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Climate risk

All indicators are flashing red

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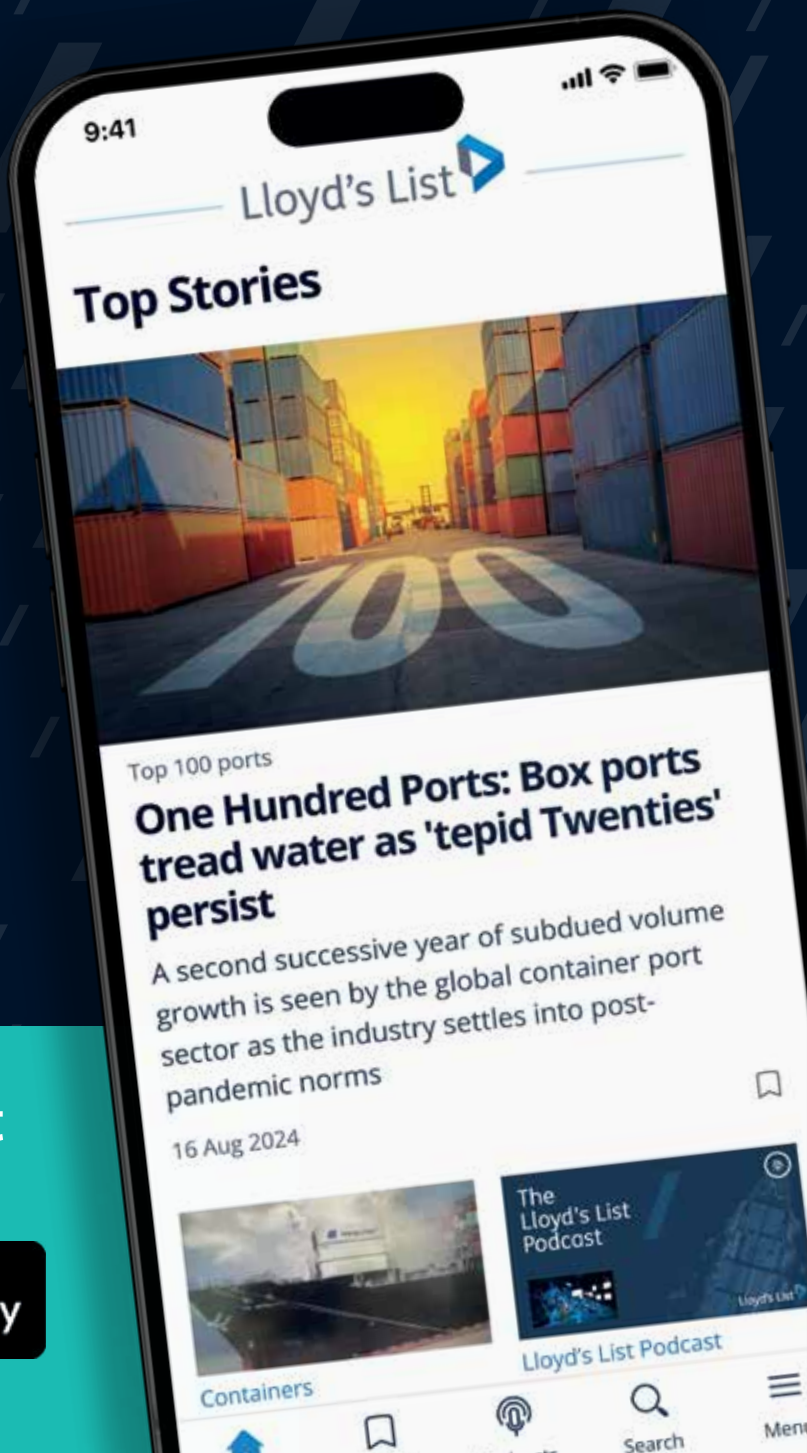

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Climate risk

The World Meteorological Organization says the Earth's climate is more out of balance than at any time in observed history, and UN secretary-general António Guterres warns that "every key climate indicator is flashing red". That's a green light for re/insurers to up their game in tackling climate risk.

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Was COP30 a turning point for insurers?

The role of the insurance industry is more crucial than ever

International negotiations on climate change, with their seemingly slow progress at annual conferences based on consensus agreements, may not seem as urgent an issue for the insurance industry as the bombing of oil and gas infrastructure in the Middle East and a blocked Strait of Hormuz. But the role of fossil fuels in global geopolitics and the causes and solutions for climate change are interconnected, **writes Germana Canzi.**

In this context, the role of the insurance industry is more crucial than ever. The European Union is more dependent on fossil fuel imports than almost any other major economy in the world, relying on outside sources for more than 90% of its oil and 80% of its natural gas.

Simon Stiell, head of the United Nations Framework Convention on Climate Change, told EU member states in March that this puts the bloc "at the mercy of geopolitical shocks and price volatility".

Wording on a "transition away from fossil fuels", was included in the outcome text at COP28 in the United Arab Emirates in 2023. COP30 in Belem, Brazil, in late 2025, was meant to work on the "how" of phasing out fossil fuels. Political momentum for detailed work on this did not materialise on that occasion, and so the final agreement ended up with weak wording on fossil fuels.

The direction of travel, however, remains clear. A push towards reverting to coal use or more drilling for oil and gas outside of the Middle East may well be part of the response, but the disruption to energy supply caused by the US/Israeli war on Iran is more likely to add a sense of urgency, in many countries, towards reducing their dependence on fossil fuels.

Meanwhile, the insurance industry is seeing its role in this climate and energy transition quietly but steadily changing. The conversations which happened among industry players and policy makers around COP30 in Belem in 2025 were a genuine turning point.

COP30 in Belem, Brazil, in late 2025, was meant to work on the 'how' of phasing out fossil fuels. Wording on a "transition away from fossil fuels", was included in the outcome text at COP28 in the United Arab Emirates in 2023. Political momentum for detailed work on how to phase out fossil fuels did not materialise on that occasion, and so the final agreement ended up with weak wording on fossil fuels.

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Causes and solutions

Emerging economies face at least two to four times the borrowing costs of advanced countries,

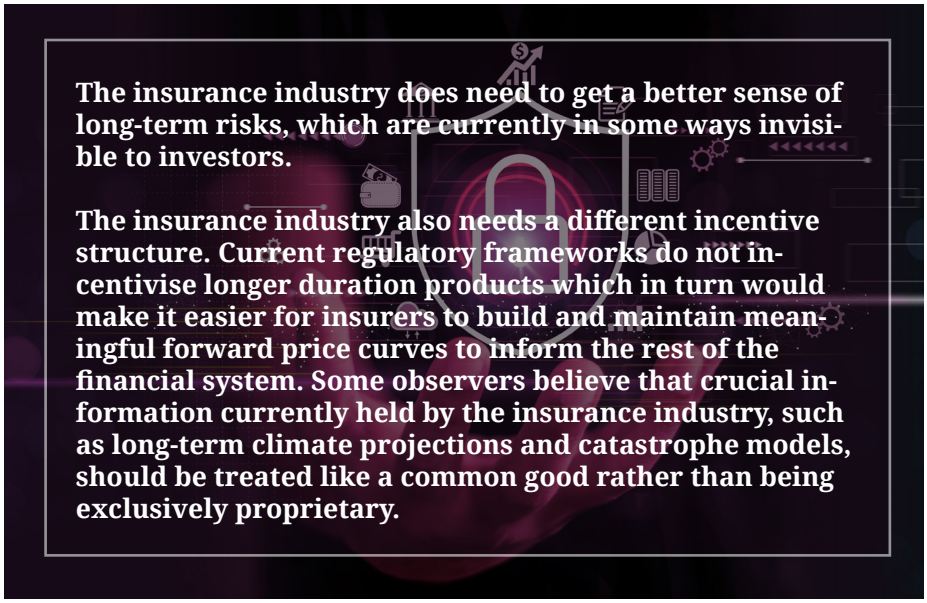
according to the 2025 Baku to Belem roadmap. The cost of capital for clean energy projects in those countries is at least double compared to advanced economies, and as much as triple for projects in some markets. In addition, only 12 out of 130 middle and lower-income countries have investment-grade credit ratings. And when these countries experience more severe climate impacts, they need to increase public spending on recovery and adaptation, while at the same time facing rising borrowing costs.

The roadmap places insurance at the heart of the solution to these problems. It also encourages insurers to expand risk management offerings to incentivise risk reductions. This would help countries be far better prepared for climate-related shocks, and to reduce their financial vulnerability. In addition, it could encourage proactive investments in climate change-related resilience and adaptation. In parallel, the report encourages governments to step up efforts to recognise innovative insurance products under their respective regulatory regimes and to support cross-border operations. This can help risk diversification and the scaling up of innovative insurance products.

The High-Level Expert Group on Climate Finance – a group of advisors undertaking independent analysis on scaling up investment for climate action – also published a report in 2025. In Delivering an Integrated Climate Finance Agenda in Support of the Baku to Belém Roadmap to 1.3T, the HLEG turned insurance from a side issue into an essential pillar of climate finance, recognising it as crucial infrastructure that enables the entire climate finance system to function.

From challenge to opportunity

The insurance industry now has the option to reposition itself. A report by research institute MSCI published in February this year, examines the views of over 50 property and casualty insurers and reinsurers globally on how climate-related physical risk is affecting underwriting. It finds that 96% of insurers see a coming market failure in terms of an uninsurability crisis. Yet fewer than one in five insurers are integrating forward-looking climate scenarios into pricing. In terms of how the industry is responding, insurers consider climate advisory services as the most relevant opportunity today, with new areas of growth in adaptation, nature and resilience advisory services to become more prominent in the future.



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Outside of international negotiations, observers say the industry doesn't yet have the right incentives and overarching regulations to support the climate transition. Narrative scenario descriptions of climate risks, disclosure scores, ESG ratings or physical risk projections expressed in degrees of warming only help inform context. They do not affect prices. The information available can't be transferred directly into financial models that are used for real world capital allocation.

The insurance industry does need to get a better sense of long-term risks, which are currently in some ways invisible to investors. Turning climate risk disclosures from narrative form to something that uses financial metrics and is comparable across companies, sectors and geographies, would be a good start. Rating agencies, credit committees and sovereign bond markets would then have a much-needed common language.

It also needs a different incentive structure. Current regulatory frameworks do not incentivise longer duration products which in turn would make it easier for insurers to build and maintain meaningful forward price curves to inform the rest of the financial system. Some observers believe that crucial information currently held by the insurance industry, such as long-term climate projections and catastrophe models, should be treated like a common good rather than being exclusively proprietary.

Overall, the insurance industry could also do more to ensure it doesn't punch below its weight on climate change. The solutions to making the world less vulnerable to climate change, to oil and gas shocks, and to a looming, major un-insurability crisis that could in turn affect the financial system, do exist. As Nobel Prize-winning economist Joseph Stiglitz told the EU Tax Symposium in March: "Sun and wind are not perfectly reliable, but they are more reliable than Putin; and they are more reliable than Trump."

Germana Canzi is a freelance journalist ■

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Insurers must help society build a culture of prevention: Bacani

United Nations Environment Programme's head of insurance explains why re/insurers must occupy the front line of climate strategies

> "The two professions within an insurance company, underwriting and investment, must work together for the long-term resilience of their business, and to drive positive, real-world impacts for communities and the real economy"
>
> Butch Bacani
> United Nations Environment Programme

The realisation of the insurance sector's key role in supporting a resilient and sustainable transition of the real economy is spreading fast, according to the head of insurance at the United Nations Environment Programme (UNEP), Butch Bacani, **writes Louise Isted.**

In an interview with *Insurance Day*, Bacani describes the momentum re/insurers created at COP30 and lists the key milestones for them in the run-up to COP31. The goal, he says, it to address the "looming global insurability crisis that could affect bankability and investability in the wider financial system".

Those milestones involve UNEP's two core insurance initiatives: the Principles for Sustainable Insurance (PSI) and the Forum for Insurance Transition (FIT), which were launched in 2012 and 2024, respectively. At the UN, Bacani leads both initiatives, which have different structures and are governed independently of each other. First, the PSI will be conducting a flagship project on the role of insurance in the de-risking and scaling of public and private finance for climate adaptation and resilience projects.

"This aims to show the links between insurability, bankability and investability," Bacani says, "and also a shift needed in the approach of policymakers and financial institutions from their traditional view of insurance in terms of post-disaster relief and recovery, to one that puts risk management and insurance at the start of policy, infrastructure and financing decision-making processes to build pre-disaster resilience, and goes all the way to the end, where insurance will still play the role of a risk transfer mechanism."

Second, the PSI aims to launch in the next few weeks the results of the first-ever landscape study of "climate smart financial services" for micro-, small- and medium-sized enterprises (MSMEs). Bacani says MSMEs face the "double whammy" of climate shocks resulting in the loss of assets and income, and the stress of obtaining credit and repaying bank loans. A win-win situation, he adds, is tailored risk reduction measures and insurance products

that enable MSMEs to become more adaptive and resilient to physical climate risk, which also means they are better able to meet their obligations to lenders.

Third, the PSI's working group for nature now has a "multi-stakeholder, global community practice, where risks and opportunities are increasingly being assessed, quantified, and embedded in underwriting processes", Bacani says, "because healthy and resilient ecosystems are an integral part of any climate strategy".

Meanwhile, the FIT is building on the "total balance sheet principles" that it unveiled at COP30, which for the first time, link the underwriting and investment portfolio of an insurance company in a transition plan context. These principles are essential to help ensure "cognitive consonance" within insurance companies, and an "invitation for different stakeholders to chime in", Bacani says.

The next step is to support companies on how to "operationalise" these principles, using key platforms such as London Climate Action Week this June, where UNEP Finance Initiative will convene its biennial Global Roundtable, with the theme "From risk to resilience, financing the future". Bacani explains: "The two professions within an insurance company, underwriting and investment, must work together for the long-term resilience of their business, and to drive positive, real-world impacts for communities and the real economy."

Whole-of-society approach

FIT issued a COP30 insurance communiqué that called for a whole-of-society approach to reduce climate risk, improve insurability and build resilient communities and economies. One of its recommendations is the creation of an International Taskforce on Climate Resilience and Transition Insurance. This recommendation was endorsed at COP30 by Laurence Tubiana, chief executive of the European Climate Foundation, one of the architects of the 2015 Paris Agreement, and a special envoy of the COP30 Presidency.

The communiqué warns of a "looming global insurability crisis" and the dual climate and nature crises, Bacani says, and spells out how to harness the risk management, risk carrying and investment capabilities of the insurance industry to support a just transition to resilient and sustainable economies.

There are various ways, he adds, including incorporating climate and nature scenarios into catastrophe risk models in a way that will "sharpen the axe" so that each re/insurer can become "even more useful" by also playing the role of risk manager, helping society better understand and reduce risk. As a multi-stakeholder forum convened and led by the UN, the FIT brings together insurers, regulators, civil society, academia and others. Its first report, Closing the Gap, was launched in 2024, at COP29 in Baku, Azerbaijan, to address the need for insurance-specific guidance on transition plans.

It then launched Underwriting the Transition — the first-of-its-kind transition plan guide tailored for insurance and reinsurance underwriting portfolios — in 2025, at the inaugural Global Transition Insurance Summit convened by the FIT and hosted by the European Insurance and Occupational Pensions Authority in Frankfurt-am-Main, Germany. This was followed by the launch at COP30 in Belém, Brazil, of the FIT's

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> United Nations Environment Programme

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Total Balance Sheet Transition plan principles. The FIT is scheduled to launch its fourth global guide that will operationalise these principles at this year's London Climate Action Week.

"The FIT has essentially set the guiding star for insurance company-specific transition plans, which can be viewed as the de facto global standard," Bacani stresses.

Such voluntary global guidance from the FIT is timely and relevant. For example, this March, the Monetary Authority of Singapore (MAS) issued three sets of Guidelines on Environmental Risk Management Transition Planning for banks, insurers and asset managers, which take effect in September 2027. MAS is a member of the FIT's Consultative Group of Insurance Regulators and Supervisors, along with 15 other supervisors from across the globe, including the Australian Prudential Regulation Authority, the Bank of England's Prudential Regulation Authority, and the European Insurance and Occupational Pensions Authority.

The FIT's work on insurance company-specific transition plans is gaining traction globally. Also this March, Bacani presented the outputs of the FIT's Transition Plan Project at the Learning and Exchange Series of the International Transition Plan Network (ITPN), with over 50 policymakers, regulators and members of ITPN's Community of Practice from jurisdictions — including South Africa, Egypt, Japan, France and the UK — joining the session on insurance and transition plans.

Re/insurers must be cautious of a "paper transition", Bacani warns, and ensure that there is "real-world impact" by supporting their clients and sectors in the real economy to move towards greater resilience, decarbonisation and a nature-positive transition. This also means insurance strategies on how to engage with corporates on Scopes 1, 2 and 3 emissions, on adaptation and resilience, and on nature-related risks and opportunities, he adds.

"There were people beyond the insurance industry, political champions, who were speaking about the role of the insurance industry as risk managers, risk carriers and institutional investors in supporting the transition, whether from a resilience or decarbonisation perspective. And I think it showed these different roles carry weight."

Butch Bacani
United Nations Environment Programme

Triple role of insurers

Another important goal, he continues, is for these transition plans to help policymakers — including negotiators at UN climate and biodiversity talks — embed and harness the triple role and capabilities of insurers, as risk managers, risk carriers and investors, in Nationally Determined Contributions, National Adaptation Plans, and National Biodiversity Strategies and Action Plans.

The climate talks in Belém last November were the most successful COP to date in shining a light on insurance, Bacani says, thanks to various efforts by insurers, the UN and key stakeholders, including the COP30 Global Sustainable Insurance Summit, which took place at the sector's very own venue — *Casa do Seguro* (House of Insurance). Convened by UNEP in collaboration with the Brazilian Insurance Confederation (CNseg), the summit showcased insurance industry leadership in tackling the climate and nature crises and the protection gap.

"While there was a recognition of the role of insurers in the past, it was more peripheral, rather than core to the agenda, but COP30 brought that role to light," Bacani says.

He continues: "There were people beyond the insurance industry, political champions, who were speaking about the role of the insurance industry as risk managers, risk carriers and institutional investors in supporting the transition, whether from a resilience or decarbonisation perspective. And I think it showed these different roles carry weight."

There are efforts under way by UNEP, re/insurers and others to build on the success of the COP30 Global Sustainable Insurance Summit. "We'll have to see in what shape and form it takes, but there are definitely efforts to replicate what was done on the insurance front at COP30," Bacani says.

The novelty of COP31 is that two countries are involved — Türkiye as host and Australia as president of the negotiations. Moreover, COP17 to the UN Convention on Biological Diversity will be held a month before COP31, in Yerevan, Armenia, which means nature-related messages will be fed into the climate talks.

There will also be a precursor to COP31, in the Pacific, which will mirror the Amazon-based COP30's closeness to communities facing

an existential crisis — in this case, small island developing states.

It has become increasingly clear, Bacani says, that a climate strategy must include adaptation and resilience, decarbonisation and ensuring healthy ecosystems. He explains: "Understanding that addressing emissions as a root cause of risk is important, but even if we could get to a decarbonised economy tomorrow, we are already feeling, and we will continue to feel in the years to come, the physical impacts of a changing climate. This is the reality that confronted many of the participants at COP30; that, wherever in the world you are, you are increasingly seeing adverse climate-related impacts."

Climate risk is no longer a global south issue, he stresses, and extreme weather events are occurring more often in high-income regions, including Australia, Europe and North America. Risk-based pricing ought to reflect the underlying risk exposure, which is growing and taking the cost of insurance up with it, Bacani continues. "There is the likelihood that uninsurability will create systemic problems, where properties, for example, become increasingly unbankable and uninvestable," he says.

Reducing emissions, strengthening adaptation and building resilience, and reversing nature loss, must go hand in hand, he stresses. This means, for example, transitioning to renewable energy, ensuring sustainable land use planning and development, using drought-resistant crops, and ensuring disaster preparedness.

It also means risk transfer solutions should reach all levels of society, particularly low-income households and communities, "who are often the first and hardest impacted", and MSMEs, "which are the economic backbone of many economies, but are systematically vulnerable to climate shocks".

Ignoring any of these elements of climate risk management is like "fanning the flames" instead of fighting the fire, he adds.

> **"The climate and nature crises are two sides of the same coin. Climate change is one of the major drivers of nature loss, and nature loss is a major driver of climate change"**
>
> Butch Bacani
> United Nations Environment Programme

Soft and hard limits

It is vital to heed the warnings of science of the soft limits and the hard limits to climate adaptation. Soft limits, such as the inability to build flood defences or the lack of access to drought-resistant crops, could be overcome by more finance and technological advancements. Meanwhile, hard limits, such as warm-water coral reefs crossing their thermal tipping point and experiencing unprecedented dieback, coastal ecosystem collapse, and sea-level rise making small islands uninhabitable. Once crossed, these points are where no further adaptation actions are possible.

"The climate and nature crises are two sides of the same coin. Climate change is one of the major drivers of nature loss, and nature loss is a major driver of climate change," Bacani explains. "Conversely, having healthy and intact ecosystems is important to sequester carbon and to buffering hazards such as storm surge in coastal communities.

"Therefore, the more we integrate nature into our climate strategies and integrate climate into our nature strategies, the more evident a positive loop of resilient economies and safer communities will become, which will also help to improve insurability." On the need for a whole-of-society approach to tackling climate risk to improve insurability and build whole-of-economy resilience, Bacani stresses that he and other participants in the COP30 Global Sustainable Insurance Summit, did not confine themselves to the House of Insurance. They ventured into the COP's Blue Zone, where the official diplomatic negotiations take place, the Green Zone, where there are public-facing climate activities and exhibitions, and other key events outside of these COP venues.

Taking the message of re/insurance far and wide includes the World Economic Forum's annual meeting in Davos, where this year Bacani attended a workshop, hosted by WWF, on tackling the insurance protection gap. "That was a concrete manifestation of the multi-stakeholder approach that we were championing at COP30," Bacani says. "Civil society was there, governments and corporates were there, academia was there, and the insurance industry was also there," he adds.

Déjà vu (again)

Despite such progress, Bacani says he occasionally gets a sense of déjà vu, most recently when he spoke at an event this March that was part of Climate Action Week Sydney. Organised by the Australian Sustainable Finance Institute and hosted by Insurance Australia Group, the event convened the Australian financial sector, including not only insurers, but also banks, superannuation funds and other institutional investors, as well as financial regulators.

"It was focused on adaptation and resilience, which is not a new priority for the insurance industry," Bacani notes. "In fact, one of the first global initiatives UNEP and insurers had over a decade ago was a global resilience project, showing that climate and disaster risk reduction is key to making properties, infrastructure and sectors more insurable and bankable going forward."

He continues: "Unfortunately, the things that we were fearing then, over a decade ago, are happening now, because our key messages were not embraced fully by all stakeholders. There has been a wake-up call since then, as climate impacts are no longer just a major issue for developing countries, but now also a major issue for high-income countries."

Climate Action Week Sydney then, was a déjà vu moment for Bacani, "because a lot of those things that we were saying then still hold true today. In fact, adaptation and resilience has now become an urgent global priority." Recognition that public policies and business strategies must consider the physical climate impacts is an opportunity for re/insurers to "amplify the risk signals", he stresses.

Response to physical risk

Bacani refers to a report published in February by the MSCI Institute, What the market thinks: How global insurers are responding to rising physical risk, which he says shows insurers are adapting their catastrophe models and underwriting processes to take into account rising physical risk. "Catastrophe models are increasingly taking into account forward-looking scenarios because the past is no longer a reliable indicator of the future," he says.

"It's important to adapt governance and embed physical climate risk into underwriting as being not merely an insurance risk, but also systemic risk, because it could impact the stability of the wider financial system," he adds.

The MSCI Institute report reveals a "near universal view", Bacani notes, that physical climate risk can lead to systemic risk, and that the "overwhelming majority" of insurers surveyed from across the world are concerned about infrastructure insurability, particularly in highly exposed and vulnerable regions. "If the insurers are saying that insurability of critical infrastructure is being compromised," Bacani says, "then we need to address that, otherwise there will be cascading effects." The insurability agenda is now "pervading globally", not only from the perspective of market participants but also of regulators, policymakers and civil society.

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> United Nations Environment Programme

"Nine out of the last 10 years have exceeded $300bn in economic losses due to natural disasters," Bacani notes. On average, 60% of these losses are uninsured, he adds, but the percentage could be as high as 90% in developing countries. "That's the protection gap. Losses will be borne by someone — from taxpayers and households, to governments and businesses. That's why a whole-of-society approach to managing climate and disaster risk is vital, and it's important for insurers to lead as they understand risk in practice," he says.

Looking ahead

This April, Singapore will be the location of UNEP's inaugural Asia-Pacific transition insurance summit. "This is a timely event as the Asia-Pacific is the most disaster-prone region in the world," Bacani says. Hosted by the Singapore Sustainable Finance Association, the event will convene re/insurers, brokers, investors, financial regulators, real economy representatives and other key stakeholders to exchange perspectives on the role of the insurance industry in supporting a resilient and sustainable transition across the Asia-Pacific. Discussions will focus on transition planning in practice, engagement with the real economy, and strengthening resilience to rising physical risk, and improving insurability.

Furthermore, UNEP and the UN Development Programme are planning a global sustainable insurance summit in Dublin in September to coincide with the start of Ireland's presidency of the EU in the second half of this year. "It's a good moment to engage with finance ministers and policymakers on the sustainable insurance agenda," Bacani says.

Bacani concludes that, "For the longest time, insurance has been a silent cornerstone of financial stability and economic security, and you don't notice its impact or its importance until there are cracks in the system. Now those cracks are showing because of the growing insurability challenge and protection gap globally."

Re/insurers should become more proactive in engaging with various stakeholders on ways to better manage climate risk. Bacani says they should ensure that stakeholders do not limit their view of re/insurers' role from a post-disaster relief and recovery angle, but more importantly, from a pre-disaster resilience building angle as well.

"That means involving insurers at the outset rather than at the tail end of many of discussions, decisions and transactions, be they on public policy, infrastructure projects or financing. Doing so would build a culture of prevention and, if all else fails, there would still be the important risk transfer mechanism of insurance to help with recovery and rebuilding. Ultimately though, an ounce of prevention is better than a pound of cure." ■

Nature treaty preserves IMO's mandate: Osborn

IMO's head of marine environment explains how the Biodiversity Beyond National Jurisdiction Agreement impacts shipping

The formal name of the world's first global treaty to protect ocean life in international waters is a bit of a mouthful: the Agreement under the United Nations Convention on the Law of the Sea (Unclos) on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, **writes Louise Isted.**

For ease therefore, it is also known as the Biodiversity Beyond National Jurisdiction Agreement. However, the even simpler term 'High Seas Treaty' that has been circulating as shorthand for the agreement is misleading. "In the context of ocean governance in general, and shipping and maritime issues in particular, it is important to remember that the BBNJ Agreement is sometimes wrongly referred to as the 'High Seas Treaty'," the head of marine environment at the International Maritime Organization, David Osborn, says in an interview with *Insurance Day.*

"That implies to the average person that the agreement is referring to nautical spaces, but under Unclos, terms such as 'the area' and 'high seas' have very specific definitions. The agreement refers to 'areas beyond national jurisdiction', which — unlike the high seas — also includes the seabed and subsoil," he adds.

IMO's mandate

The BBNJ Agreement, which entered into force in January, targets sustainable use of marine biodiversity in international waters, bringing into effect legally binding rules for the sustainable use and management of marine resources beyond national jurisdiction. Environmental group Greenpeace hailed the agreement, which aims to protect 30% of the world's oceans by 2030, as "the biggest conservation victory ever".

Although the agreement does not directly address climate change, it is seen as a step towards protecting the ecosystems that store carbon in sediments. In practical terms, the agreement strengthens international co-operation to protect marine biodiversity but, as Osborn notes, it also upholds the authority of the IMO for shipping. Crucially, it does not necessarily create new rules for shipping or override existing regulations.

"The BBNJ Agreement explicitly preserves IMO's mandate as the global regulator of shipping and requires parties to coordinate with IMO rather than duplicate or override its rules. This is clearly articulated throughout the agreement," Osborn stresses. "More specifically, the agreement does not create new rules for vessel operations, navigation, safety, emissions, pollution, or any other aspect of shipping. These matters remain under the exclusive competence of IMO, which has developed more than 50 binding global treaties governing maritime safety and environmental protection."

The long game

Analysis of the IMO's net zero policy plans feels far more 2023 than 2026. But it's still worth doing, because of what could happen in 2027 and the years that follow. The Maersk Mc-Kinney Moller Center for Zero Carbon Shipping estimates that the Net-Zero Framework could reduce emissions by 35%-55% by 2040, by when transport costs would be about 20% higher. The most talked-about alternative plan on the table – the Panama-Liberia-Argentina 'market-driven' fuel standard – would reduce emissions by about 1% a year to 2050, since in practice the only fuels allowed would be diesel and LNG, **writes Declan Bush.**

The green debate at IMO is really a debate about the future of LNG. Countries that sell a lot of fossil fuels oppose taxing them, as do shipowners with big investments in transporting frozen gas. The countries that want the NZF adopted (and there are more of them than you think) tend to be those with green industries that would benefit, or cash-strapped countries particularly vulnerable to climate change. But the other thing to keep in mind is energy independence. The world's reliance on a single, war-torn part of the world for most of its oil and gas comes at a cost, as consumers are finding out. That will create emergency demand for US LNG but also increase countries' desire to lessen their dependence on fossil fuels in the long run. Green energy is easy to ignore when it's far too expensive compared with dirtier energy. But a protracted oil shock, and more climate disasters, could put these ideas back in play.

This article first appeared in Lloyd's List

What the BBNJ Agreement does aim to do, Osborn continues, is create co-operation processes to improve the governance of biodiversity in areas beyond national jurisdiction, as defined in Unclos. "This may influence how shipping activities are managed on the high seas," he says. "However, it would always have to be done through coordination with IMO, and with respect to IMO's mandate." For example, the agreement allows for the establishment of high-seas marine protected areas.

"If an MPA would overlap with major shipping routes, or seek to limit future shipping routes, any such measures affecting ships must be developed through IMO as the regulator of international shipping, and not separately by BBNJ bodies," Osborn says. "It is very true that the areas beyond national jurisdiction are critical for sustaining life on this planet, in particular with respect to biodiversity — which is the main reason for the development of the BBNJ Agreement," he adds. The agreement addresses four themes: marine genetic resources, including the fair and equitable sharing of benefits; measures such as area-based management tools, including marine protected areas; environmental impact assessments; and capacity-building and the transfer of marine technology.

Ocean governance

As the third implementing agreement under Unclos (the others concern deep seabed mining and managing fish stocks), Osborn describes the BBNJ Agreement as a "constructive step forward in ocean governance", as it provides for effective implementation of the relevant provisions of Unclos and further international co-operation and coordination.

"It is again important to distinguish between 'the area' — the deep seabed — and the high seas, as the agreement applies to both," Osborn says, noting there are existing institutions and legal frameworks established for these.

> **"Issues related to the conservation and sustainable use of marine biological biodiversity in ABNJs touch upon the interests and mandates of many stakeholders and organisations, at many different levels — national, regional and global — and the BBNJ Agreement aims to provide opportunities for increased coordination between all these actors,"**
>
> David Osborn
> International Maritime Organization

He explains: "For example, IMO's regulatory framework applies also to ships on the high seas, and the exploration and exploitation of seabed resources is part of the mandate of the International Seabed Authority. Unclos provides the overarching framework for these activities, with specific mandates given to competent organisations with specialised mandates, such as IMO."

The main benefit of the BBNJ Agreement, Osborn continues, is that it can strengthen international co-operation between states to protect the biodiversity of the 'areas beyond national jurisdiction', which cover 95% of ocean volume.

"Issues related to the conservation and sustainable use of marine biological biodiversity in ABNJs touch upon the interests and mandates of many stakeholders and organisations, at many different levels — national, regional and global — and the BBNJ Agreement aims to provide opportunities for increased coordination between all these actors," Osborn stresses. "At the same time, bringing so many interests together for discussion and decision-making will not be without its challenges, but it will be a forum for dialogue and co-operation that will provide unique opportunities," he adds.

The main challenge of the BBNJ Agreement, according to Osborn, is that it does not have implementation and enforcement mechanisms, so it is not yet clear how specific protective measures will be established and enforced.

He explains: "There are no specific requirements in the agreement that shipowners need to meet, since any such requirements will need to be considered and established by IMO as the competent international organisation to deal with all matters related to navigation."

Shipping is not listed in the agreement as an activity to be regulated and requiring EIAs for activities in international waters. "In fact," Osborn says, "it provides that an EIA is not necessary when the potential impacts of a planned activity have been assessed in accordance with the requirements of other instruments, frameworks or bodies."

"However, shipping impacts may of course be considered when assessing cumulative effects in an area," he adds. The BBNJ Agreement then, does not regulate shipping, but it does create a framework where conservation measures in areas beyond national jurisdiction may require close co-operation with the IMO.

Osborn concludes: "Any requirements that relate to shipping will need be considered and established by IMO as the competent international organisation to deal with all matters related to navigation," he says. "Any binding rules affecting ships must still be adopted through IMO processes, preserving the integrity of the global maritime regulatory system."■

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Climate risk demands a change of mindset: Marsh's Surminski

Marsh's climate thought leader explains why climate change is a strategic risk

> **"Climate risk really needs to be brought into day-to-day decisions, because it requires insurance, not just to protect against loss, but to unlock opportunities and to increase resilience.This means a change of mindset for traditional re/insurers, to putting risk reduction before risk transfer."**
>
> Swenja Surminski
> Marsh Risk

Swenja Surminski's single best piece of advice for re/insurers is to stop seeing climate risk as an environmental issue and instead approach it strategically. That means changing their longstanding mantra of risk transfer to risk reduction, and their reactive payment of claims to the active prevention of losses, **writes Louise Isted.**

As managing director of climate and sustainability at Marsh Risk (formerly Marsh McLennan) and, simultaneously, a professor in practice at the London School of Economics and Political Science, Surminski applies her experience of business and academia to climate risk strategies.

In addition to these prominent roles, she is a member of the UK government's Climate Change Committee and chair of the Munich Climate Insurance Initiative.

Many of Marsh Risk's clients have already started to examine climate risk through a strategic lens, Surminski says in an interview with *Insurance Day*, and they understand that the next step is to integrate this risk into investment and operational decisions.

"Climate risk really needs to be brought into day-to-day decisions," she says, "because it requires insurance, not just to protect against loss, but to unlock opportunities and to increase resilience."

This means a change of mindset for traditional re/insurers, she continues, to putting risk reduction before risk transfer. A good example of this is a novel programme run by North Carolina Insurance Underwriting Association that incentivises homeowners to install rooves that can withstand extreme winds.

"The resilience bond placed by Guy Carpenter Securities that focuses on fortifying rooves is part of our traditional approach to insuring or designing cat bonds," Surminski says. "It's about looking at how to be there, not just to pay out after loss, but to help communities to become more resilient in the first place. That's a mind-shift."

Reflections on COP30

Marsh regularly attends the United Nations climate talks, but COP30 in Belém last year stood out as the first to provide a venue dedicated to insurance. Surminski spoke at this *Casa do Seguro* (House of Insurance), which was convened by the Brazilian Insurance Association (CNseg), and supported by Marsh and several insurers, to showcase insurance industry leadership in tackling climate change, nature loss and the protection gap.

This underscored Surminski's sense that insurers are "no longer observers" at climate talks but "central actors", not least because policymakers know they must move from high-level commitments to practical implementation.

She explains: "We as a company attend COPs because our clients are there, because we have solutions to share, and because collaboration across sectors is essential. But the first-ever House of Insurance was an opportunity to showcase global leadership in innovation."

"Marsh sponsored the House of Insurance and held a joint event with the City of London Corporation and CNseg to demonstrate innovation in the London market."

It may appear that progress with such efforts is overshadowed by geopolitical and regulatory uncertainty, she continues, but in fact re/insurers continue to work on solutions for all the "core pillars" of climate risk — mitigation, adaptation and resilience.

COP30 also showed, however, that the protection gap "remains enormous", she stresses, adding that Marsh used the event to unveil a report it co-authored with the Inter-American Development Bank — Resilience Now — which shows that Latin America and the Caribbean alone face $1.2m in climate related losses every hour, and much of that is uninsured. The finance needed to address this requires re/insurers to flip their usual script, from addressing losses to preventing them, Surminski says.There are encouraging examples of this change in mindset, she adds, such as parametric products for disaster response and solutions that integrate risk analytics with resilience planning.

"A big focus of the 'Resilience Now' report was on how we can use our risk analytical tools like cat models to also incorporate that resilience role that nature plays. Is there cover for nature-based solutions? Are there products that insure natural assets? What can be done in the context of carbon markets?"

Swenja Surminski
Marsh Risk

A noticeable feature of the climate talks, she adds, is that nature is becoming "intertwined" with innovative solutions to climate risk.

"Nature is often our first buffer, such as when a storm hits, by absorbing a lot of the damage, but at the same time there's the challenge of nature and ecosystem loss. So, a big focus of the 'Resilience Now' report was on how we can use our risk analytical tools like cat models to also incorporate that resilience role that nature plays. Is there cover for nature-based solutions? Are there products that insure natural assets? What can be done in the context of carbon markets? There is more innovation taking place, but nature risk is still an emerging area."

The Belém talks had been dubbed the "implementation COP", but did this turn out to be a fair characterisation? "To some extent, yes," Surminski says, "because there is a lot of demand from clients to help them with their transition investments, their emissions reductions and their resilience plans. This shows how insurance can help to de-risk a project to make it more investable."

A growing emphasis on biodiversity, ecosystem restoration and nature-based resilience is evidenced by the EU-funded Naturance project — "nature for insurance, insurance for nature" — which Surmanski leads with her team at the LSE's Grantham Research Institute to find nature-positive insurance and finance solutions that support adaptation and risk reduction, especially in vulnerable regions. While it may be "a bit early" to have an Insurance House at the UN's separate biodiversity COPs, Surminski says she hopes there will be one at the next climate COP, in Türkiye, and that nature will again be a "cornerstone" of the talks.

Equitable risk reduction

Surminski's team at the LSE investigates how the insurance industry can address climate, nature and equity goals. Asked how they can design products to address all three goals, she says, "There is no universal blueprint, but there are principles, and good pilot examples to learn from."

She continues: "The first rule is to understand the context because the needs and requirements of a community, business or government can

vary significantly." The key point is to avoid trade-offs, she stresses. "It's risk layering. Don't start with the insurance question, but with how to manage the risk better, so that you already have a focus on resilience when you come to look at the insurance, to help deal with larger residual risks," she says.

On social equity, Surminski points to Blue Marble, a collaborative venture run by Marsh and a consortium of insurance companies to promote the use of parametric insurance solutions for remote and low-income communities. "Engaging with communities to make sure their needs are met is at the heart of this," she says.

To better recognise nature's role, she encourages re/insurers to define and quantify a "natural asset" in the context of risk reduction.

A classic example, she adds, are mangroves, which can absorb up to 75% of storm damage along a coastline. "Do we have the right tools to factor things like that into our risk analysis? And can we incentivise communities and businesses to work with nature? The main thing is making sure there are no trade-offs," she says.

Surminski also highlights the community-based catastrophe insurance (CBCI) that Guy Carpenter, a Marsh business, developed in partnership with the Wharton Risk Management and Decision Processes Center. In a CBCI programme, a community — loosely defined as any community organisation, special-purpose district, or public entity — arranges insurance protection on behalf of its members or to the benefit of its members.

By securing coverage for a group of properties, CBCI has the potential to help close the disaster protection gap, improving financial recovery for communities.

CBCI could also be designed to provide more affordable disaster insurance coverage and could be linked directly to financing approaches for community-level hazard mitigation. Surminski says the goal of CBCI is to address risk reduction in a way that keeps insurance affordable, ideally by also incorporating nature.

The principles of climate, nature and equity are not "revolutionary", Surminski stresses, but it is crucial to "spell them out" when designing insurance schemes for communities, particularly those in low-income and high vulnerability contexts. "It's about smart solutions realising co-benefits. Risk reduction that is relevant to communities, is affordable and which includes nature — for example, with wetlands or urban green space — is hardly a revolutionary idea, but it is helpful to spell it out again and again," she says.

Data at its heart

Just as it is for insurance, data is at the heart of resilience planning and implementation, so that risks can be prevented. And for data to prevent risk, it must encompass the "trinity" of hazard, vulnerability and exposure.

"Existing models and tools have really improved, including through the use of satellite-based observations, as well as open-source risk platforms, and public-private climate service partnerships. We've really moved way ahead, but we still face challenges when we try and

> **"If you want people to make the right choices, be that about insurance, be that about where they build and how they build, be that how a government prioritises where to spend public money on risk protection, they will need data"**
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> Swenja Surminski
> Marsh Risk

Kanomaoi/Adobe stock

integrate the hazard, exposure and vulnerability components into cat models," Surminski says.

"And with climate science we can also get a view on what future risk looks like across different climate scenarios, but very rarely do these tools show you what you can do to reduce the risk and how that changes the risk equation," she adds.

Remedies such as flood defences or better building codes matter, as they "change the equation", she says, but the ultimate aim is to calculate the total cost of a risk.

Data quality and availability also vary according to region, with the most vulnerable countries having the greatest lack. "Data scarcity in emerging markets makes insurance innovation in those regions quite challenging because investing in tools and models can be time consuming and expensive," Surminski says.

"Hopefully, with new innovations, such as artificial intelligence, and new approaches to incorporating nature into analysis, exciting things can happen," she adds. Narrowing the protection gap thus requires enabling vulnerable communities to have better access to data.

"If you want people to make the right choices, be that about insurance, be that about where they build and how they build, be that how a government prioritises where to spend public money on risk protection, they will need data," Surminski says. "I have big hopes in making existing data and tools more accessible, so there is better visualisation that can drive more resilient behaviour," she adds.

Traditional analysis has changed significantly, so that catastrophe models are now incorporating climate change and integrating resilience features, such as fortified rooves, property level flood resilience measures or mangroves along a coast. However, this approach

> **"Hopefully, with new innovations, such as artificial intelligence, and new approaches to incorporating nature into analysis, exciting things can happen,"**
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> Marsh Risk

is not yet standardised and often requires a lot of time and effort, Surminski says. Another challenge is keeping up with the science of climate change's influence on the ways a hazard behaves.

"Our traditional approach is to model one risk on a standalone basis, but what we really need to understand is how these behaviours are interlinked, which means taking a systemic view of risk," Surminski says. "This is a challenge for models, but our awareness is clearly increasing," she adds.

Surminski doesn't find the distinction between primary and secondary perils useful because she says it is often misunderstood. "Secondary in that context doesn't mean that they are minor, but rather are the knock-on effects from primary perils. "For example, a flood is often a consequence of a windstorm. That was the initial way of framing it, but when it comes to modelling and data, the severity and frequency of extreme weather events have pushed up demand for better tools on all fronts," she says.

An example of a better tool, she continues, is the probabilistic flood modelling system that Guy Carpenter launched for Brazil last year. The company is confident this will be fundamental to understanding, quantifying and managing portfolio flood risks, in addition to promoting the reduction of the coverage gap with business expansion and sector resilience.

Imperfect science

Bridging academia and business means that Surminski is "pragmatic" about science and accepts there is no commercial sense in waiting for the "perfect" model. "I have very strong links to the academic world and, through my LSE team, I can spend time looking from a purely scientific standpoint at what the challenges are with the existing catastrophe models. But then I look at the implementations side and the need to be pragmatic," she says.

"We also need to recognise that models are just models, and though they can be improved, they're never going to be perfect. The main thing is how to interpret them in the context that climate change is the 'new normal'. And climate change means surprises because the climate system is messy, and so relying on one model or, even worse, relying on one climate scenario, isn't going to be reliable," she adds.

Fundamentally, modelling climate risk is not a linear process, but rather a complex and dynamic system. "There's going to be some interesting work concerning the potential tipping points and tail risks, which are the really scary parts because quantifying them is still very hard," Surminski says.

"What we can do is to start incorporating that uncertainty into our understanding of floods and winter storms, and so on," she adds.

Surminski's career in climate risk began when she was a PhD student in Munich Re's geoscience department, but there had already been warnings for decades about the potential impacts of climate change on re/insurance.

"The first publications warning about climate change and the implications for the insurance industry go back to the 1970s, so it's really not a new topic," she says. "Now, as then, it's about becoming more focused on prevention and risk reduction." ■

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Bridging the gap between climate science and finance

Institute and Faculty of Actuaries report outlines how actuarial expertise is helping firms understand and manage climate risk

> "Actuaries may be involved in work that is looking at the climate impact of traditional areas of their work, such as capital setting and pricing. But equally, they're then liaising with other experts to communicate how that actuarial work then impacts outcomes in those teams"
>
> Alan Marshall
> Institute and Faculty of Actuaries

Actuaries are building a bridge between climate science and financial planning as scenarios once deemed tail risks are appearing more firmly in the main body of expected outcomes, according to an online discussion for members of the Institute and Faculty of Actuaries (IFoA). **writes Louise Isted.**

Insurance Day was granted access to the webinar, where the IFoA presented its latest thematic review report, which shows actuaries are increasingly providing advice on climate risk to clients across a range of domains, including insurance, pensions, investments and banking.

Specific climate-related contributions actuaries make include stress and scenario testing, strategic asset allocation, sustainability frameworks and physical and transition risk modelling. A key finding of the report – Actuarial involvement in climate and sustainability work – is that a changed "geopolitical background" threatens the consensus view on the extent of human influence on climate change. "In the context of consistent scientific evidence, challenged by changing political influence, it remains hugely important for actuaries to deliver evidence-based analysis to help drive positive social, environmental and economic outcomes," IFoA review actuary and author of the report, Alan Marshall, said.

"It is therefore critical actuaries continue to focus on evidence-based analysis and research and use judgement on how to apply this to potential future scenarios, helping to support robust decision-making," he added. Marshall highlighted the range of case studies included in the report, which he said "showcased" actuarial skills, from technical delivery – scenario analysis and stress testing – through to investments, where actuaries communicated outcomes to senior management and boards in a way they could understand and put into practice. The report said climate and sustainability is seen as a "cross-disciplinary collaboration".

Marshall said: "Actuaries may be involved in work that is looking at the climate impact of traditional areas of their work, such as

capital setting and pricing. But equally, they're then liaising with other experts to communicate how that actuarial work then impacts outcomes in those teams."

Marshall pointed to scientific evidence from the World Meteorological Organization and the Planetary Health Check, and also highlighted a new report, Parasol Lost: Recovery plan needed, published recently by the IFoA and the University of Exeter, which describes the threats to "planetary solvency".

In that report, David King, founder and chair of the global Climate Crisis Advisory Group, argues climate change is a "classic model risk situation", with strong parallels to the global financial crisis of 2008, when emergency action was required to stabilise the system and enhance the risk management practices of financial services. King said the world had arrived at a similar "break glass" moment for climate change.

Data, not politics

In the webinar, IFoA chair, Sam Younger, described the current US administration's contradiction of climate science as a "cold wind blowing across the Atlantic" towards Europe and the UK, which means there is a "degree of scepticism around, still, about what would seem to many of us to be pretty much a no-brainer in terms of climate change". Younger highlighted a quote in the IFoA report about the importance of transparent analytics to "separate scientific signal from politically charged noise". Actuaries have the skills needed, he continued, to "bring in that scientific signal".

Through their scenario analysis, actuaries work with concrete evidence, he stressed, and thus they stand outside the ideological argument of whether anthropogenic climate change is real. The fact extreme weather events could lead to an increasing number of areas where people are unable to get insurance to cover climate risks is a "scary prospect for everybody", he said. To ensure their impartiality, however, actuaries should not work in a "little bubble of their own" but collaborate with other experts. In November the IFoA's board therefore decided the IFoA should work more closely with the Financial Reporting Council and the Financial Conduct Authority, as well as with its own sustainability board. Such collaboration would avoid duplication of effort, but the IFoA must avoid "piling requirement on to requirement", Younger said, adding over the next six months, the board will establish what further guidance its members need on climate risk.

Dedicated team

Georgina Bedenham's role as head of climate and disaster risk at the Government Actuary's Department (GAD) proves this multi-disciplinary organisation of actuaries, analysts and specialist consultants is closely monitoring climate risk. Its work supports some of the UK's most significant financial commitments and policy challenges across different areas: workforce and pensions, insurance and market failure, assurance and financial risk, but also societal challenges.

GAD has had a dedicated climate team since April 2025, which brings together actuarial expertise with scientific expertise to support its assessment and management of climate-related risks across the public sector.

Recognising climate change is a significant source of uncertainty that affects long-term financial planning, GAD identified climate risk as an area where actuaries are "well placed" to provide advice, Bedenham said. "We apply the same analytical and quantitative skills that underpin our core actuarial work to understand how climate change, both its physical and transition impacts, could affect public finances, assets and services," she said.

Most of her team's work has grown out of financial reporting requirements, which, for government,

Alan Marshall,
Institute and Faculty of Actuaries

How would you characterise the respective roles of actuaries and underwriters in managing climate risk?

Underwriters are experts in relation to the specifics of a given insurance risk, in particular exposure and likelihood of claims. Actuaries have knowledge of these aspects through insurance domain expertise and can consider the range of potential outcomes over a longer time period.

The overlay of climate-related risks on existing underwriting risks will benefit from both underwriting and actuarial expertise; underwriters focused mainly on risk acceptance and pricing, with actuaries able to provide thoughts on potential reserving, capital and wider stress testing outcomes.

How does the IFoA ensure its members are taking action on climate risk?

The IFoA supports its members in a range of ways – standards, and guidance, education and lifelong learning, and policy and research. Specifically, the Actuaries' Code sets out principles actuaries must adhere to, with competence and care and compliance being key examples relevant to climate risk work. The latter places responsibility on actuaries to ensure they are following all relevant legal and regulatory requirements.

include those aligned with Taskforce on Climate-related Financial Disclosures, but it also supports operational and strategic decision-making on, for example, adaptation planning. It is also building an evidence base to support analysis of the relationship between climate change and human health; namely, healthy life expectancy and future mortality trends.

"An actuarial skill set lends itself very well to understanding and quantifying climate risk, but it's important we continue to build our understanding of this fast-moving, evolving area and make sure there's sufficient training and resources in place to do that," Bedenham said.

"Actuaries have a unique and important role to play in looking at climate through a risk management lens, by translating scientific data into the financial impacts and also by communicating the associated risk and uncertainty. We're also able to look at climate risk holistically, in the context of other interconnected and cascading risks, too," she added. The appointment of actuaries, such as Bedenham, into climate and sustainability roles, is "really encouraging", Marshall said, adding the IFoA must support that career path for its members.

Global risks

Referring to Younger's comment about not being distracted by "geopolitical noise", Marshall stressed actuaries should instead "keep their eyes on the steady flow of data". He said: "Scenarios deemed tail risks in the past are now appearing in the main body of expected outcomes and that's going to have an impact on how actuaries deliver capital setting and stress testing for boards.

The World Economic Forum's latest Global Risks Report places climate, nature and sustainability in five of the top 10 global risks, Marshall pointed out. "If that's not enough for actuaries to take notice, given our focus on the medium and the long term, I don't know what is," he said. Marshall referred to a newly published report on biodiversity, which the UK government had been due to publish last year but, "for whatever reason, didn't make it out until January".

"We apply the same analytical and quantitative skills that underpin our core actuarial work to understand how climate change, both its physical and transition impacts, could affect public finances, assets and services"

Georgina Bedenham
Government Actuary's Department

Journalist and activist George Monbiot suggested why in his column for *The Guardian*. "The national security assessment on biodiversity loss and ecosystem collapse was supposed to have been published in October 2025, but the apparatchiks in Downing Street sought to make it disappear," Monbiot wrote. "Apparently there were two reasons: because its conclusions were 'too negative' and because it would draw attention to the government's failure to act," he added.

Marshall said it was "pretty clear" the impacts of biodiversity loss were already happening and there was potential for ecosystem collapse.

He continued: "The report emphasises this from a global perspective as well, with the impacts on food supplies, migration and, potentially, infectious diseases, which all then impact economic outcomes and that brings it firmly back into the sphere of financial services." As well as stress testing, actuaries may also be involved in "reverse" stress testing, he added, "which is built to see where you would go to to break a firm or perhaps to break a sector". Whichever trend they analyse and map, he stressed, actuaries must ensure they are using the latest scientific data.

Decarbonisation efforts

In addition, Marshall said actuaries could help firms decarbonise their own operations. "The biggest bang for our buck will be applying actuarial skills to climate-related risks, but if actuaries want to be involved in getting their firm to reach net zero, fill your boots," he said.

Bedenham noted the potential reputational risk for organisations from a failure to set their own net-zero goals, adding actuaries could assist their clients in calculating the financial impacts but also the potential cost benefits from them "decarbonising now versus in the future". Marshall added transition risks are "crystallising" at an increasing rate, which will "bring its own challenges".

Related to that challenge is the increasing use of artificial intelligence (AI) and data centres, which will need ever-greater amounts of energy. Conversely, AI will drive "better assessments, better judgements and better modelling", Marshall said, "so there's a balance to be struck there".

The intense use of natural resources needed to produce AI outputs is one of the "cascading interconnecting risks" associated with climate risk, Bedenham said. "That hasn't necessarily come directly into our work yet, but it is something we're aware of – that AI has the potential to have an impact on climate risk."

Natcat losses must be viewed across years

Insured losses in 2025 were below average for the past decade, but against a backdrop of elevated hazard potential, a single year should not be interpreted as a sign of lowered risk

Insured losses in 2025 broke the $100bn barrier for the sixth consecutive year — a number that has long been considered a measure of escalating natural catastrophe risk. Without a major US hurricane landfall, however, losses came in below the average incurred during the past decade, **writes Cameron Rye**

While the market may take a moment to exhale, context is crucial. A below-average loss year is not an anomaly; statistically, it is the expectation. Because catastrophe risk is heavily skewed by tail events, the average will always be driven by a handful of very active years, leaving most years falling below the mean. What makes 2025 stand out is that losses were modest despite the backdrop of elevated hazard potential.

Sea-surface temperatures in the North Atlantic have been among the warmest on record, while global mean temperatures continued to test the upper bounds of the satellite era. Exposure concentrations in hazard hotspots are higher than ever and rebuild costs continue to rise. The ingredients for large losses were present in 2025, yet the atmosphere chose not to combine them.

This situation is best described as transient meteorological luck: the temporary alignment of atmospheric and oceanic conditions that suppresses loss activity without altering the underlying risk. A quiet year does not signal that the underlying hazard or vulnerability has reduced.

Rather, it represents a fortunate gap in natural catastrophes. When viewed through this lens, 2025 stands out as a moderate loss year in a high-risk situation. While 2025 was the first year in a decade where no hurricanes made landfall in the US, other places were not so fortunate.

Hurricane Erin followed an eastward track well away from the Caribbean but still delivered heavy rain to Guadeloupe and Puerto Rico and high winds to the Bahamas. Hurricane Imelda passed directly over the

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northern coast of the Dominican Republic and Haiti and brought heavy rains and severe flooding to both countries. The storm also caused heavy rain and landslides in Cuba and strong winds (with gusts up to 100 miles per hour) over Bermuda.

Greater volatility

The most consequential event of the past season was Hurricane Melissa, which made landfall over Jamaica on October 28 as a Category 5 storm. It was previously uncommon for major hurricanes to form in October, but as the North Atlantic has warmed, the environmental conditions that are favourable to hurricane formation are lasting later in the year.

And that same warming also allows storms to become much stronger very quickly. Compared to the late 20th century, the number of storms undergoing "explosive" intensification (winds strengthening by almost 60 miles per hour in less than a day) has almost doubled.

Long term, the climate is warming, which continues to load the dice toward greater volatility and more complex extremes, from wildfire behaviour outside historical norms to record rainfall and the rapid intensification of tropical cyclones.

Even if the financial tallies appear muted, the physical risk remains on an upward trajectory. For example, future wildfire losses in California are likely to exceed what recent fire footprints suggest. Fires can now occur across more of the year, more people and assets are located in flammable areas and rebuilding is materially more expensive. With much of the state's high-value wildland-urban interface yet to experience fire under these conditions, historical loss experience alone is no longer a reliable guide for pricing or portfolio steering.

Meanwhile, flood events in 2025 illustrate the accelerating trend of hydrological intensification driven by ongoing global warming.

A preliminary global review shows extreme and often record-breaking rainfall on every continent, with many events producing exceptional sub-daily intensities. Crucially, severe flooding is increasingly occurring in locations not historically classified as high risk, prompting renewed scrutiny of exposure and preparedness. Recent flooding illustrates how once-in-a-lifetime events are now occurring in rapid succession.

The US' Texas Hill Country floods, with more than 500 millimetres of rainfall in two days, exemplified this shift, resulting in substantial loss of life and revealing gaps in emergency response and insurance coverage. Further evidence of this intensification has been seen in Pakistan, Spain and elsewhere. The persistence and clustering of such extremes align with trends clearly established in 2023 and 2024. Climate change is increasing rainfall intensity and expanding flood hazard footprints, while societal exposure continues to outpace preparedness.

False sense of security

Quiet years often breed a false sense of security. The 2006-2016 drought of major hurricane landfalls in the US created an illusion of reduced risk. But the inevitable return of high-impact events in 2017 (including hurricanes Harvey, Irma and Maria) taught us that lucky streaks always end.

As the reinsurance market softens, the temptation to chase premium can erode discipline, leading to the silent accumulation of risk. In this environment, strong scientific judgement, rigorous model evaluation and robust exposure management frameworks will be essential safeguards.

Now is the time to dig into the data. Leveraging research to develop bespoke views of risk, such as climate-conditioned event sets or vulnerability functions based on recent claims experience, allows cedents to distinguish portfolio resilience from temporary good fortune. Today, re/insurers increasingly expect not only robust numbers from models, but also a transparent account of the science and limitations behind them.

Meteorological luck can delay the inevitable but does not offer lasting protection. The question is whether the industry uses this pause to relax or to prepare for when the pendulum inevitably swings back.

Cameron Rye is natural catastrophe analytics director at Willis Re ■

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- **Hurricane Erin** followed an eastward track well away from the Caribbean but still delivered heavy rain to Guadeloupe and Puerto Rico and high winds to the Bahamas.
- **Hurricane Imelda** passed directly over the northern coast of the Dominican Republic and Haiti and brought heavy rains and severe flooding to both countries. The storm also caused heavy rain and landslides in Cuba and strong winds (with gusts up to 100 miles per hour) over Bermuda.

Rookielion/Adobe stock

Recalibrating climate risk and insurance

An endless stream of priorities passes through government, some deserving of urgent attention, some not. But the looming insurability crisis has never been one of them.

In February, Carbon Tracker and the University of Exeter published Recalibrating Climate Risk — informed by a survey of 60+ climate scientists' expectations of future damages from climate change, **writes Joel Benjamin.**

The report urged governments to 'fix the faulty radar' of economic climate damage models and found:

- Economic modelling has traditionally linked damages to changes in global mean temperature, but societies and markets experience climate change through local and regional extremes — including heatwaves, floods and droughts — which drive the bulk of economic and financial disruption, yet often barely register in global averages.

- While a useful proxy, gross domestic product (GDP) can mask the real impact of climate change by failing to account for mortality, inequality, ecosystem loss and social disruption. As risks rise, relying on GDP assessments can give policymakers and financial institutions a false sense of resilience, even as vulnerability increases — for example, recovery spending that spikes GDP after a climate-related disaster, masking welfare losses entirely.

- With temperatures trending towards a 2°C future, experts stress that impacts become increasingly unpredictable, as tipping points and tail risks increase. Even as models continue to produce precise-looking point estimates, climate risks will likely undermine model assumptions of continuous growth.

The recent National Security Assessment on nature and biodiversity risks painted an alarming picture of what climate and nature risks could mean for the UK.

The government commissioned it, but then tried to limit its release, and it's only available publicly thanks to the work of journalists.

It's a working example of the delayed disclosure trap — when institutions withhold disclosure of the full impacts of global warming, because they fear it will spook citizens and/or financial markets.

A related concept applicable to insurance is 'derailment risk'. This describes a situation where policymakers divert ever more resources to deal with the increasingly severe physical impacts of climate change, thus derailing the work of decarbonising the economy and guaranteeing that climate impacts worsen.

These dynamics, coupled with the increasing risks of breaching climate tipping points give cause for concern, with little to no consideration given to the full range of possible diverging climate futures in the century ahead.

Coastal hazard

My first job out of university was working as a town planner in Hawkes Bay, New Zealand. The year was 2005, and council were introducing a coastal hazard zone, mapping the low-lying coastal areas where ~0.5m of sea level rise with storm surge could erode or inundate coastal properties over the next 10-100 years.

Owners of valuable beach-front properties located in the coastal hazard zone quickly found they could no longer build or extend as of right, with external works subject to planning consent approval and restrictions. Coastal residents were angry to lose agency over their own properties, with complaints that properties lost value. Worst affected communities demanded the council construct sea walls, while the council argued this was neither technically nor economically feasible at public expense, and their policy would be managed retreat.

Unfortunately, long-sighted planning for future climate realities remains the exception, not the rule, and is under threat globally as populists ignore or reject climate risks as a material factor.

Despite increasing warnings from the scientific community, the risk of breaching climate tipping points and bifurcating climate futures does not currently feature in how we plan and design infrastructure for the century ahead.

Take the scenario of Atlantic Meridional Overturning Circulation (AMOC) collapse for the UK. This circulatory system of warm water in the Atlantic, is responsible, among other things, for making the UK and Ireland far warmer than their latitudinal neighbours in Northern Quebec and Labrador. Scientists cannot say for sure when or if this tipping point will be reached, but experts warn of a 50/50 risk of tipping this century.

AMOC tipping would result in extreme UK winter cooling, with winters closer to those in Eastern Canada, driving average temperatures ~7°C lower, with precipitous declines in rainfall severely impacting agricultural output, with short, hot summers providing a brief growing season — decimating crop yields.

AMOC collapse is just one of nine global tipping points. The tipping point for coral reef loss was breached in October 2025.

Like the financial system, the planning system is also vulnerable to future climate risks, through its reliance upon backwards looking weather data informing policy. Scientists warn we urgently need a global assessment of catastrophic but avoidable climate risks such as tipping points.

In 2015, the Paris Agreement was signed as a voluntary treaty to manage emissions, not a legally binding treaty to phase out fossil fuels. As a result, global emissions have continued to climb.

When he was the governor of the Bank of England, Mark Carney's landmark address at Lloyd's of London on the Tragedy of the Horizon was laser-sharp in its analysis of the problem of short-termism in financial markets, yet delivered voluntary TCFD disclosure as the solution.

Whilst the Task Force on Climate-related Financial Disclosures precipitated a bull market in climate data, we've not seen the required capital reallocation to low-carbon energy, undermining the central premise that disclosure would drive accurate asset repricing and a shift in business strategies.

In Glasgow for COP26 with Carbon Tracker, we witnessed outgoing Carney's launch of the Glasgow Financial Alliance for Net Zero, to media fanfare — riding the wave of net zero target setting. Rishi Sunak, as chancellor of the exchequer, stood before photographers modelling a green briefcase as if to imply that financial markets "have got this". Government policy makers duly checked out, with responsibility falling between the cracks of finance, delivery and regulatory departments.

Concrete preparations in the UK have barely shifted beyond the creation of Flood Re, and business-as-usual flood defence funding, falling far short of what is needed to prepare for a world of 1.5°C overshoot and increasing physical climate damage.

A recent Aviva study found one in nine new UK homes are constructed in flood zones. Homes increasingly uninsurable by private markets as flood risk increases, yet outside the scope of the insurer-of-last-resort, Flood Re. Flood Re points out it was only intended to act as the first part of a two-step solution. The second and crucial element, addressing flood resilience at source and property flood resilience, was never sufficiently resourced.

Residential property and critical infrastructure continues to be built without due consideration and design contingency for worsening flood risk, and necessary defences remain underfunded, storing up

The scenario of Atlantic Meridional Overturning Circulation collapse for the UK.

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costly future problems. Climate adaptation is foundational to the continued functioning of the insurance sector and in turn, all the downstream economic activity that insurance enables. An endless stream of priorities passes through government, some deserving of urgent attention, some not. But the looming insurability crisis has never been one of them. In the decade since Paris, the tragedy of the horizon has increasingly become the tragedy of today:

- 2019 bushfires in Australia – 30+ deaths estimated cost $100bn
- Historic 2022 flooding in Pakistan – 1700+ deaths, estimated cost $40bn
- Cyclone Gabrielle 2023 – New Zealand's costliest non-earthquake disaster strikes Hawkes Bay – estimated cost $13.5bn
- Valencia floods in 2024 – 200+ fatalities, with estimated cost of $3.8bn
- LA wildfires in 2024 – 31 direct, 400+ indirect deaths – estimated cost $250bn+

While costs mount, politicians have failed to act on the required scale, or pace for dealing with the climate crisis, which continues to be framed by economists as a future problem (when we're all assumed to be wealthier?), rather than a problem requiring urgent action today.

This lack of urgency has come into sharp focus during Carney's first year as prime minister of Canada, supporting the construction of new oil pipelines and fossil fuel expansion, despite his expert knowledge of the financial risks to markets and society. The implications of policy failure, both to mitigate climate change, and to adapt to its new, rapidly worsening realities, should concern us all.

A new report by the Institute for Public Policy Research (IPPR) — Adapt or Die — warns that ignoring climate change risks losing votes on the left and right: 81% of voters believe we are unprepared for its impacts & holds across the voting spectrum, including 83% of Labour's 2024 voters and 84% of Reform's 2024 voters. The IPPR recommends better protecting people by pairing policies like solar for schools with adaptation to extreme heat, like air conditioning. Failure to adapt to escalating extreme weather is creating a governance crisis and leaving space for the populist right to exploit public anger, according to IPPR.

Eight out of 10 of England's most flood-prone constituencies are predicted to switch to Reform UK at the next general election.

Gunther Thallinger at Allianz warns the climate crisis at 3°C of warming is on track to destroy capitalism — with the vast cost of extreme weather impacts leaving the financial sector unable to operate.

The financial sector is uniquely well placed to support climate adaptation and resilience efforts but must now robustly engage on policy in a collaborative, cross-sector manner, ensuring its voice is matched by joined–up government policy actions and investment in the real economy — accelerating mitigation efforts to avoid the worst impacts of climate change.

Joel Benjamin is financial policy and advocacy manager at Carbon Tracker Initiative ■

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How insurance can help build future-ready nations

Effective disaster risk management requires integrated solutions and shared ownership across public and private actors

> **"Bringing the capabilities of the global insurance industry to bear on this challenge through concrete, in-country programmes across EMDEs is inherently complex and long-term work, requiring sustained collaboration between governments, insurers, development partners and local institutions."**
>
> Ivo Menzinger
> Insurance Development Forum

Across emerging markets and developing economies (EMDEs), floods, droughts and extreme weather events are highly consequential risks, repeatedly testing public finances, livelihoods and critical infrastructure. For decades, the dominant response has been to mobilise resources after disasters strike. Today, that model is no longer sufficient, **writes Ivo Menzinger**.

The defining question for governments is not whether climate impacts will intensify, but how nations can become truly future-ready by shifting from reactive crisis response to pre-empting risk and pre-arranging finance before disasters occur.

This strategic shift is critical. Pre-arranged financial protection enables faster response, greater fiscal stability and more effective support for vulnerable communities when shocks hit.

Insurance, when deployed thoughtfully and in partnership with the public sector, can play a decisive role in this transition, linking risk data, financial preparedness and institutional resilience.

Bringing the capabilities of the global insurance industry to bear on this challenge through concrete, in-country programmes across EMDEs is inherently complex and long-term work, requiring sustained collaboration between governments, insurers, development partners and local institutions. Yet the results emerging on the ground demonstrate what is possible when those partnerships are aligned around shared resilience outcomes.

Extending disaster risk protection

Over the past year, Insurance Development Forum (IDF)-driven programmes have directly or indirectly extended disaster-related risk protection to more than four million people.

These figures matter, but they only tell part of the story. The deeper impact lies in how these initiatives strengthen local risk understanding,

build institutional capacity and embed insurance within national strategies for disaster risk financing and climate resilience.

A number of these initiatives are being delivered through the Tripartite Agreement Programme of the IDF, the United Nations Development Programme (UNDP), and the German Federal Ministry for Economic Cooperation and Development (BMZ) through the InsuResilience Solutions Fund (ISF), which provides a structured operational platform to translate public-private collaboration into insurable solutions on the ground.

In Lagos State, Nigeria, a Tripartite urban flood risk project illustrates this approach. IDF members AXA Climate and Swiss Re worked with ARC Ltd, Axa Mansard, Iceye, and JBA Risk Management, in close partnership with UNDP and the Lagos government, to design a parametric flood insurance product for public assets. The project was underpinned by the creation of a comprehensive public asset database and advanced flood risk models. Once the product is placed in the local insurance market, the solution will indirectly protect around four million people, while significantly strengthening institutional risk management capacity at state level.

Agriculture remains one of the most climate-exposed sectors across EMDEs, particularly for smallholder farmers. In Uzbekistan, a Tripartite project led by IDF members Europa Re and Swiss Re, in partnership with UNDP and supported by BMZ through the ISF, resulted in the launch of a parametric insurance product tailored to smallholder horticulture farmers.

The product covers six crops across five regions, and is supported by a 50% government premium subsidy, marking a significant step forward in agricultural insurance market development.

In Syria, meanwhile, a $9.25m drought macroinsurance policy was launched in 2025 to support World Food Programme (WFP) operations in one of the world's most fragile contexts. Developed through the IDF's Sovereign and Humanitarian Solutions Working Group by Hiscox, Howden and Swiss Re, in collaboration with Humanity Insured, and funded by the World Bank's Global Shield Financing Facility, the UK Foreign, Commonwealth & Development Office (FCDO) and BMZ, the policy protects 240,000 people against food insecurity.

A $7.9m payout enabled rapid response also in 2025, in reaction to the worst drought in 50 years, demonstrating how insurance can shift humanitarian action from reactive appeals to pre-arranged financial preparedness.

Beyond product development, strengthening the climate and disaster risk understanding and risk analytics that make pre-arranged finance possible is equally critical in EMDEs. With funding support from BMZ and in partnership with the ISF at Frankfurt School of Finance and Management, the IDF's risk modelling steering group is now working in countries through the public-private Global Risk Modelling Alliance (GRMA). The GRMA shares its insurance risk thinking and skills in risk quantification with resilience policymakers, regulators and others, conducted with governments to help

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Elkhan Babayev/Adobe stock

them identify risk informed decision makers. During an 18- to 24-month programme, the GRMA builds capability in ministries, agencies and the domestic market, working on practical projects and filling critical model and data gaps. IDF experts in the GRMA collaboration are currently working with the governments of Costa Rica, Madagascar, Ghana and Malawi. Projects are in the pipeline in Latin America, Africa and South Asia.

The sovereign determines the priorities and co-defines the projects – examples include urban flash flooding in 5 cities in Ghana; impacts of cyclone, flood and drought on farmers in Malawi, and threats to infrastructure in Costa Rica.

This work demonstrates how IDF, through the GRMA, is building national risk insight to inform better resilience strategies and unlock more effective disaster risk finance solutions.

Infrastructure Resilience

Infrastructure resilience is another critical frontier. Through the joint IDF-Agence Française de Développement (AFD) IDRIMA programme, projects are currently being implemented in Costa Rica and Mozambique. In Costa Rica, a parametric insurance policy is being structured to protect the state-owned electricity provider from drought-related losses in hydropower generation.

In Mozambique, work is under way to strengthen protection for the assets, operations and revenues of the national rail and port operator managing the Nacala, Beira and Maputo corridors, infrastructure that underpins the country's economic resilience.

These operational programmes are complemented by efforts to mobilise capital at scale.

In late 2025, the IDF announced the first close of the Infrastructure Resilience Development Fund (IRDF), raising $340m. Backed by Axa, Convex, Generali, Scor, Swiss Re, Zurich and the International Finance Corporation (IFC), and managed by Global Infrastructure Partners (part of BlackRock), the fund is designed to invest in resilient infrastructure across EMDEs, from energy and water to transport and health.

"Across EMDEs, climate risk management is increasingly moving away from reliance on post-disaster assistance towards pre-arranged, risk-informed financial strategies that can be activated quickly and predictably when shocks occur."

Ivo Menzinger
Insurance Development Forum

Changing global strategy on risk financing

These examples represent only a fraction of the work being undertaken by the IDF and its members and partners. Taken together, however, they point to a deeper, ongoing strategic shift. Across EMDEs, climate risk management is increasingly moving away from reliance on post-disaster assistance towards pre-arranged, risk-informed financial strategies that can be activated quickly and predictably when shocks occur. This is not a one-off transition, but a structural change in how governments plan for, finance and manage disaster risks, one that will continue to evolve and deepen in the years ahead.

Crucially, this shift is being shaped through collaboration. The experience of working alongside governments, development institutions and local partners in EMDEs has also transformed how insurers understand climate risk itself. The focus has expanded well beyond traditional instruments or standalone catastrophe solutions.

Today's resilience toolkit spans parametric insurance, macro and meso-level covers, risk data and modelling, disaster risk reduction, public asset protection, premium financing, and the mobilisation of long-term capital for resilient infrastructure. It reflects a growing recognition that effective disaster risk management requires integrated solutions and shared ownership across public and private actors.

Building future-ready nations is therefore not about exporting a fixed model, but about co-creating approaches that respond to real-world constraints and opportunities. It demands patience, trust and sustained commitment from all sides.

The IDF's experience shows that when this collaboration is done well, insurance becomes more than a financial product. It becomes part of the institutional fabric that enables countries, and the global insurance industry itself, to better anticipate risk, manage uncertainty and strengthen resilience in a changing climate. Our collective next challenge is scale — expanding on what has been built so that pre-arranged risk finance becomes the norm rather than the exception across EMDEs.

Ivo Menzinger is chair of the Insurance Development Forum's operating committee

Is finance keeping pace with climate disasters?

Centre for Disaster Protection analysis of the most recent global data available shows that international pre-arranged financing reached $9.4bn in 2024, the highest level on record

PRE-ARRANGED financing refers to disaster funding that is agreed in advance and guaranteed to be released when predefined trigger conditions are met, **writes Michele Plichta.**

In the context of climate disasters, where extreme weather events are becoming more frequent and more intense, it is a mechanism designed to ensure that funds arrive as soon as they are most needed. The increasing frequency and severity of climate shocks are now widely recognised.

What is less well understood is how much pre-arranged financing exists, which countries benefit from this, and how this is evolving over time.

That matters because in the wake of major storms like Hurricane Melissa, one of the most powerful hurricanes to strike the Caribbean, the gap between available finance and actual needs can determine whether governments can protect vulnerable communities and stabilise national economies in the face of widespread damage.

The route of the money

Our latest analysis of the most recent global data available shows that international PAF reached $9.4bn in 2024, the highest level on record. This increase reverses the post-Covid decline and reflects a growing global commitment to proactive financing for disasters. Much of this expansion has been driven by contingent loans provided by multilateral development banks, particularly the World Bank and the Inter-American Development Bank. These credit lines are underwritten in advance and can be drawn down when a shock meets the agreed criteria.

These instruments have the advantage of scale and speed: they can mobilise tens or even hundreds of millions of dollars quickly after a qualifying event. However, they are also mainly accessible and affordable to countries with the fiscal capacity to take on additional borrowing, meaning that middle-income countries receive a disproportionate share of total coverage.

In 2024, low-income countries and those in fragile and conflict-affected situations each received less than 7% of the total international PAF, despite their high exposure to climate risk. This reflects structural constraints in the current system of PAF instruments.

How PAF works in practice

The volume of financing available ex-ante tells only part of the story; whether and how quickly funds are released during real crises is equally critical. In 2024, PAF payouts more than doubled to $879m, after several years of decline, signalling increased activation of pre-arranged instruments. The real-world relevance of these mechanisms was illustrated

starkly in the aftermath of Hurricane Melissa, which struck Jamaica and other Caribbean islands in late 2025. Jamaica activated multiple pre-arranged instruments within days of landfall. The Caribbean Catastrophe Risk Insurance Facility, one of the world's largest parametric insurance pools, announced a record payout of $70.8m to Jamaica's government under its tropical cyclone policy, triggered automatically based on wind, rainfall and storm surge parameters.

A second parametric payout of around $21.1m was also triggered for excess rainfall, bringing Jamaican CCRIF disbursements from the event to nearly $92m, its highest total for a single storm. These funds were delivered within 14 days, demonstrating the speed and certainty that parametric insurance from regional risk pools, a key form of PAF, can provide.

Meanwhile, Jamaica will also receive a full $150m payout from a World Bank-arranged catastrophe bond, another form of pre-arranged risk transfer that taps into global capital markets rather than traditional providers of pre-arranged financing. Catastrophe bonds issue securities to investors that are redeemed in full if an event surpasses pre-defined metrics such as hurricane intensity or path, thereby transferring risk to capital markets while providing predictable triggers for payouts.

These activations underscore an important point: PAF is not just about the total amount of financing arranged, but about how quickly and predictably funds flow when climate disasters strike. In Jamaica's case, regional risk pool insurance and catastrophe bonds offered immediate liquidity that can be deployed for emergency relief, early recovery and stabilising fiscal pressures without waiting for lengthy assessments or budget reallocations.

The role of parametric insurance

The Jamaican example highlights the important role that different financial instruments play at different stages of disaster response and recovery. In the immediate aftermath of a shock, governments face urgent liquidity pressures.

Emergency relief must be funded, critical services restored and fiscal stability maintained, often before the full scale of damage is known. Instruments with pre-defined triggers, such as parametric insurance and catastrophe bonds, are particularly well suited to this phase. Because payouts are linked to objective parameters, such as wind speed, rainfall levels or storm intensity, funds can be disbursed quickly without waiting for detailed damage assessments.

Regional risk pools such as the CCRIF, which has provided parametric coverage to its members since 2014, are designed to meet these early financing needs. Their value lies in speed and certainty: governments know in advance the conditions under which funds will be released and the approximate scale of support they can expect.

This does not diminish the importance of indemnity-based insurance or other reconstruction financing. These instruments are often more appropriate for covering defined longer-term recovery and reconstruction costs, such as repairing public infrastructure or rebuilding state assets, where detailed assessments are necessary to determine the scale of loss.

Equity and resilience

Despite these important developments, structural gaps remain. The bulk of recent growth in PAF has been driven by instruments that favour countries with borrowing capacity or access to capital markets.

Without greater expansion of concessional and grant-based mechanisms, tailored to low-income and fragile contexts, progress in scaling pre-arranged financing risks reinforcing existing inequalities in financial protection. At the same time, the increasing use of parametric policies, catastrophe bonds and contingent credit lines demonstrates how a diversified toolkit can strengthen national disaster risk financing strategies.

No single instrument can meet the full range of needs generated by major climate shocks. Immediate liquidity, medium-term budget support and long-term reconstruction financing all require different types of financial solutions, sequenced and combined appropriately.

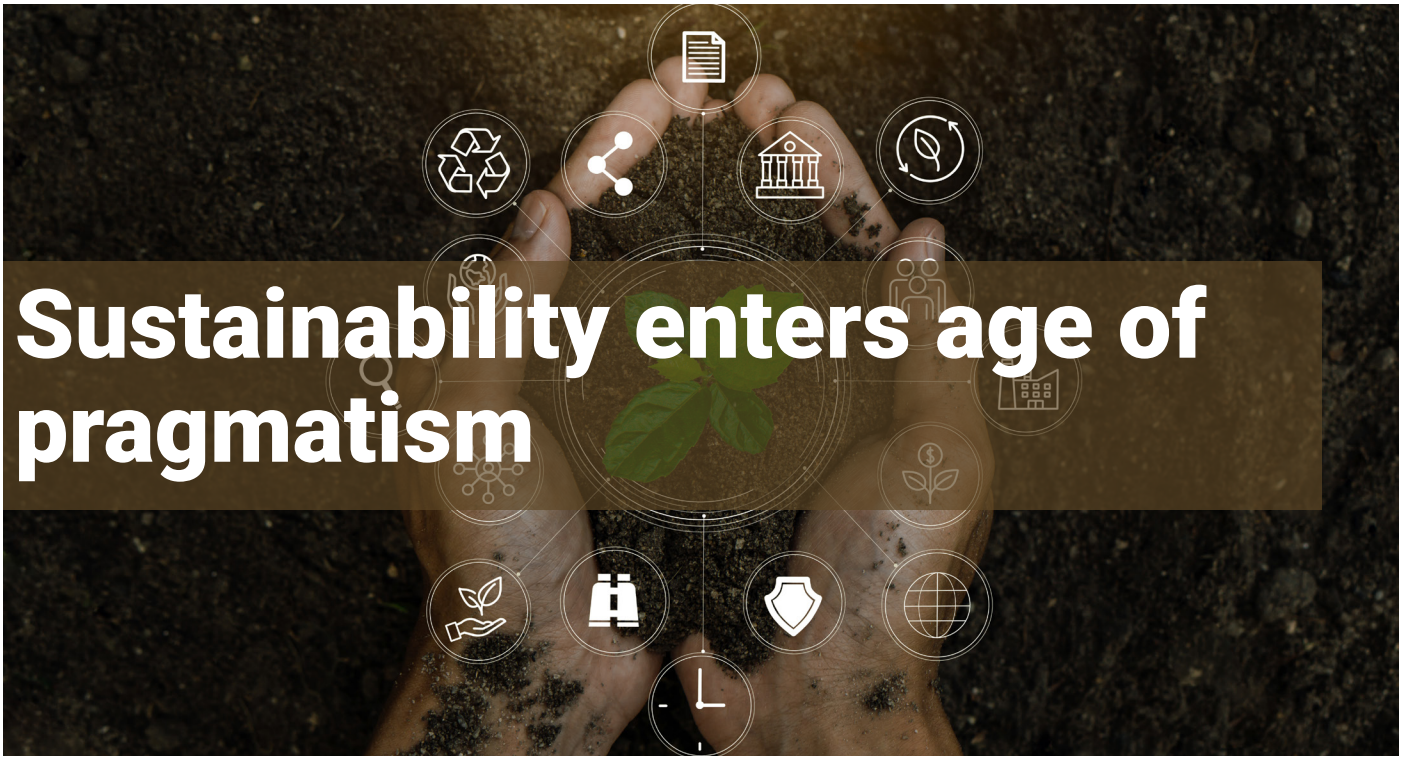
Even in Jamaica's case, large and rapid payouts, measured in the tens or hundreds of millions of dollars, cover only a fraction of total losses estimated in the billions following major storms like Melissa. Pre-arranged finance reduces the delay and uncertainty between impact and response, but it does not eliminate the scale of climate risk itself.

The latest data show that having finance in place before disasters strike matters because it narrows the gap between shock and action. It enables governments to support vulnerable communities more quickly, safeguard development gains and protect macroeconomic stability.

As climate change reshapes global risk landscapes, building resilience will depend not only on scaling up pre-arranged financing, but on ensuring that the full range of instruments, including parametric insurance, indemnity-based coverage, contingent credit and market-based risk transfer, is accessible, equitable and designed to work together.

The Centre will continue to monitor global sources of pre-arranged financing, supporting greater transparency, accountability and evidence-based decision-making, and helping to ensure that financial protection reaches the most vulnerable communities.

Michèle Plichta is a senior researcher at the Centre for Disaster Protection



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Sustainability enters age of pragmatism

ClimateWise programme director Felicity Alvey applauds the re/insurers making progress with sustainability efforts despite geopolitical challenges

There have been distinct stages in the evolution of sustainability reporting, according to Felicity Alvey, programme director of ClimateWise, a network of re/insurers convened almost 20 years ago by the University of Cambridge Centre for Sustainable Leadership, **writes Louise Isted.**

From the Brussels-led "going for green" approach with new EU taxonomies, to a period of "consolidation" with the arrival of the International Sustainability Standards Board in 2021, Alvey identifies the latest phase as "pragmatism" and says ClimateWise members are increasingly engaged in this shift.

Membership benefits

Alvey lists the four main benefits of becoming a member of ClimateWise. First, its long track record, having been formed as long ago as 2007. Second, its disclosure framework is aligned with global reporting standards but tailored to the insurance sector. Third, its benchmarking exercise provides feedback that is private. Fourth, it provides access to the climate research of a world-class university.

In exchange, ClimateWise expects its members to engage fully with other members and to report according to its "principles", which are regularly adapted to new regulatory requirements. In 2018, the ClimateWise Principles were aligned to the Task Force on Climate-related Financial Disclosures. In 2024, they were updated to reflect a much wider range of requirements including the Corporate Sustainability Reporting Directive and the Taskforce on Nature-related Financial Disclosures.

Then, in 2025, the ClimateWise framework for the first time formally assessed transition plans.

It has 31 members, with more in the pipeline, partly because of the Prudential Regulation Authority's new supervisory statement — SS5/25 — which aims to enhance banks' and insurers' approaches to managing climate-related risks.

There remains uncertainty among re/insurers, Alvey tells *Insurance Day*, on additional "incoming requirements", but the increase in ClimateWise members' scores proves they are managing to navigate the various approaches of the jurisdictions where they operate.

"Regardless of the moving parts, there's an interesting dynamic in the market to use reporting standards in a way that has the greatest impact," she says.

In addition to the ClimateWise Principles, should re/insurers keep an internal scorecard of their progress with sustainability? Alvey replies: "Looking externally to ClimateWise for a sense check is important, while internally you can have a big focus on your materiality assessment."

Latest review

The ClimateWise Principles Independent Review for 2025 revealed that its members had achieved an average improvement of 6% in their scores.

Although the number may seem small, Alvey says the increase proves that re/insurers are making progress in spite of 2025 being a "strange year, geopolitically". She adds: "It shows there's been a quiet continuation going on under the bonnet, even in a complex geopolitical environment."

Another highlight of the report is that momentum is building on transition plans. "We were really pleased to see organisations saying they value transition planning, regardless of what happens from a regulatory perspective," Alvey says. One-third of its members have already submitted full transition plans, demonstrating how long-term net zero commitments are being translated into tangible, near-term underwriting and investment actions. A further one-third of its members have made formal commitments to develop transition plans and have disclosed detailed roadmaps outlining how these will be developed.

The report also indicated that incorporating nature into transition planning is seen as an emerging challenge. Alvey explains: "Organisations are starting to build a foundation to understanding their nature-related risks, both within their underwriting and in their investment portfolios, and we've seen an uptick in bringing that into governance too."

The most challenging aspect, however, is that these risks "cascade" into multiple areas of a re/insurer's portfolio, and organisations therefore need to address any "disconnect" this creates, she says.

Davos doubts

Alvey notes that attention appeared to shift away from climate policy and the transition to net zero during the World Economic Forum's latest annual meeting, in January, where leaders expressed concerns around resilience and "insurability".

Alvey explains: "If climate impacts continue to worsen and insurers, from a purely economic perspective, are forced to step out of the market, then that would create huge systemic risks. It was interesting to see the topic of building business cases around resilience come through really strongly in Davos."

> **"If climate impacts continue to worsen and insurers, from a purely economic perspective, are forced to step out of the market, then that would create huge systemic risks. It was interesting to see the topic of building business cases around resilience come through really strongly in Davos."**
>
> Felicity Alvey,
> Programme director at ClimateWise.

She continues: "There's been a reality check in the past year, for better or worse, across a number of jurisdictions, and we've moved from aspirational environmentalism and the moral aspects of the transition to net zero, to pragmatic resilience. There's a lot more focus now by companies on building strength around adaptation and resilience to climate change, and a shift away from language around environmental, social and governance."

To any politician's claim that energy security is a bigger priority than climate risk, Alvey responds these are not competing priorities.

She explains: "For a long time, we've relied on volatile global supply chains that can leave us vulnerable to geopolitical shocks, but action on climate change is in many ways an answer to that, and we've seen proof of this in the market. Energy security means moving towards domestic renewable power that can't been turned on or off by geopolitical shifts. You can therefore create a virtuous circle of managing your climate risks and having energy security. We can look at the two in lockstep — and not as separate issues — to give us a much better footing for resilience."

Implementation COP

Pragmatism was clearly the focus of the head of the UN's latest round of climate talks, in Brazil last November, Alvey says. COP30 president, André Aranha Corrêa do Lago, wrote in a letter on January 28 that the negotiations in Belém had shown a new model of global response is emerging — "one fully entangled with its context, rendering climate implementation increasingly ubiquitous, much as the effects of global warming already are". In fact, the word "implementation" appears 22 times in his letter.

Alvey's first COP — COP26 in Glasgow in 2021 — was led by the UK's Alok Sharma, who famously offered an emotional apology when agreement had only been reached with last-minute changes to its wording on coal. Alvey remembers the flurry of announcements during the event and notes that COP30 showed a shift from that mindset to one focused on delivery.

One of the clearest achievements of COP30, she continues, is the Tropical Forest Forever Facility, which aims to establish a permanent financial incentive for preserving standing tropical forests, transforming them into protected, valuable assets. "If there hadn't been progress on nature at a COP based in the Amazon," Alvey says, "then where could there be?"

She adds: "Did we see progress with mitigation? Probably not, as the lack of fossil fuel language in the main

text of the COP30 agreement reflected the geopolitical environment going into the discussions, and this is going to be harder as we move into the implementation phase of any climate policy."

COP31 will be a unique event, she notes, as it will be based in one country (Türkiye) but led by another (Australia). This begs the question, she adds, "Will it create a really powerful force because two countries are backing it, or will it weaken the talks?" Whichever outcome transpires, 2026 is significant in that the COP31 climate talks and the COP17 biodiversity talks (in Armenia) are happening in the same year. "I'd be hopeful that good things for nature come out of COP31 in November, following COP17 in October," Alvey says.

Preventing nature loss

Asked how re/insurers can help prevent nature and ecosystem loss to climate change, Alvey stresses that nature is an "invaluable, yet often under-recognised asset". The finance industry is shifting towards the "nature positive" approach called for by the United Nations Environment Programme, she says. This recognises that protecting natural landscapes, such as wetlands or mangroves, creates a "natural insurance policy", she adds, to directly support resilience against floods, for example.

To meet this ambition, Alvey describes the four "levers" re/insurers can utilise to protect natural capital.

- *Underwriting nature-based solutions:* this includes developing products like parametric insurance for coral reefs, which ensures that if a storm hits, then funds are released immediately for reef repair, maintaining the natural barrier that prevents coastal erosion.

- *Addressing harmful underwriting:* implementing guidelines that help to reduce the availability of cover for projects contributing to issues such as deforestation or the destruction of biodiversity hotspots. This effectively raises the cost of capital for activities that are harmful to nature.

- *Investing in natural capital:* directing asset management towards projects that restore biodiversity and high-quality carbon sequestration, prioritising ecosystem health alongside financial returns.

- *Standardising disclosure:* supporting frameworks, such as the Taskforce on Nature-related Financial Disclosures. This ensures that nature-related risks are reported with the same rigour as climate risks, bringing transparency to how companies both impact and also depend on the natural world.

Three roles

Alvey underlines the importance of the three roles re/insurers have in tackling the impacts of climate change — risk transfer, asset management and investment. "How do you see those reinforcing one another currently and also how can you make sure they do? That's an interesting dynamic and challenging for quite a few re/insurers," she says.

Nevertheless, re/insurance was one of the first sectors within the financial services industry to "sound the alarm" on climate change, she stresses, because of the data it sees. "Over the past couple of years, there has been a push for re/insurers to play a greater role, thanks to the three mechanisms within that," she adds. As well as serving as an "early warning system" with their awareness of risk, she continues, re/insurers have "stewardship policies" that can determine how they manage assets and direct where they invest capital to support mitigation outcomes.

"It's really important to keep underwriting as climate risks worsen," she adds. Policymakers are increasingly aware that re/insurers "straddle" three functions, she continues, which means they are being encouraged to engage fully in climate talks.

Embedding climate risk

To effectively embed climate risk into financial modelling, actuaries and underwriters must move beyond their traditional methods, Alvey stresses. "Because climate risk is non-stationary, the historical data we rely on is no longer necessarily a reliable predictor of the future," she says.

Modern modelling must shift its focus therefore towards "cascading and systemic risks". Alvey explains: "Increasingly, we need to move from looking at individual hazards to understanding how shocks propagate through interconnected systems." Studies can clarify when a risk shifts from being a systems risk to a systemic one. Alvey notes a "very visual example of this fragility" — though not climate-related — is the 2021 Suez Canal blockage.

"A single chokepoint disruption sent ripples through global supply chains and credit markets," she says. "In a climate context, we must model for similar dynamics, such as multiple major global ports being forced to close simultaneously due to overlapping hurricane events."

Examples like this show that a systemic risk is typically characterised by three critical conditions, Alvey continues. These are:

- *Correlation:* A single shock affecting multiple markets simultaneously.

- *Duration:* Disruptions that last long enough to exhaust existing financial buffers.

- *Feedback loops:* Initial losses that amplify further losses elsewhere in the system.

Alvey concludes: "These are the factors we need to be increasingly embedding into modelling." ■

Pre-disaster insurance market is growing: Napiorkowski

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'We can boost climate finance by spreading the word about technology performance insurance,' Ariel Green managing director Jan Napiorkowski says

Momentum is building for insurance as a driver of climate finance, with technology performance insurance gaining ground as a pre-disaster solution, according to Ariel Green's managing director, Jan Napiorkowski, **writes Louise Isted**.

Ariel Green, a division of re/insurer Ariel Re, provides investment-grade technology performance insurance (TPI) to ensure clean energy projects secure financing at competitive rates to facilitate their construction and derisk their operation.

This role has received a boost, Napiorkowski says in an interview with *Insurance Day*, from the fourth report of the Independent High-Level Expert Group on Climate Finance, which was published last November. The report — Delivering an integrated climate finance agenda in support of the Baku to Belém Roadmap to 1.3T — is full of references to insurance. "The fourth report is a fantastic next stage in the evolution of climate finance because it shows that insurance is a critical element," Napiorkowski says.

"And it doesn't associate insurers only with risk transfer or post-disaster relief but also acknowledges it as a form of pre-disaster contingent capital funding," he adds.

Ariel Green's mission, therefore, is to increase awwareness of new insurance products that support climate finance by "spreading the word" about TPIs. "TPI is pre-disaster contingent capital that enables the funding of technologies designed to mitigate climate change," Napiorkowski says.

Supply creates demand

Ariel Green's TPI deploys capital to the clean energy industry through customised long-term and non-cancellable risk management solutions, and supports energy storage, waste to energy, fuel cell, electrolysers or solar projects by backstopping supplier warranties or guaranteeing project production levels.

Ariel Green says it brings Ariel Re's re/insurance and Lloyd's underwriting expertise and collaborative approach to developing insurance products that enable clean energy projects to "secure financing, get built and begin operations".

Napiorkowski says the TPI market is growing thanks to the somewhat unusual situation of "supply creating demand" and Ariel Green has been able to grow its consortium members to 11, by adding Tokio Marine HCC and GIC Syndicate from January 1. Ariel Green has received "many more inquiries", he adds, since Munich Re stepped out of the TPI market (for bioconversion and waste-to-energy projects) last year.

The absence of the German re/insurer is a blow to TPI competition, Napiorkowski admits, because brokers are "more comfortable when there are multiple markets", but Ariel

Green has nevertheless been able to increase the total notional risk limit of the consortium from $150m to $222m in the past 12 months.

That increase is not from having new members, he adds, but reflects the "increase in appetite" from the consortium.

"Having a solid panel of 11 markets is very good for diluting risk because we have a very uncorrelated book of different types of policies for different underlying technologies," Napiorkowski says. The consortium is there for the long term, he stresses, and able to shoulder losses that no single company would want to try and bear alone.

TPI and clean energy

Ariel Re caters to the full gamut of investors in renewable energy projects, from banks to private equity companies, who understand that the growth in clean energy technologies relies on derisking assets, Napiorkowski says.

One of these is Clairvest Group, the Canadian private equity management firm. Ariel Re insures the contractual performance guarantees of NovaSource Power Services, which Clairvest acquired with NovaSource in 2020 from SunPower Corporation.

At the end of last year, Ariel Green announced it had provided insurance coverage for Elite Solar, for its solar module performance warranty for up to 30 years.

Ariel Green's TPI provides financial protection to buyers even in the unlikely event of a manufacturer default — which means unexpected underperformance or defects are still covered over the lifetime of the equipment, even after a supplier bankruptcy.

He explains: "Financial institutions know that equipment suppliers with long-term performance guarantees must build up significant reserves on their balance sheets to be able to fulfil their obligations under their warranties. "Auditors require them to build up those reserves and insurance is a very efficient way of releasing some of the reserves so that there is cash for operations. They're paying the insurer a fraction of their reserves, but in return they're getting a policy limit that is bigger than their reserves in the event of a product recall or product defect."

In addition to balance sheet relief, TPI enables a credit enhancement of the manufacturer's warranty.

TPI is not a credit insurance policy, Napiorkowski stresses, and does not directly insure against manufacturer insolvency.

> **"When we insure a solar project, we recognise that equipment failures over a 30-year operating life are inevitable. The purpose of TPI coverage is to ensure the project can repair or replace underperforming components and continue delivering its guaranteed output, rather than face prolonged shutdowns**
>
> Jan Napiorkowski
> Ariel Green

However, because the coverage is tied to the equipment achieving specified performance parameters — regardless of whether the manufacturer remains in operation — it can indirectly mitigate insolvency risk by preserving the ability to recover losses and maintain the value of the underlying warranty obligations.

TPI does not cover physical damage to equipment, such as hail landing on solar panels, he continues, and is instead focused on a project's ability to generate electricity from renewable energy sources.

Equipment manufacturers are constantly working on weather resilience, he says, such as trackers that make solar panels tilt vertically to avoid the path of hailstones.
TPI does cover business interruption, but not as a consequence of physical damage.

"When we insure a solar project, we recognise that equipment failures over a 30-year operating life are inevitable. The purpose of TPI coverage is to ensure the project can repair or replace underperforming components and continue delivering its guaranteed output, rather than face prolonged shutdowns," Napiorkowski says.

Politically agnostic

Ariel Green said that partnering with trusted solar manufacturers like Elite Solar aligns with its mission to expand its solar module coverage in the US.

With climate policy in the US facing pushback and uncertainty under the current administration, TPI can provide long-term stability to project developers and owners that will outlast any single administration.

"We're completely agnostic about politics, but there was an urgency to proceed with projects and secure tax credits before the One Big Beautiful

Bill Act," Napiorkowski says.

Signed in July 2025, the bill is a major legislative package affecting 2026 taxes and spending.

Although it does not favour fully renewable energy technology, there is some support for "semi-renewable" types, Napiorkowski adds. These include, for example, fuel cells and electrolysers.

The bill has encouraged domestic US manufacturing, he continues. "We've closed two policies that cover US solar manufacturers, which we hadn't seen in over a decade because all the manufacturing was happening in Asia, not the US," he adds.

Conversely, tariffs on imported products have led foreign manufacturers to look for — and find — other markets. "I'm not saying this is a good thing for the domestic US market, because pricing will be much higher there and we have to see how the quality plays out over time," he says.

Asia remains the centre of renewable energy technology — China and India are the two biggest for solar and battery storage, he says — while European investment in their products has "picked up significantly".

Ariel Green has been "active" in 30 countries and provided coverage in 15 of them. Given the long-term nature of TPI coverage, no company can predict government policy changes, Napiorkowski stresses.

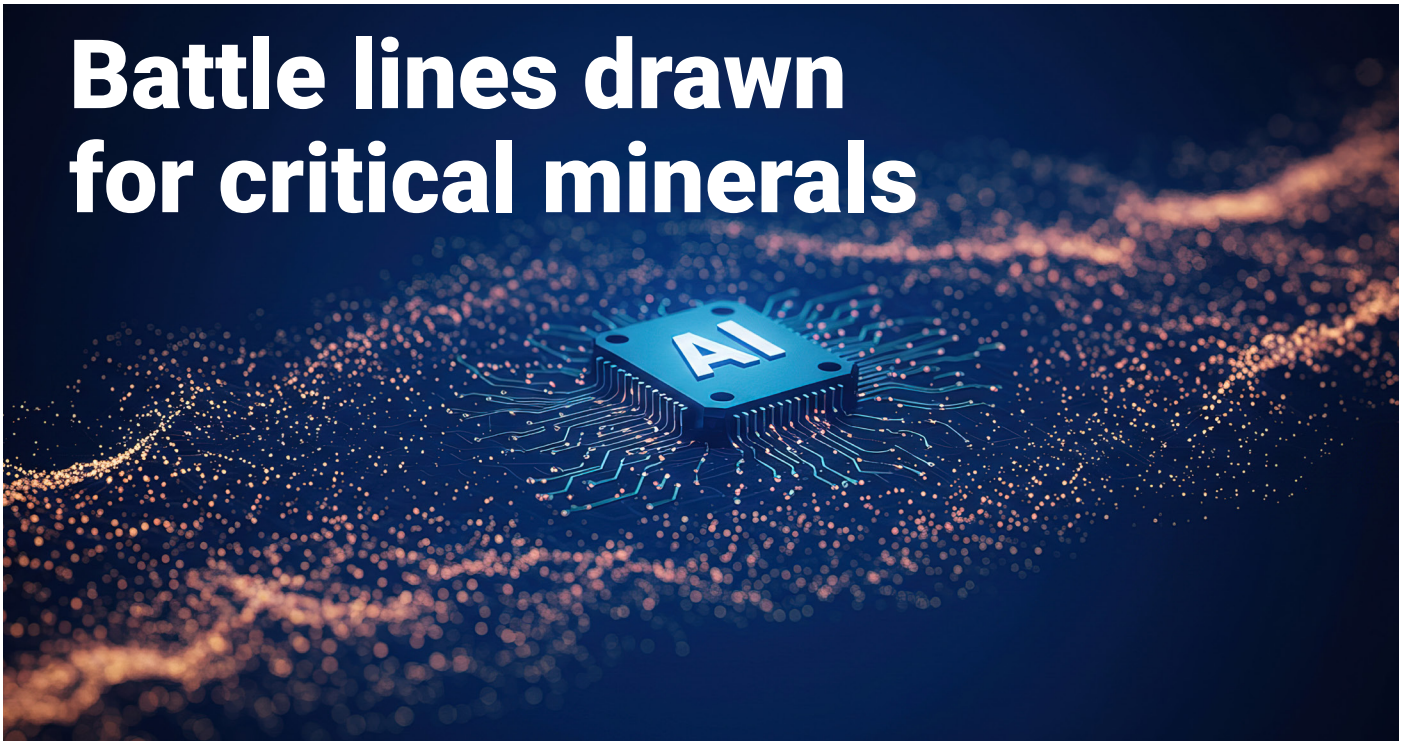
He explains: "For example, we've been supporting the South Korean fuel cell market for a good eight years, but investments decreased last year following 18 months of political instability there. This is slowly turning around and in Q4, and now in Q1, there has been a pickup again in funding these projects."

On the global stage, however, the link between insurance and renewable energy is growing stronger. The UN climate talks in Azerbaijan in 2024 — COP29 — was the "breakthrough" cop for re/insurers, Napiorkowski says, and COP30 in Brazil last year proved that insurance is moving "systematically upstream into the investment process".

He concludes: "Many financial institutions are getting into renewable energy projects, but most of them still don't know of the existence of TPI, and so we need to create more awareness that bankability and insurability go hand in hand, which together will help drive further investment into clean energy."

zhu difeng/Adobe iStock

Battle lines drawn for critical minerals



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Competition for critical minerals is heating up between the developers of data centres and the producers of clean energy

Whether one believes artificial intelligence (AI) is revolutionary or even useful, it is certainly driving a colossal volume of capital and other resources into data centres and similar infrastructure. UN Trade and Development estimates there were more than $270bn in announced data centre investments in 2025, **writes Ben Margulies**.

Data centres consume vast stores of raw materials which are also needed by other economic sectors, including renewable energy production. The US Geological Survey lists silver, tin, copper, palladium, platinum and tantalum among the components necessary just to construct server boards. Data centres also need aluminium, rare earths, arsenic, silicon, indium, germanium and gallium — which is not an exhaustive list.

Mining company BHP estimates data centres will use about three million tonnes of copper each year by 2050, up from half-a-million tonnes today. Then there are lithium batteries, needed by renewables energy networks to store power, and by data centres for back-up electricity supply. Precedence Research predicts data centre spending on lithium-ion batteries will rise by about 250% between 2024 and 2034.

This could put pressure on the renewable energy sector as a competing user of the same materials and devices. By 2050, the International Energy Agency (IEA) estimates that solar photovoltaic power will require nearly 2.8m tonnes of copper, and wind more than 1.3m tonnes, based on announced climate pledges.

"Growing AI investment poses a tangible risk of diverting electricity and critical mineral resources from renewable energy and other decarbonisation technologies," James Forsyth, energy transition director for Deloitte UK, tells *Insurance Day*.

"This is due to the substantial power demands of AI data centres and the need for specific minerals in AI hardware, which could outpace renewable energy growth and create supply chain competition."

In its Global Critical Minerals Outlook 2025, the IEA predicts the 2030s will see supply outstrip demand for both copper and lithium, with "a potential 30% supply shortfall of copper by 2035 due to declining ore grades, rising capital costs, limited resource discoveries and long lead times".

The IEA does add it will be easier to open new lithium mines than to expand copper production.

Muhammad Anwar, director of strategic climate disclosure at WTW, believes that big data's demands for raw materials may not necessarily prevent the development of renewable energy infrastructure. However, it might inflate costs which could impact the competitiveness of renewables production.

Big Tech is not the only competitor for some of these resources. S&P says while data processing is "creating a new vector of copper demand, it is not the largest by any means". Mikael Mikaelson, a policy fellow at the Stockholm Environment Institute (SEI), says that Tesla's planned production alone might require a

doubling of lithium production.

According to IEA data, electric vehicles already accounted for almost 56% of lithium consumption in 2024, rising to nearly 83% by 2050. Electric automobiles will also consume more than a quarter of rare earths by 2050, almost twice the amount wind power plants will. Even in the absence of AI, the projected needs of the energy transition mean the supply of critical minerals is "very constrained", Mikaelson says.

Another constraint Mikaelson mentions is opposition to new mining. A planned lithium mine in Serbia has faced years of protests and Rio Tinto suspended the project last November. In Panama, mass protests broke out in late 2023 after authorities granted a long-term concession to a Canadian company to operate the Cobre Panama copper mine. The supreme court annulled the contract that November, shutting down operations at the mine.

Sanjay Patnaik, director of the Center on Regulation and Markets at the Brookings Institution, points out that resource constraints could create political dangers and exacerbate environmental damage. "Critical inputs such as lithium and rare earths are geographically concentrated, heightening geopolitical exposure and environmental damage from intensified extraction," he says.

The IEA forecasts that just over half of all copper in 2030 will come from just three countries — Peru, Chile and the Democratic Republic of the Congo. Other mineral production is even more concentrated — China, Australia & Chile will make up nearly two-thirds of lithium sources, and China 62% of lithium refining. Cobalt, graphite, rare earths and nickel production will be even more concentrated.

Big Tech companies are not hostile to the development of renewable energy. Anwar and his colleague Michael Buckle, WTW's head of natural resources, say that data centres require constant power, which renewables can sometimes struggle to provide. But that has not prevented data centre operators from investing in green energy.

Mikaelson and his colleague Adis Dzebo, a senior policy fellow at SEI, counter that it may be faster for technology companies to bring renewables plants online than to rely on fossil fuels — and certainly faster than relying on nuclear power, though some are also investigating the use of small modular reactors.

Ironically, AI itself might be able to ease supply constraints by finding new mineral deposits and expanding production. "In mining, AI-enabled machine learning and data integration can sharply improve energy efficiency, reduce waste and accelerate discovery" of mineral deposits, Patnaik says. WTW's Anwar also notes there has been some investigation into whether AI can find new seabed mineral deposits.

Recycling may be another way to ease resource constraints, Mikaelson says, as will moving from commodity-based business models to service-based ones. The latter would involve time-share arrangements for infrastructure use, "where you're maybe selling cooling hours rather than refrigerators", Mikaelson explains.

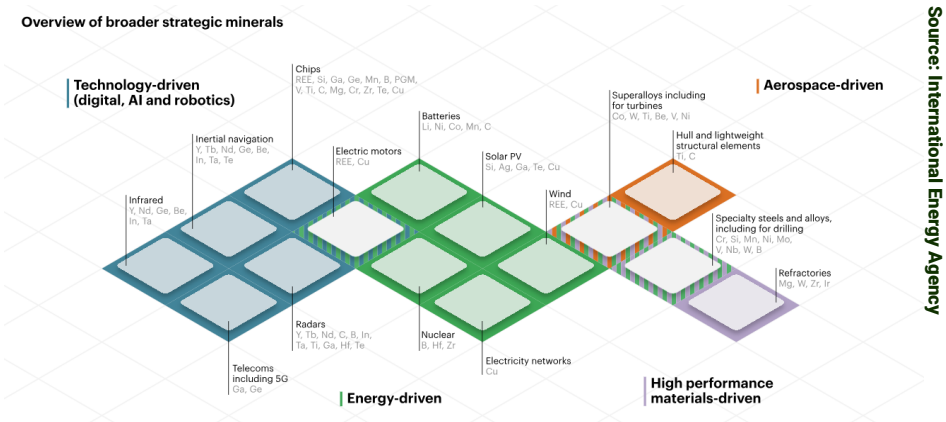
Some say AI could also reduce consumption through efficiency savings. Mikaelson argues, however, that increased efficiency just sets a new benchmark to create a never-ending cycle of greater demand for productivity.

Meanwhile, the UN's nuclear watchdog is muscling its way into the fray, arguing that nuclear power and AI are "converging to shape the future".

Addressing the International Symposium on Artificial Intelligence and Nuclear Energy last December, Rafael Mariano Grossi, director general of the International Atomic Energy Agency, said that nuclear fission is the only energy source that can meet the combined demands of low-carbon generation, 24/7 reliability, massive power density, grid stability and genuine scalability.

But then, nuclear energy itself depends on critical elements for both fuel and infrastructure: uranium, copper, nickel, chromium, manganese, molybdenum, etc. So, it may be a bit presumptive for Grossi to claim that "Atoms for Peace" — as per US president Dwight D. Eisenhower's speech to the UN General Assembly in 1953 — is now "Atoms for Algorithms".

Maryam Golnaraghi, the Geneva Association's director for climate change and environment, stresses that financial institutions should build climate considerations into their funding and insurance decisions. How best to use AI to assist them with the clean energy transition remains to be seen. "Capital allocation, underwriting standards and risk-engineering engagement will determine whether AI becomes a headwind or a catalyst for resilient decarbonisation," she says. ■



Source: International Energy Agency

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Insurers like green data centres, but only if the lights stay on

Big Tech is open to renewables and may find innovative ways to save energy — but uninterrupted power is the first priority, WTW experts say

The boom in artificial intelligence (AI) is creating vast demand for electricity and raw materials. The International Energy Agency (IEA) expects the amount of electricity that data centres consume to double between 2024 and 2030 – an increase of 415 terawatt-hours, which is more than many advanced economies generate each year, **writes Ben Margulies**.

And that power must be uninterrupted. AI requires "consistent baseload", says Michael Buckle, head of natural resources in the UK market for WTW.

"You can't have power that's going to be dropping out or disappearing. So renewable energy won't be enough for AI data centres because, by their very nature, they're intermittent. And all that power – and the data centres themselves – could also divert raw materials from the renewables sector," he says.

Do data centres spell the death knell for the future of renewable energy?

Not really: Big Tech is not driving any expansion of the dirtier fossil fuels, and neither insurers nor their partners are abandoning their climate commitments. Renewables could become more expensive due to resource constraints, but that does not mean they will become uncompetitive.

The environmental impact of AI remains difficult to calculate, however, in part because AI may also reduce emissions and make it easier to supply the renewables sector through improved mining.

Fossil fuels

According to the IEA's Energy and AI report, fossil fuels generate most of the electricity used by data centres globally. Coal provides the largest share, some 30%, but this is driven by the Chinese technology sector, which relies on coal for almost 70% of the power provided to its own data centres. Renewables are the second-leading source of power, at 27%, though their share is smaller in the US (24%) and China (less than 20%). Natural gas is third at 26%, but it provides more than 40% of data centre power in the US.

In Europe, renewables and nuclear are set to supply most of the additional electricity required by data centres, with their combined share rising to 85% by 2030, the IEA says.

Buckle tells *Insurance Day* that Big Tech companies are currently most interested in electricity produced by natural gas. "If you can provide gas turbine dedicated island power supply, either from large gas turbines or from aero-engine derivative gas turbines, that is consistently reliable power."

Data centre operators are also interested in using nuclear power, specifically small modular reactors. Google signed a deal with Kairos Power in 2024 to produce such units, with the first slated to come online before 2030.

Buckle says that data centre expansion is not driving increased investment in coal or other fossil fuel supplies — neither data centre operators nor insurers are interested in constructing new coal power plants just to power AI operations.

However, Muhammad Anwar, director of strategic climate disclosure at WTW, says data centres could give some ageing or decommissioned gas and nuclear power plants a new lease of life, pointing to the Three Mile Island (TMI) nuclear power plant in Pennsylvania being brought back online. Anwar refers to a 2024 contract Microsoft signed to source power from TMI, site of the US's only major nuclear accident, in 1979.

Keep the lights on

Big data firms are open to renewable energy. In a 2024 report, the US Department of Energy notes that the data centre industry has "shown interest and leadership" in implementing real-time renewable energy and zero-carbon power, including battery storage resources. Buckle notes that many major companies, including Amazon and Microsoft, have invested in renewable energy.

Anwar adds: "More demand in a growing market can mean that you're not having any negative incremental impact on renewables because you just need to fill that growing demand."

Major technology companies can build renewable energy units alongside data centres quite cheaply. Any preference for non-renewable fuels is "not necessarily about economics, because renewables are actually very, very competitive in a lot of these cases", he adds.

Ester Calavia Garsaball, WTW's head of catastrophe and risk financing, points out that regulators may oblige data centres to rely on green energy. She notes that Ireland will require data centres to derive 80% of their electricity from renewables from this year. She also mentions the EU Energy Efficiency Directive, which requires data centres to report their power usage effectiveness among other metrics.

Competition for resources

Could data centres starve renewables of raw materials? The IEA estimates that by 2040 renewables will account for nearly 80% of lithium demand, as well as 40% of cobalt and more than 20% of copper and rare earths.

S&P Global predicts decarbonising the energy system will require over 7m metric tonnes of copper alone each year between 2025 and 2040.

"If you have a load of data centres being built-out globally, then you will see an increase in demand for things like copper and lithium," Anwar says, adding this could constrain supply for renewable energy producers. This implies elevated prices rather than resource shortage, Anwar continues.

"If there's a lot of demand entering the market from AI data centres, and the price of copper, all other things being equal, is higher, [that] makes it more expensive to build electricity grids or renewable technologies that require a lot of copper." In theory, this could make renewables more expensive and so "slightly less competitive", he adds.

AI may be able to improve how electrical grids utilise different types of power "in real time", Anwar says, and ease renewables into the distribution network. And AI could, potentially, help detect new mineral resources and expand production, he adds.

Business interruption

The key issue for both technology firms and their insurers is preventing business interruption, which means keeping the lights on at all costs. "When you're operational, you're receiving revenue, but if the power goes down and your revenue flow stops, and then you want to insure that revenue flow, which is a huge risk for insurers," Buckle says.

The first concern when designing and constructing a data centre, therefore, is redundancy. "Build it to the right design, where you haven't got single points of failure, where you can switch between power supplies and power sources," Buckle says. That creates an opportunity for renewables, but also for rival fuel sources.

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Insurers focused on the clean energy transition will not promote the use of fossil fuels and will encourage Big Tech firms to adopt renewables. "They will support the businesses and clients that actually get it right, and get the balance right, and overall prove that they are doing it in an efficient way that is as carbon friendly as possible," Buckle says.

Calavia Garsaball adds that WTW has found there is support for innovative efforts to improve the resilience of power grids. "So I think we're going to see more collaboration between clients and insurers to overcome these challenges." ■

greenbutterfly/Adobe iStock

Leveraging space technology and data

European Space Agency and Liberty Mutual Reinsurance are collaborating to enable fast, objective and transparent risk protection for agriculture and forestry

The European Space Agency and Liberty Mutual Reinsurance have started a three-year collaboration aimed at exploring how space applications can help create parametric insurance solutions to protect sectors such as agriculture and forestry from climate-related risks, **writes Louise Isted**.

In an interview with *Insurance Day*, Ana Raposo, business applications and partnerships officer at ESA, and Victor Bouton, head of science, parametrics and agriculture at LM Re, explain what comes next.

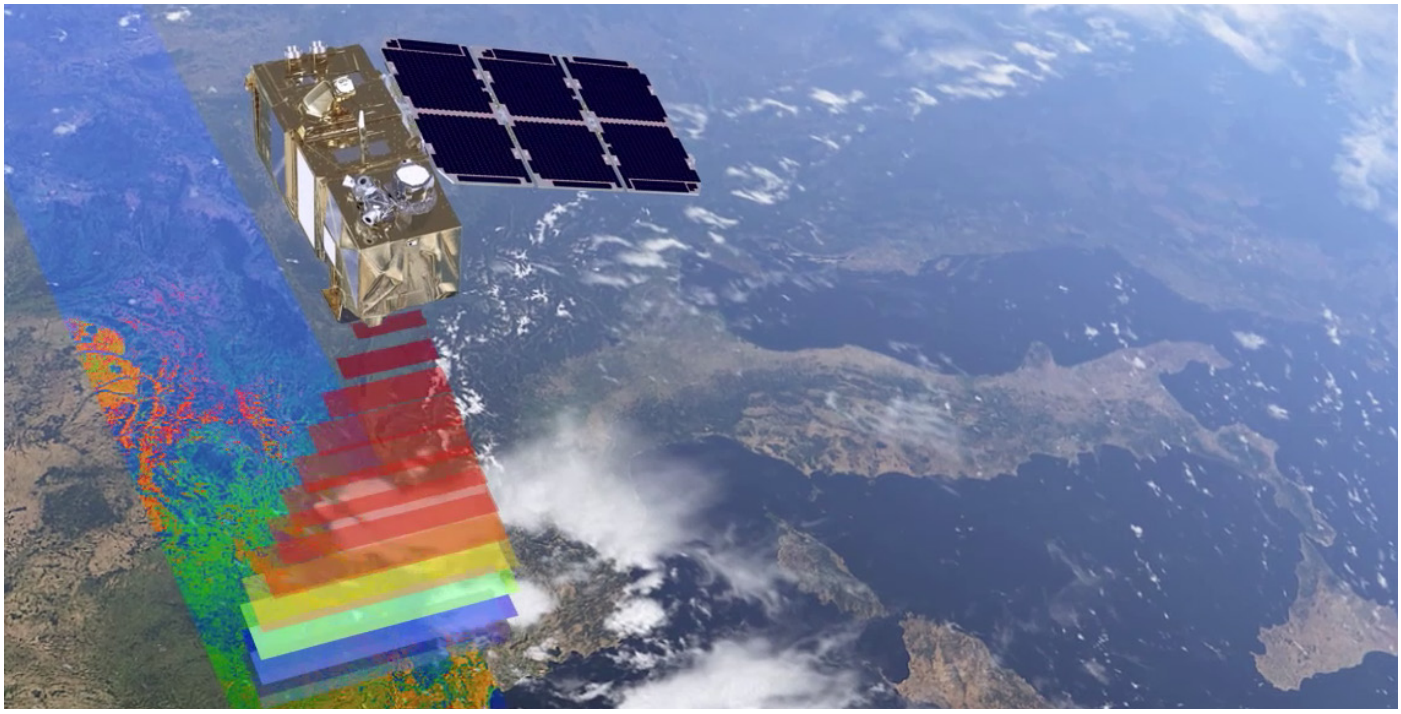
What will be the milestones for this collaboration and the final desired outcome?

VB: The main milestones for this collaboration are centred on developing accurate and reliable indices for the parametric insurance market by leveraging space technology and data. Our goal is to close existing gaps where current solutions either lack the necessary indices or fail to provide the precision our clients require. By bringing together industry stakeholders and technological expertise, we aim to create new, innovative indices that address unmet needs, ultimately making parametric insurance more effective and tailored to real-world risks.

AR: ESA's Business Applications and Space Solutions aims to accelerate the transformation of innovative ideas into market-ready space-based services and applications that deliver measurable socio-economic impact. Through this collaboration with LM Re, BASS will help businesses make use of space technologies in support of scalable and market-driven products that enable fast, objective and transparent risk protection for agriculture and forestry.
We are looking forward to supporting European companies to develop space-based services and products in support of parametric insurance solutions to drive innovation, enhance performance and promote climate resilience.

What are the respective expertise and resources for this collaboration?

VB: Within this collaboration, each partner brings distinct expertise and resources. Liberty Mutual has a team focused on parametric and agricultural insurance and reinsurance, comprising underwriters with both technical and commercial capabilities who operate globally. We also have an important dedicated data science team, with specialists in each of the natural hazards (floods, tropical cyclones, earthquakes, agriculture, remote sensing, weather, etc). These resources are supplemented by ongoing partnerships with technology providers — private and academic — and the development of proprietary risk models, ensuring a comprehensive blend of insurance experience and techno-


ESA

logical innovation is brought to the projects.

AR: BASS provides tailored project management support and zero-equity funding to help accelerate the development of promising solutions. It also offers access to ESA's extensive network of partners and stakeholders, together with the credibility of ESA branding which helps businesses strengthen market outreach. In addition, BASS plays a key role in identifying, selecting, and supporting technically robust and commercially viable solutions, ensuring they are well aligned with the specific needs and challenges of the target market.

How can space technology make insurance faster, more transparent and scalable?

VB: Space technology plays a crucial role in improving insurance operations by allowing for the remote assessment of losses using physical indices such as biomass, burned area, sea surface temperature, eliminating the need for in-situ loss adjustments. This approach, inherent to the concept of parametric insurance, enables rapid claims processing, ensures transparency by relying on deterministic data and indices that are pre-defined in the insurance policy and allows insurance solutions to be offered at scale even in very remote or inaccessible regions.

AR: Space technology can significantly improve the speed, transparency and scalability of insurance products by providing reliable, continuous and objective data that supports better risk assessment, monitoring and claims processing across the entire sector. Satellite Earth observation supplies near real-time information about events such as storms, floods, droughts or wildfires. For instance, Sentinel 1 can provide valuable data for flood and storm damage mapping, Sentinel 2 delivers optical imagery for vegetation monitoring, and Sentinel 3 data can monitor land and sea surface temperatures.

This allows insurers to assess conditions quickly and, in the case of parametric insurance, trigger payouts automatically when pre-defined thresholds are met. For example, the NDVI (Normalised Difference Vegetation Index) generated from ESA's Sentinel 2 optical data offers frequent and reliable measurements of vegetation health, enabling insurers to detect drought impacts and use these metrics as triggers for parametric payouts. Thanks to space data, insurers and policyholders can share access to the same independent data.

For parametric products, space-derived metrics such as soil moisture anomalies, flood extent mapping, or wind speed estimates from satellites support clear criteria for payment.

How do you plan to develop advanced risk models for climate resilience?

VB: The development of advanced risk models will rely on accessing and processing large volumes of data to capture trends, seasonal shifts and teleconnections such as El Niño cycles. This requires technical capacity not only to handle data but also to integrate continuous feedback from clients into model features. The open collaboration with all relevant stakeholders, insurers, clients, technology partners and organisations like the European Space Agency ensures that offered solutions are constantly refined and adapted to emerging challenges, improving both accuracy and resilience in response to climate risks.

What was the purpose of and what were the main takeaways from your first workshop? When will the next one be?

VB: The workshop on February 12 was organised to address the challenge of assessing wind and storm damage on forestry assets using space-based technologies. Its purpose was to bring together industry stakeholders to discuss technical obstacles and identify potential solutions. The event was well attended, with about 80 participants from over 30 companies, reflecting significant interest in the topic. The workshop concluded with a call to select a partner company for a six-month pilot programme under ESA guidance, which will lead into a commercial phase. While this specific workshop is now closed, further workshops and collaborative projects are planned over the next two-and-a-half years.

What are the current challenges in assessing wind damage on forestry?

VB: Assessing wind damage in forestry using space data faces several key challenges. Persistent cloud cover, particularly after storms during winter, often limits the effectiveness of optical satellite imagery. Many affected locations are remote, have complex terrain or feature a wide variety of forest types, all of which make accurate assessment more difficult. While SAR (radar) imagery can penetrate cloud cover, it brings its own set of challenges, including data noise and interpretation difficulties. These factors mean that the market does not yet offer a fully robust or rapid solution that meets all clients' needs. The objective of this project and our ongoing collaboration is precisely to close this gap by finding a relevant and accurate solution and ensure our clients have access to the best risk mitigation solution for their forestry assets.

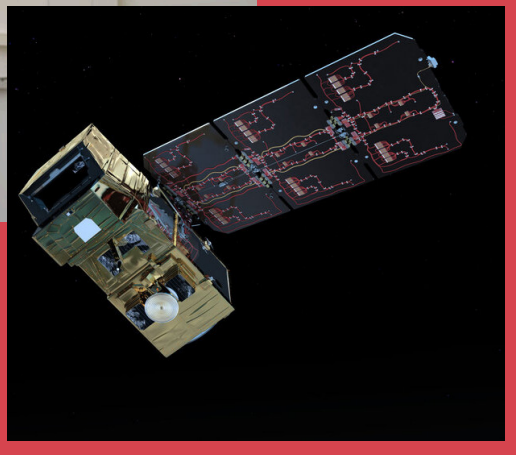
What is the deadline for companies to propose solutions to these challenges that use space data and technology?

VB: The call for project proposals related to this specific workshop is now closed and our team is currently reviewing all submissions received. For companies that were unable to participate in this round, there's no need to worry: another call for projects is being prepared, and is expected to be released in Q2 or Q3 of 2026.

What funding will be available and from whom?

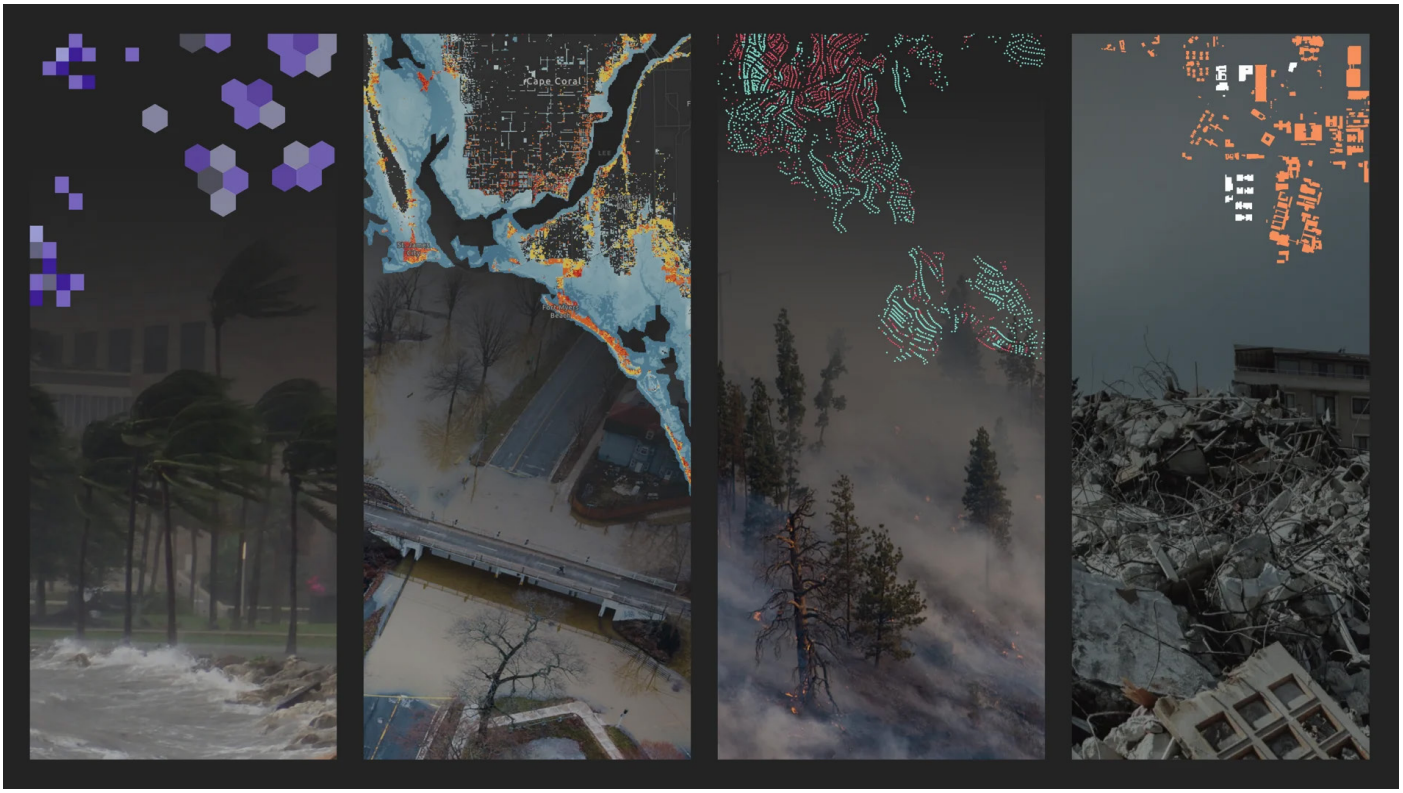
AR: BASS Open Call for Kickstarts offers €75,000 ($87,000) equity-free funding for companies looking to assess the viability and sustainability of new concepts, where the €75,000 represents 75% of the total cost of the activity. BASS has also a call for proposals where companies can undertake proof-of-concept studies and pilot projects. Proof-of-concept studies aim to design service concepts and develop a minimum viable product to consolidate market opportunities and user engagement, with maximum funding of €600,000. Pilot projects aim to integrate and pilot the service/product with customers in the primary market, demonstrating full integration in an operational context. Activities are typically funded at 50% of the total cost — formally there is no upper limit, but typically this is up to around €2m. ■

Sentinel-2A fully integrated at IABG's facilities



Sentinel-2: high-resolution and multispectral

ESA



Source: Iceye

Market 'only scratching the surface' of parametric potential

Iceye's head of reinsurance practice and Guy Carpenter's head of catastrophe risk research describe the growth and potential of parametric solutions, and the frictions standing in the way of larger adoption

The potential of parametric insurance as a tool for tackling climate risks is slowly becoming clearer, according to Guy Carpenter's head of catastrophe risk research, Guillermo Franco, and Iceye's head of reinsurance practice, Anke Sielker, **writes Louise Isted**.

Guy Carpenter is using space technology to enable some of the parametric structures that it commercialises. It started working with Iceye, the Finnish microsatellite maker, in 2023 to boost flood resilience of low- and medium-income households in New York City.

In a joint interview with *Insurance Day*, Franco and Sielker describe the rapid evolution of microsatellites in the past few years and identify applications that can lead to further progress in the parametric insurance market.

Satellite developments

Sielker describes the progress Iceye has made with parametric products based on its microsatellite technology. Iceye's satellite capabilities and adjacent analytics are no longer limited to flood, but now also include the perils of wildfire, earthquake with fire following and hurricane. It is also experimenting with other perils and recently "brought live" its deforestation data.

She explains: "Working from a multi-peril perspective is a step change from working on flood as a sole peril. Having said that, there has also been a change in the usage of satellite imagery for natural catastrophes, as we're now mapping the hazard for flood versus change detection by using pre- and post-event imagery for hurricane and earthquake, which brings a new decision matrix to the insurance industry.

Understanding the actual change is a perfect trigger for parametric insurance after physical damage."

Iceye's constellation has grown, providing round-the-clock monitoring in all weather, including through cloud cover. It has launched 64 synthetic aperture radar satellites in orbit to date, up from 35 in 2024, which has markedly increased the number of images it is able to take.

It has also enhanced the imaging mode to increase the resolution of images, scan wider areas and take multiple images in a single overpass. This translates into a larger volume and variety of data to support parametric insurance products.

"Not only can Iceye's constellation reveal how many buildings have been destroyed in a certain postcode," Sielker says, "but it does so within 24 hours of an event, giving re/insurers an early, first overview of a loss."

On the commercial side, Iceye has been building and contributing to a data ecosystem for insurers, cedants and insureds.

A recent example of this is the company's collaboration with Munich Re's Risk Management Partners division, which integrates Iceye's flood solutions into the German re/insurer's Location Risk Intelligence Platform, thus enabling its clients to assess and manage the risks associated with natural hazards and climate change.

"The platforms that we're working with are primarily for risk management and underwriting, but we also provide data for corporate resilience platforms," Sielker continues, "which is all aimed towards more private industries adopting climate risk analytics."

There may be occasions when an insured requires a form of data that Iceye does not provide, such as optical satellite, aerial or drone imagery. "Using the right type of observation data for the right coverage is essentially an art that needs to be crafted further," Sielker says.

She explains: "We know the benefits we offer and for which perils, but we hope a wider ecosystem will be created to enable even more coverage than we offer now. Our goal is for the re/insurance market to understand our data, where and when to use it, to have platforms for our imagery to deliver into, as well as the other types of images that are needed in addition, or as an alternative, to ours."

She continues: "I hope the industry will develop more hybrid triggers using various types of observation data, because that will cover the risk more completely. It's the third parties, including brokers, who will need to spark this because it takes a lot of different types of expertise."

Guy Carpenter has significant experience transforming observational data into parametric insurance mechanisms, Franco says. Over the years, the broker has developed four proprietary parametric products for earthquake, tropical cyclone, wildfire and flood risk.

All these products use robust remote sensing data from different satellite and ground-based systems.

Two of them, GC FireCell and GC FloodShield, are explicitly designed to accommodate "hazard footprints" acquired from space-based systems.

"For wildfire, we use the footprint of the burnt scar as the triggering data," Franco says.

Although the parametric mechanism is flexible to accommodate footprints from different acquisition systems, he adds, one of the providers Guy Carpenter often relies on is Nasa's Fire Information Resource Management System, a satellite-based observation service that detects and reports peaks in brightness on the surface of the planet, and is routinely used by emergency services to monitor wildfire events.

Guy Carpenter also uses hazard footprints acquired from satellite systems to detect the extent of flooding events. This approach was used, through its collaboration with Iceye, for a flagship transaction for New York City.

"Iceye's observations tell us what locations have experienced flooding across an extensive grid that covers several neighbourhoods of New York City. Based on that assessment, we calculate a payout outcome for the client," Franco explains.

> "We know the benefits we offer and for which perils, but we hope a wider ecosystem will be created to enable even more coverage than we offer now
>
> Anke Sielker,
> Head of reinsurance practice, Iceye

Basis risk

Franco and Sielker say that an obstacle to the growth of parametric insurance is presented by basis risk — the difference between the losses incurred and the payout an insured obtains from a policy. If this discrepancy is large, it can leave the policyholder without appropriate coverage, causing frustration and financial distress.

"Basis risk, which is present to a greater or smaller degree in parametric transactions, is the argument that often silences suggestions for these alternative solutions," Franco says. This challenge is further complicated by the fact there is no standardised approach to quantifying basis risk.

Clients looking for parametric coverage often find multiple mechanisms in the market. "While it is positive that we have the creativity in the industry to craft this kind of coverage using different strategies, without a protocol to benchmark and compare them, clients can sometimes feel disoriented," Franco explains.

"Parametrics may have not yet enjoyed wider implementation partly due to this effect."

What is needed, he adds, is a set of neutral, analytical benchmarks, conventions and protocols for the whole sector to use as a baseline common reference, upon which the industry can build with creativity and freedom.

Sielker suggests that, as more new data is collected, basis risk could eventually be reduced, thanks to more irrefutable evidence of the damage caused by primary and secondary perils.

Climate mitigation efforts

Franco notes that parametric insurance, in its modern form, began in the mid-1990s, as a way for investors to easily deploy insurance capacity.

Over the years, and particularly in the past five to 10 years, the utility of parametric solutions has evolved, and they have become an important component of a risk transfer strategy, to complement the benefits of traditional indemnity.

"The benefits we often talk about with parametrics are transparency and speed, but we've barely scratched the surface of the potential utility of these solutions. For example, they could be strategically used to recognise premium reductions due to mitigation efforts," Franco says.

He explains: "I have frequent conversations with communities who are interested in building mitigation infrastructure, such as a sea walls, or nature-based solutions, such as oyster reefs. They wonder whether their investment could be offset, in the long run, by reductions in premiums from their insurer.

"Insurers, unfortunately, do not always have the appropriate data and tools to recognise these new mitigation measures and often cannot immediately provide their clients with the relief they seek. This misalignment is particularly challenging for those living in high-hazard areas, and it is frustrating efforts for faster climate adaptation."

"The benefits we often talk about with parametrics are transparency and speed, but we've barely scratched the surface of the potential utility of these solutions

Guillermo Franco
Head of catastrophe risk research, Guy Carpenter

Parametric insurance offers them a new mechanism to approach this challenge.

If a community takes action to build infrastructure that they are confident increases the hazard intensity they can sustain, they can use that knowledge to transfer their risk on a parametric basis and materialise premium reductions.

"Picture a community that usually floods every time a category 1 hurricane makes landfall in their vicinity," Franco says.

"If they implement storm-surge mitigation measures that they are confident will provide protection up to a category 3 hurricane, they can purchase parametric insurance using that intensity as a threshold. The insurer in this scenario does not need intimate knowledge about the mitigation infrastructure."

From that perspective, it is akin to increasing the "deductible" or the "attachment" of the coverage, and the premium difference from a category 3 versus a category 1 can be priced "without difficulty", Franco says, adding that this type of mechanism remains "largely unexplored" though it could unlock "enormous potential" to encourage climate adaptation.

Data acquired from satellite imagery can also support mitigation efforts, Sielker says.

By observing in real time, as events develop, how mitigation measures interact with physical events, the re/insurance industry can better track and understand the effect that these efforts have in reducing risk, and this can in turn help recognise them in the pricing arena.

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Protection gap

Developing countries need further access to insurance capacity, Franco stresses, but poor-quality exposure data is a common obstacle to obtaining it. It is common for re/insurers to incorporate uncertainty in exposure data through higher premiums and developing countries have therefore chosen parametric solutions to gain an access point to insurance capacity without being penalised for poor exposure information. This has worked extremely well for countries across the Caribbean, Latin America and Asia, for example, Franco says.

Technology, however, continues to pose a greater challenge in developing settings than in developed countries.

Franco notes that the orientation of satellites often provides better coverage for the northern hemisphere and that there are similar problems with insufficient sensors deployed on site in countries with less advanced monitoring networks.

Iceye has conducted several pilot projects to take more images of developing countries, and is working with brokers and re/insurers to support public disaster risk financing.

"In addition to enabling parametric insurance for faster access to funding, our data is also being used by emergency response agencies to determine building damage and facilitate help on the ground, such as in Nigeria and Ghana," Sielker says.

Changing risks

Franco notes that some "phenomena that were considered rare in the past are now occurring more frequently, such as the rapid intensification of storms.

"To consider an environment of dynamic risk, it is important that companies continue to make use of multi-model approaches that allow them to quantify uncertainties and to interiorise a strong view of risk," Franco stresses.

"Tools such as parametric risk transfer can often help to protect from edge scenarios that models may not yet contemplate fully," he adds. Sielker encourages re/insurers to learn about the rapidly expanding data ecosystem. "The scale, granularity and accuracy we are achieving enables new insights," she says. "It's the digestion of data intelligence, more than just taking the images, that will define who is going to be the most successful in adopting parametric solutions using satellite imagery." ■


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Re/insurers must plan now for nuclear-powered ships: Axa XL

Any future insurance for these vessels would need to be 'bespoke, extremely high in value and likely supported by governments', Axa XL's Vicky Roberts-Mills and Jarek Klimczak say

Nuclear energy may be the most viable long-term option for propelling the maritime industry to net zero, according to Axa XL's global head of energy transition, Vicky Roberts-Mills, and chief risk consulting officer for specialty, Jarek Klimczak. The time for collective action to address this complex prospect is now, they said in an interview with *Insurance Day*, **writes Louise Isted**.

The sub-committee on ship design and construction of the International Maritime Organization (IMO) has set a timeline for the adoption of new technologies and alternative fuels. This includes finalisation of the revised nuclear code for ships and amendments to chapter VIII of the international convention for the safety of life at sea (Solas) in 2030.

Other key milestones for developing or amending existing safety regulations are 2028 for lithiumion batteries and swappable traction battery containers on ships, and 2029 for wind-propulsion and wind-assisted power.

Klimczak says many shipping companies see the cleaner alternatives to heavy fuel oil and marine gas oil as, at best, a "quick win" (biofuel) or a "medium-term solution" (ammonia, hydrogen and methanol).

Only nuclear energy is considered to be a long-term option, he adds.

Axa XL has joined the Nuclear Energy Maritime Organization (Nemo), which was launched in 2024 to bring together the maritime and nuclear industries in a commitment to advancing the safe, secure and sustainable integration of nuclear technology in the maritime sector.

Roberts-Mills notes the ambitious targets set by the IMO to address the environmental impact of shipping and says that becoming a member of Nemo allows Axa XL to support the development of standards and regulations for floating nuclear technology solutions.

Understanding the risks associated with these applications, and helping insureds mitigate those risks, will be critical to scaling these efforts, she says.

Re/insurance is one of the biggest challenges for nuclear-powered commercial ships because of the scale of potential liability.

"Standard marine insurance mainly covers damage to ships, cargo and third-party liability, but it usually excludes damage caused by nuclear fuel or waste," Roberts-Mills says. "Nuclear-powered vessels therefore require very different insurance arrangements," she adds.

Klimczak continues: "The main risk is not everyday accidents, but rare events with potentially severe consequences. A major nuclear incident could contaminate coastal waters, disrupt international trade, and cause long-term environmental damage. Claims could emerge many years later and be difficult to limit in value, location or duration."

As a result, Roberts-Mills says, any future insurance for these vessels would need to be "bespoke, extremely high in value and likely supported by governments".

She explains: "In practice, governments would need to act as insurers of last resort. Without such backing, insurance is often too expensive or unavailable, making nuclear-powered commercial ships unattractive to most shipping companies."

At present, the regulatory framework of nuclear for shipping remains fragmented and underdeveloped, they say.

"Responsibility for nuclear vessels largely rests with flag states, while international regimes are limited," Klimczak says, adding that international harmonisation of safety and security standards is essential.

"Regional policies should facilitate licensing, emergency preparedness and cross-border cooperation, and clear, consistent regulations are needed to reduce uncertainty and encourage investment," he adds.

Collaboration between the IMO, the International Atomic Energy Agency (IAEA) and national regulatory authorities must be strengthened, he continues, to create a "supportive and transparent policy environment that balances safety, innovation, and sustainability".

Energy transition

Axa XL has been underwriting renewable energy projects, particularly solar, wind and hydro-electric operations, for at least 15 years.

It is also working with clients to provide coverage for a range of emerging technologies, including hydrogen, bioenergy and carbon capture underground storage.

Roberts-Mills joined Axa XL in 2023 from Aon, where she was offshore renewables leader. Prior to this, she served for 18 years at BP, where she led the oil and gas major's global insurance team.

"There's not much in the way of infrastructure, even beyond renewables, that gets built without the role of insurance," Roberts-Mills says, "and it's a personal mission of mine not to let insurance become a blocker of the transition."

Part of that mission, she adds, is identifying useful collaborations for Axa XL, which includes joining Nemo, allowing the reinsurer to understand how governments, governing bodies and the maritime industry can support the safe transition to nuclear energy.

"We should be pushing ourselves and our organisations to understand the changing insurance and risk management needs of our clients but also to effectively pick up the pace in the transition," she says.

Recognising that the energy transition affects the entire economy, Axa XL involves not only its underwriters but also risk consultants, such as Klimczak, who is a member of the loss prevention committee and ESG Forum at the International Union of Marine Insurance.

Klimczak urges underwriters to "expand their zoom" beyond the operation of clean energy technologies, to also include the pre-production phase.

"A lower carbon footprint during production might skew the picture," he says, "because the stages before that – distribution, logistics, storage, refining – might actually look very bad from an emissions standpoint."

Alternative fuels for shipping such as methanol are also more complex than simply being a cleaner option than oil. "There's a lot of question marks, because none of these fuels offer a long-term solution," he says.

"When people think about the energy transition," Roberts-Mills says, "there is an automatic focus on energy production, but that's only part of the equation because that energy needs to be transmitted and distributed. There are conversations around grid infrastructure refurbishment as well as new infrastructure like smart grids. And energy consumption brings in most of our clients. There's also the financing piece for the construction and operation of assets, where insurance also has a huge role to play because it touches most of our business."

Asked whether finance models would include public-private partnerships, Roberts-Mills says: "We need to explore all options."

She explains: "You need private investment, but you also need public investing support as well, because it brings in that regulatory piece.

"A lower carbon footprint during production might skew the picture because the stages before that – distribution, logistics, storage, refining – might actually look very bad from an emissions standpoint

Jarek Klimczak
Axa XL's chief risk consulting officer for specialty

"What we've already seen with the development of other technologies and certain geographical locations, is tax credits and other financial incentive mechanisms that have helped technologies scale. And scale drives cost efficiencies, which then positively impacts the financial model."

Nuclear energy potentially touches all insurance products, Klimczak adds, from the obvious, like energy and marine, to the less obvious, including political risk, credit and bond.

"It comes down to understanding, identifying and quantifying the risk, and then managing it," Roberts-Mills stresses.

"And the capacity and levers to manage the risk aren't always traditional and so I think you're potentially seeing blended solutions for nuclear energy — traditional capacity and captives, pools and mutuals — because we need all of that capacity across the breadth of the energy transition, given the trillions of dollars of investment that transition requires," she says.

Data centres are another good example, in addition to the marine sector, where nuclear power will play an important role, Klimczak says.

"Data centres have massive energy demand, and they can't be powered entirely by the traditional grid and so small nuclear reactors could be a solution. So again, nuclear energy is literally touching every insurance topic."

Finding nuclear

Asked why now is the right time for Axa XL to join Nemo, Roberts-Mills says: "Joining Nemo is a natural fit for us to work with the different stakeholders looking at policy and regulation, to see what is required from insurers."

She continues: "It isn't always full risk transfer. It could require government backstops or policy and regulation to help enable the insurance policies needed, and we want to understand the risk engineering, loss prevention and risk management services. A multi-stakeholder solution is required for that, and we want to be at the forefront of what those solutions look like." Klimczak sees Nemo as a bridge between industry and regulators.

"The IMO is a regulatory organisation for flag states and doesn't have representatives of manufacturers and insurers, but Nemo has the status of a consultative member of the IMO. Consultative members can't vote at the IMO's assembly but, as external experts, they can propose topics for IMO committee agendas," he says.

He continues: "The biggest issue from the insurance standpoint, is that nuclear energy in shipping involves different layers of exposure. There will be few or no attritional losses, but the severity and the magnitude of a loss is such that a single event could wipe out billions of dollars in investment."

In addition to becoming a member of Nemo in January, Axa XL participated in the World Nuclear Exhibition last November, where it signed the Declaration of Cooperation to Accelerate Nuclear for Maritime Applications.

This was a natural move for Axa XL to make, given its head office is in France, a country that produces as much as 70% of its electricity from nuclear energy and is the world's third biggest nuclear power producer, after the US and China.

"France has been a big hub for nuclear technology for many years," Klimczak says, "and so for Axa XL it was very important to join the journey to support new nuclear technology."

He adds: "We want to industrialise, we want to collaborate, and we want to talk internationally and so our declaration is to support the implementation of nuclear technology, especially in the marine sector."

According to the text of the declaration, there are three main parts to that commitment:

1. Support and promote the safe, sustainable, innovative use of nuclear energy in shipping.

2. Collaborate with stakeholders to develop best practices and regulatory harmonisation.

3. Accelerate the adoption of nuclear propulsion while ensuring safety,

"You're potentially seeing blended solutions for nuclear energy — traditional capacity and captives, pools and mutuals — because we need all of that capacity across the breadth of the energy transition, given the trillions of dollars of investment required

Vicky Roberts-Mills
Axa XL's global head of energy transition

environmental sustainability and public trust through shared efforts and transparent risk management.

Nuclear regulation

The IMO will provide the legal framework for the operation of nuclear power reactors for shipping – both on-board units for propulsion and floating reactors located near ports. The management and transport of radioactive waste, along with other nuclear safety issues, is the responsibility of the IAEA, rather than the IMO.

National regulation is designed to meet IMO conventions, such as the marine guidance note 679 (M) Nuclear Ships issued by the UK Maritime and Coastguard Agency, which brings UK law in line with chapter VIII of Solas and the IMO code of safety for nuclear merchant ships.

Another example Klimczak gives, is the US, which has a "very comprehensive" code of federal regulations that references the IMO.

"Nothing that hasn't been agreed by the IMO will be implemented by flag states, which are required to ratify IMO conventions into national law, so there always needs to be alignment," Klimczak says.

"However, the technological and safety aspects will be with the IAEA, which doesn't create any treaties, but rather standards to be adopted by its member states.

In short, the IAEA focuses on everything that is nuclear and the IMO focuses on everything nuclear in shipping, except the specific safety elements that the IAEA takes care of," he adds.

Nuclear-propelled ships will be as vulnerable to terrorist attack as a vessel powered by conventional fuel, but there is the added risk of wreck removal.

The biggest issue, if there's an accident, at port or at sea, is that the vessel sinks," Klimczak says, because the Nairobi international convention on the removal of wrecks does not address radioactive contamination. The risk of an accident at sea could be mitigated, he continues, through the creation of "nuclear corridors", so nuclear-propelled vessels are always close enough to a flag state with experience in nuclear technology, such as the US, the UK, China and France.

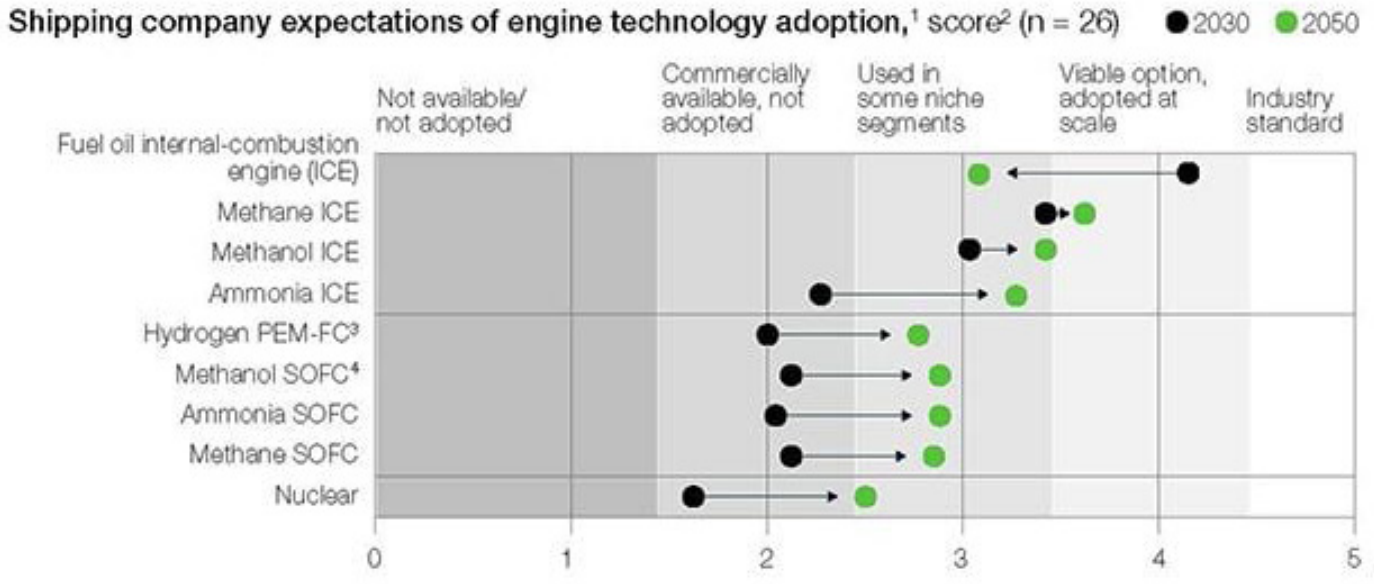
Emission reductions

The IMO's net-zero framework would impose a carbon levy on ships above 5,000 tonnes from 2028. Its adoption, which was widely expected to unlock demand for green hydrogen-based fuels like ammonia and e-methanol, has been delayed by 12 months, to October this year.

Nuclear propulsion offers a "viable pathway" for the decarbonisation of shipping, Roberts-Mills says, since it enables vessels to operate for extended periods without refuelling or the use of fossil fuels.

Moreover, the nuclear fuel is contained within the reactor, rather than in a separate container, which improves a vessel's "carrying efficiency", she adds.

Respondents foresee internal-combustion engines remaining the preferred technology for ships through 2050, with fuel cells moving into niche segments.



[1]Question: What is your expectation of the industry's adoption of the following fuels?
[2]Scored from 0 to 5, where 0 is no adoption, and 5 is total adoption.
[3]Proton-exchange membrane fuel cells.
[4]Solid-oxide fuel cell.
Source: Survey of shipping companies conducted October–November 2022

These advantages come with the caveat, however, that the timeline for the adoption of nuclear power by the maritime sector is unlikely to start for at least another decade, she continues.

The reasons for this are not merely technological and regulatory, she says, but also societal. "These are challenges that we need to overcome, as opposed to saying they're too complex," she stresses.

Klimczak referred to a 2023 report by the Global Maritime Forum, the Global Centre for Maritime Decarbonisation, and the Mærsk Mc Kinney Møller Center for Zero Carbon Shipping.

The shipping industry's fuel choices on the path to net zero illustrates nuclear energy's "notable shift", Klimczak says, to being the largest among alternative fuels in the 'commercially available, not adopted' category.

The report was based on an October-November 2022 survey of 29 shipping companies.

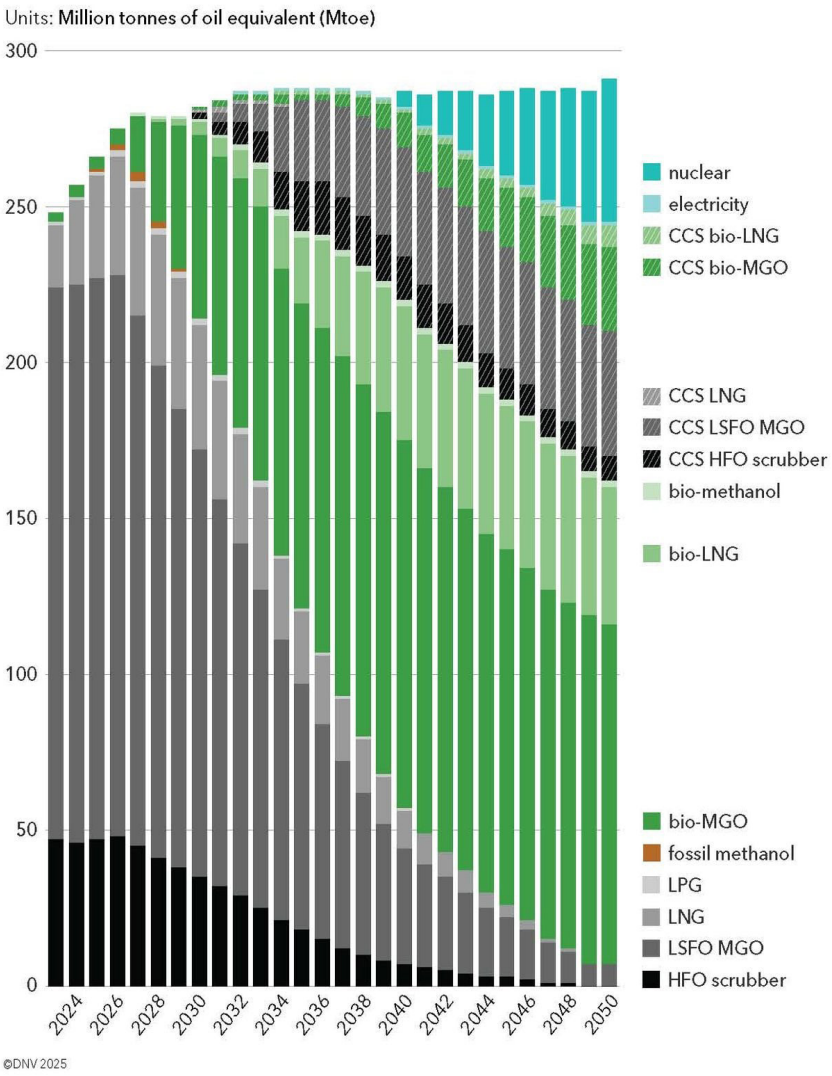
"Even as early as 2022, nuclear was starting to take on a very significant role relative to other options. Fast forward four years, and we're seeing even more developments as the landscape continues to evolve," Klimczak says.

A 2025 white paper from DNV – Maritime nuclear propulsion: technologies, commercial viability, and regulatory challenges for nuclear-powered vessels – presents data that Klimczak says underscores the growing importance of nuclear as an option for commercial shipping.

Technological progress

Small modular reactors (SMRs) are at the advanced research and design stage, with some examples already undergoing pilot projects, while SMRs for shipping propulsion are still under development. Roberts-Mills says commercial deployment of SMRs is expected "within the next decade or two", but the biggest constraints are not only technical and regulatory, but financial.

A possible scenario for fuel mix in a world fleet achieving net zero by 2050 - previously published scenario 1 from 2024 edition of DNV's Maritime Forecast to 2050 report



Regulators will need to decide what having nuclear-propelled vessels looks like from a national versus international perspective, she continues, and how public opinion will impact these decisions.

"With Nemo and the IMO, we'll hopefully push into the regulatory space because you can't fix one element — technical, regulatory and financial — without working in combination with other stakeholders," she adds.

Klimczak says progress is also needed in other ways — adapting ports to be able to accommodate nuclear vessels, and training crews in the operation and decommissioning of nuclear reactors. There are big differences, he adds, between pressurised water reactors (PWRs) used on naval vessels and SMRs being designed for use in commercial shipping.

IMO's sub-committee on ship design and construction has been tasked with updating the code of safety for nuclear merchant ships to ensure it is not limited to designs of PWRs with direct steam cycle propulsion systems, but adequately addresses recent advances in new nuclear technologies and the all-electric-ship concept. ■

Nature risk moves up the insurance agenda

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Experts insist nature risk is reshaping underwriting, with new products and collaborative structures emerging to address risks too complex for any single carrier

For every $1 invested in protecting or restoring nature, $30 is spent on activities that degrade it. That ratio, drawn from UNEP's State of Finance for Nature 2026 report, published earlier this year, captures the central tension facing insurers as nature-related risk increasingly moves from the margins of sustainability to becoming a more central underwriting factor, **writes Queenie Shaikh**.

The numbers are stark: in 2023, an estimated $7.3trn flowed into nature-negative activities globally, while just $220bn supported nature-based solutions, of which only $23bn came from the private sector.

The insurance industry has been grappling with how to respond. Research published by the Taskforce on Nature-related Financial Disclosures (TNFD) found that over half of re/insurers believe nature-related risk is material to their underwriting business. Believing it is material and pricing for it are different matters, however, and the same research found that nature risk is not being systematically assessed by underwriters.

Thankfully, the gap between recognition and action is now narrowing, driven by a convergence of regulatory pressure, disclosure frameworks and, increasingly, commercial opportunity. The TNFD's recommendations have been adopted by over 620 organisations.

UNEP FI's Principles for Sustainable Insurance working group on nature, established in 2024, has started publishing practical guidance on how insurers can apply the TNFD's locate, evaluate, assess and prepare (LEAP) approach to underwriting portfolios. Meanwhile, the Nature-Insure programme, a joint initiative between the United Nations Development Programme, the TNFD and consultancy KPMG, is working to strengthen supervisory responses to biodiversity risk.

And in October, COP17 of the Convention on Biological Diversity in Yerevan, Armenia, will assess progress on the Kunming-Montreal Global Biodiversity Framework, with finance and underwriting as a central pillar.

All of this brings opportunity. If nature risk is material, it can be priced, transferred and products can be built, but building them may require a different kind of market structure.

Claire McDonald, chief executive at Scor Business Solutions, argues that the risks involved are too complex for any single carrier to

> **Natural buffers contribute to better water regulation and biodiversity recovery, benefits that support the performance of insured assets**
>
> Dan Alexander-Lothian,
> Climate strategy manager,
> Axa XL

> **Environmental risks, particularly those linked to nature loss, climate change and land degradation, are systemic**
>
> Claire McDonald,
> Chief executive,
> Scor Business Solutions

absorb alone. "Environmental risks, particularly those linked to nature loss, climate change and land degradation, are systemic," she says. "They involve complex interactions between ecological, social and economic factors, which often exceed the capacity or expertise of any single carrier."

One answer to that question, McDonald explains, emerged earlier this year, when Scor and Axa XL launched a Lloyd's consortium dedicated to ecological restoration insurance. The consortium, led by Scor's syndicate 2015 with support from Axa XL's syndicate 2003, underwrites Scor's Restore product, which provides cover for the implementation phase of restoration projects against a defined set of physical and climatic perils, including fire, flood, storm, heatwave, landslide and malicious damage. It is the latest evolution of Scor's NatReCo initiative, launched in 2024.

The commercial logic behind the product addresses a specific financing bottleneck. Ecological restoration projects struggle to attract private capital because they are exposed to climatic and operational uncertainties that conventional insurance was never designed to cover. Moreover, ecosystems recover in non-linear ways over timescales that can stretch to decades. UNEP's restoration finance data estimates that annual investment needs to quadruple from $64bn in 2022 to $296bn by 2030 to meet global restoration targets. The gap between what is needed and what is flowing is enormous, and the private sector's contribution remains a fraction of the total.

Emma Bartolo, global segment leader for environmental impairment liability at Scor and product lead for NatReCo, highlights that tailored underwriting can shift how the market perceives restoration risk. "By creating dedicated restoration insurance, built on science-based quality standards and independently verified ecological criteria, we help project

> **We quickly recognised the need for additional solutions, such as land rehabilitation, urban biodiversity and regenerative agriculture**
>
> Henri Douche,
> Head of product and innovation,
> Scor

> **Tailored underwriting transforms restoration from a perceived high-risk activity into an investable, bankable asset class**
>
> Emma Bartolo,
> Global segment leader for environmental impairment liability,
> Scor

developers, investors and corporates move ahead with confidence," she says. "Tailored underwriting transforms restoration from a perceived high-risk activity into an investable, bankable asset class."

The underwriting model, she adds, is designed around staged ecological milestones rather than a single payout trigger. "This approach allows us to structure insurance around progress checkpoints rather than waiting solely for end-state outcomes," she says. "It is a sophisticated model that aligns insurance coverage with ecological reality."

The underwriting framework is built around standards developed with the Society for Ecological Restoration, which grades projects at A, AA and AAA levels across criteria spanning assessment, planning, implementation and monitoring. Coverage is triggered by impact assessment rather than parametric thresholds, allowing Scor to price risk based on what actually happened to a project rather than whether a predefined index was breached.

Henri Douche, head of product and innovation at Scor, sees the implementation phase as the critical point of intervention. "As ecological projects can span decades, this initial phase, often the riskiest due to the low integrity of the ecosystem, sets the foundation for long-term success," he argues.

The decision to structure the product as a Lloyd's consortium, rather than a single-carrier offering, is itself a signal about where this class of business may be heading. Dan Alexander-Lothian, climate strategy manager at Axa XL, describes the collaboration as driven by scale requirements. "Our expertise, distribution footprint, global reach and capacity will enable us to provide insurance cover in respect of larger, more complex ecological restoration projects worldwide," he says.

McDonald positions the trajectory in broader terms. "Nature and climate are now inseparable risk domains," she points out. "Corporates increasingly understand that climate transition plans without nature restoration are incomplete, and regulators and investors are reinforcing this."

Whether the broader market follows will depend in part on the regulatory direction of travel. The UK's 2026 national security assessment identified global biodiversity loss and ecosystem collapse as security concerns of national significance, joining a growing list of sovereign-level signals that nature risk is no longer an environmental externality but an economic one. For insurers, the implications run across the balance sheet: on the underwriting side, nature degradation amplifies physical perils that are already being priced, from wildfire frequency to flood severity to agricultural yield volatility.

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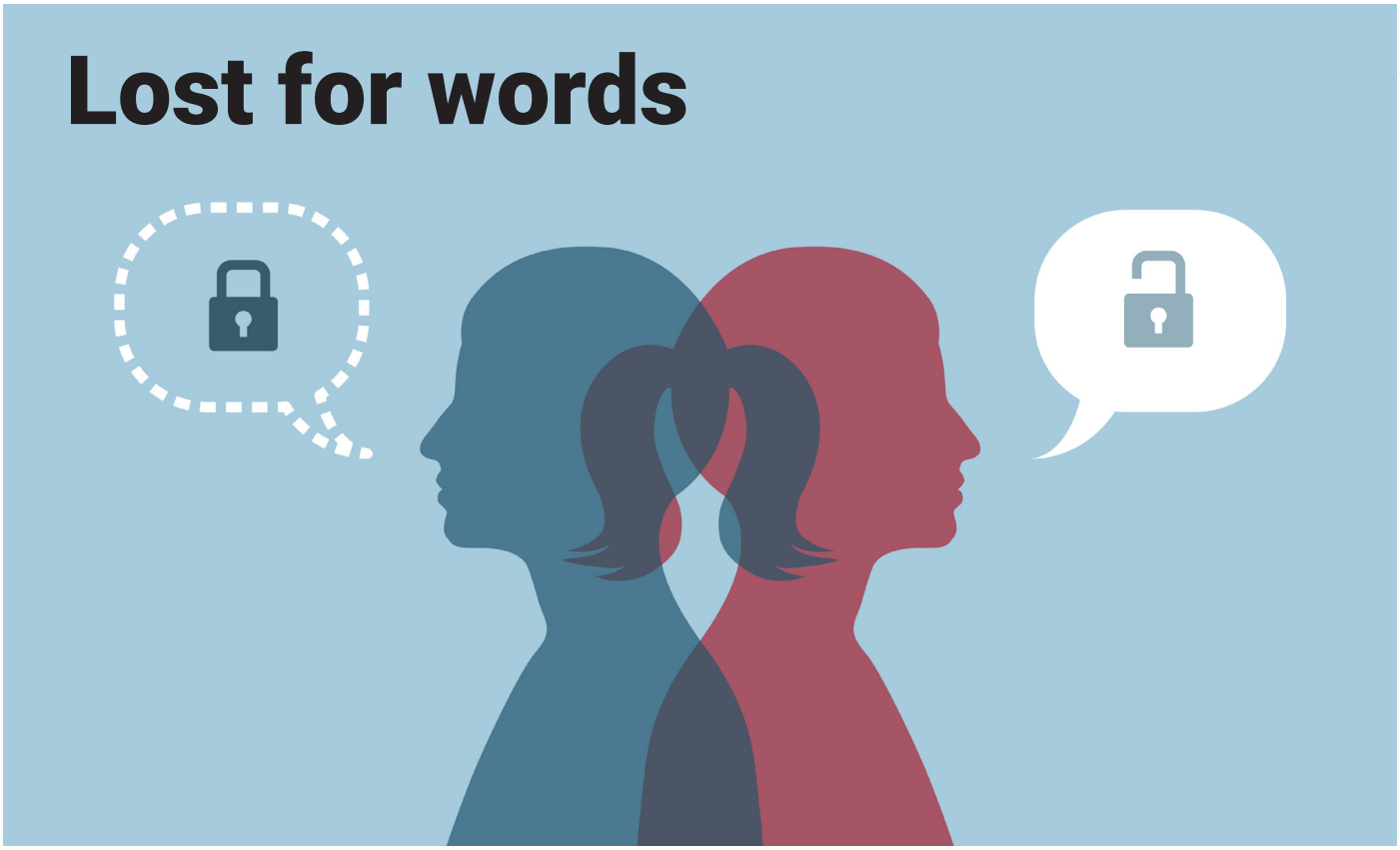
Alexander-Lothian argues the logic also works in reverse: healthy ecosystems reduce insured losses.

"Nature-based solutions increase resilience to weather-related events such as floods, heatwaves and wildlife disturbances, and their natural buffers contribute to better water regulation and biodiversity recovery, benefits that support the performance of insured assets," he says. On the investment side, portfolios with heavy exposure to nature-negative activities face transition risk as disclosure requirements tighten and capital allocation shifts.

The products that will emerge from this shift are unlikely to look like conventional lines of business. Ecological restoration insurance, with its decade-long policy horizons, science-based grading systems and impact-triggered claims, is closer in structure to project finance than to marine hull. But the underlying principle is familiar enough: identify a risk that is currently preventing capital from flowing, find a way to price it credibly and build a transfer mechanism that gives both parties confidence. The restoration finance gap is real, the disclosure frameworks are maturing, and at least two major carriers have concluded that the risk is insurable. Douche, for his part, is already looking beyond the current product.

"While our initial focus was on ecological restoration, we quickly recognised the need for additional solutions in areas such as land rehabilitation, urban biodiversity and regenerative agriculture," he says. "With several new solutions already in development, there is much more to come." The question is whether the rest of the market agrees, and how quickly. ■

Lost for words



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The insurance sector must make its methodology understandable to investors or climate finance will remain a pipe dream

The English are infamous for assuming that everyone speaks their language and, if not, believing that shouting might help. Similarly, insurers must stop shouting about climate risk and instead hire an interpreter fluent in the language the investment community understands. Ironically, insurers have the information that could drive money towards the risks they seek to transfer — and the losses they want to reduce — but they first need to change their approach to presenting data, **writes Louise Isted**.

As Anthony Hobley, deputy chair of climate, risk and resilience at Howden Group, wrote in a recent article, 30 years of climate data hasn't changed how investors solve a problem that insurers already know how to fix.

In his article, Lost in Translation: The Climate Disclosure Paradox and the Missing Price Signal, Hobley says that, on a day-to-day basis, finance ministers are making decisions as though the huge trove of data — from the Intergovernmental Panel on Climate Change, the World Meteorological Organization, the Financial Stability Board's Task Force on Climate-related Financial Disclosures, the Carbon Disclosure Project, the Inevitable Policy Response, etc. — don't exist.

The reason for this, Hobley argues, is that investors speak the language of forward price curves, which are formed from commodity prices, interest rates, currency movements and freight rates — and not from "parts per million", "warming scenarios" or "qualitative risk ratings".

In short, they need numbers, not words "to translate uncertainty into monetised probability distributions over time".

In its current form, climate risk data can't be modelled in financial terms, which the Bank of England noted in a 2024 analysis, saying it remains "challenging to translate qualitative proxy metrics into decision-useful information that can be incorporated into risk management frameworks".


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Exceedance probability curves

As long ago as 2014, Rowan Douglas, a senior adviser at Howden, offered a solution to bridging the gap between risk and capital. Then the chief executive of Willis Group's capital, science and policy practice, Douglas presented the concept of "exceedance probability curves", which represents the probability that a certain level of loss will be exceeded in a defined period. Hobley says this concept "turns an abstract fear into a line on a graph that a bank can understand".

Despite the absence of a regulatory mandate, financial innovation is emerging, Hobley notes, such as the launch in 2025 by the Natural Capital Reserve (NCR) of sovereign marine biodiversity investment ratings, which make the stress-test methodology that insurers use internally to assess catastrophe risk available to bond investors, credit analysts and finance ministries.

Another innovation is the Inevitable Policy Response (IPR) commissioned by the UN Principles for Responsible Investment, which surveys climate transition experts annually to produce median forecasts for policy and regulatory changes across 21 countries and 15 sectors. For example, the 2025 transition forecast provides forward price curves for carbon.

Both the NCR and the IPR demonstrate that the methodology exists, it is operational, and it produces exactly the forward price signals that capital allocation decisions require. Hobley stresses: "These are not pilot projects — they are market-driven data infrastructures being used by institutional investors to model long-duration commitments."

Be the change you wish to see

So far, so good for the interpreters, but insurers must start learning the language of finance themselves. What's stopping them? Their short-term outlook.

Hobley argues that, while the 12-month renewal model is rational "in a world of relative physical and economic equilibrium", it relies on two assumptions — that the market would remain broadly stable and that any disruption would be temporary and quickly corrected — that are now invalid.

The climate transition, he stresses, represents a "structural shift in the physical environment that underlies every risk the insurance sector prices" which poses an existential threat to the insurance sector's business model.

There has already been evidence of this, as insurers withdraw from markets in California, Florida and parts of Australia because, Hobley says, climate risk is "accelerating faster than an annual renewal cycle can track". Investors interpret withdrawal as "uninsurability", when in fact the correct translation is "outdated model".

Hobley calls on insurers to make three shifts: change your incentive structure; treat forward climate risk pricing as public infrastructure; and require forward climate risk disclosure in standardised monetary form. The methodology the insurance sector developed in the 1990s must be made available to the broader financial system, Hobley says, in the form of long-duration, forward-looking, publicly accessible climate risk price curves.

The "policy window" for these shifts is emerging, Hobley adds, with the multilateral consensus around insurance as a foundational climate finance infrastructure. He concludes: "The transition will not be financed unless it is first priced. Let the pricing commence."

Lost for words? Versicherbarkeit, assurabilité, asegurabilidad... however your clients say "insurability", the word will become redundant if the insurance sector doesn't start speaking to investors about climate risk in the only language they understand: finance. ■

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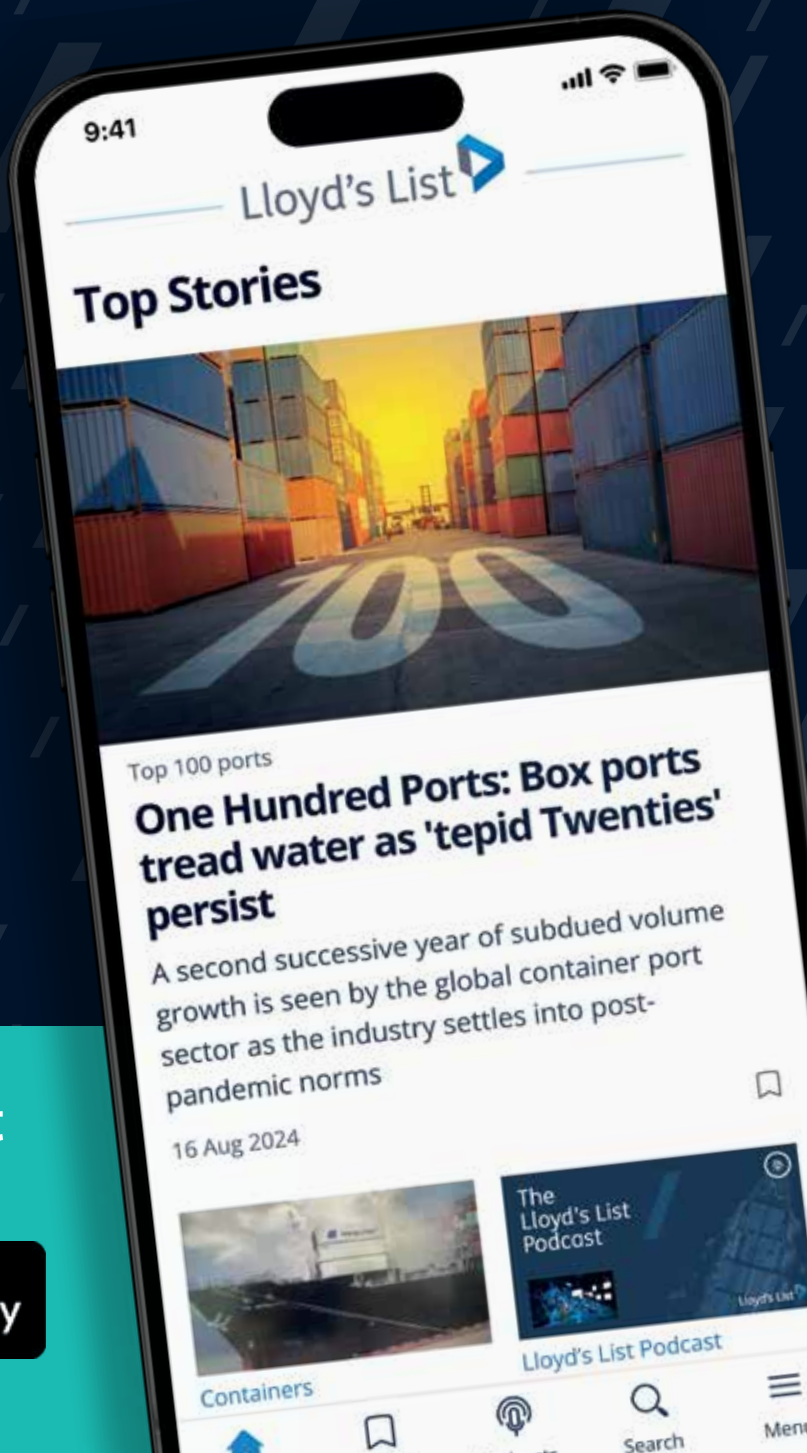

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