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GIRO50 Conference 2023

1-3 November, EICC Edinburgh





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The Journey Ahead

Update from the Climate Change
Reserving Working Party

James Orr, Alex Marcuson and
Josie Durley



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In preparing this paper, members of the working party have reviewed an extensive volume of underlying legal and other documents and research papers in order to summarise in a generic fashion what they believe to be the key points to bring to the attention of reserving actuaries. The working party emphasises that this is not a legal or scientific analysis of the arguments, and no conclusions should be drawn from this paper regarding the merits or otherwise of the legal, scientific and moral arguments presented. The paper is intended to provide an overview of the materials reviewed and of areas which, in the opinion of the working party, may be of interest to actuaries. It should be noted however that the topics presented reflect only a small number of the areas which could have been considered in relation to this topic.

While care has been taken to present the information accurately and as understood by members of the working party at the time of preparing this paper, no duty of care is accepted by the authors, nor is any liability for any errors or omissions contained within it. Any party choosing to place reliance on the information contained within this paper does so at their own risk. Readers should therefore ensure that (i) they should obtain their own legal or other professional advice regarding matters presented in this paper, including, but not limited to, specific questions relating to the legal and regulatory cases presented and their impact on the insurance lines of business discussed; (ii) they are aware of subsequent updates that may affect their interpretation of the matters presented in this paper. While care has been taken to present the information as understood at the time of preparing this paper, recent and future developments may affect the interpretation of the matters presented, potentially materially.



Agenda

- Recap on Working Party Journey
- Setting the Scene
- Practical tools for Reserving Actuaries – 2023 Edition
- The Journey Ahead





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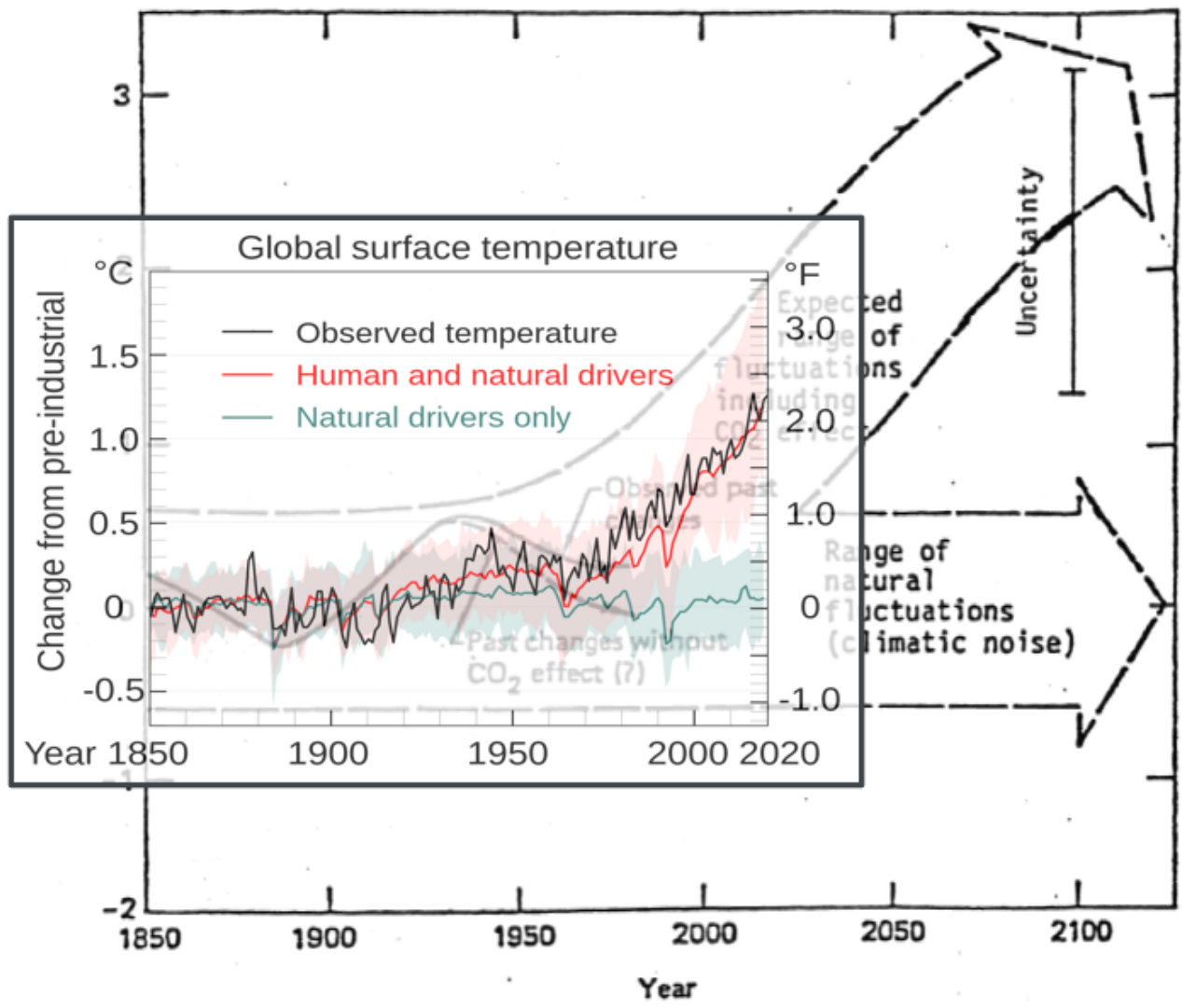
Recap on the Working Party Journey



Previously...



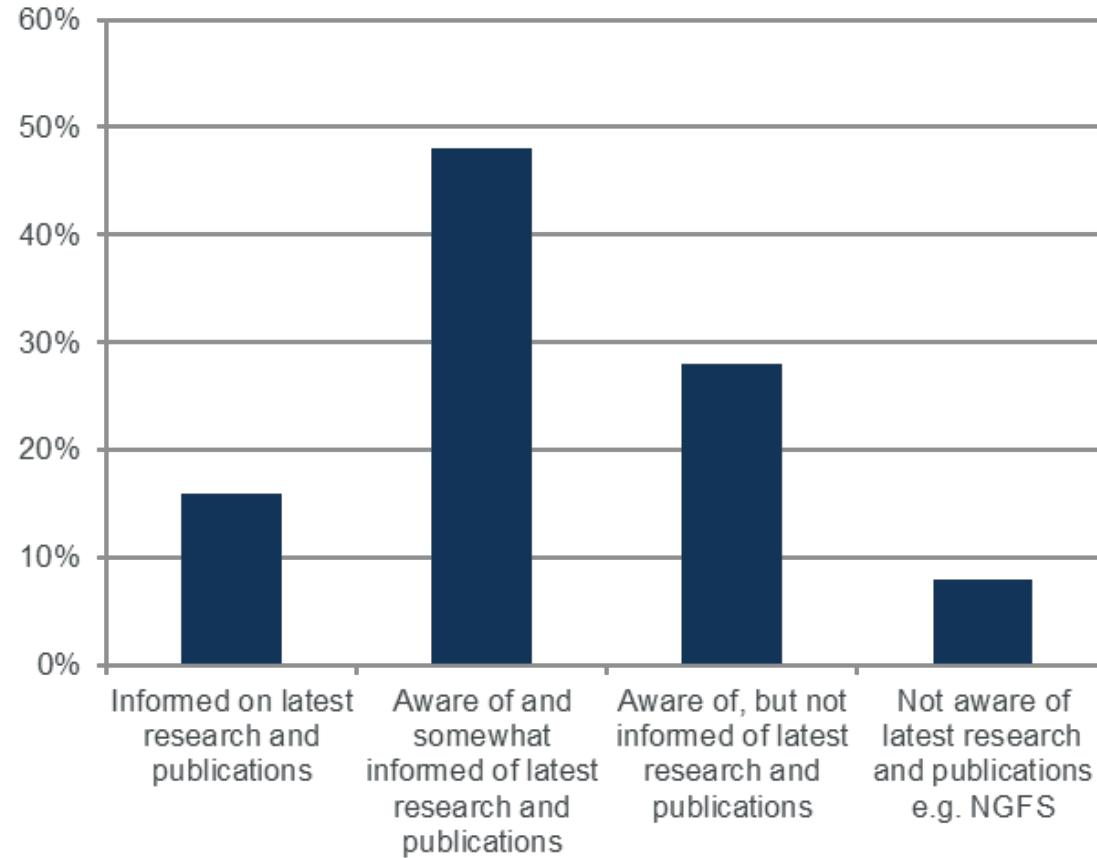
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Source: Exxon CO₂ primer (1982)



How would you evaluate your current understanding of climate issues?



Source: Climate Change Reserving Working Party “Boiling the Ocean?” GIRO2022



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Global trends in climate change litigation: 2022 snapshot

Joana Setzer and Catherine Higham

Policy report
June 2022

LSE Research Centre for Climate Change and the Environment

U.S. Climate Change Litigation

A collaboration of:

COLUMBIA LAW SCHOOL
Sabin Center for Climate Change Law

Arnold & Porter

Cases in the U.S. database are organized by type of claim and may be [filtered](#) by the principal laws they address, their filing years, and their jurisdictions. The database is also [searchable](#) by keyword. In many cases, the database includes links to the cases themselves.

Global Climate Change Litigation

The Global Climate Change Litigation Database includes all cases except those in the U.S.

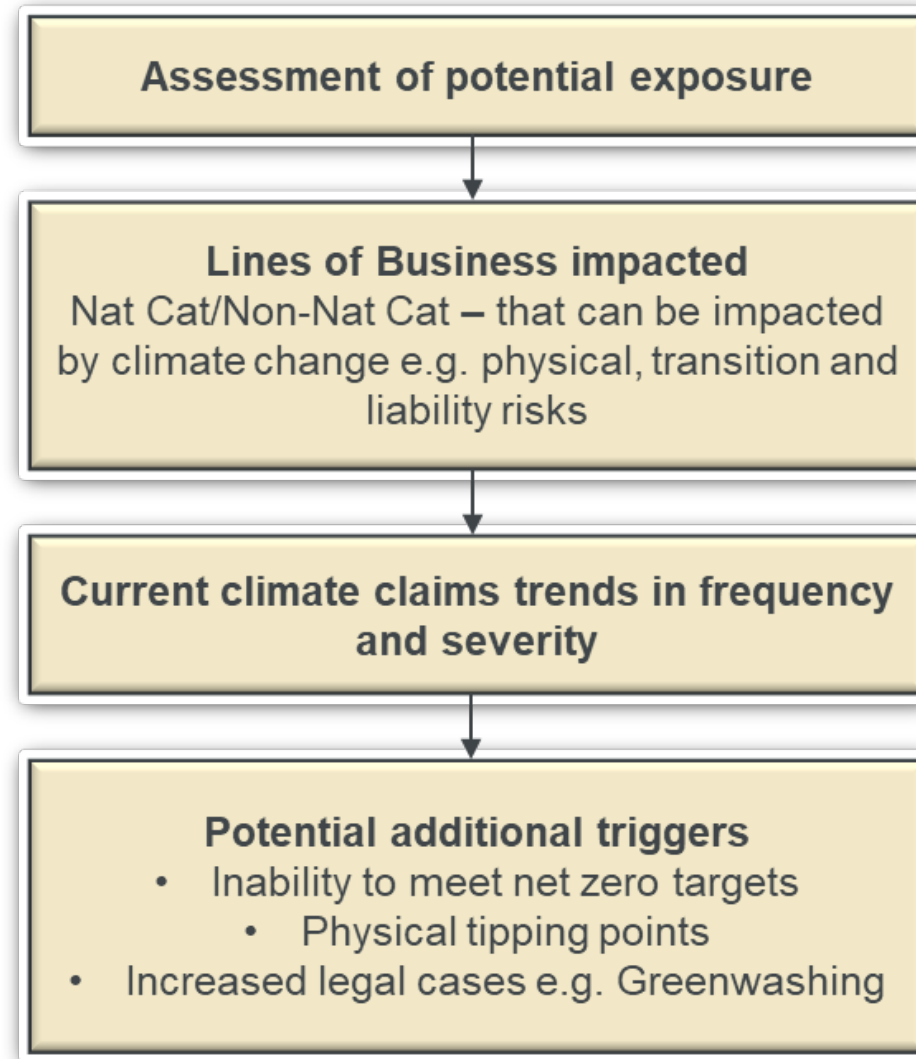
You may also browse [by Jurisdiction](#) or [by Principal Law](#).

Category	Number of Cases
SUITS AGAINST GOVERNMENTS	
Just transition	21 Cases
Energy and power	31 Cases
Trade and Investment	28 Cases
GHG emissions reduction and trading	190 Cases
Access to information	177 Cases
Environmental assessment and permitting	224 Cases
Human Rights	113 Cases
Failure to adapt	11 Cases
Protecting biodiversity and ecosystems	220 Cases
Public Assembly	33 Cases
Public Trust	21 Cases
SUITS AGAINST CORPORATIONS, INDIVIDUALS	
Corporations	100 Cases
Protesters	14 Cases
Others	31 Cases
Other Statutes and Regulations	181 Cases
Other Institutional Claims	11 Cases
Utility Regulation	30 Cases

Economics and Policy

Source: Sabin Center for Climate Change Law / LSE Global trends in climate change litigation: 2022 snapshot





Source: Climate Change Reserving Working Party “Boiling the Ocean?” GIRO2022



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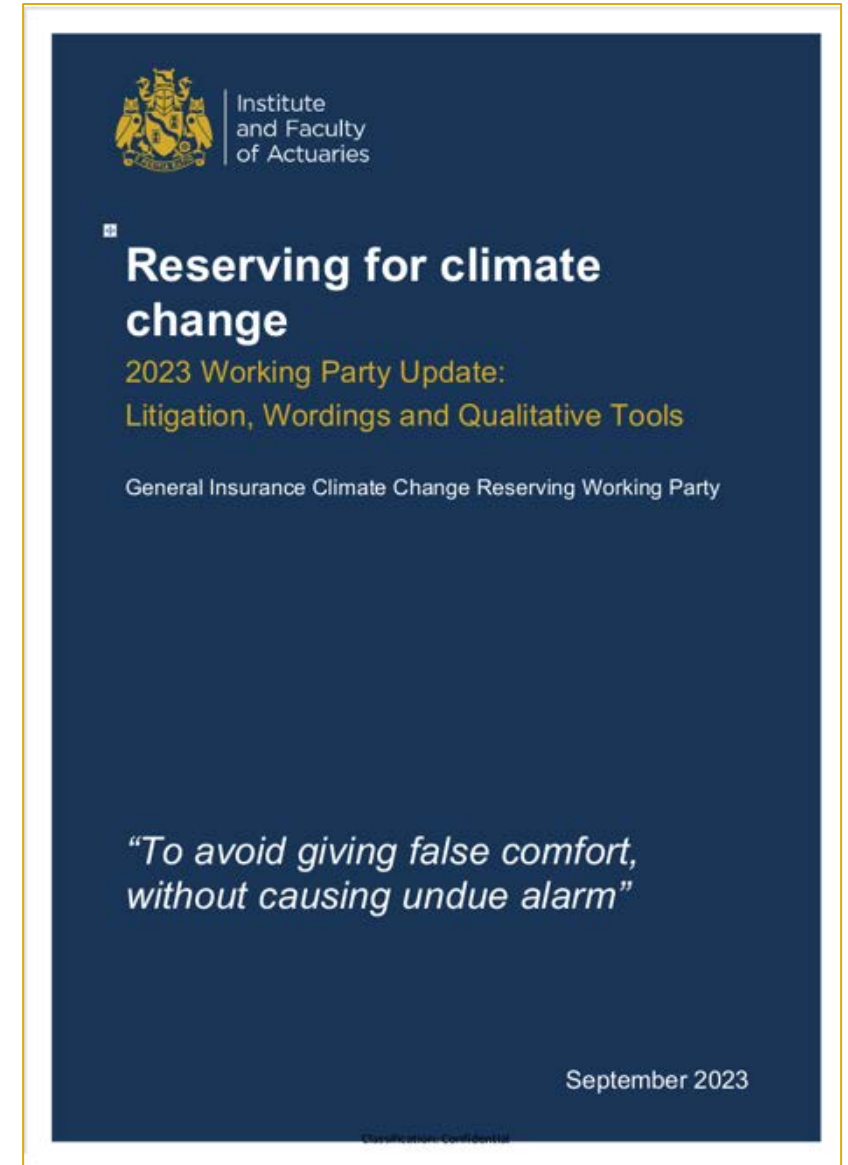
Working Party Paper – 2023

Contents

1. Overview of this Paper
2. Climate Change Litigation Case Studies
3. Communicating Climate Change Reserving Uncertainty
4. Assessing Climate Change Uncertainty using Qualitative Methods
5. Conclusion

Find the paper here:

<https://vle.actuaries.org.uk/course/view.php?id=1684>



Thank you to the rest of the working party!

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Yurie Budhi

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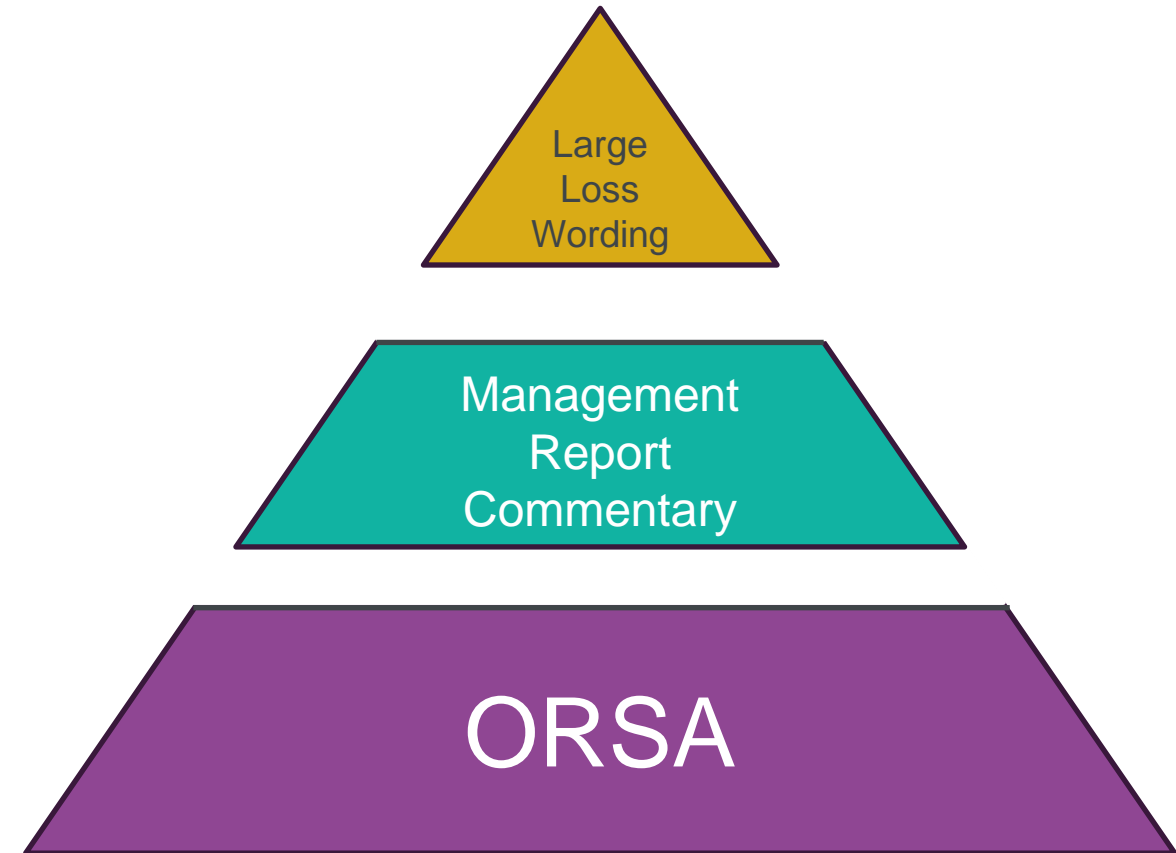
Recruiting soon for 2024



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Communicating Climate Uncertainty in Reserves

- Many layers to communicating uncertainty in reserves.
- A significant section of our paper is devoted to this; particular focus on Lloyd's SAO large loss wordings.
- We see 2024 year-end as the likely earliest point at which requirements may change.
- Increasing attention in ORSA and reserving reports/board papers is now appropriate.





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Setting the scene



Managing Uncertainty with Professionalism

Recommended Reading

GIRO working party (2014 – 2019)

Final paper presented at sessional meeting in
February 2019

Framework to make sense of and to manage
uncertainty



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Managing Uncertainty

Principles for improved decision making

by Members of the IFoA Working Party

Face up to uncertainty

Deconstruct the problem

Don't be fooled (un/intentional biases)

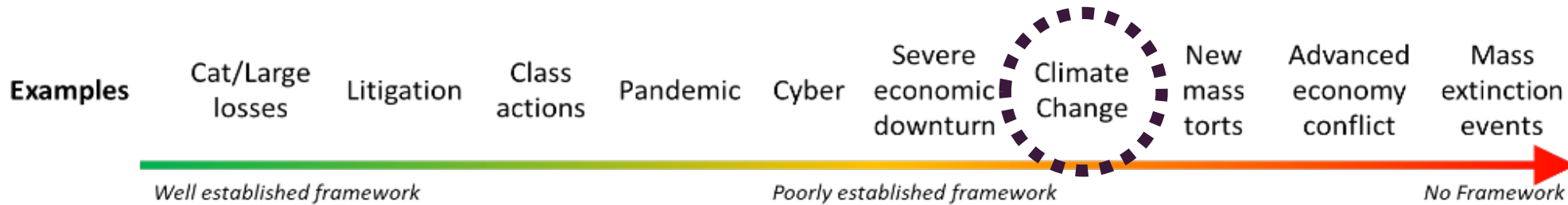
Models can be helpful, but also dangerous

Think about adaptability and resilience

Bring people with you

February 2019

The wider landscape



Climate change [+ Add to myFT](#)

Lloyd's of London warns insurers climate-related pain is still to come

Executive at the insurance market has called for 'urgent' investment in risk modelling



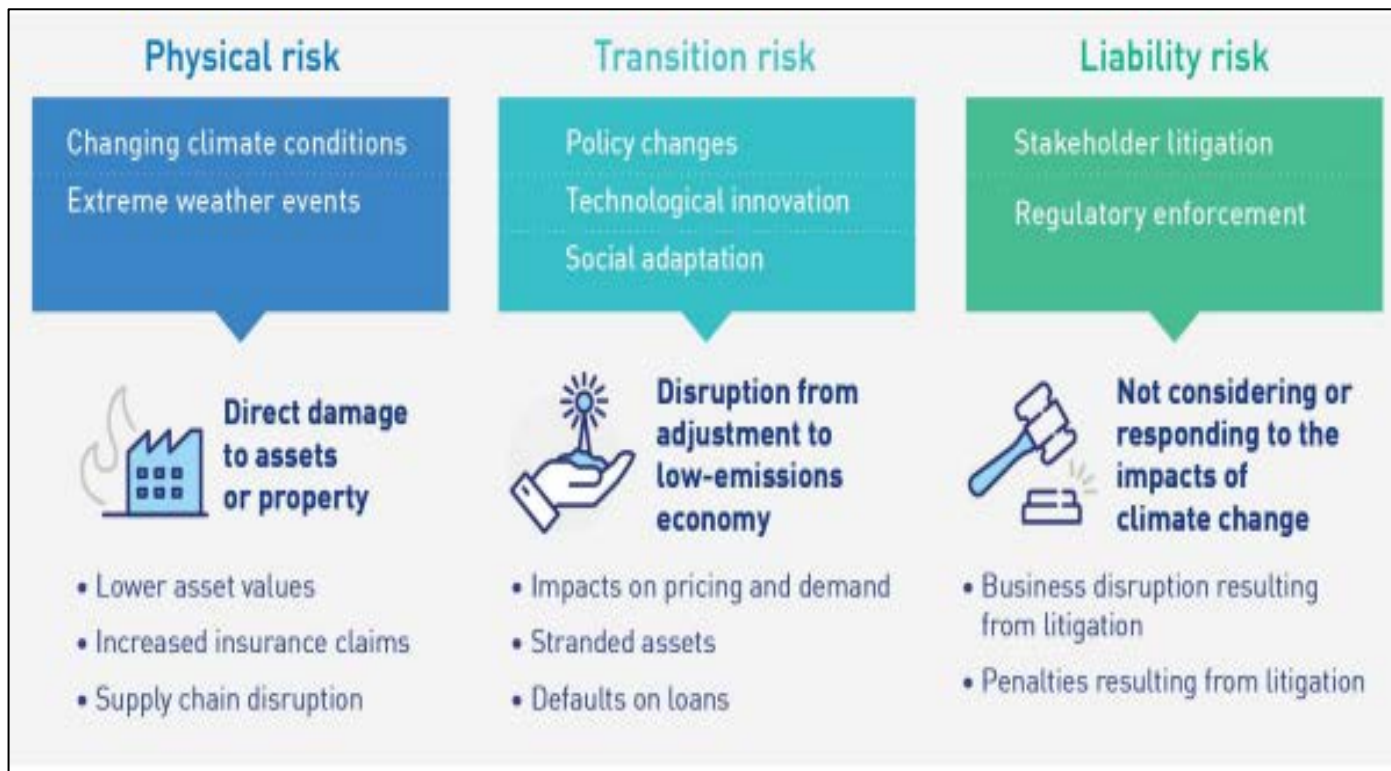
Lloyd's is one of the global hubs for property catastrophe reinsurance © REUTERS

Climate change:

- is systemic
- is evolving along a long timeline of impacts.
- is both a causal event and amplifier of events...
- “attribution” is an emerging science.



Setting the context and motivation: Climate Risk Taxonomy and Reserving



Source: Australian Prudential Regulatory Authority Prudential Practice Guide CPG Climate Change Financial Risks November 2021.

Climate change is a new and different risk:

- We have existing frameworks for “Events”
 - but “Climate Weirding” is emerging
 - ...and likely to increase over time...
 - it is a cause of events, but also an amplifier of events...and their costs
- New technologies → new markets/losses
 - new legal arguments → unresolved legal arguments
 - ...new frameworks needed

How should an actuary communicate reserve uncertainty in relation to climate change?



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New TAS 100 requires an Active Response

- TAS 100 Version 2.0:

- Applies to technical actuarial work completed on or after 1 July 2023

- Principle 1 Risk identification:

“Practitioners carrying out technical actuarial work must identify and consider all relevant material factors and relevant material risks that may affect or have the potential to influence their technical actuarial work and which the practitioner might reasonably be expected to know about at the time of carrying out the work.”

- Application Section:

“External factors may, for example, include climate change, technological, economic, political and geopolitical, regulatory and legislative changes.”

A “Wait and See” approach may no longer be adequate



Some historical context for reserving

S&P Report Blasts Actuaries

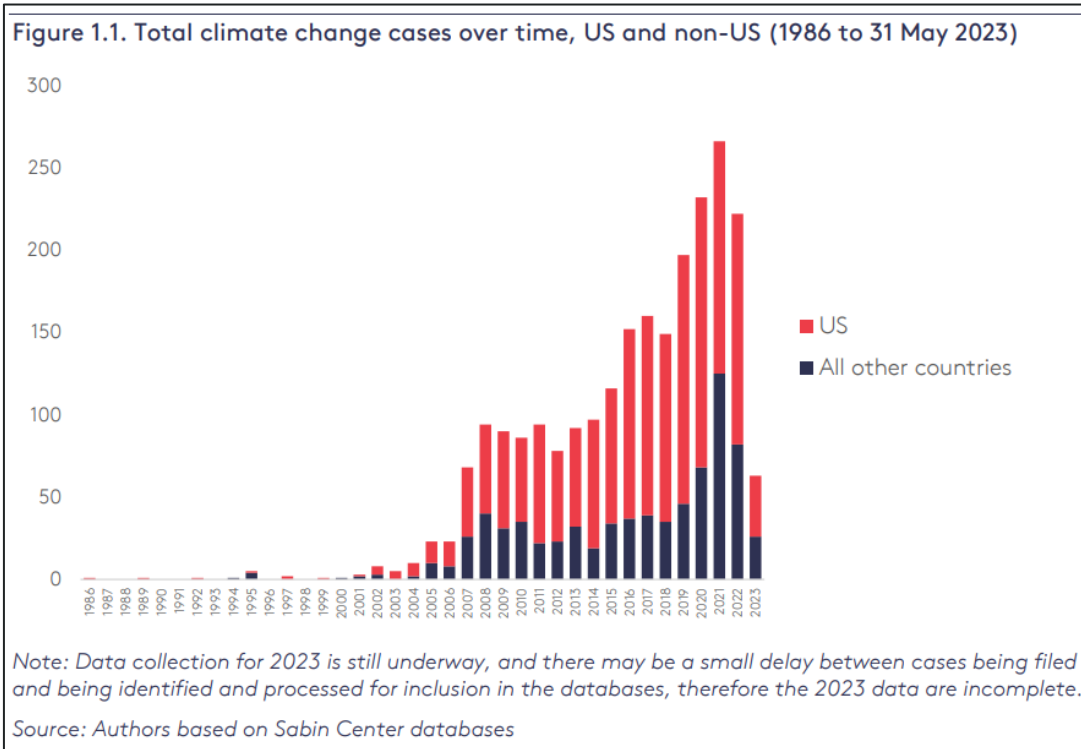
“Actuaries are signing off on reserves that turn out to be wildly inaccurate... It’s an abysmal track record.”

Steve Dreyer, analyst in S&P’s insurance ratings division. Nov. 2002



The climate litigation problem(s)

Understanding climate change exposure is difficult and still rather uncertain since many of the risks are only just starting to appear.



Sources: [Global trends in climate change litigation 2023 snapshot.pdf \(lse.ac.uk\)](#)

Definition unclear on what constitutes a Climate Change loss

Limited information currently available on Climate Change losses



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Example: The City and County of Honolulu sued Sunoco LP, et al

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Attorneys for Plaintiff CITY AND
COUNTY OF HONOLULU

IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAII

CITY AND COUNTY OF HONOLULU	CIVIL NO.
Plaintiff,	(Other Non-Vehicle Tort)
vs.	COMPLAINT
SUNOCO LP; ALOHA PETROLEUM, LTD.; ALOHA PETROLEUM LLC; EXXON MOBIL CORP.; EXXONMOBIL OIL CORPORATION; ROYAL DUTCH SHELL PLC; SHELL OIL COMPANY; SHELL OIL PRODUCTS COMPANY LLC; CHEVRON CORP.; CHEVRON USA INC.; BHP GROUP LIMITED; BHP GROUP PLC; BHP	Trial Date: None.

“Defendants, major corporate members of the fossil fuel industry, have known for nearly half a century that unrestricted production and use of their fossil fuel products create greenhouse gas pollution that warms the planet and changes our climate.”

Complaint filed in March 2020

V. FACTUAL BACKGROUND	31
A. Climate Disruption—Cause and Effects.....	31
B. Attribution.....	34
C. Defendants Went to Great Lengths to Understand, and Either Knew or Should Have Known About the Dangers Associated with Their Fossil Fuel Products.	35
D. Defendants Did Not Disclose Known Harms Associated with the Extraction, Promotion, and Consumption of Their Fossil Fuel Products, and Instead Affirmatively Acted to Obscure Those Harms and Engaged in a Concerted Campaign to Evade Regulation.	59
E. In Contrast to Their Public Statements, Defendants’ Internal Actions Demonstrate Their Awareness of and Intent to Profit from the Unabated Use of Fossil Fuel Products.	75
F. Defendants’ Actions Have Exacerbated the Costs of Adapting to and Mitigating the Adverse Impacts of the Climate Crisis.....	78
G. Defendants Continue to Mislead About the Impact of Their Fossil Fuel Products on Climate Change Through Greenwashing Campaigns and Other Misleading Advertisements.	85
H. Defendants Caused the City’s Injuries.....	88



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Source: [20200309_docket-1CCV-20-0000380_complaint.pdf](#) (climatecasechart.com)

Honolulu: Impacted by and Vulnerable to Sea Level Rise

“Over five miles of beaches in the City have already been lost due to sea level rise.”



Figure 10: Destruction of Public Facilities, Maunalahilahi Beach Park, 2018

Source: [20200309_docket-1CCV-20-0000380_complaint.pdf](#) (climatecasechart.com)

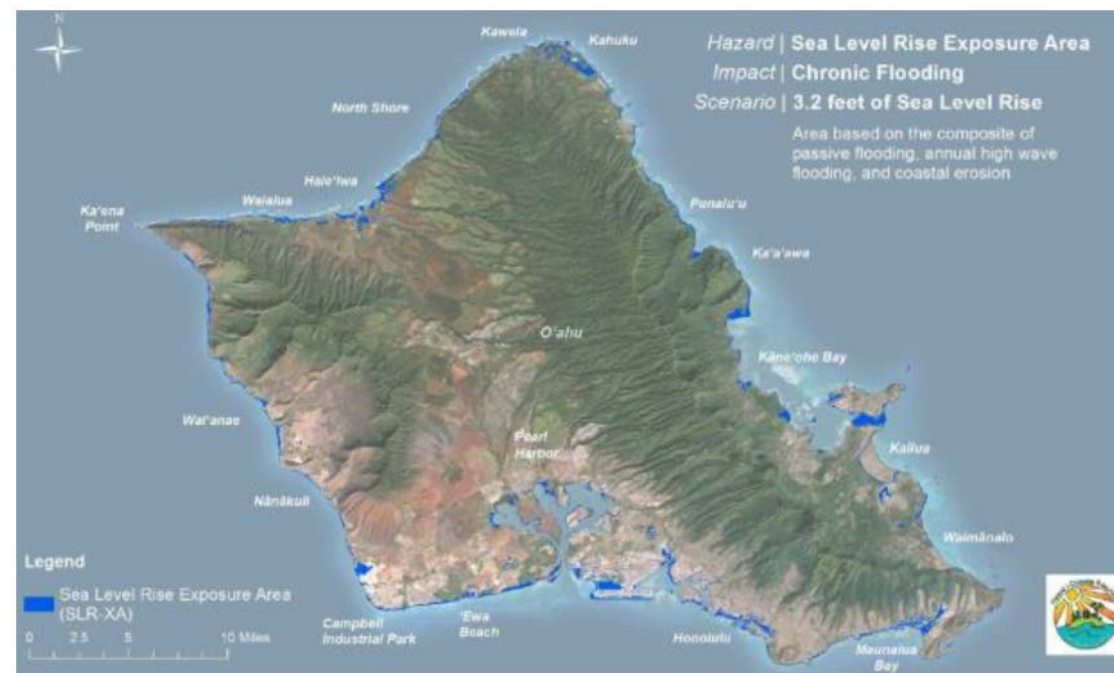


Figure 7: The City's Sea Level Rise Exposure Area

“With 3.2 feet of sea level rise, more than 18 miles of coastal roads on O‘ahu will be impassible [sic].”



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Honolulu: Vulnerable to Rainbombs and Sunny Day Flooding

“...section of the Hahaione Channel...destroyed during a massive rain bomb in April 2018.”



Figure 8: Destruction of the Hahaione Channel After Rainbomb Event, 2018



Figure 11: Sunny Day Flooding in Mapunapuna, July 2019

“...sunny-day flooding associated with higher tides, have rendered City roads impassable.”

Source: [20200309_docket-1CCV-20-0000380_complaint.pdf](#) (climatecasechart.com)

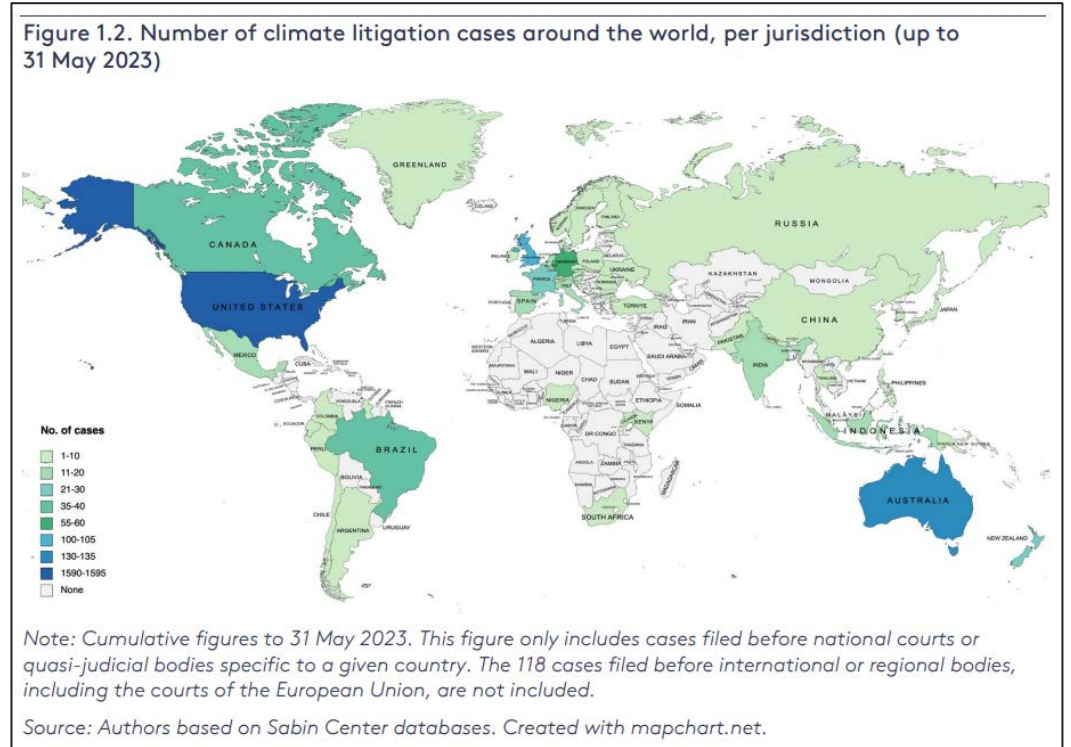


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Litigation landscape is complex and evolving

Types of claims include:

- Framework cases
- Direct tort/compensation claims
- Strategic cases
- “Counter claims”
- “Silent climate” claims



Attribution science playing an increasing role in cases.

Source: [Global trends in climate change litigation 2023 snapshot.pdf \(lse.ac.uk\)](#)



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Practical tools for Reserving Actuaries

2023 Edition



Have conversations and set up working groups

- Conversations with internal and external stakeholders
 - Can be initiated using some of the questions outlined in the paper to help understand internal perspective
 - Similar conversations with auditors, regulators, industry bodies and third-party consultants
- Consider setting up or joining working groups in your firm through which you can share knowledge and ideas



Talking to underwriting and claims experts

Underwriting

- How have policy wordings changed to cater for climate change?
- Have exclusionary wordings been used? Which? From when?
- Do we track explicit write-ins?
- What aggregate modelling do we perform?
- What modelling tools are we relying upon?

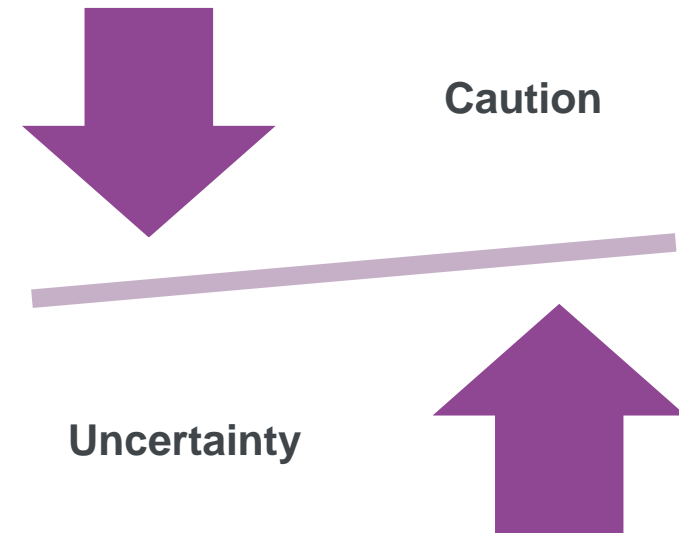
Claims

- What claim watch-lists are currently maintained?
- Are any climate change flags used?
- Are there any emerging claim types?
- What are the main legal defences?



Consider Biases

- Internal and external stakeholders will have a range of biases:
 - Political views.
 - Attitude to climate change.
 - Bonus.
 - Seeking a quiet life.
- These may influence you to:
 - Alter the allowance you make in your reserves.
 - Moderate how you describe the uncertainty.



Using heatmaps to analyse exposures

Paper includes example heatmaps:

- Property
- D&O

Customise to your own portfolio by considering how the different climate risks affect different policy triggers.

Mirror approach for other classes of business...

...with care.

D&O Triggers	Climate Risk Taxonomy			
	Transition Risks - Transitioning to a low carbon or "Green" economy			Physical risks - Damage to assets/indirect impacts to supply chains etc.
	GHG Emissions Related	Change in consumer and investment sentiment	Policy/Legal changes (e.g. not meeting net zero targets)	Acute - Events and Chronic - Long-Term Changes
A: Climate Attribution for Past Emitters / Climate Inaction	Stakeholder action against companies that have been responsible for emitting GHG emissions including new developments in attribution science, where the relationship between emissions and climate change impacts is quantified		There may be legislation that comes in that makes companies pay for the damage that climate change has caused.	
B: Failure to adapt - Continued inaction/denial/investing in causes of climate change	Climate inaction by continuing BAU without changing stage e.g. continuing to invest in fossil fuels with no transition plan in place i.e. not reducing carbon footprint	Claims against companies for not sufficiently addressing consumer/investor needs to reduce their carbon footprint	Claims against companies whose targets are not aligned with net zero and are not aggressive enough	Trend - Sewage and Water companies being sued as heavy rainfall is going into storm drains and causing flooding.
C: Failure to comply with regulations / Breach of Duty	Failing to comply with the emissions laws prevailing in respective jurisdiction	Companies investing heavily in "green" ways of doing business at the cost of profits and so failing their fiduciary duty to make shareholders money	Litigation against companies for anti-competition where they are working with competitors towards net-zero	Claims against companies for causing a major natural disaster such as a wildfire not complying the regulations
D: Misrepresentation in reporting disclosures of "green" credentials or climate risks	Failure to disclose climate change risks, misrepresenting its business practices related to use of proxy costs of carbon.	Claims against companies for overstating their green credentials to meet stakeholder expectations	Failure to report climate related risks	
E: Misleading advertisement / Greenwashing	Where firms cynically divert public attention away from say a polluting activity.	Companies advertising better green credentials than they have as society is more climate conscious.		

		Property damage/ Business interruption	Contingent business interruption
Physical risk - Acute	Flood	Increase in property damage and business interruption due to widespread flood events caused by e.g. rising sea levels. More severe flooding covering more territories, as observed for example in Europe in 2021, leading to significant claim costs for insurers (damage and loss of assets that then lead to service disruption).	A major natural catastrophe can lead to global supply chain impacts that can lead to e.g. delay in support of goods and services (example Thailand Floods (2011)). Power outage and damage to transportation infrastructure due to a wide-scale flood occurring. Coastal flooding due to rising sea levels can lead to significant supply chain disruptions.
	Windstorm	Increase in windstorm damage due to climate change resulting in buildings needing to be repaired more frequently. Hurricane seasons become longer and more intense. Storm Ciara (2000) and Storm Dennis (2020) have hit the UK and Europe in recent years.	A major natural catastrophe can lead to global supply chain impacts that can lead to e.g. delay in supply of goods and services. Power outage and damage to transportation infrastructure due to a wide-scale windstorm occurring.
	Wildfire	Increased frequency and severity of wildfire events leading to property damage. Due to changing climate patterns, wildfires are happening more often and for longer (exacerbated by longer and hotter days). New territories are also being exposed to wildfires (e.g. UK and Europe). This can be exacerbated by inability to increase loss prevention e.g. number of firefighters.	Wildfires can lead to communications, power, water support and gas service disruption.
Physical risk - Chronic	Drought/ Extreme heat	Extreme heat can lead to increased frequency and severity of damage to crops.	Extreme heat can lead to operational disruptions such as power outages and interruptions in the supply chain.
	Subsidence	Hotter and drier summers being driven by global warming are leading to the ground under houses shrinking and cracking, increasing property losses.	
	Freeze/ Extreme cold	Increase in damage due to more extreme cold weather leading to e.g. burst pipes in properties (e.g. Beast from the East (2018))	
Transition risk	New government policies along with societal/ technology shifts are leading to insurance of "greener" property assets	Insurers are insuring a range of new assets. This causes greater uncertainty on future payments e.g. electric/hydrogen vehicles. Some claims costs can be both positive and negative.	



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Key points from our heatmaps analysis



Current model allowances

- Consider if there are allowances for climate risks in current models and whether the scope is sufficient:
 - Cat Models will likely include an allowance for climate change for large events
 - What about smaller events?
 - Allowance in the Attritional (“Climate Weirding”)



Knowledge Maturity Model to Inform Back Book Liability Scenarios

Tier	State of Knowledge
1	Little or no knowledge or information regarding the firm's historical underwriting activities.
2	Partial awareness of underwriting periods, lines of business, basis of cover and industry sectors covered.
3	Complete awareness of underwriting periods, lines of business, basis of cover and industry sectors covered. Little or no details surrounding underlying insured names, policy limits, coverage, terms and conditions with which to determine extent of exposure to liability from specific litigation or general classes of litigation.
4	Complete awareness of underwriting periods, lines of business, basis of cover and industry sectors covered. Partial details surrounding underlying insured names, policy limits, coverage, terms and conditions with which to determine extent of exposure to liability from specific litigation or general classes of litigation.
5	Complete awareness of underwriting periods, lines of business, basis of cover and industry sectors covered. Comprehensive details surrounding underlying insured names, policy limits, coverage, terms and conditions with which to determine extent of exposure to liability from specific litigation or general classes of litigation.

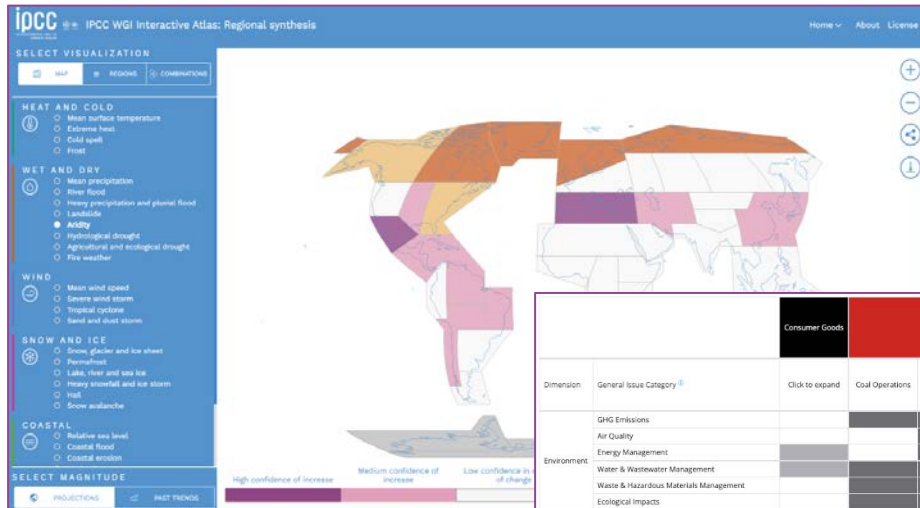
Back Book Exposures

- Building scenarios with an incomplete picture of historical exposures is hard.
- Framework (left) can help boards and senior management to understand blind spots.

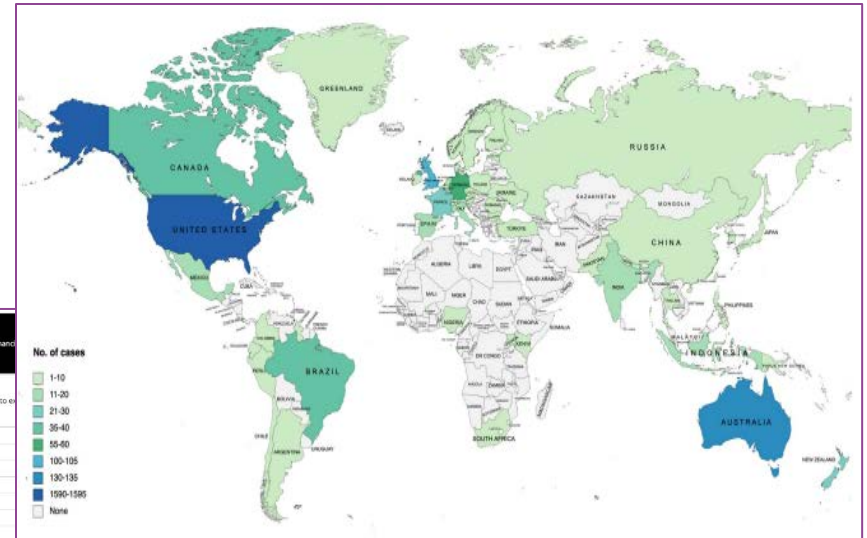


Other tools and resources

...included in paper...



Source:
<https://interactive-atlas.ipcc.ch/>



Source:
<https://www.lse.ac.uk/granthaminstitute/publication/global-trends-in-climate-change-litigation-2023-snapshot>

		Consumer Goods	Extractives & Minerals Processing							Financial	
		Click to expand	Coal Operations	Construction Materials	Iron & Steel Producers	Metals & Mining	Oil & Gas - Exploration & Production	Oil & Gas - Midstream	Oil & Gas - Refining & Marketing	Oil & Gas - Services	Click to expand
Environment	GHG Emissions										
	Air Quality										
	Energy Management										
	Water & Wastewater Management										
Social Capital	Waste & Hazardous Materials Management										
	Ecological Impacts										
	Human Rights & Community Relations										
	Customer Privacy										
Human Capital	Data Security										
	Access & Affordability										
	Product Quality & Safety										
	Customer Welfare										
Business Model & Innovation	Selling Practices & Product Labeling										
	Labor Practices										
	Employee Health & Safety										
	Employee Engagement, Diversity & Inclusion										
Leadership & Governance	Product Design & Lifecycle Management										
	Business Model Resilience										
	Supply Chain Management										
	Materials Sourcing & Efficiency										
	Physical Impacts of Climate Change										
	Business Ethics										
	Competitive Behavior										
	Management of the Legal & Regulatory Environment										
	Critical Incident Risk Management										
	Systemic Risk Management										

Source: <https://sasb.org/standards/materiality-map/>



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The Journey Ahead



The Journey Ahead

- Developing our professional understanding of the issues
- Bringing colleagues with you on this journey
- Not every portfolio faces the same challenges
- Don't assume that others have this covered



Questions

Ideas

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.





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Thank you

