Mitigating Climate Risk in the (Re)insurance Industry and Beyond

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Gallagher Re

Agenda

Climate Risk & the (Re)Insurance Industry: A View from the Middle

Physical Climate Risk: Can We Quantify It?

Can the Industry Play a Larger Role in Building Resilience?

How Can Technology Empower Resilience: A View from Above

Conclusions

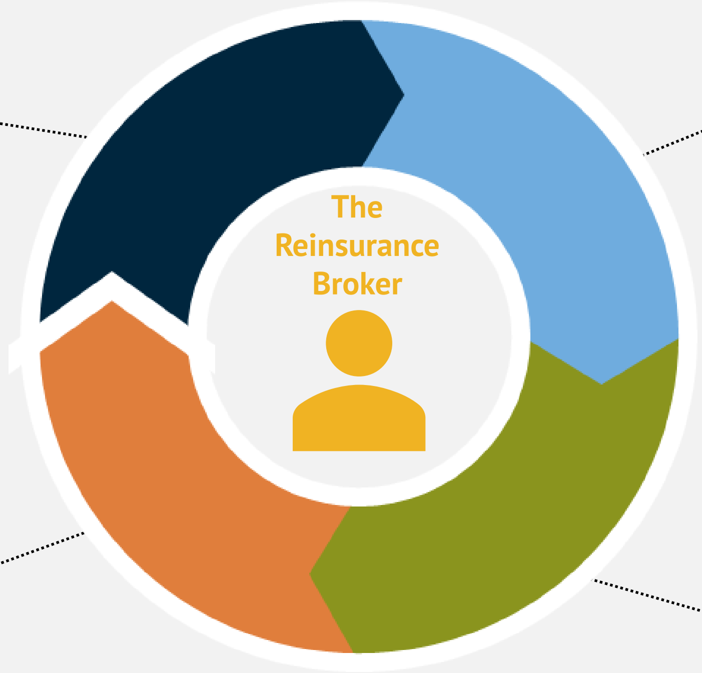
Climate Risk & (Re)Insurance Industry: A View from the Middle

Analytics and Brokers

- Catastrophe specialists for **catastrophe quantification**.
- Brokers & Actuarial analysts for **price implications**.

Regulators and Consultants

- Internal and external legal teams to advise on **environmental compliance**.
- **Investment** advisors and consultants.
- ESG ratings consultants.



Insurers

- **Exposed to physical** CC risks.
- Exposed to liability risks.
- In position to price and select CC risks.
- Capacity to **transfer risk** away from direct cedants.
- Large volume of assets under management.

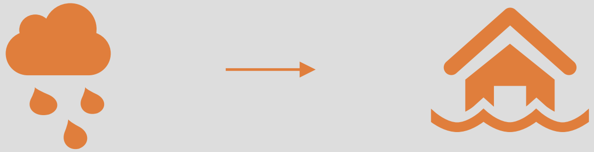
Reinsurers

- Exposed to physical and liability risks.
- In position to price the **aggregate transfer of climate risk**.
- Large aggregations of catastrophe risk – careful underwriting and management.
- Helping further share climate risk with insurers.

Insurers, (re)insurers are increasingly expected to be proactively addressing climate risk

How Does Climate Change Affect The (Re)Insurance Industry?

Physical Risk

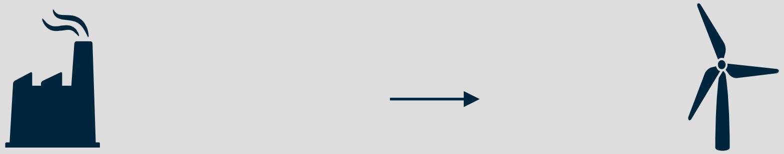


- Changing climate conditions
- Extreme weather events

Direct damage to assets or property

- Lower asset values
- **Increased insurance claims**
- Supply chain disruption

Transition Risk



- Stakeholder litigation risks resulting from policy and regulatory changes
- Technological innovation
- Social adaptation

Disruption from adjustment to low-carbon economy

- Rapid repricing of financial assets
- **Penalties** and **business disruption** resulting from litigations
- Defaults on loans

Physical Climate Risk: Can We Quantify It?

Having the Right Toolkit

Industry has a long-established history of quantifying natural catastrophe risk

Catastrophe models

The traditional toolkit of the Reinsurance industry. Models are used to make probabilistic assessment of potential losses over long time horizons

Key components

1. **Hazard:** stochastic simulations of the physical hazard associated with catastrophe events. Manifested in intensity measures (e.g. flood depth) for simulated events. Impacted by climate change.
2. **Exposure:** Insured exposure portfolio or estimated exposures of public solidarity funds. This will inevitably grow considerably (insured and non-insured), key driver loss increases.
3. **Vulnerability:** the relationship between intensity of a hazard and expected damage to an asset. Vulnerability expect to decrease due to better codes and quality – partly offsetting impact of climate change.
4. **Financial:** Financial losses from potential catastrophe events.

Impact of climate change on the hazard

- Large body of **academic literature** and climate model projections available
- Some **uncertainty** around the changes to the **frequency** and **severity**
- **Climate change adjusted models** can help clients stress test portfolios

Climate Risk Analytics

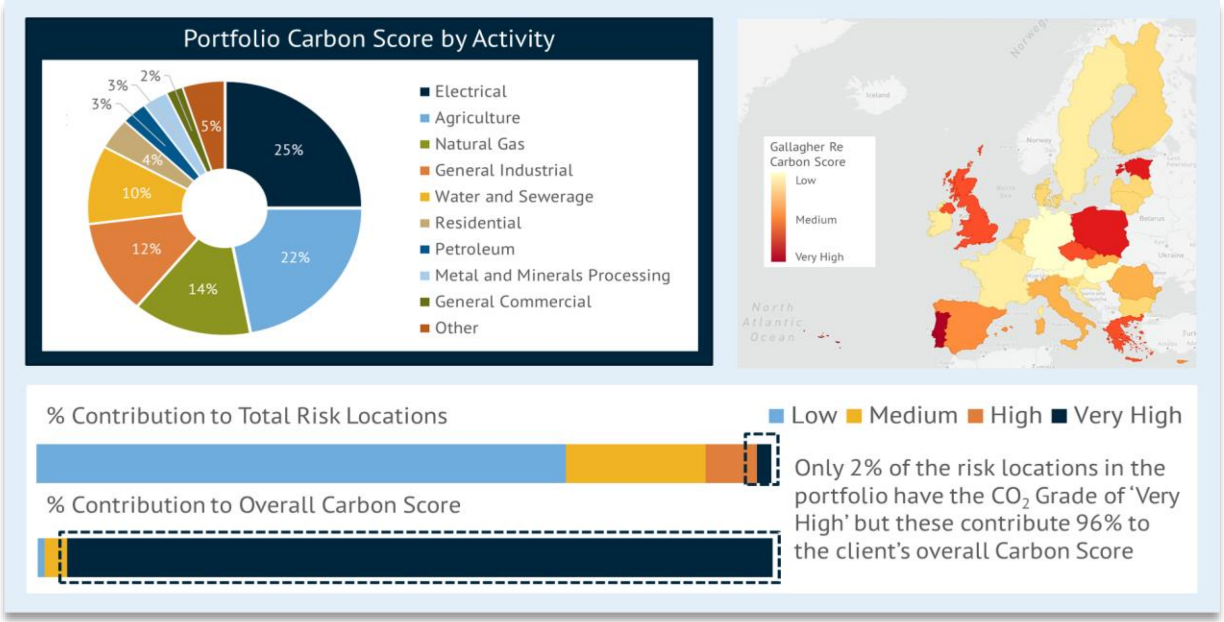
- Industry has seen a surge in **climate risk analytics solutions** and service providers utilising climate model outputs to build products.
- Many **new and diverse approaches** – not all transparent and time tested.
- Are we being clear about the **uncertainty** in this solutions?
- Are we using a **diverse range of tools and assumptions** for the same job? Huge spread of potential results.
- **Transparency is key** and industry best practise and thought leadership needed on the implementation of tools.

Climate and ESG Analytics

Carbon portfolio benchmarking tool – can the industry contribute to mitigation

New research from Gallagher Re's Climate and ESG Centre of Excellence (CoE) has led to the creation of a **carbon portfolio benchmarking tool**. This innovative offering from Gallagher Re:

- Helps underwriters **identify 'hotspots' of high carbon emissions** within specific geographical regions and industry sectors
- Uses **standard catastrophe model exposure input file formats** and classifies industry sectors to **indexed carbon scores**, in part weighted by each risk's contribution to Total Sums Insured to quantify the portfolio's carbon footprint
- **Visualises** the percentage of portfolio risk locations that have been calculated as having a 'Low' to 'Very High' carbon score grade and the extent to which these locations contribute to the portfolio's overall carbon score
- **Maps** out where exactly the portfolio's **carbon score drivers** are geographically located by country, region or CRESTA zone



▲ Footprint Profiling by Activity and Geography for a European Client Portfolio

Gallagher Re's carbon portfolio benchmarking tool would give OUTsurance the flexibility to **drill-down into your portfolio carbon analytics** and **gain insight** on the locations that matter the most to you and your underwriting strategy

Can the Industry Play a Larger Role in Building Resilience?

Sovereign Pools and Public-Private Partnerships

- Catastrophes can have a huge hit on a country's GDP, which can significantly hinder development.
- Moreover, insuring people against such catastrophic events comes at a cost – sometimes too large for even the biggest risk appetite from insurers.
- As such, sovereign risk pools can help build economic resilience to such events by not only providing a **back-stop** but also **capacity**.
- The reinsurance industry can then step in to help transfer risk *away* from the public sector and disburse this across the private sector.
- The reinsurance industry has the tools and expertise to help mitigate risk **sustainably** through correct pricing with programmes that transfer the right risks, at the right time, in the right place.

Generally speaking, public-private partnerships can serve different purposes ...

FLOODRE

EQC EARTHQUAKE COMMISSION Kōmihana Rūwhenua

Developed Economies	Developing Economies
• Use of reinsurance and capital markets to reduce reliance on state bailouts / payouts post economic downturns or large catastrophes. • Develop the capacity of insurers to provide catastrophe insurance by sharing part of the extreme tail of the risk. • Promote the availability and affordability of insurance for those in high risk areas.	• Protect the vulnerable. • Improve post-disaster recovery. • Enhance the resilience of affected communities, especially given climate change. • Improve insurance penetration by proving the usefulness of insurance as a financial tool to manage risk and improve risk management.

African Risk Capacity Sovereign Disaster Risk Solutions A Specialized Agency of the African Union

dask DOĞAL AFET SİGORTALARI KURUMU

Alternative Capital

Insurance-Linked Securities (ILS)

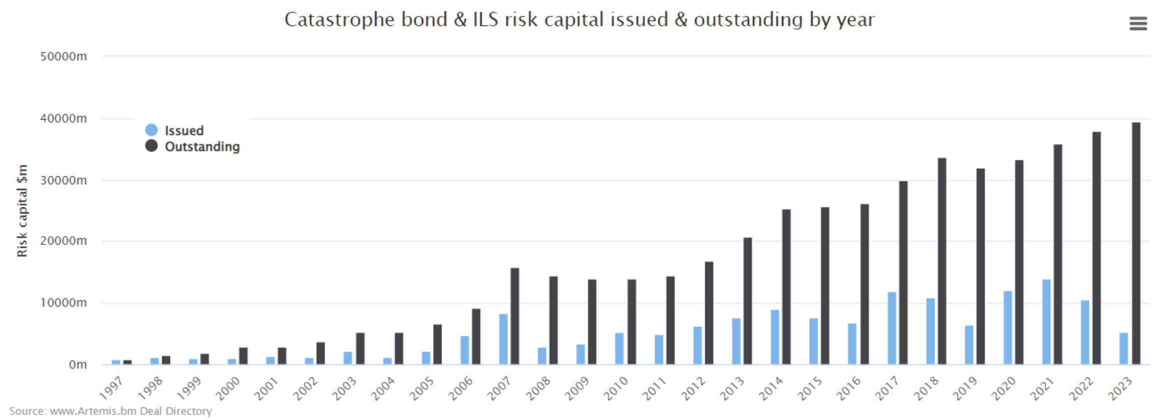
Gallagher Securities

- Catastrophe (CAT) bonds are a type of **insurance-linked security (ILS)** – an umbrella term for financial securities that are linked to pre-specified events or insurance-related risks.
- A CAT bond is a **high-yield debt instrument** that is designed to raise money for companies in the insurance industry (property and casualty insurers as well as reinsurance companies) in the event of a natural disaster.
- A CAT bond allows the issuer to receive payment only if **specific events** occur.
- Investors can receive an **interest rate** over the life of the bond that is greater than that of most fixed-income securities.
- If the specified event does occur, triggering a payout, the obligation to pay interest and return the principal is either deferred or completely forgiven.

In **2021**, the insurance industry faced **$343 billion in climate-related losses**.

With climate-related losses on the rise, in turn squeezing (re)insurance capital, **we can turn to the global capital markets for capacity** – a huge, under-tapped resource to kick risk up to these markets.

Of pertinence, the CAT bond market has grown dramatically in its 26 years as an asset class, and provides traditional (re)insurers and sovereign risk funds with an **alternative risk transfer mechanism**.



▲ General growth in the catastrophe bond and ILS risk capital issued and outstanding (1997-2023).

How Can Technology Empower Resilience: A View from Above

Technology and Climate Risk Mitigation

Technology is driving our ability to measure exposure, quantify climate risk and transfer that risk to reinsurance and financial markets.

Remote sensing

- Large range of meteorological variables available (e.g. precipitation)
- Vegetation / crop / agriculture indices
- Removes need for widespread on the ground monitoring

Artificial intelligence

- Warning systems (precipitation, SCS etc.)
- Quick assessment of damage from natural disasters
- Exposure data sets – building footprints etc

Climate Modelling

- New generations of high resolution climate modelling are improving our ability to quantify changes in future risk
- We have already mentioned the need for transparency and communication of uncertainty

Example – Helping Quantify unknown exposures and risk – better data, better outputs

- Our insurance and sovereign clients often lack a clear picture of their exposure (only aggregate knowledge).
- Building footprint data, construction types, occupancy types and much more information is available.
- Combination of remote sensing, AI and community science to improve knowledge

Example – monitoring flood events for parametric insurance

- Remotely sensed data available to resolve flood footprints
- Ai can be used to automatically calculate flooded areas and potential financial losses
- Useful for disaster risk managing and triggering parametric (re)insurance contracts

Parametric (Re)Insurance

Empowering Resilience, Enabled By Technology

Why Parametric (Re)insurance

- Does not require knowledge of **exposure / liability**
- Able to provide **immediate liquidity** where traditional policies cannot
- Gallagher Re broke most of the key parametric schemes **(ARC, FSEC, PCRIC, CCRIF)**
- Requires **reliable historical data** for the hazard for modelling and pricing
- Requires **reliable and accurate reporting** of events and associated hazard data.

Case Study – Fond de Solidarite Contre les Evenements Catastrophes **(FSEC)**

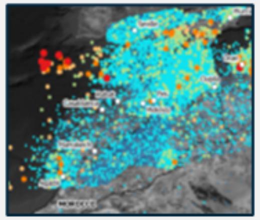
- Solidarity fund to protect all uninsured of Morocco against natural disasters.
- Parametric solution ideal and exposure / limit of liability highly uncertain
- Technology is key to estimate potential exposure, build hazard model and calculate event losses

How does FSEC's parametric earthquake risk transfer work?

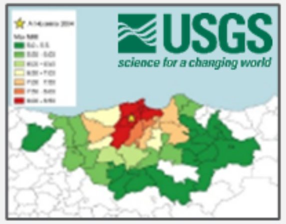
Event triggers national disaster → FSEC Solidarity Fund → Compensation for un-insureds

FSEC Solidarity Fund ↔ Risk Transfer ↔ International reinsurance markets

Cover designed and calibrated utilising **Gallagher Re's MENA Earthquake Model**



Stochastic events located in and around Morocco from our proprietary earthquake model



Maximum MMI per commune for 2004 Al Hoceima earthquake

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Conclusions and Overview

Industry **exposed to a range of climate risks** – physical and transition. **Natural catastrophe risk** is at the forefront of the (re)insurance industry

Careful **thought and transparency** must be applied when quantifying the risk. Climate models contain diverse **ranges of assumptions and outputs.**

It's not just about mitigating risk within the industry but also **mobilising capital throughout the industry** to mitigate societal risk.

Technology, including remote sensing and AI, can help **empower better risk quantification** and risk and monitoring of natural disasters in real time. Treat with care though…

The combination of **technology and innovative (re)insurance** schemes can drive sustainable risk transfer across society.

Thank You.

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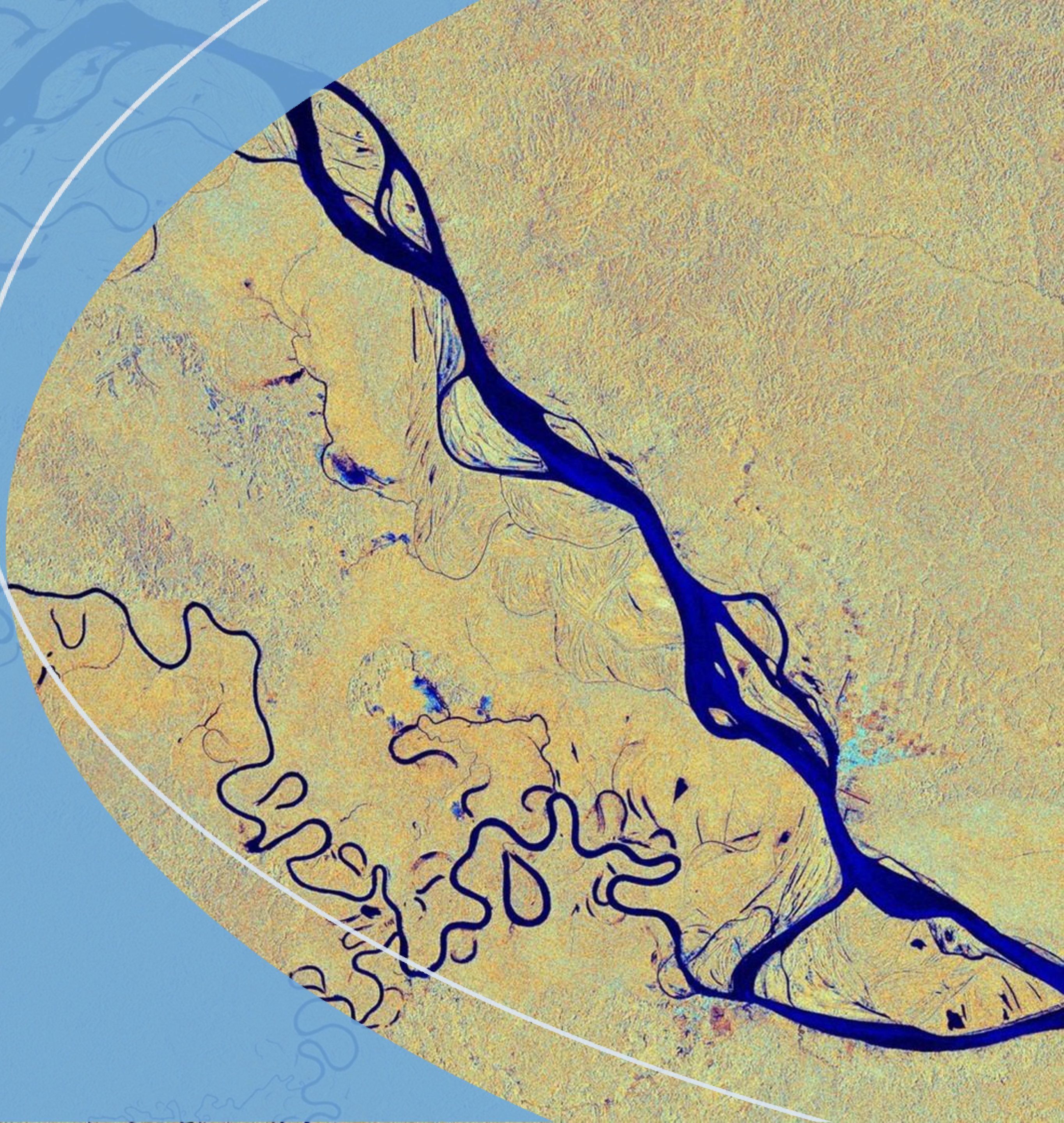
Appendix



Motivations and Actions

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What motivates stakeholders in (re)insurance to take action?

Regulatory expectations are the main motivation for insurers, and continue to rapidly accelerate

Insurers' Climate Motivations

Regulatory

1st

- Solvency requirements
- Capital management
- Internal risk appetite

Principle

2nd

- Environmental, Social, & Governance (ESG)
- Climate-related disclosures
- Thought leadership

Resilience

3rd

- Sustainable growth opportunities
- Identify and mitigate business risks
- Peer benchmarking

Most active regulator: Bank of England (BoE)

BANK OF ENGLAND

Stress testing	***CBES* climate stress test 2021** largest UK banks, insurers, & Lloyd's syndicates
Climate-related financial disclosure	**Mandatory** from 2022
Internal risk management	Firms' climate risk expected to be **fully embedded** by end of 2021

Gallagher Re is supporting our clients' responses to the BoE's climate stress tests

Climate risks & opportunities will increasingly become Business-As-Usual for a successful insurance company:
Resilience will be the driving motivation in the future

How Does Climate change affect the (re)insurance industry?

Loss & price increases	Heightened regulatory expectations	Increasing cost of inaction	Further public, shareholder, and government pressure

Analytics and Brokers

- Catastrophe analysts and scientific researchers for loss estimates
- Actuarial and finance analysts for price implications
- Brokers and reinsurers for price increases

Regulators and Brokers

- Regulators consult and publish discussion documents and regulations
- Brokers advise on application
- Brokers advise on compliance

Legal consultants

- Internal and external legal teams
- Investment advisors and consultants
- Brokers and reinsurers
- Marketing teams and external consultants
- ESG ratings consultants

Consultants

- Specialists in TCFD (UK) and similar
- Investment advisors and consultants
- ESG consultants
- Climate Transition Pathways (UK) consultants and similar

Insurers are increasingly expected to be proactively addressing climate risk

View of a Reinsurance Broker

The Insurers

- Write direct property risks
- Exposed to physical climate risk
- Write direct casualty / liability insurance
- Exposed to liability risk
- Large volume of assets under management
- In a position to price and select risks
- Helping transfer climate risk away from direct cedants

The Reinsurance Broker

Forming an intimate understanding of both sides of the industry - direct insurers and those that reinsure them

The Reinsurers

- In a position to price the aggregate transfer of physical climate risk
- Have we got to the right price? A hardening market
- Large aggregations of catastrophe risk – careful underwriting and management
- Helping transfer climate risk away from sovereign actors too
- Helping share climate risk further

Motivations and Actions

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What are the most common requests from clients?

Regulatory

Compliance and governance

How do we respond to regulatory expectations?

- Solvency requirements
- Capital management
- Internal risk appetite

Principle

Corporate Responsibility

How can we help address climate risk?

- Environmental, Social, & Governance (ESG)
- Climate-related disclosures
- Thought leadership

Resilience

Future-proofing business

How can we future-proof our business?

- Sustainable growth opportunities
- Identify and mitigate business risks
- Peer benchmarking

Client requests span all three motivations

Gallagher Re's Climate Offering

What services does Gallagher Re offer to mitigate climate risk ?

Climate Toolkit

Supporting business-wide integration of climate risk

Physical climate scenarios
Covering key perils and territories, with scenarios in line with risk management requirements.

Bespoke views of climate risk
Including the impact on specific perils, such as European Windstorm.

Board Trainings & ESG workshops
Priorities identified and targeted.

Risk management
Assisting firms draft risk policies, and designing risk frameworks following a gap analysis.

Climate related disclosure
Including physical & transition risk scenario analysis

Gallagher Re Climate Risk Service Offering Framework

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