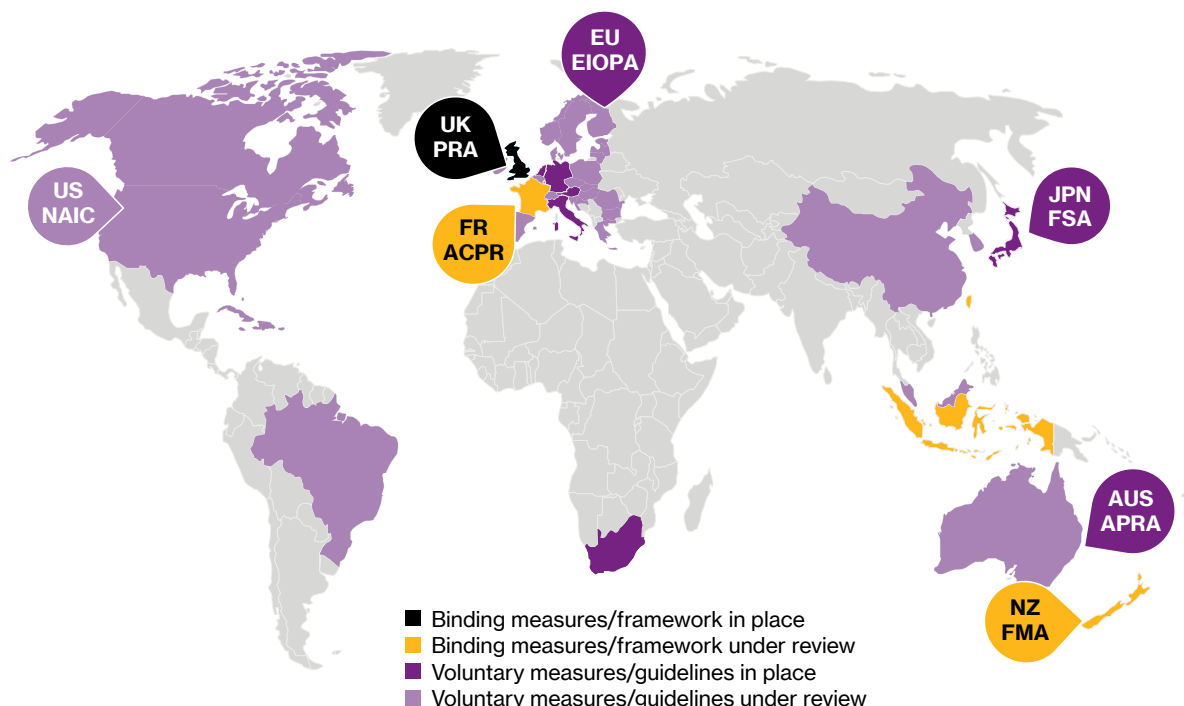
Regulators are adopting scenario development as the means for companies to demonstrate how they are evolving their approach and thinking as understanding

of climate risk develops. To assist companies with scenario analysis and quantification of climate change-related risks, different regulatory, academic and industry-led bodies have published selected climate scenarios. The most prominent in relation to financial services are listed below and these can often be used to develop scenarios relevant for a particular risk profile or business.

Organisation	Type of scenarios
<p><b>The Intergovernmental Panel on Climate Change (IPCC)</b></p> <p>The IPCC is the United Nations body for assessing the science related to climate change. It has continued to increase the sophistication and accuracy of the future climate projections used in its research publications. The latest IPCC Assessment Report (AR6) has considered a refined set of five future scenarios, considering both climate projections and plausible socioeconomic circumstances associated with different emissions pathways.</p>	<p><b>Taking the Green Road:</b> 1.5°C additional warming by 2100 relative to pre-industrial levels following slight overshoot, with CO2 emissions reaching net zero by mid-century.</p> <p><b>Sustainable Development:</b> Global warming kept below 2°C, with emissions pathways in line with the Paris Agreement.</p> <p><b>Middle of the Road:</b> Around 3°C warming by 2100 relative to pre-industrial levels with global emissions peaking by mid-century.</p> <p><b>Regional Rivalry:</b> 4.5°C of warming by 2100 following no additional climate policies.</p> <p><b>Fossil-fuelled Development:</b> A high reference scenario only projected with no mitigation action and all future growth is driven by fossil fuels.</p>
<p><b>The Network for Greening the Financial System (NGFS)</b></p> <p>The NGFS is a group of 66 central banks and supervisors and 13 observers committed to sharing best practices, contributing to the development of climate- and environment-related risk management in the financial sector and mobilising mainstream finance to support the transition towards a sustainable economy.</p> <p>While developed primarily for use by central banks and supervisors they may also be useful to the broader financial, academic and corporate communities.</p>	<p><b>Orderly:</b> Assumes climate policies are introduced early and become gradually more stringent. Net zero carbon dioxide (CO<sub>2</sub>) emissions are achieved before 2070, giving a 67% chance of limiting global warming to below 2°C. Physical and transition risks are both relatively low.</p> <p><b>Disorderly:</b> Assumes climate policies are not introduced until 2030. Since actions are taken relatively late and limited by available technologies, emissions reductions need to be sharper than in the Orderly scenario to limit warming to the same target. The result is higher transition risk.</p> <p><b>Hot house world:</b> Assumes that only currently implemented policies are preserved. Nationally Determined Contributions are not met. Emissions grow until 2080 leading to 3°C+ of warming and severe physical risks. This includes irreversible changes like higher sea level rise.</p>
<p><b>Shared Socioeconomic Pathways (SSPs)</b></p> <p>An international team of climate scientists and economists have created 5 new pathways that examine how global society and economics might change over the next century. Collectively they are known as the Shared Socioeconomic Pathways (SSPs). The SSPs are used as inputs into the latest climate models and are the back-bone of the most recent IPCC AR6 report and their 5 future scenarios, as described above.</p>	<p>The Five SSPs describe alternative pathways for future society, with varying degrees of challenges to socioeconomic adaptation and mitigation.</p>  <p>The diagram illustrates the five Shared Socioeconomic Pathways (SSPs) plotted against socioeconomic challenges for mitigation (y-axis) and adaptation (x-axis):</p> <ul style="list-style-type: none"> <li><b>SSP 5 (Fossil-fuelled development):</b> Taking the Highway. (Mitigation challenges dominate)</li> <li><b>SSP 3 (Regional rivalry):</b> A Rocky Road. (High challenges)</li> <li><b>SSP 2 (Middle of the road):</b> Middle of the road. (Intermediate challenges)</li> <li><b>SSP 1 (Sustainability):</b> Taking the Green Road. (Low challenges)</li> <li><b>SSP 4 (Inequality):</b> A Road Divided. (Adaptation challenges dominate)</li> </ul>

## Scenario development and regulatory trends

Figure 4. Global regulatory approaches to climate risk



The PRA in the UK is a frontrunner in climate regulation and has provided substantial guidance for companies to develop scenarios material to their business. In other parts of the world, regulators are currently developing guidelines in consultation with industry. Should regulatory guidance be more fluid, exposure management principles may be useful – first identifying accumulations of assets or liabilities, then assessing the climate risk for the top drivers. As the saying goes, there is no risk without exposure, but equally if there is no climate signal for the peril then the exposure could be immaterial for the purposes of this exercise.

- TCFD is currently voluntary but financial services regulators in a number of countries are moving to make it mandatory<sup>2</sup>. For example, the UK joint regulator and government TCFD Taskforce has signalled TCFD-aligned disclosures will be mandatory across the economy by 2025, with a significant portion of mandatory requirements in place by 2023.
- Also in the UK, the Prudential Regulation Authority (PRA) has requested that insurers should have “fully embedded their approaches to managing climate-related financial risks by the end of 2021”.<sup>3</sup>

- Australia’s financial regulator has started a consultation on climate-related financial risks.
- The European Insurance and Occupational Pensions Authority (EIOPA) is asking national regulators to include climate risks in the Solvency II Own Risk Solvency Assessment (ORSA) and consulting on integrating them into the Standard Formula. Insurers should subject material climate change risks to at least two long-term climate scenarios, where appropriate: 1) a climate change risk scenario where the global temperature increase remains below 2°C, preferably no more than 1.5°C, in line with the EU commitments; and 2) a climate change risk scenario where the global temperature increase exceeds 2°C.
- In the U.S., the Securities and Exchange Commission (SEC) has directed agency staff to begin work on guidance for climate change disclosures by public companies. That follows on from the New York Department of Financial Services having written to insurers requesting firms to integrate climate-related risks into governance frameworks, risk management processes and business strategies.

<sup>2</sup>TCFD: coming, ready or not – [www.willistowerswatson.com/en-GB/Insights/2020/11/TCFD-coming-ready-or-not](http://www.willistowerswatson.com/en-GB/Insights/2020/11/TCFD-coming-ready-or-not)

<sup>3</sup>‘Dear CEO’ letter from Sam Woods Deputy Governor for Prudential Regulation and CEO of the Prudential Regulation Authority [1 July 2020] [www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2020/managing-the-financial-risks-from-climate-change.pdf?la=en&hash=A6B4DD1BE45B2762900F54B2F5BF2F99FA448424](http://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2020/managing-the-financial-risks-from-climate-change.pdf?la=en&hash=A6B4DD1BE45B2762900F54B2F5BF2F99FA448424)



- The International Association of Insurance Supervisors (IAIS) has published its draft Application Paper to support supervisors around the world in their efforts to integrate climate-related risks into supervisory frameworks, including those relating to supervisory review and reporting, corporate governance, risk management, investments and disclosures.
- While part of a learning exercise rather than an immediate regulatory standard, The Bank of England's 2021 Bi-annual Exploratory Scenarios lays out three scenarios of early, late and no action built on a subset of the NGFS scenarios: these are applied over a span of 30 years reflecting the longer-term nature of climate-related risks and for the first time cover exposures from liability policies as well as physical risks.
- From January 2022, insurers operating in the European Economic Area will have to meet the Sustainable Finance Disclosure Regulation (SFDR) requirements.

Figure 5. Latest regulatory action on climate risk

Regulatory agency	Latest regulatory action
<b>Financial Stability Board (FSB)</b>	Task Force on Climate-Related Financial Disclosures (TCFD) was created in 2015 by the Financial Stability Board (FSB) to develop consistent climate-related financial risk disclosures for use by companies and investors in providing information to stakeholders. In the UK, TCFD-aligned disclosures will be mandatory across the economy by 2025.
<b>Bank of England – Prudential Regulation Authority (PRA)</b>	The Bank of England's 2021 Bi-annual Exploratory Scenarios lay out three scenarios of early, late and no action in which insurers and banks will have to stress test their businesses against. The PRA has requested that insurers should have “fully embedded their approaches to managing climate-related financial risks by the end of 2021”.
<b>Australia Prudential Regulation Authority (APRA)</b>	Australia's financial regulator, APRA, has started a consultation on climate-related financial risks.
<b>The European Insurance and Occupational Pensions Authority (EIOPA)</b>	The European Insurance and Occupational Pensions Authority (EIOPA) is asking national regulators to include climate risks in the Solvency II Own Risk Solvency Assessment (ORSA) and consulting on integrating them into the Standard Formula.
<b>U.S. Securities Exchange Commission (SEC)</b>	The SEC has directed agency staff to begin work on guidance for climate change disclosures by public companies. That follows on from the New York Department of Financial Services having written to insurers requesting firms to integrate climate-related risks into governance frameworks, risk management processes and business strategies.
<b>The International Association of Insurance Supervisors (IAIS)</b>	IAIS has published its draft Application Paper to support supervisors around the world in their efforts to integrate climate-related risks into supervisory frameworks, including those relating to supervisory review and reporting, corporate governance, risk management, investments and disclosures.
<b>European Commission</b>	From January 2022, insurers operating in the European Economic Area will have to meet the Sustainable Finance Disclosure Regulation (SFDR) requirements.



# Climate science into peril science



**Regulators are taking steps to provide more guidance on using scenarios for climate risk assessment. However, the capability to translate between climate science into factors for loss modelling varies around the world.**

Applied academic research therefore plays a critical role. At this time, where climate analysis tools are in their infancy and regulatory timeframes challenging, the temptation may arise to simply use what is on offer from various vendors. We expect that as more tools and models become available, the stronger the imperative to ensure a firm's Own View of Risk is properly captured and reflected in climate analyses, as it is in regular reporting.

A reasonable approach to these analyses (Figure 6) would be to:

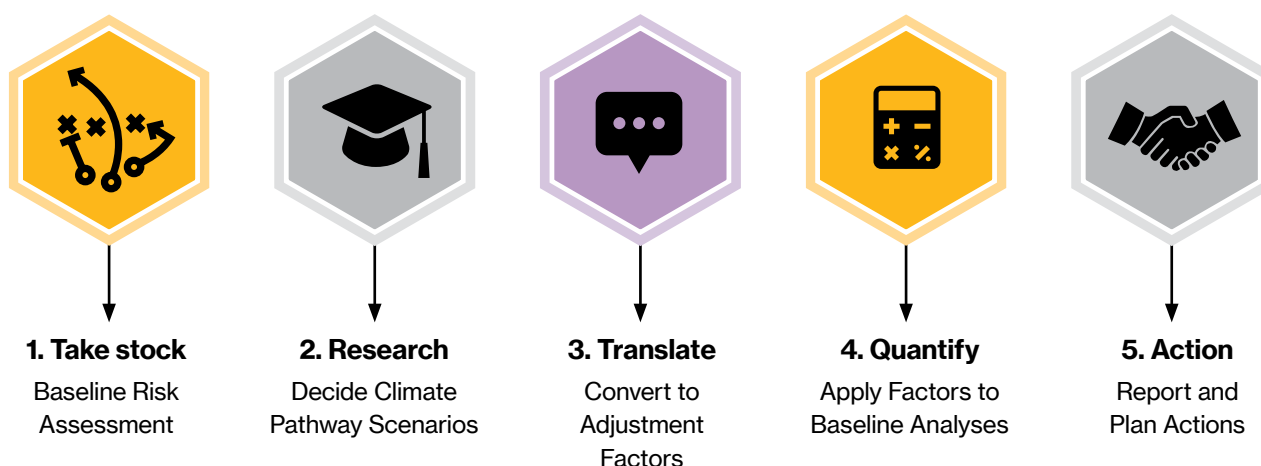
1. **Take stock** of the baseline risk to the underwriting and investment portfolios. Materiality will be driven by identifying key exposures in conjunction with peril regions where a climate signal can be discerned.
2. **Research** climate factors, deciding on the temperature and time horizon, and transition pathway (orderly, disorderly or in between) that are most relevant to the business. Research the impact of these climate factors on baseline risk.

3. **Translate** these factors to adjustments that can be applied to tools and models used for regular current climate modelling. This is where external partnerships can be useful, and have been used by industry, in particular where expertise or resourcing is a challenge.
4. **Quantify** the expected climate impact by conducting the modelling. While cat modelling covers physical risk, transition and liability narratives ideally should be built off the same base physical assumptions to allow for continuity in the analysis.
5. **Take action** based on the outputs. Generally, with the regulatory impetus, reporting of findings and a plan of intended management actions will be required. Risks identified can also be then mitigated, and opportunities maximised.

A similar approach can be adopted for transition risk:

1. Identify a source (e.g. IPCC).
2. Apply research and knowledge of the underlying risk to short-list drivers.
3. Consider different areas (e.g. policy and legal, reputational, technology and market) to assess impact on the business.
4. Modify the base scenario to design a set of scenarios for each key transition risk by incorporating cost impact data.

Figure 6. An approach to incorporating climate analyses in an insurer's Own View of Risk





## Applying a longer-term climate lens



**Adjusting time horizons to the long-term is an opportunity for directors to reflect on future financial risks today and to set a strategic ‘climate intent’.**

This, in turn, can inform a more strategic approach; one that embraces the need for stewardship of a whole economy transition.

At present, the market is some way off reflecting the systemic physical, transition and liability risks embedded in P&C insurers’ liabilities and assets, and the reserving of long-tail liabilities on life insurers’ balance sheets seldom considers the impact to mortality and morbidity from acute and chronic physical risks.

As the industry comes to terms with the financial challenges ahead, a recent Willis Towers Watson survey of UK companies’ readiness for Task Force on Climate-related Financial Disclosures (TCFD) reporting noted 71% of companies indicated that scenario development and climate metrics and targets were the main areas where they expected to need support.

The good news is that analytical building blocks exist that can be adapted to climate analysis, which is work Willis Towers Watson is undertaking in partnership with the Willis Research Network. These views of risk will evolve over time as tools develop in complexity and companies gain further understanding of the risks and opportunities to their business, to better implement a climate strategy.



The PRA’s 2019 General Insurance Stress Test defined future climate scenarios via a set of hazard parameters (see *Figure 7*, below). This converted raw academic climate model outputs (temperature) to hazard parameters (rainfall). However, participants still required

in-house or external expertise in order to calculate the impact on their portfolio from these hazard parameters, such as the impact on inland flood losses from increased rainfall.

Figure 7. The PRA’s 2019 General Insurance Stress Test scenarios

	A sudden transition (2022)	Long-term disorderly (2050)	4°C scenario (2100)
Assumptions	Scenario A	Scenario B	Scenario C
% increase in <b>surface run-off</b> resulting from <b>increased precipitation</b> (cumeecs)	5%	10%	40%
Uniform increase in cm in average <b>storm tide sea-levels</b> for UK mainland coastline	2cm	10cm	50cm
Increase in <b>frequency of subsidence</b> -related property claims – benchmark worst year on record	3%	7%	15%
Increase in <b>frequency of freeze</b> -related property claims – benchmark worst year on record	5%	20%	40%



## Step 3

### Stress test climate-exposed assets

Regulators are seeking greater transparency from insurers on their climate change exposure, requiring evidence of their ability to identify, quantify, and manage climate-related risks.

After determining a framework for the application of a set of climate scenarios, insurers can then begin to integrate climate research and insights into their financial analyses, stress testing assets for climate exposure.

There is no one-size-fits-all approach, as not all insurers are exposed to the same type or degree of climate risk. Insurers can look to assess enterprise- or security-level climate risks according to their severity and materiality, deepening their quantitative and scenario analysis and focusing on higher-risk exposure as befits their organisational context. At the same time, insurers can capture opportunities by identifying assets positioned to benefit from or contribute to the low-carbon transition. These may include renewable energy, large-scale battery storage, water and wastewater management, electric network utilities, and many others.

#### Assessing direct and indirect impacts of climate change

Climate physical and transition risks (detailed in *Step 1*) vary by asset class, sector, and geography; and certain assets may be diversified across climate risks or have relatively lower inherent climate risks. For climate transition risk assessment, insurers can employ point-in-time carbon scoring to zero in on high-carbon-emitting assets or start to move towards more sophisticated climate value-at-risk (CVaR) type measures. When assessing physical risks, it helps to determine subsets of assets with explicit geographic links and map them according to project peril exposure.



## Direct climate-risk exposure

Asset types	Exposure type	Insights
<b>Carbon-intensive industries</b>	Transition	Companies in high-emitting sectors operating in countries with carbon pricing are at risk of lower profitability if they are unable to pass through taxes or emissions trading credit prices to customers. Assess a company's pricing power and local tax environment. Look for companies with robust climate disclosures, ideally those that include Scope 1, 2 and 3 level emissions data.
<b>Direct real estate</b>	Physical and transition	The use of advanced tools and analytics that combine climate data with geospatial views of real estate locations can help insurers pinpoint the physical risk exposure of these assets. Determine real estate holdings subject to emerging energy-efficient building standards, which can lead to high capex costs associated with retrofitting or new construction.
<b>Energy infrastructure</b>	Physical and transition	Global energy demand is expected to rise over the next 30 years, even as fossil fuel consumption gradually sunsets. Emissions regulations will be a material risk factor, creating performance and risk dispersion. Electric grids will need to be made more resilient against extreme climate events and modernised to accommodate an increasing share of renewables. Assess holdings that enable or benefit from the transition to a greener energy market, and those that may lag or be at risk of becoming stranded assets.
<b>Transportation infrastructure</b>	Physical	In many parts of the world, these assets will require significant investments to avoid damage from physical perils. Transportation will become more electrified, shared, autonomous, and connected; sensors and advanced driver-assistance systems (ADAS) are becoming standard features; freight and logistics are becoming digitised.
<b>Agriculture</b>	Physical and transition	A warming world creates substantial issues with agricultural labour and productivity. Heat, droughts, extreme and variable precipitation are projected to impact some of the world's largest bread baskets, resulting in crop yield declines, supply pressures, and nutritional degradation. Regulators may begin to mandate methane reduction from livestock production or better soil practices.
<b>Municipal bonds</b>	Physical	A significant portion of this market is essentially project finance. Given the risk of material climate impacts on certain municipalities, insurers may want to rethink their long-term assumptions on the asset class, particularly for credits in vulnerable areas.
<b>Utilities</b>	Physical and transition	Utilities that embrace the energy transition may see lower cost of capital, maintain operating licenses, and align production with increasing demand for lower carbon energy sources. Failing to account for these risks may limit access to capital or raise costs. Access to water (or lack thereof) can also directly impact the scale of power generation in a given geography.
<b>Emerging market investments</b>	Physical and transition	Many developing countries have significant exposure to climate change and face the largest incumbent adaptation costs, particularly given existing infrastructure conditions. A handful of emerging markets, most notably China, are already investing heavily in climate adaptation and mitigation. Insurers should assess a government's ability to fund climate resilience, its reliance on fossil fuels, the vulnerability of its agriculture, and macroprudential policies aimed at sustainable development. Certain thematic investments, including renewables, could become more attractive as climate events unfold.
<b>Real estate investment trusts</b>	Physical	Investment opportunities in this space should consider exposure to physical perils and can be an attractive alternative/complement to direct real estate.
<b>Mortgage loans</b>	Physical	Traditionally, illiquid assets with longer durations carry greater potential physical risk exposure.
<b>Renewables/green assets</b>	Transition	These assets are generally well placed to benefit from the transition to net zero emissions. While significant investment capital has already flowed to renewables, opportunities remain in many parts of the world, particularly in regions where energy market share for renewables is still low. As renewable energy becomes more cost effective to implement the space should experience considerable growth.
<b>Sovereign debt</b>	Physical and transition	Rating agencies have begun to formally integrate ESG factors into credit risk assessments. As a result, sovereign nations with a heavy reliance on fossil fuels or high exposure to physical perils could be at risk for downgrades.

## Indirect climate-risk exposure

**A robust analysis should also aim to identify portfolio assets with significant indirect exposure to climate change, where first-order consequences create downstream challenges for other stakeholders.**

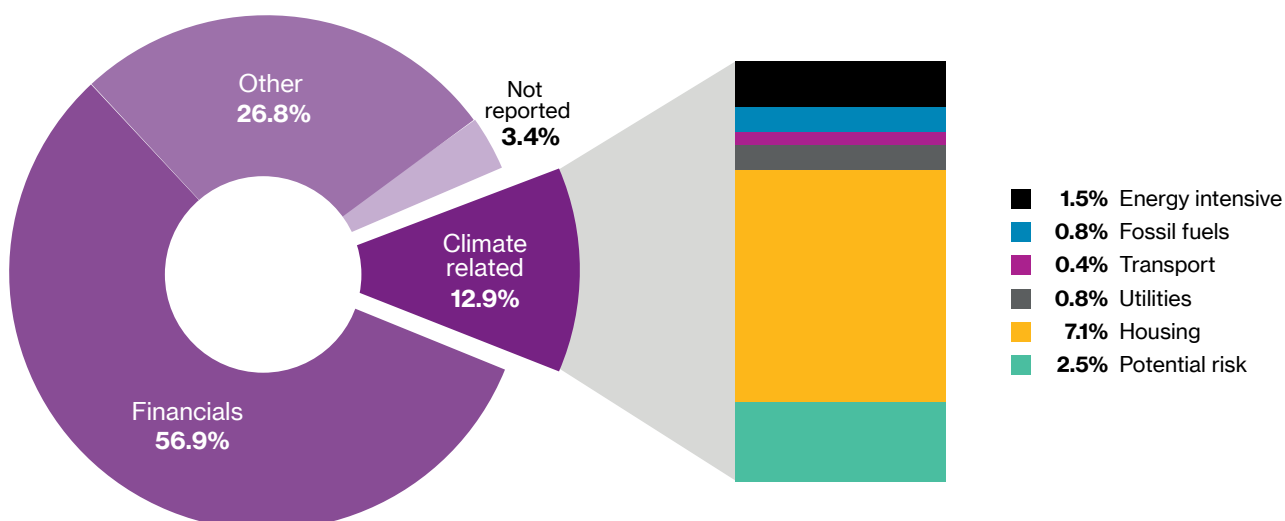
For example, many industries, including auto manufacturing, agriculture, semi-conductors, construction, and utilities, rely heavily on water. Water scarcity can result in higher operating expenses and/or lower output, including utilities' ability to generate hydroelectricity and nuclear power. In countries where water challenges hamper an important economic sector, these headwinds may be a drag on GDP growth.

Another indirect risk is migration. Climate migration caused by permanently reduced livability as a result of climate change could have long-term, wide-ranging impacts, particularly on the climate-vulnerable zone 30 degrees north and south of the Earth's equator. Wellington's climate research team believes most climate migrants will abandon vulnerable rural areas for urban ones. The economic consequences and considerations of climate-driven migration will be manifold. In countries where sovereign debt is downgraded as a result of climate risk, higher borrowing costs could have downstream impacts, including unemployment, inflation, social unrest, and higher corporate cost of capital. While indirect impacts are more challenging to quantify, understanding and reporting on them is useful.



The European Insurance and Occupational Pensions Authority (EIOPA) created a framework illustrating direct and indirect exposures for insurers (*Figure 8*). EIOPA defines sectors, companies, or technologies directly at risk of devaluation as a result of transition risks like climate policy as "climate relevant". While assets with indirect climate exposure, including those across the financial sector, are not immune to transition risks, a diversified allocation to less climate-relevant sectors could be considered by regulators to be diversified across geography and peril.

Figure 8. Climate-relevant asset exposures of the European insurance sector (% of total investment assets)



Source: EIOPA Financial Stability Report, December 2018



## Case study: Assessing climate risk in the European utilities sector



### The following is an example of Wellington's Climate Research and ESG Research Teams' assessment of the climate risks and opportunities facing the European utilities sector.

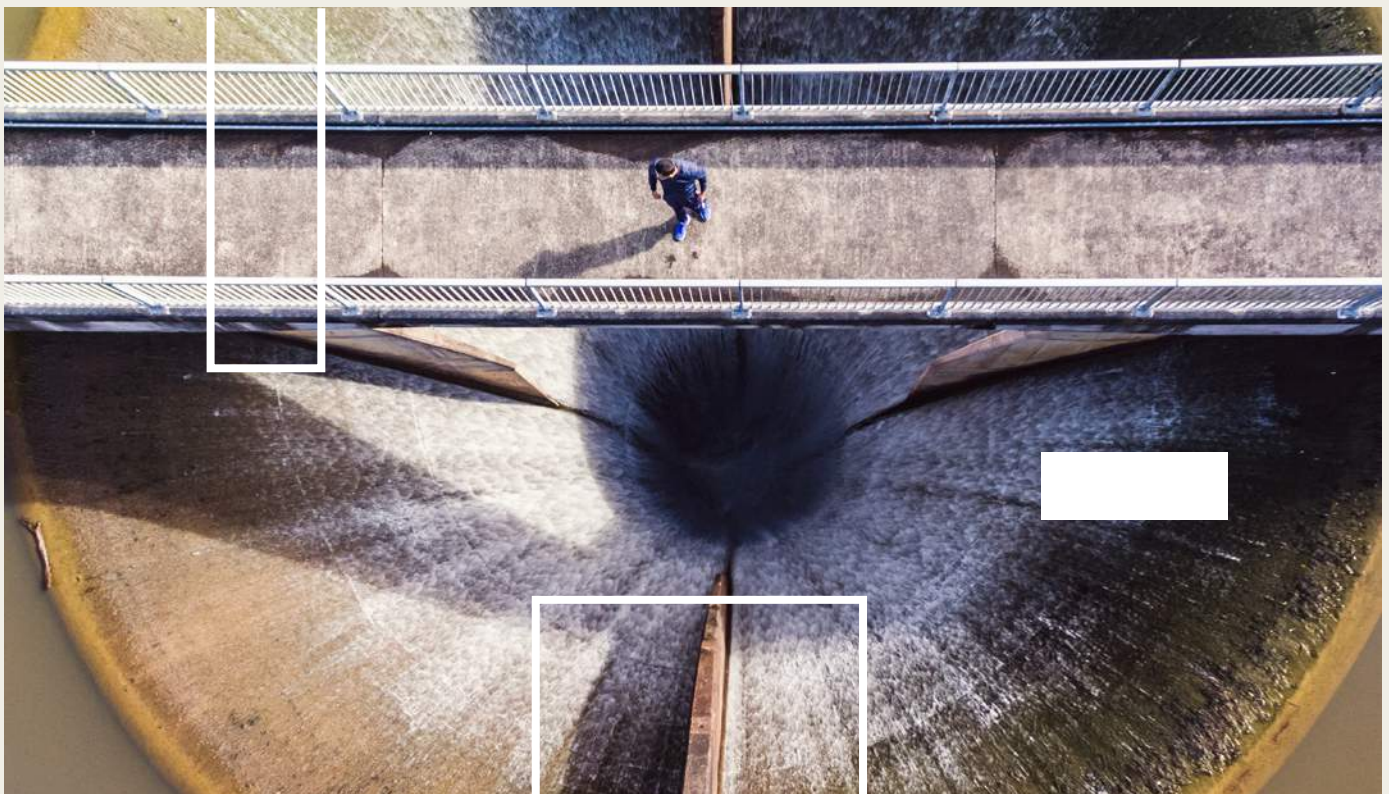
**Transition risks and opportunities:** For electric utilities, an ambitious renewables growth strategy can potentially lead to lower marginal costs, higher operating margins, and regulatory tailwinds. We see early movers in this sector benefitting from their scale and strong relationships with suppliers. We find that utility companies differ according to the current and projected proportions of renewables capacity relative to installed capacity, and by the proportion of growth capex allocated to renewables.

In the European Union (EU), eligibility for the 2020 Taxonomy Regulation is a helpful proxy for utilities' exposure to economic stimulus and their potential for valuation rerating. Companies with electricity transmission capabilities and renewables exposure are viewed more favourably than those reliant on natural gas and will more

likely clear the hurdles of being considered sustainable. For the remainder of the EU's power generation mix, there is more pressure on governments to retire plants with coal, lignite, and nuclear exposure. We compare the outcomes of these strategic generation mix choices using current and projected carbon intensity, relative to future intensity under the utility sector's 2°C pathway.

**Physical risk assessment:** Climate-change induced temperature variability and drought risk can impact a utility's ability to provide reliable service to its customers. Woodwell research highlights certain European countries, particularly Spain, Portugal and Italy, where drought poses a material risk to existing hydro plants, and where heatwaves could cause nuclear generators to overheat and shut down. Rising temperatures could also cause transmission cables to expand, melt, or fail.

Energy grids could become less efficient or overloaded as a result of extreme temperatures, with utilities with large transmission businesses seeing greater relative impact. As we've seen recently in the southwestern U.S., extreme cold snaps can also impair the ability of utilities to deliver power if equipment is not properly insulated or protected.



# Analysis – Why peril frequency is rising: Understanding cumulative climate-loss probabilities

The calculation of financial loss for a given asset is a relatively standard equation:

$$\text{Expected loss} = \text{Value} * \text{Vulnerability} * \text{Probability of loss event}$$

### Where:

- Exposure value = expected market value on traditional performance measures (e.g. appreciation, defaults)
- Vulnerability = Estimation of loss for asset in question
- Occurrence probability of loss event

Wellington's work with Woodwell Climate Research Center finds that in many parts of the world, the probability of so-called hundred-year weather events, for example (those with a 1-in-100 or 1% probability of occurring in a single year), is rising.

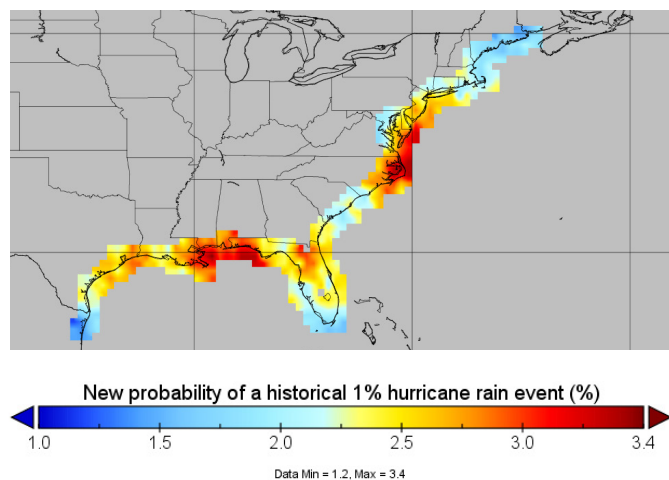
**Assessing probability over time requires calculating the cumulative percentage risk of an event's likelihood for a given time period. The longer the period, the more likely a "rare" event is to occur, and the greater the impact minor increases in probability have.**

Over a 20-year period, for example, there is an 18.2% chance of a hundred-year event occurring, and a 33.2% chance of a fifty-year event occurring. Here's how the math works:

- In any given year, the probability that a 1% event will NOT occur is 99% or 0.99 ( $1 - 0.01$ ).
- Over a 20-year period, the chance that a 1% event will not occur is 0.99-20, as we assume event occurrence to be independent year over year.
- So, the probability that a 1% event WILL occur at least once over a 20-year period is  $1 - (0.99-20)$ , or 18.2%.
- The chance of a 2% event occurring at least once over 20 years is  $1 - (0.98-20)$ , or 33.2%.

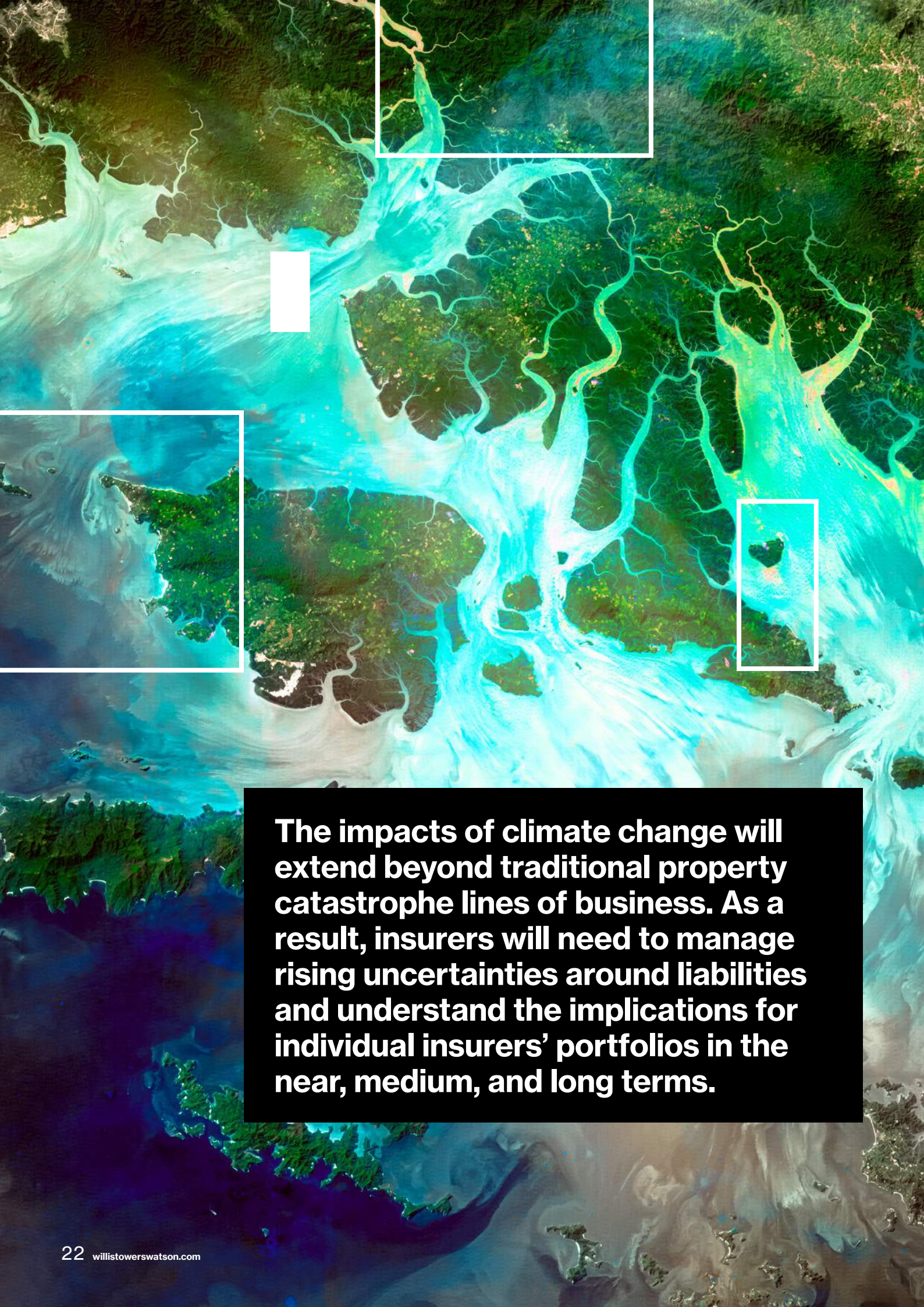
The continued mischaracterisation of rare climate events as one-time occurrences rather than part of a changing pattern may be a reason why climate risk often remains abstract, hampering proactive behaviour, policy change, and asset repricing. If insurers better understand climate probabilities, particularly the cumulative risk of occurrence over multi-year periods, they can better appreciate the severity and more accurately reprice these risks. Climate data and scientific models from Woodwell show the rising probability of extreme hurricanes along the U.S. Eastern seaboard and Gulf Coast (Figure 9). The legend colours show the change in probability of a 1% event from the 1981 – 2000 period to the 2031 – 2050 period. In some places, 1% events will become 3% events. Based on the math above, that means that certain already vulnerable regions will face a 40% – 60% chance of experiencing a devastating hurricane between 2031 and 2050.

Figure 9. Change in probabilities for an extreme hurricane event for the period (2031-2050) from the period 1981-2000



Sources: Woodwell Climate Research Center, Wellington Management





**The impacts of climate change will extend beyond traditional property catastrophe lines of business. As a result, insurers will need to manage rising uncertainties around liabilities and understand the implications for individual insurers' portfolios in the near, medium, and long terms.**



## Step 4

# Develop a climate strategy for liabilities

Even with the protection gaps that currently exist (which insurers seem likely to be expected to help fill in coming years), the physical impact of climate change on insurers' liabilities (Figure 10) has been clear.

## Adapting liability management

Understanding and quantifying the risks of climate change is key to managing insurance liabilities and determining next steps.

On the liability side of the balance sheet, the underwriting portfolio naturally comes under scrutiny as the largest segment. A common misconception is that because climate signals are long-term, this does not affect annual (re)insurance contracts. However, underwriting portfolios are subject to the increasing volatility expected from climate-related perils, with increases in frequency and severity in some peril regions but decreases in others. This could change the risk profile of the portfolio and also has implications on earnings and reserving. Fortunately, P&C insurers are used to modelling their portfolios, as mentioned in Step 2, so a baseline view of risk is present. The question then shifts to what underwriting strategy would be suitable going forwards.

For example, will insurers penalise themselves if they put a 'climate premium' on products as modelling of the risks continues to improve? Equally, public policy and regulatory changes may rule coverage exclusion out. The state of

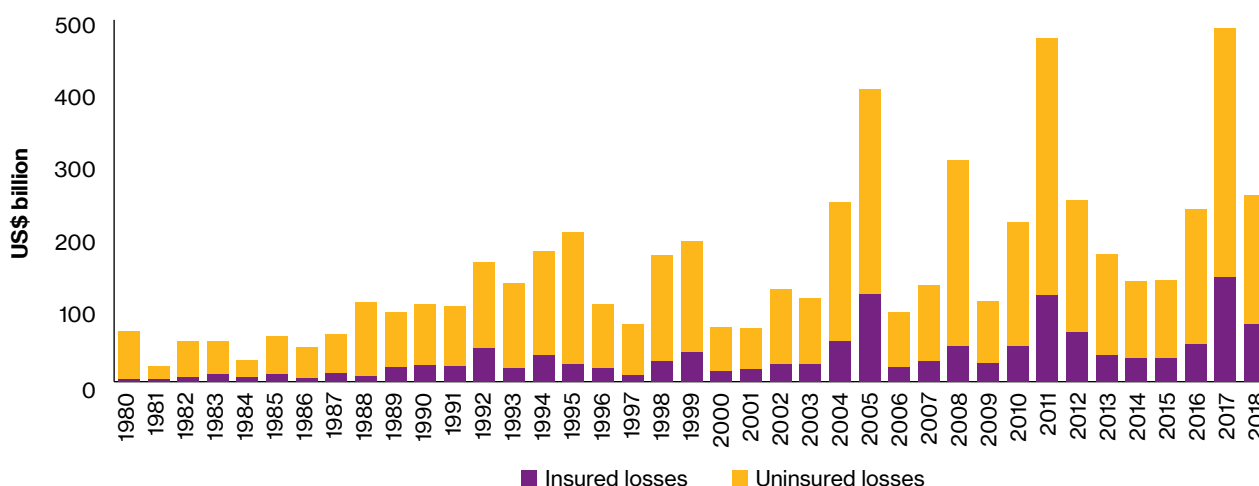
California mandated continuing coverage for wildfire by insurers after the 2018/2019 fire season, and the 2020 season produced five of the largest wildfires in the state's history.

Stakeholder attitudes could also play an important role in determining future risk levels. Consumers and shareholders are increasingly likely to hold companies accountable for their overall approach to climate change and may seek to purchase products and invest in companies with environmentally sustainable options and business models.

The insurers' view of risk would also be impacted by the evolving regulatory and policy requirements. Tail events that increase further in severity, or severe events that increase in frequency, could well have material impacts on solvency or regulatory compliance that no one wants to be caught out by. This highlights the need for insurers to integrate the financial risk from climate risk into governance, risk management and business strategies. Similarly, rating agencies' shift to a more proactive view of climate risk by including ESG factors in their rating criteria has already begun.

In short, the impacts of climate change will extend beyond traditional property catastrophe lines of business. As a result, insurers will need to manage rising uncertainties around liabilities and understand the implications for individual insurers' portfolios in the near, medium, and long terms.

Figure 10. Historical climate-related insurance (and uninsured) losses



Source: Swiss Re Institute, sigma No 1/2021

## Extending risk assessment

P&C insurers need to take a mid- to long-term view of climate risk management by considering the impact of climate-change-related uncertainties on the business plan over a multi-year period. Through better risk assessment, insurers can manage and mitigate risks better and prepare for changes in the economic and business environment.

<b>Understand climate risk</b>	Understand the type of physical and transition climate risks the business is exposed to (See Step 1)
<b>Identify risk drivers</b>	Qualitative identification of drivers through risk register, surveys, workshops
<b>Measure risk</b>	Quantitative assessment of risk through stochastic modelling or scenario analysis (See Step 2)
<b>Embed risk framework</b>	To allow continuous assessment of risk
<b>Develop strategy</b>	To provide a short-, medium- and long-term view of underwriting strategy, taking into consideration that might change over time

Identifying liabilities' exposure to physical and transition risks and avenues for risk mitigation requires harnessing climate-science data and integrating that information into strategic planning.

Insurers will be able to apply their improved understanding of climate risk to underwriting as well as reserving and capital management, including for reinsurance and risk-transfer strategies. These processes will ultimately help insurers manage and mitigate climate risk and identify new business opportunities (see Figure 11).

While liabilities have a strong basis for understanding physical risk, asset modelling is currently behind. Investment decisions made on yield and maturity rarely take into account risk from natural perils. However, this can be done using similar methods as for the underwriting portfolio, and can be built on for transition risk scenarios. One point to consider then, is the correlation risk between the underwriting book and the investment book, which may have been flying under the radar. For example, an underwriting portfolio of coastal property in Texas would be exposed at the same time as investments in offshore energy in the Gulf of Texas – both would potentially be impacted by the same changes in hurricane intensity and frequency with flow on impacts to the balance sheet.

Understanding the dependencies will not only allow insurers to manage and mitigate the risk better but also help in identifying new opportunities.

“  
**Identifying liabilities' exposure to physical and transition risks and avenues for risk mitigation requires harnessing climate-science data and integrating that information into strategic planning.**”

Figure 11. A Willis Towers Watson model for developing climate strategy for insurance

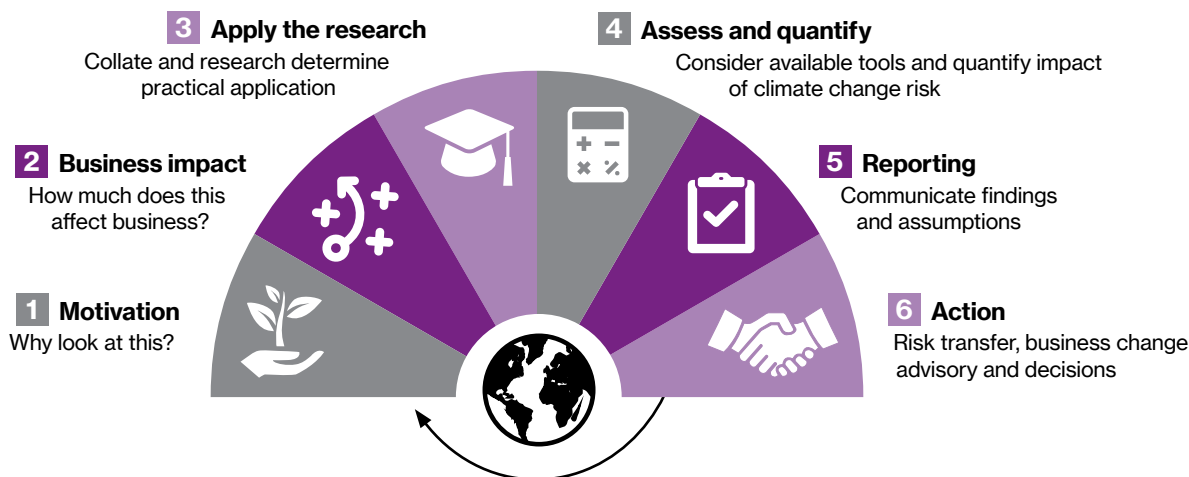
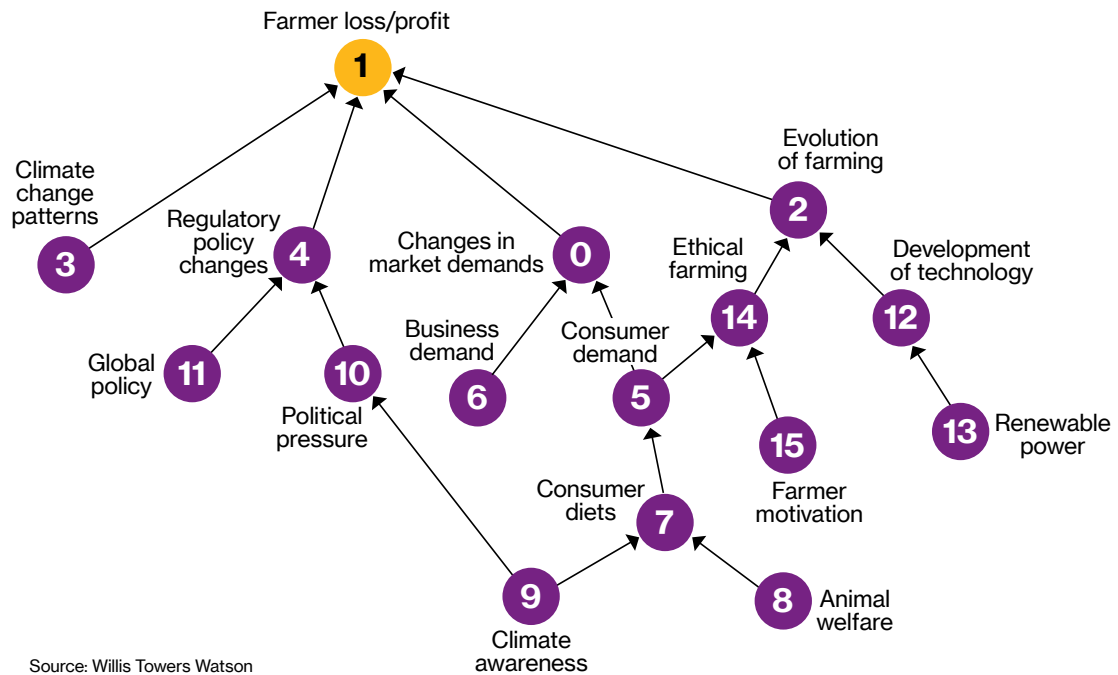


Figure 12. A method for identifying climate drivers and developing future strategy



The time horizons and flexibility required from insurers in dealing with longer-term, unpredictable climate-related risks, and the associated policy and regulation, are evolving rapidly. A distinct climate strategy for managing the liability side of insurers' balance sheets will help make sure insurers are prepared. A driver-based approach (see Figure 12) that aids visualisation to engage stakeholders, as well as forming a framework to measure risk, is often a good way to assess dependencies between risks and take a forward-looking view.

**Visualisation tool**  
For ESG and climate workshops

**Bayesian model**

**Risk management**  
A tool to build scenario analysis, carry out sensitivity and stress tests

**Underwriting strategy**  
Multifactor what-if scenarios to inform business planning







**While developing underwriting strategy, a stewardship programme rather than an exclusion policy can often be instrumental in a smooth transition to science-based targets.**

An example of such a solution is provided below.

## Case study: accreditation for low-carbon pathways

To transition in an effective and orderly way, carbon-heavy organisations will need continued access to insurance capacity and finance capital.

Climate Transition Pathways (CTP) aims to position insurance as a force for good to help accelerate the move to a low-carbon economy.



It enables insurers and financial institutions to easily identify and support organisations committed to executing robust transition plans, using a consistent approach. Willis Towers Watson has developed this solution, in conjunction with insurers, to create an industry standard.

The backbone of the CTP proposition is an independent accreditation framework that provides financial institutions assurance that the organisations they are supporting have robust transition plans aligned with the Paris Agreement.

[www.climatetransitionpathways.com](http://www.climatetransitionpathways.com)

Life and health insurers are certainly not exempt. Indeed, they may need to look further out at the chronic impacts of climate on mortality and morbidity to consider the impact of a changing climate on human health. Some effects may be relatively simple and easy to quantify, such as increased mortality from heatwaves, but others, particularly indirect impacts such as changes in migration patterns or food security, will need deeper insight.<sup>4</sup>

<sup>4</sup>[www.willistowerswatson.com/en-GB/Insights/2021/03/the-mortality-impacts-of-climate-change-chapter-2](http://www.willistowerswatson.com/en-GB/Insights/2021/03/the-mortality-impacts-of-climate-change-chapter-2)



## Step 5

# Develop a climate-aware strategic investment plan

Investment planning must also evolve to account for and capture the range of outcomes – positive and negative – related to the effects of climate change. Insurers needn't disregard the time-tested strategic asset allocation (SAA)

processes that have served them well; rather, they can make certain climate-specific modifications that supplement and enhance those approaches.

## At a glance: Pillars of a strategic asset allocation plan (SAA)

	<b>1</b> Establish objectives	<b>2</b> Determine investable universe	<b>3</b> Optimise allocations	<b>4</b> Consider implementation options
<b>Traditional SAA</b>	<ul style="list-style-type: none"> <li>Set return target</li> <li>Set risk target</li> <li>Know business implications:               <ul style="list-style-type: none"> <li>▪ Credit rating</li> <li>▪ Capital consumption</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Broad asset class inclusion</li> <li>Set capital market assumptions:               <ul style="list-style-type: none"> <li>▪ Grounded in history of asset classes</li> <li>▪ Proxied with traditional benchmarks</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Set constraints:               <ul style="list-style-type: none"> <li>▪ Liability relative</li> <li>▪ Regulatory driven</li> <li>▪ Over a given horizon</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Decide level of active vs. passive</li> <li>Choose internal or external management</li> <li>Determine how to benchmark performance</li> <li>Establish a review cycle</li> </ul>
<b>Climate-aware modifications</b>	<ul style="list-style-type: none"> <li>Establish climate-driven outcomes:               <ul style="list-style-type: none"> <li>▪ Climate footprint</li> <li>▪ Alignment with United Nations (UN) Sustainable Development Goals (SDGs)</li> <li>▪ Reduce climate risk exposure via scenario analysis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between assets with direct vs indirect climate exposure</li> <li>Test projected capital market outcomes with climate-based scenarios:               <ul style="list-style-type: none"> <li>▪ Lower expected returns, higher volatility</li> <li>▪ Greater emphasis on region/sector</li> <li>▪ Decreasing emerging market (EM) risk premia relative to developed markets (DM)</li> <li>▪ Increased emphasis on illiquid/private markets</li> </ul> </li> <li>Add green indices to supplement broad benchmarks</li> </ul>	<ul style="list-style-type: none"> <li>Understand climate-aware constraints:               <ul style="list-style-type: none"> <li>▪ Geographical diversification</li> <li>▪ Analyse exposure to physical perils</li> <li>▪ Embedded tilts to green assets</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Set engagement criteria for exposed sectors/industries</li> <li>Implement KPI reporting structure</li> <li>Create a return hurdle for climate exposed investments</li> </ul>

# Building a climate-aware SAA

## 1 Establish objectives

Climate-aware investment objectives including reducing a carbon footprint, building resilience against physical risks, and targeting opportunities should be explicitly included in the SAA process.

Status quo	Evolution to climate aware
<p>Investment planning has focused on the trade-offs between risk and return targets for an insurer.</p> <p>In recent years, enhancing SAA to include impacts on an insurer's credit rating, risk-based capital consumption, and return on surplus has made the process a central component to every insurer's enterprise risk management framework.</p>	<p>Setting targets for total climate footprint and progressing along a glidepath can help insurers stay on track.</p> <p>A plan can also leverage results of the climate scenario analysis to pinpoint ways to lower exposure to physical and transition risks.</p> <p>Finally, a climate-aware plan can include specific allocation frameworks, such as aligning with the UN SDGs, or impact investments.</p>

## 2 Determine investable asset universe

Risks and opportunities associated with climate change and the low-carbon transition will vary widely.

Status quo	Evolution to climate aware
<p>Insurers typically include broad asset classes, reflecting the current market opportunity set.</p> <p>Capital market assumptions are generated from traditional benchmark indices and grounded in historical asset-class performance, with an adjustment on forward-looking views.</p> <p>Segments within asset classes grouped by region or economic status (e.g. U.S. vs. international, developed vs. emerging markets).</p>	<p>Separate assets (within and across asset classes) with direct climate exposures, such as those with explicit geographical links or fixed locations, from assets with indirect climate exposures (See Step 3: Stress testing).</p> <p>Traditional broad-market indices can be supplemented with green/sustainable indices to reflect a portion of the market with direct risks.</p> <p>Testing capital market outcomes with climate-based scenarios can help to reflect projected risks and opportunities across asset classes:</p> <ol style="list-style-type: none"> <li>1 Expect a wider range of outcomes: lower expected returns and higher volatility in segments with high climate-risk exposure; potentially above-market returns in assets with less relative climate risk.</li> <li>2 Greater emphasis on country-, region-, and sector-level asset class exposure to isolate the biggest risks, decarbonise core allocations, and increase allocations to climate solutions.</li> <li>3 Expect emerging market risk premia to rise relative to developed markets, for example EMs that rely heavily on fossil fuels face near-term transition risk, while EMs near the equator will struggle with outsized impact of physical risks. We expect higher risk levels to drive EM equity and debt premia higher.</li> </ol>

## 3 Optimise allocations

Climate-aware constraints will need to become part of the optimisation exercise.

Status quo	Evolution to climate aware
<p>Traditionally, asset-class limitations, liability-relative constraints on duration and cash flows, regulatory driven limits, and a set time horizon informed insurers' optimisation efforts.</p>	<p>Climate factors will include liability-relative diversification across geographies and/or physical perils, a glidepath approach to climate footprint over time, and likely green tilts in asset classes where innovative, climate-ready solutions are likely to materialise. These may include private equity, real estate, and private credit, among others.</p>



#### 4 Consider implementation options

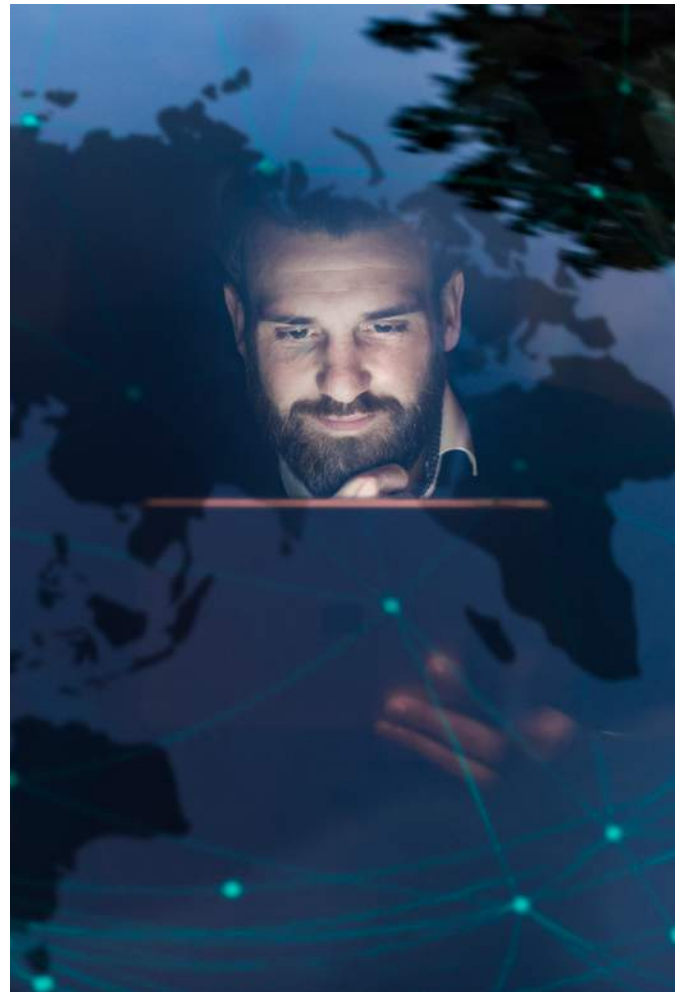
Determine language embedded in an investment policy statement, and manager guidance, that reflects climate-relative risk appetite.

Status quo	Evolution to climate aware
<p>Insurers currently decide whether to incorporate active or passive management for a given return stream. They may need to determine if a mandate will be handled in-house or if engagement with an external asset manager is required.</p> <p>This stage also includes the determination of how the SAA will be benchmarked, and which review cycle will be required for evaluating the success of the investment plan.</p> <p>Procedures are implemented to “cure” positions that do not meet set criteria (e.g. must sell a position that has a two rating downgrade).</p>	<p>Outline the process for managers to use engagement if select companies or industries are targeted for investments (e.g. do these companies have credible transition plans?)</p> <p>Work with investment managers to develop and track KPIs that can feed into management reporting and tracked alongside portfolio risk and return figures.</p> <p>Determine if the analysis dictates return hurdles that an insurer could use to take on additional climate risk.</p> <p>Establish exit price targets for assets deemed to be most at risk.</p>

### Monitor and adjust the plan periodically

Once their climate-aware SAA is in place, allocators should revisit its progress on an annual basis, or as frequently as needed.

- Establish a regular cadence for senior management review.
- Update scenarios to reflect the latest available science.
- Look to enhance scenarios by increasing the range of outcomes.
- Expand scope of asset classes considered, and underlying detail:
  - Reflect supply chain disruption;
  - Operating expense variability;
  - Demographic shifts.



## Step 6

# Joining the dots: holistic asset and liability management

So far, for reasons of simplicity, the sections of this paper have largely segmented the impacts and implications of climate change effects on insurers' assets and liabilities.

But, as we said in the introduction, the systemic and long-tailed nature of climate-related physical, transition and liability risks make a compelling and indisputable case for addressing those enterprise-level effects holistically and with a common approach to quantification and analysis.

For some insurers, this will require adjustments to the tendency to manage assets and liabilities in siloes.

On the life side, for example, we have laid out reasons why and how climate change could affect mortality and morbidity. Asset strategy should take into consideration any changes in claims pattern and duration.

Similarly, climate risks will change the nature of many P&C insurance liabilities, making them potentially more drawn out and requiring different asset matching strategies.

Susceptible classes of business are likely to include the Casualty lines, where it's quite possible that claims, driven by climate change, could emerge many years down the road. Mounting expectations of organisations in relation to climate stewardship, greater consumer advocacy and activism, and changing legal and regulatory frameworks can also have an impact on the liability lines of business.



**Cohesive, integrated assets and liabilities strategies, with consistent oversight, will be the way forward.**

If companies take decisions to change the type of risks they write due to climate change, the assets backing that capital commitment should be simultaneously reviewed.





Key steps to achieving better alignment between assets and liabilities, and reducing potential balance sheet volatility, are shown in *Figure 13*.

That said, there's one essential aspect of insurers' management of climate risks and opportunities that we haven't discussed in any great detail so far – the people dimension. The final section of the paper looks at how insurers should take their people with them on their climate journey.

Figure 13. **Key steps to achieving better alignment between assets and liabilities**

<b>Set up a risk monitoring framework</b>	Understand the physical climate and transition risks affecting your entire balance sheet. This framework should assist in identifying risk across assets and liabilities and help develop a strategy to manage and mitigate the risk.
<b>Develop overarching responsible insurance and investment principles</b>	Based on the risks identified and the principles followed in different parts of the business, develop overarching ESG principles for the organisation and assess its impact on the business.
<b>Create a picture of risk development</b>	Make consistent use of analytics tools and data sources available and integrate climate scenario development into analysis.
<b>Understand holistic climate exposure</b>	Stress test assets and liabilities based on analysis of physical, transition and liability risk exposures.
<b>Evolve underwriting and risk management approaches</b>	Build mid- to long-term views of how the business can adapt to climate-related uncertainties in portfolio and operational management. This may involve underwriting and investment working hand in hand with mitigation activities.
<b>Develop a climate-aware strategic business plan</b>	Bring a sustainability mindset to how the business generates investment returns, including the increased roles for governance and stewardship.





## Step 7

### Bring your people with you

By now, it should be clear that climate risk is an enterprise risk for insurers and reinsurers. To make a lasting difference, addressing climate risk will require an enterprise-wide approach.

An approach, yes, that better identifies and quantifies physical, transition and legal risks and that brings a holistic climate lens to liability and asset management, but one also where people are the advocates and enablers of the strategy. Climate is no different from any other driver of significant organisational change – insurers have to bring their people with them.

And whilst that means communicating and engaging with employees about new climate policies, practices and targets, it also means driving behaviour change. The kind of change where factoring climate risks and opportunities into decision making and operations becomes second nature to the organisation and those working in it.

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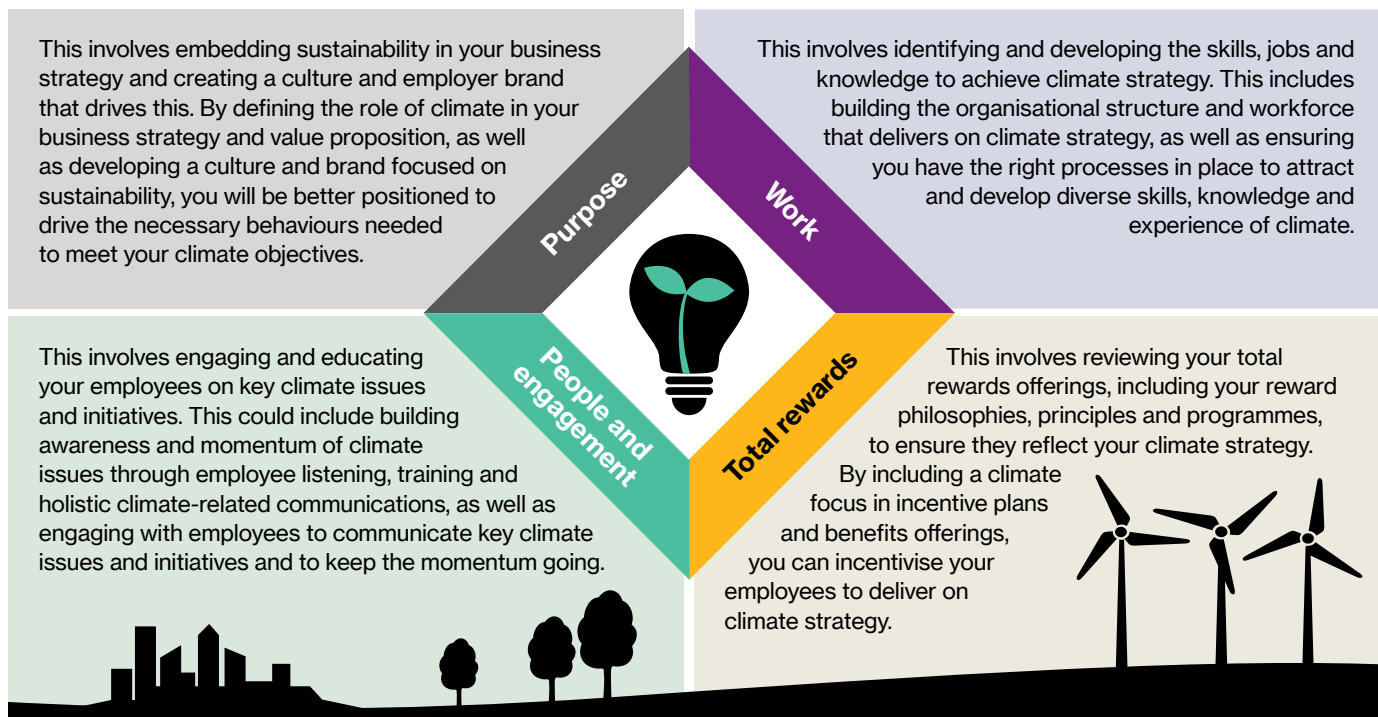
**Climate is no different from any other driver of significant organisational change – insurers have to bring their people with them.”**



# Multiple dimensions of people-focused climate action

A useful model and launch point for the people-focused plans and actions needed to embed such change will have four dimensions – **Purpose; Work; Total rewards; and People and engagement.**

The longer-term considerations for the four dimensions will revolve around questions such as “what does good look like?” and “what will work for the organisation?”.



## ◆ Purpose

Organisations that effectively define a climate purpose tend to have a clear understanding of the role of climate in their business strategy along with the cultural and behavioural changes required to achieve it. They embed sustainability into the core values of the organisation, with top-down role modelling from senior leaders and mechanisms for soliciting employee feedback. Effective two-way communications should clarify how an organisation's climate strategy plays out in day-to-day work roles and behaviours.

## ◆ Work

A clear climate purpose and strategy is all very well but insurers must have the organisational structure, supplier network and skills to deliver them. More broadly, companies making progress on the work dimension are getting into identifying skills gaps and plugging them with training and recruitment as well as defining clear accountabilities and decisions rights for different roles, green champions or working groups. They are also thinking about the role and impact of the supply chain.

Without defining how an organisation can successfully function with an integrated climate purpose and action plan, a company may struggle to make headway.

## ◆ Total rewards

It's early days for companies using their total rewards offerings to achieve their climate objectives – but momentum is building.

Company leaders should review reward philosophies, principles and programmes to ensure they reflect the value of climate in strategic planning. Furthermore, it is important that employees perceive senior executives as having 'skin in the game'.

## ◆ People and engagement

Companies leading on climate awareness are discovering the crux of educating and engaging employees on climate is making sure they feel heard and involved – not merely informed. Listening strategies to understand which environmental issues are important to employees are taking on greater significance as a company's 'green' credentials become central to its brand perceptions and ability to attract and retain talent.

## No time for tinkering

Companies often overlook or pay lip service to the importance of people in change management programmes. And, be in no doubt, addressing climate risk and improving resilience is a transformational change that goes to the heart of insurers' people policies and practices in addition to how they manage risks and capital. As regulators, investors and employees increasingly demand proof of companies' long-term climate-resiliency plans, people are the key to building them.

This is no time for tinkering around the edges of climate's impact and influence on business culture, roles, engagement and rewards when the need to establish a longer-term, sustainable strength of climate purpose is at stake.



**“...be in no doubt, addressing climate risk and improving resilience is a transformational change that goes to the heart of insurers' people policies and practices in addition to how they manage risks and capital.”**

## Getting started

**Managing change will certainly be a familiar concept to insurance industry executives, but the key question in this context is: “Which actions will help us take our people on our climate journey?”**

For those not sure where to start, some key short-term priorities (and potential quick wins) should provide the initial impetus. Steps to consider might include:

### A current-state audit

Auditing existing environmental policies and practices across the business. This would allow an insurer to understand its existing policies and practices, including the key gaps in people policies in relation to climate goals, as well as identify and gather key stakeholders to form part of overarching environmental governance.



### Employee listening

Employee listening techniques could be used to test employee awareness of the organisation's environment strategy, to understand employee attitudes and sentiments on pro-environment initiatives, and to understand where employees view the organisation's gaps in order to inform roadmap development. These could be in the form of virtual focus groups, surveys, manager listening or through a holistic listening strategy that incorporates a variety of these techniques. The listening questions asked would be informed by the outcomes of the current state audit or could be used as an input to the current state audit.



### Incentive plans

To help communicate a powerful message to both internal and external communities, indicating company commitment to climate goals, organisations should consider aligning their executive incentive plans to the company's environmental priorities. Tying incentive rewards to the achievement of environmental metrics would not only incentivise executives to reach company climate objectives but would also role model positive behaviours across the organisation and incentivise employees to change their own behaviour. For some organisations, tying executive pay to the fulfilment of environmental goals is a regulatory requirement.



### Regulatory communications

As more governments and regulatory bodies move towards mandatory climate disclosures, organisations need to understand the process involved in complying with these disclosures. Communicating how the business can support the climate change agenda offers insurers the opportunity to convey confidence to not only investors, but also to employees and other stakeholders as part of building a market-leading brand image around climate.







## Next steps:

# Some questions to think about in relation to climate risk

- 1. Accountability:** Who is responsible for assessing and managing climate-related risks? Does the board have explicit oversight?
- 2. Climate scenarios:** How will you use and adapt climate scenarios for your business? Are you able to apply climate stress testing to your capital requirements and asset strategies?
- 3. Disclosure:** Have you thought through the approach to climate risk disclosure, beyond what mounting regulatory impetus may imply? Have you, for example, adopted the recommendations of the TCFD, including the guidance to report on assumptions used in conducting scenario analysis?
- 4. Decarbonisation:** What are you doing to mitigate your emissions? Are there any reduction targets and if so, how do you evaluate year-over-year performance against those targets?
- 5. Transition-risk management:** Do you have a quantification mechanism (e.g. an internal price on carbon or Climate Value at Risk) for capital allocation decisions? If so, what is it and how does it inform decisions?
- 6. Underwriting strategy:** How will your underwriting strategy need to adapt for physical, transition and liability risks?
- 7. Physical risk management:** Are you aware of your physical risk exposures?
- 8. Opportunities:** What products or services do you offer or could you offer that will benefit from the transition to a low-carbon, climate-resilient economy and related consumer trends?
- 9. Stewardship:** How can you assist your clients through climate transition and how can you influence the pace and nature of transition through your investment activities?
- 10. Culture:** Are your people and business culture in step with the changes that adapting to and mitigating climate risk will bring about?
- 11. Customers:** Do you have a marketing, public relations or other outreach plan in place to build your climate brand and engage with customers to align these critical stakeholders with your mission?



For more information, please contact:

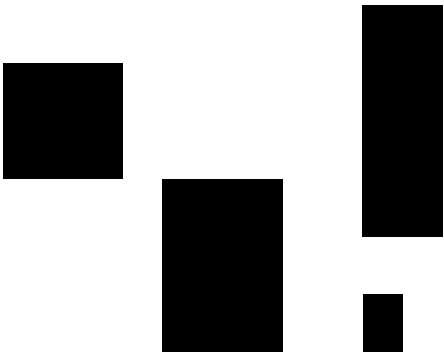
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WTW-HP-2021-0520

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