The great enabler

A collection of insurance solutions powering $10 trillion of climate finance

HOWDEN | BCG | RACE TO RESILIENCE | RACE TO ZERO

Foreword

We have just six years to deliver the goals of the 2030 Climate Solutions,[1] a roadmap including specific Breakthroughs that we need to get back on track if we are to overcome the defining challenges of our time: climate change and biodiversity loss.

This whole-of-society challenge requires commitment, capabilities and radical collaboration from across the real economy. This timely report demonstrates how the insurance industry value chain can accelerate the delivery of these Breakthroughs.

It includes a variety of case studies that outline the remarkable range of existing insurance solutions that can help accelerate the transition, but which are not widely known. The case studies show that by derisking, the insurance industry can accelerate transition finance to flow at the speed and scale that we need, lowering the cost of clean technologies and scaling their deployment in the process. Further, the examples provided in this report demonstrate how insurance can expedite the dramatic expansion required in nature-based solutions, as well as support new asset types, such as carbon credit markets - a critical source of transition finance. They also show how lives and livelihoods can be protected to help us adapt to the changes we face.

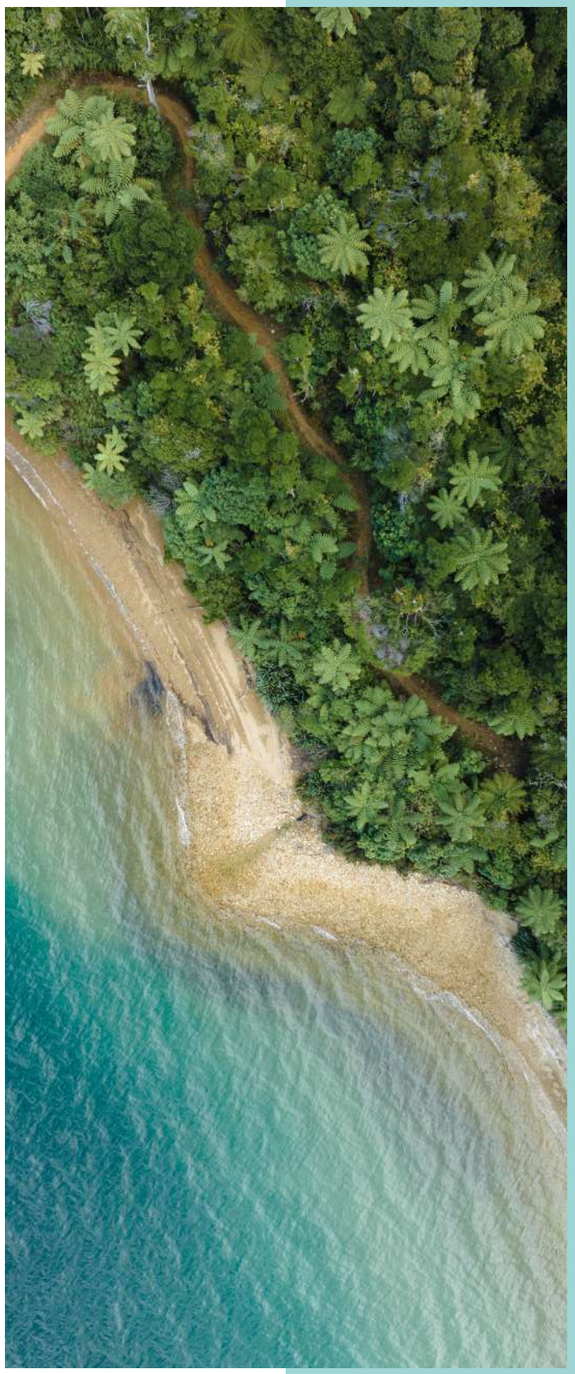
With over half of these case studies highlighting examples from the Global South, women, and vulnerable communities, we can see how insurance serves as an enabler for a just and inclusive transition.

Who knew that insurance could be such a force for good?

By proposing high impact solutions to accelerate and expand the benefits that insurance offers, this report has a welcome focus on making impact quickly.

We are delighted to see insurance on the Finance Day agenda at COP29, marking the first time that insurance will be formally recognised in this way. This endorsement pushes us towards a critical paradigm shift: when we speak about transition finance, insurance will now be recognised as part and parcel of this discussion, as an integral aspect in accelerating the just transition.

1 2030 Climate Solutions; An implementation roadmap, Climate Champions, 2023



We hope this report informs policymakers as they consider how insurance can be most impactful in their jurisdictions, particularly when developing their Nationally Determined Contributions and National Adaptation Plans.

We call on all stakeholders to support the Enabling Insurance Breakthrough to help deliver the goals of the 2030 Climate Solutions.

Finally, as the world faces the unprecedented twin challenges of the climate crisis and biodiversity loss, we would like to thank the authors of this report for setting out so clearly how insurance can play this critical enabling role in addressing this existential threat and do right by future generations.

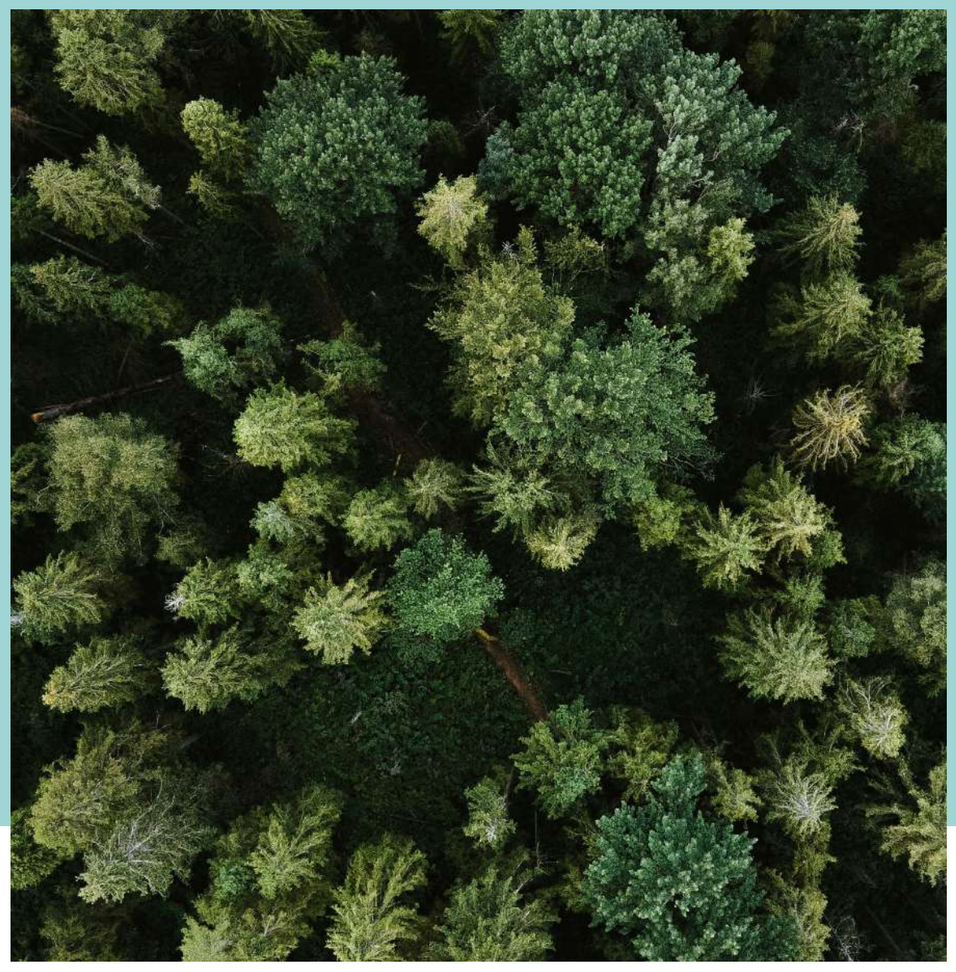
HE Razan Al Mubarak

UN Climate Change
High-Level Champion
from COP28 Presidency

Nigar Arpadarai

UN Climate Change
High-Level Champion
from COP29 Presidency

Executive summary



Governments, businesses, and financiers have just six years to deliver the 2030 Climate Solutions, a roadmap including specific Breakthroughs that are vital for meeting the twin challenges of climate change and biodiversity loss.

Insurance will be critical for meeting these epoch-defining challenges.

Insurance is the foundation of the capital stack, and it is only by treating it as a strategic priority that we can unlock the $19 trillion [2] in investment capital that has already been committed to finance the climate transition through to 2030, with over $10 trillion of this overall figure requiring insurance coverage. [3]

Insurers have developed many solutions that can help derisk finance, unlocking and decreasing the cost of transition finance and accelerating the transition, but these are largely unknown by financiers, project developers, businesses, and governments. This knowledge gap stems from the rapid evolution of these solutions and the tendency to engage insurers late in the project cycle, which leads to missed opportunities to enhance investment certainty and reduce risk early on.

This paper showcases existing use cases across three critical areas in which insurance can play a pivotal role:

01. Financial risk reduction and capital mobilisation

02. Operational and project performance optimisation

03. Implementing public policy and market expansion priorities at scale.

The paper also identifies key challenges that need to be overcome to fully leverage the enabling power of insurance and advances six high-impact insurance solutions to accelerate the climate transition.

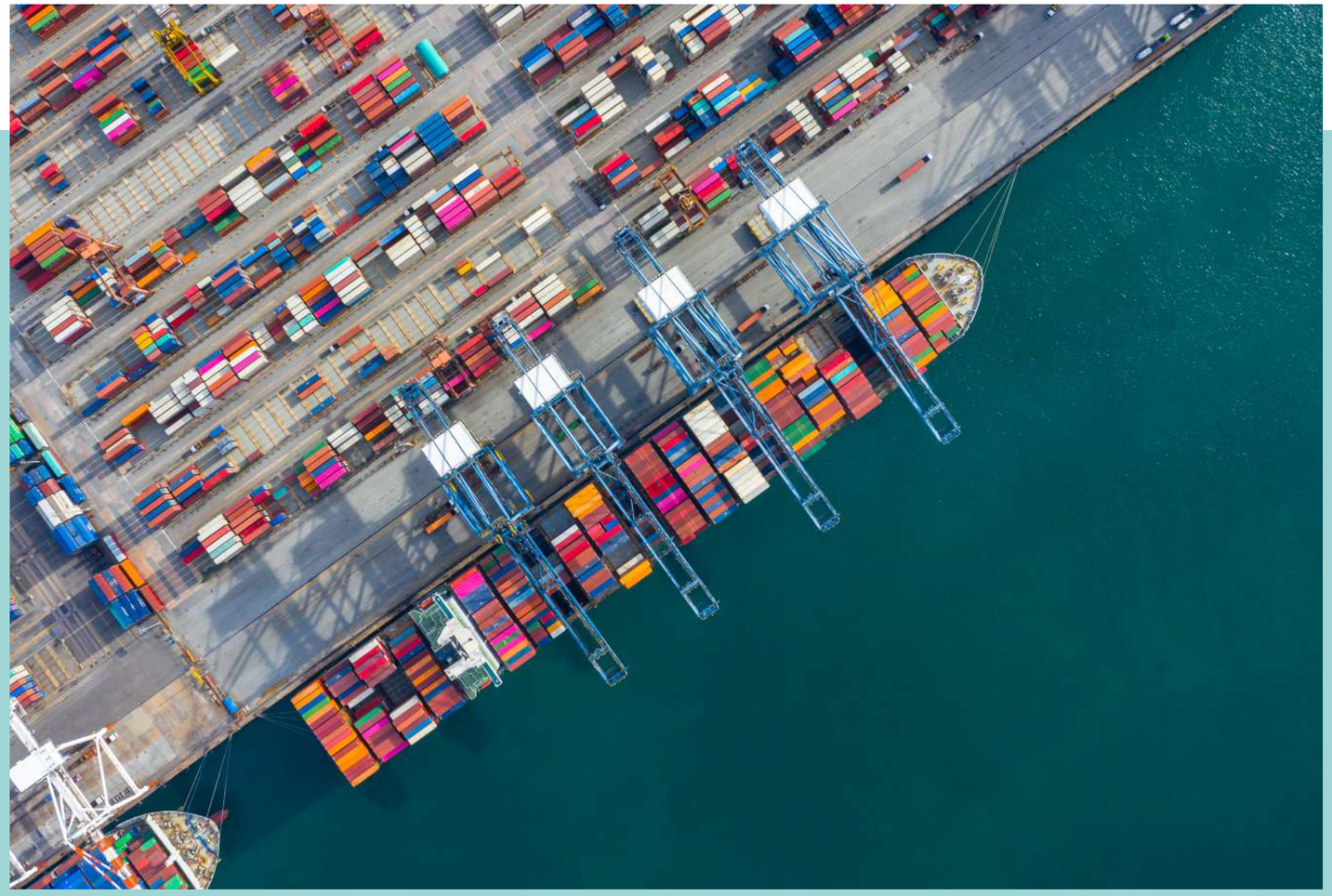
- Collaboration on a prioritised set of thematically focussed deal pipelines to accelerate the benefits of insurance
- Blended insurance mechanisms to expand capacity
- Multi-year insurance solutions for long-term projects
- Scaling insurance for clean technologies through international collaboration
- Governance and legal reforms to strengthen insurance frameworks
- Data-driven risk models for nature-based solutions

Successful delivery of the 2030 Climate Solutions will require radical collaboration between policymakers, businesses, and insurers. All stakeholders will need to work together to increase the range of insurance solutions and spread awareness of their availability, as well as to facilitate their rapid scaling and maximise their application.

Doing so will unlock new investment opportunities, reduce risks, and increase returns for businesses and financiers alike.

2 Bridging the vast gap in net zero capital - BCG ⓘ

3 The bigger picture: The $10 trillion role of insurance in mobilising the climate transition - Howden, BCG, 2024 ⓘ



The great enabler

Insurance has played an essential economic role in modern history, bringing individuals, businesses, and investors together to enable epoch defining advances.

Most businesses and households view insurance as little more than a protective shield. In exchange for an annual premium, the insurer agrees to pay out in the event that disaster strikes, absorbing defined risks that the policyholder would otherwise be ill-equipped to meet. However, this view of insurance as something fundamentally reactive—a service that is only valuable when things go wrong—does not tell the whole story.

Because insurance can derisk investments, it can also act as an enabler. Individuals are more willing to invest in homes and cars when they know they are not at risk of losing everything in one bad day. Business owners and investors will found new ventures and seize opportunities for growth when they know that a fire, a missed shipment, or an unfortunate mistake will not wipe them out.

But insurance can also enable critical investments on a much larger scale. The enabling role of insurance has helped drive some of the most important economic and social transitions humanity has experienced. From underwriting the global shipping trade to derisking the introduction of the steam boiler and the mass electrification of cities, insurance has allowed society to transform itself in ways that would otherwise have been impossible.

By distributing risk, decreasing its real-world cost, and incentivising the formalisation of standards, insurance serves as a catalyst for large-scale innovation, providing the security and governance that is needed to unlock capital flows.

Today, as the world faces the unprecedented twin challenges of the climate crisis and biodiversity loss, insurance must once again play this critical enabling role.

The challenge

$19 trillion in investment capital has already been committed by energy companies, governments, and private equity to financing the climate transition through to 2030, [4] a figure that is equivalent to the combined annual GDP of the twenty-seven nations of the European Union.

However, too few projects meet the risk thresholds required by investors. To unlock this enormous sum, the insurance industry will need to provide more than $10 trillion in additional coverage, including for innovative insurance solutions that will help make climate projects investable. [5] It is only by derisking investments in climate technologies and nature-based solutions that businesses, governments, and investors will be able to drive the green transition forward.

At the COP21 United Nations Climate Change Conference in Paris, governments agreed that mobilising stronger and more ambitious climate action was urgently required to achieve the goals of the Paris Agreement. To connect the work of governments with the many voluntary and collaborative actions taken by cities, regions, businesses, and investors, nations decided to appoint two High-Level Champions.

The UN Climate Change High-Level Champions for COP25 and COP26, Gonzalo Muñoz and Nigel Topping, established the Climate Champions Team to help deliver on their mandate to enhance the ambition and strengthen the engagement of non-state actors in supporting Parties, in working with the Marrakech Partnership, to deliver the goals of the Paris Agreement. H.E. Ms. Razan Al Mubarak and H.E. Ms. Nigar Arpadarai are the UN Climate Change High-Level Champions for COP28 and COP29.

4 Bridging the vast gap in net zero capital - BCG ⓘ

5 The bigger picture: The $10 trillion role of insurance in mobilising the climate transition - Howden, BCG, 2024 ⓘ

The UN Climate Change High-Level Champions have been instrumental in driving global climate action through initiatives such as the 2030 Breakthroughs and the Breakthrough Agenda, launched at COP26. The 2030 Breakthroughs set specific targets and provide practical guidance for key sectors, such as energy, transport, and agriculture (see below), with the goal of accelerating the shift to a net-zero economy by 2030. For financial institutions, the 2030 Breakthroughs can serve to highlight key investment opportunities. This paper emphasises the critical role insurance must play in managing risks and enabling capital flows to the 2030 Climate Solutions needed in every sector.

The 2030 Breakthrough sectors

Energy

- Clean power
- Electrification
- Power pool integration
- Grids and battery storage
- Justice and affordability
- Clean cooking
- Cooling
- Green hydrogen
- Oil and gas
- Oil and gas: methane reduction
- Energy adaptation planning

Transport

- Road transport (passenger vehicles and vans)
- Road transport (buses and HDVs)
- Resilient transport
- Green shipping
- Resilient shipping
- Aviation

Industry

- Steel
- Cement/concrete
- Aluminium
- Metals and mining
- Chemicals
- Plastics
- Technology-based carbon removals
- Retail/consumer goods
- Apparel
- ICT/mobile
- Pharma/med tech
- Private sector resilient planning

Land use

- Nature-based solutions for mitigation
- Resilient natural landscapes
- Halting deforestation, investing in nature
- Sustainable and resilient agriculture
- Healthy and sustainable food for all
- Reducing food loss and waste
- Financing the food systems transformation

Ocean and coastal zones

- Mangroves
- Coral reefs
- Ocean renewable energy
- Aquatic food
- Marine conservation

Water

- Water and wastewater systems
- Freshwater
- Climate resilient WASH
- Food-water nexus
- Funding water
- Water decarbonisation

Human settlements

- Built environment
- Housing access and affordability
- Open waste burning
- Early warning systems
- Resilient health solutions
- Universal access to risk info and solutions to build resilience
- Cities and regions resilient planning
- Planning and locally-led principles for adaptation
- Greening urban areas

Finance

- Public finance adaptation
- Private finance adaptation
- Insurance finance adaptation
- MDB finance adaptation
- Finance for NZ
- Private finance for NZ
- Finance for developing countries
- MDB financing for green transition
- Concessional finance for developing economies

Insurance is a fundamental part of the financial sector, providing capital in the form of contingent capital. It is the base on which all other layers of finance are built and without it no major project can move forward. However, the ubiquity and familiarity of insurance means that it is often taken for granted in existing markets and overlooked in newer classes of investment. The result is that insurance has become a major blind spot in derisking the resilient net zero transition. As the foundation of the capital stack, insurance now needs to be included at the strategic level by businesses and financiers, alongside traditional investment capital. This will allow it to serve as a critical enabler of the increased investment in climate solutions that we urgently need.[6]

The direction of travel for the transition is clear. The 2030 Breakthroughs launched by the Climate Champions and Marrakech Partnership at COP26 identify key actions and targets that need to be achieved across all major sectors including energy, transport, industry, and agriculture to keep global warming within 1.5 degrees.[7]

It will be impossible to meet the 2030 Breakthrough goals in the energy, transport, and industry sectors unless appropriate insurance solutions are in place. The increasingly prominent role of nature in the climate agenda also underscores the growing need for innovative insurance mechanisms. The UAE Consensus reached at COP28 emphasised that an effective and equitable response to climate change can only occur if nature is fully integrated into the global transition. To limit global warming and meet the targets of the Kunming-Montreal Global Biodiversity Framework, finance flows to nature-based solutions will need to nearly triple by 2030 (from $200 billion to $542 billion per year) and quadruple by 2050 (rising to $737 billion).[8] Insurance protection is crucial to unlocking capital flows both to the nature-based solutions themselves and to the new asset types, such as carbon credits, that will help finance them.

Insurers will need to work closely with businesses and investors to ensure that the right kinds of solutions are available to meet their needs. Collaboration will also be needed to overcome another emerging challenge. Businesses have traditionally expected that insurance will be readily available to them whenever it is needed. This assumption can no longer be relied upon.[9] As demand from climate transition and adaptation projects grows, and as climate change drives rapid increases in physical risk levels, insurers and businesses must shift towards building longer-term partnerships that can ensure that the right types of coverage are secured in advance.

Insurance and the insurability of climate solution projects and resiliency measures should now be viewed as a strategic priority by businesses and investors. A critical first step on this path is to identify where insurance can already enhance the investability and resilience of climate-related projects and where more work is needed to develop the solutions that will enable a just and resilient climate transition.

Whilst this paper focuses primarily on innovative insurance solutions that have the greatest potential to help rapidly enable the delivery of the 2030 Climate Solutions, the authors support and endorse the important work being undertaken by other insurance initiatives such as the United Nations Environment Programme Finance Initiative's (UNEP FI) Principles for Sustainable Insurance Initiative, whose purpose is to better understand, prevent and reduce environmental, social and governance risks, and better manage opportunities to provide quality and reliable risk protection.[10] The scope of solutions for adaptation we include is limited to examples that go beyond other work on the subject, so does not include other valuable adaptation solutions such as the Build Back Better.[11]

6 New collective quantified goal on climate finance - UNFCCC

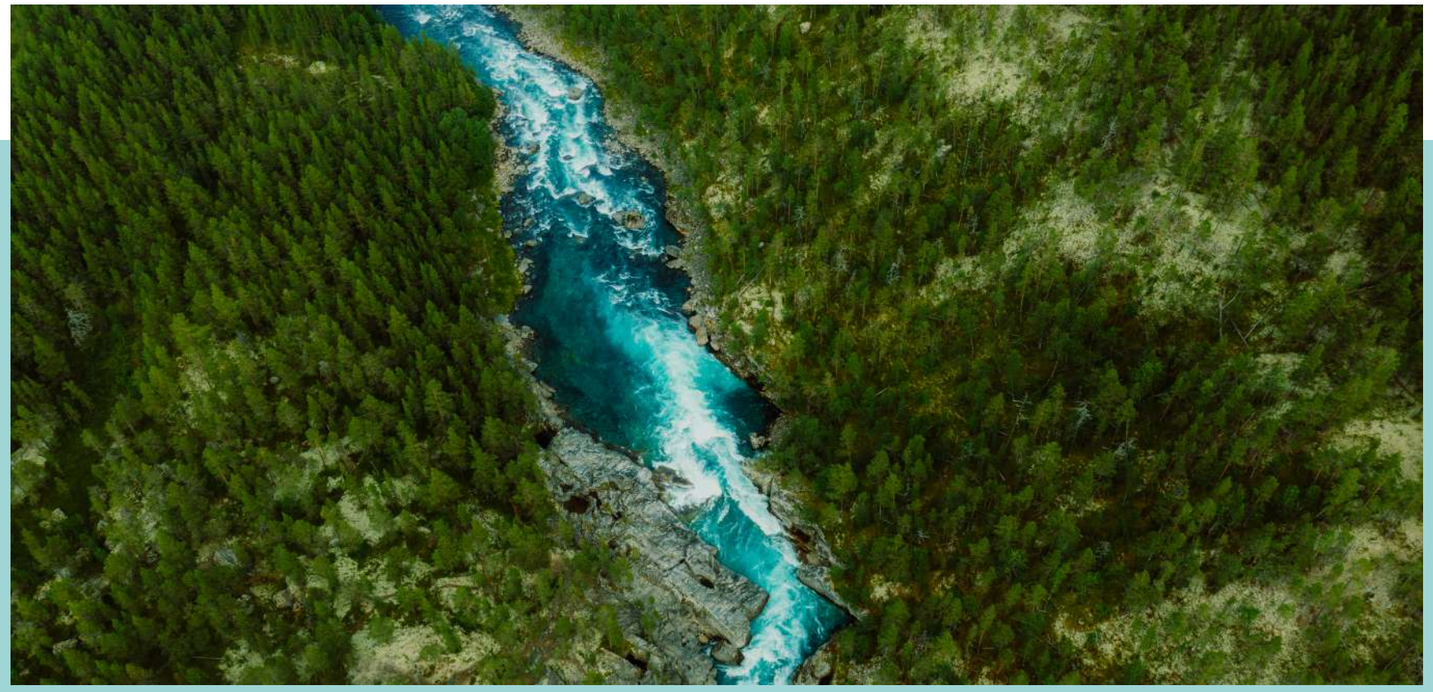
7 Breakthroughs - Climate Champions (unfccc.int)

8 Analysis provided by UNEP, State of finance for nature - The big nature turnaround repurposing $7 trillion to combat nature loss (2023) to meet Rio Convention targets

9 Can extreme weather events threaten the rise of solar?

10 UNEP FI Principles for Sustainable Insurance (PSI)

11 Build Back Better (BBB) - Flood Re



The transition to a sustainable future

How insurance can support the transition to a sustainable future.

Traditional forms of insurance already play a key role in supporting climate transition and adaptation projects. Property and liability coverage, for example, are as essential for businesses deploying climate technologies as they are in any other parts of the economy. But traditional insurance is not enough to unlock the implementation of new technologies and nature-based solutions at the speed and scale needed.

Innovative insurance products can give investors the confidence they need to finance both the deployment of mature climate solutions at scale and the development of the new technologies required for net zero. Insurers are in a unique position to help projects deliver commercially by reducing uncertainty in a wide range of areas. For instance, insurers can provide performance guarantees for new technologies (e.g. green hydrogen), protect operating margins from physical climate impacts, and underwrite supplier, contractor, credit, and political risks.

The following case studies illustrate how some of these solutions can have a real-world impact. Each case study illuminates one of three critical areas in which insurance can play a pivotal role:

01. Financial risk reduction and capital mobilisation

Reducing financial risks, increasing resilience, and ensuring capital flows for climate projects.

02. Operational and project performance optimisation

Enhancing efficiency and reliability in climate projects by managing operational and technical risks.

03. Implementing public policy and market expansion priorities at scale

Helping scale clean technologies and nature-based solutions by reducing uncertainties and supporting the shift to a sustainable future.

These examples highlight the potential for insurance to act as a powerful catalyst for achieving the 2030 Climate Solutions by unlocking the deployment and rapid scaling of critical climate projects across diverse sectors.

Brightmark Energy

Plastics renewal plant financing [12]

Financial risk reduction and capital mobilisation | Industry | USA

Challenges

Brightmark Energy Plastic Division was in the process of securing financing for its first commercial-scale project, an advanced plastics recycling facility. However the investment community perceived significant technology risk for this first-of-its-kind project.

Risk exposure

Even though the underlying technology had gone through years of testing and piloting, Brightmark Energy Plastic Division didn't have any commercial facilitites to use as references for operational history. This meant that it proved difficult for Brightmark energy to secure financing at favourable rates.

Risk mitigation

New Energy Risk (NER) developed a tailored technology insurance policy issued by Indian Harbor Insurance Company, part of AXA XL, providing critical coverage for technology performance risks, directly addressing investor concerns.

Impact

With the help of this risk-mitigating insurance solution, Brightmark Energy raised an aggregate $260 million, raising the requisite debit capital at a favourable long-term rate of 7.125%. This financing facilitated the development of the Ashley plastics renewal facility, a plant designed to process 100,000 tons of plastic waste annually, creating 18 million gallons of ultra-low sulfur diesel, naphtha blendstocks, and 6 million gallons of commercial-grade wax, with the underlying technology uses 83% less fossil fuel energy compared to plastic create by virgin petrolium. [13]

12 New Energy Risk helps Brightmark Energy secure cost-effective financing for its first advanced plastic recycling plant ⓘ

13 Brightmark Energy ⓘ

Parc Eolien Taiba N'Diaye

MIGA political risk insurance [14]

Financial risk reduction and capital mobilisation | Energy | Senegal

Challenges

The Parc Eolien Taiba N'Diaye wind farm, Senegal's first large-scale renewable energy project, aimed to diversify the country's energy portfolio. However, operating in an emerging market exposed the project to political instability and financial uncertainty.

Risk exposure

Key risks included expropriation, currency inconvertibility, and political violence, which directly threatened investor returns and made it difficult to attract the necessary foreign capital to proceed with the project.

Risk mitigation

The project secured MIGA Political Risk Insurance to cover $149.8 million against expropriation, currency inconvertibility, and political violence. This provided a financial safety net for investors, ensuring that they would be compensated in case of political disruptions that negatively impacted the project.

Impact

With the political risk insurance in place, the wind farm attracted foreign investment and became operational, generating 158.7 MW of clean energy and supplying electricity to 2 million people. Additionally, the project is expected to reduce CO2 emissions by 300,000 tons annually, contributing to Senegal's renewable energy goals.

14 MIGA supports construction of largest wind farm in West Africa ⓘ

Musical Solar

Offtaker credit insurance [15]

Financial risk reduction and capital mobilisation | Energy | USA

Challenges

Musical Solar aimed to expand its solar energy portfolio but struggled to secure financing due to uncertainty from energy buyers (offtakers), who posed a risk of default. This created concerns for investors.

Risk exposure

Offtaker defaults threatened revenue stability, raising concerns about the project's ability to meet operational costs and debt obligations and thus making it difficult to secure financing on favourable terms.

Risk mitigation

Musical Solar worked with Energetic Capital to integrate Offtaker Credit Insurance early into their financial planning process, providing insurance coverage in the event of buyer defaults. This solution ensured stable revenue flows by covering payment shortfalls from energy buyers, thereby derisking the project for potential investors. The guarantee gave lenders confidence that the project would remain financially viable, even with buyer defaults.

Impact

Offtaker Credit Insurace allowed Musical Solar to secure financing with lower interest rates and more favourable loan terms. This derisking mechanism enabled the company to expand its operations, accelerating its portfolio growth. The insurance solution improved investor confidence and positioned Musical Solar for long-term success in the renewable energy sector.

15 Capitalizing on niche markets: harnessing high-return opportunities in solar financing ⓘ

Greenbacker Capital

Parametric wind proxy hedge [16]

Operational and project performance optimisation | Energy | USA

Challenges

Greenbacker Capital sought to expand its portfolio of wind energy projects but encountered difficulties in securing financing due to concerns over the unpredictability of wind resources.

Risk exposure

Variability in wind speeds caused revenue fluctuations, making it difficult to meet debt obligations consistently. This instability heightened investor concerns about the project's financial reliability.

Risk mitigation

Greenbacker implemented a Parametric Wind Proxy Hedge with kWh Analytics and Munich Re. The hedge provided financial compensation when wind speeds fell below predefined benchmarks, ensuring steady cash flows despite fluctuations in wind resource availability. The payouts triggered are independent of any physical damage.

Impact

The hedge enabled Greenbacker to secure roughly 20% more debt capital by stabilising revenue streams, with each dollar of premium resulting in ~$6 of additional loan proceeds. This innovative insurance solution allowed Greenbacker to expand its wind energy projects while attracting more investors, contributing to growth in the renewable energy sector.

16 kWh Analytics pioneers first-of-its-kind parametric wind proxy hedge for Greenbacker with Munich Re, MUFG - kWh Analytics ⓘ

UNHCR

Innovative drought insurance programme

Operational and project performance optimisation | Finance | Malawi

Challenges

Innovative financing solutions are required to address the increasing impacts on climate-vulnerable communities. This is evident in Malawi's Dzaleka refugee settlement, where refugees and local communities face food insecurity due to droughts, particularly during the agricultural season from November to May.[17]

Risk exposure

Drought conditions threaten livelihoods in Dzaleka, leaving its inhabitants and the local host community struggling to meet basic needs and, in some cases, forcing them to adopt negative coping strategies - driving a cycle of food insecurity and poverty.

Risk mitigation

UNHCR[18] have developed a comprehensive resilience programme that includes both insurance and resilience-building activities. In partnership with Africa Risk Capacity (ARC) UNHCR developed an innovative drought insurance programme providing financial resilience to Dzaleka's inhabitants and the local host community. UNHCR and Humanity Insured have jointly financed the premium for insurance. The insurance provides an inclusive safety net, ensuring UNHCR has the funds available to provide cash transfers during a drought, enabling households to make essential purchases over a three-month period. This support empowers beneficiaries to build resilience and reduces reliance on negative coping strategies.[19]

Impact

This initiative, that will operate through the 2024–2025 growing season, will help stabilise livelihoods by providing financial security to both communities, stimulating local economies, and reducing the need for negative coping strategies that disproportionately impact women and girls. In the long term, the initiative will enhance food security, promote self-sufficiency, and support economic stability for both communities.

17 Malawi – UNHCR ⓘ

18 Environment and Climate Action Innovation Fund - UNHCR Innovation ⓘ

19 Latest news - Humanity Insured ⓘ

Secure Source Energy

Combined heat and power (CHP) solutions[20]

Financial risk reduction and capital mobilisation | Energy | USA

Challenges

Secure Source Energy (SSE) set out to reduce carbon emissions from buildings by retrofitting two New York City skyscrapers with energy-efficient combined heat and power (CHP) systems. However, securing affordable financing for these high-impact retrofits proved challenging.

Risk exposure

The large-scale CHP retrofits raised concerns among SSE's banking partners over potential underperformance or equipment failure. If the technology failed to deliver the expected energy savings and cost reductions, SSE's ability to service its debt could be compromised, increasing investor caution.

Risk mitigation

Ariel Green collaborated with SSE's engineering and finance teams to develop custom, long-term performance policies that guarantee sufficient income for debt servicing in the event of CHP technology underperformance. These policies were underwritten under the Technology Performance Insurance product from Ariel Green.

Impact

SSE was able to secure over $20 million in capital with a high debt-to-equity ratio, enabling the retrofit projects to proceed. The CHP systems reduced energy consumption, lowered utility costs, and improved compliance, with financial and environmental benefits shared between SSE, building owners, and financiers. Currently, SSE's pipeline includes 25 million square feet of projects across five major metro markets, expanding their impact in energy efficiency and emissions reduction.

20 Energy efficiency - Ariel Green ⓘ

Altelium

Data-driven battery warranties [21]

Operational and project performance optimisation | Transport | United Kingdom (also operating in Europe and North America)

Challenges

Electric Vehicle (EV) owners, trade sellers and fleet operators face high financial risks and a lack of buyer confidence due to battery degradation risk. Original equipment manufacturer warranties aren't wholly satisfactory in this regard. In particular, they only cover limited periods and mileages or can be perceived to offer protection only in very extreme cases, leaving asset owners exposed to significant risks.

Risk exposure

Rapid battery degradation could lead to costly replacements and reduced value, discouraging large-scale new EV adoption. Uncertainty regarding the battery health of used EVs, is often mentioned as an inhibitor for their potential buyers.

Risk mitigation

Altelium partner with Tokio Marine Kiln to offer a battery health check with the option to purchase a battery warranty for the EV if it passes the check. This solution covers repair and replacement costs if the battery degrades faster than expected.

Impact

The warranties reduce the financial risks of purchasing and owning EVs, allowing the EV eco-system to function more efficiently. The solution helps EV adoption by offering financial protection and reducing the uncertainty surrounding battery performance and asset value. The increased confidence in used EVs that it offers, should become reflected in their price, leading to lower costs for financed purchasers of new EVs in turn, further stimulating adoption.

21 Altelium and TMK partner on first data-driven insured warranty for battery energy storage systems ⓘ

Zephyr Power Limited

Asset protection with mangrove restoration [22]

Implementing public policy and market expansion priorities at scale | Energy (ocean and coastal zones) | Pakistan

Challenges

Zephyr Power's wind project in Pakistan's Indus River Delta [23] faced environmental threats, such as tidal erosion and storm surges and typhoons. These risks were worsened by the degradation of local mangroves, leaving the wind power infrastructure vulnerable.

Risk exposure

Environmental hazards threatened to increase maintenance costs and disrupt energy production, undermining the long-term financial viability of the project.

Risk mitigation

Zephyr implemented a hybrid solution, integrating Mangrove Restoration with Asset Protection Insurance. The restored mangroves acted as a natural barrier, shielding the wind power infrastructure from environmental risks.

Impact

The $352,400 investment in mangrove restoration is expected to save Zephyr Power $1 million in maintenance costs over the project's lifetime, justify reduced insurance premiums for the $7m wind turbines and is projected to generate $6.75 million in increased local fishing revenues over 25 years, doubling local community incomes demonstrating financial, nature and local community benefits.

22 The investment value of nature: the case of Zephyr Power Limited ⓘ

23 Zephyr Power - British International Investment ⓘ

Respira

Carbon credit insurance [24]

Implementing public policy and market expansion priorities at scale

Land use

United Kingdom (operating globally)

Challenges

Respira aimed to scale its reforestation projects to generate carbon credits but encountered investor scepticism due to concerns about the credibility and compliance of voluntary carbon credits.

Risk exposure

Key risks included fraud, non-compliance, and delivery failures, which could undermine the value of carbon credits and deter institutional investors from committing capital.

Risk mitigation

Respira partnered with Howden to launch the first Voluntary Carbon Credit Insurance, covering risks associated with fraud, regulatory non-compliance, and delivery failures. This insurance solution reassured investors that the credits would meet regulatory standards and retain their value over time.

Impact

The introduction of Carbon Credit Insurance reduced the risks for institutional buyers, enabling Respira to scale its reforestation projects and unlock new capital. This initiative is expected to prevent 5 million tonnes of CO_2 emissions annually, making a significant contribution to global carbon reduction efforts while enhancing the credibility of the voluntary carbon market.

24 Voluntary carbon credit insurance product to help scale the market ⓘ

Kuala Lumpur SMART Tunnel

Public-private partnership for flood protection [25]

Operational and project performance optimisation

Human settlement

Malaysia

Challenges

Kuala Lumpur's infrastructure faced regular disruption from annual flooding, which damaged transport networks and worsened traffic congestion. The city required a solution to manage both flood risks and traffic bottlenecks simultaneously.

Risk exposure

Flood risks posed a serious threat to critical infrastructure, while traffic congestion created inefficiencies that reduced the city's economic productivity and worsened long-term operational stability.

Risk mitigation

The SMART Tunnel was developed under a public-private partnership, with a 40-year concession agreement to manage both the construction and operational phases. The total cost of the project was $510 million, with $170 million coming from the private sector through SMART Sdn Bhd, and $340 million provided by the Malaysian government. The project also incorporated insurance mechanisms designed to cover the infrastructure against the risk of flooding, ensuring that the private sector's investment was protected from significant financial losses due to climate-related events.

Impact

The SMART Tunnel successfully mitigated flood risks while improving traffic flow, generating sustainable toll revenue. The project secured long-term financial resilience for the city's infrastructure and supported broader economic development by reducing transport disruptions and improving overall urban mobility.

25 SMART (stormwater management and road tunnel), Kuala Lumpur, Malaysia ⓘ

SEWA

Parametric heat insurance programme

Operational and project performance optimisation | Finance | India

Challenges

The Self Employed Women's Association (SEWA) is the single largest central trade union for women workers across the Indian formal economy, being made up of 2.9 million women across 18 states. [26] Women informal workers are disproportionately harmed by climate impacts, with many working outdoors or in dangerously hot indoor conditions. [27]

Risk exposure

Prolonged heat exposure not only endangers the health of workers but also leads to significant loss of income, creating financial instability for families dependent on these workers' daily earnings. [27]

Risk mitigation

SEWA, Climate Resilience for All and Swiss Re have developed the Women's Climate Shock Insurance Program in India, compensating workers for lost income during extreme heat days, combining microinsurance parametric triggers and direct cash assistance. The policy was based on temperature thresholds, automatically triggering payouts when temperatures exceeded safe levels. [28]

Impact

In May, 2024, record heat levels triggered heat insurance and direct cash payments, with these first payments being directed to approximately 42,242 women, 92% of participants. 100% of members have received a one-time cash payment – so far, with the program running through to April 2025. [28]

26 Self Employed Women's Association

27 Extreme heat triggers novel payout for over 46,000 women in India

28 Women's climate shock insurance and livelihoods initiative

Innovative approaches like these are leading examples of the ways in which insurance can increase the investability of climate-related projects. These and many more such solutions are needed to help control the broadest possible range of transition and adaptation risks and hence to attract the investment that is needed today.

For example, the move from industrial monoculture to regenerative agriculture offers producers impressive increases in profitability (70-120%), along with a host of other benefits. [29] Yet despite the advantages that will be realised in the end state of the transition, many producers are deterred by initial yield drops and by the need for significant upfront capital expenditure, which together make it financially challenging to take the first steps. Transition finance can resolve these issues, but currently falls short of the $250-430 billion needed each year, [30] with short financing cycles and uncertainty around the speed at which crop yields will improve dramatically limiting current financing options. Insurers could help derisk investments in this area by putting a financial floor on the crop yield, supporting the codification and monitoring of best practices, and sharing performance data that could help scale early learnings more rapidly.

A similar approach to reducing risks could support the uptake of electric vehicle (EV) use. One of the key obstacles inhibiting financing for the construction of EV charging stations is uncertainty about the pace at which these services will be adopted. Utilisation guarantees by insurers, including guarantees of usage by contracted private and public offtakers, would significantly derisk this financing, increasing its supply and consequently decreasing the cost of recharging.

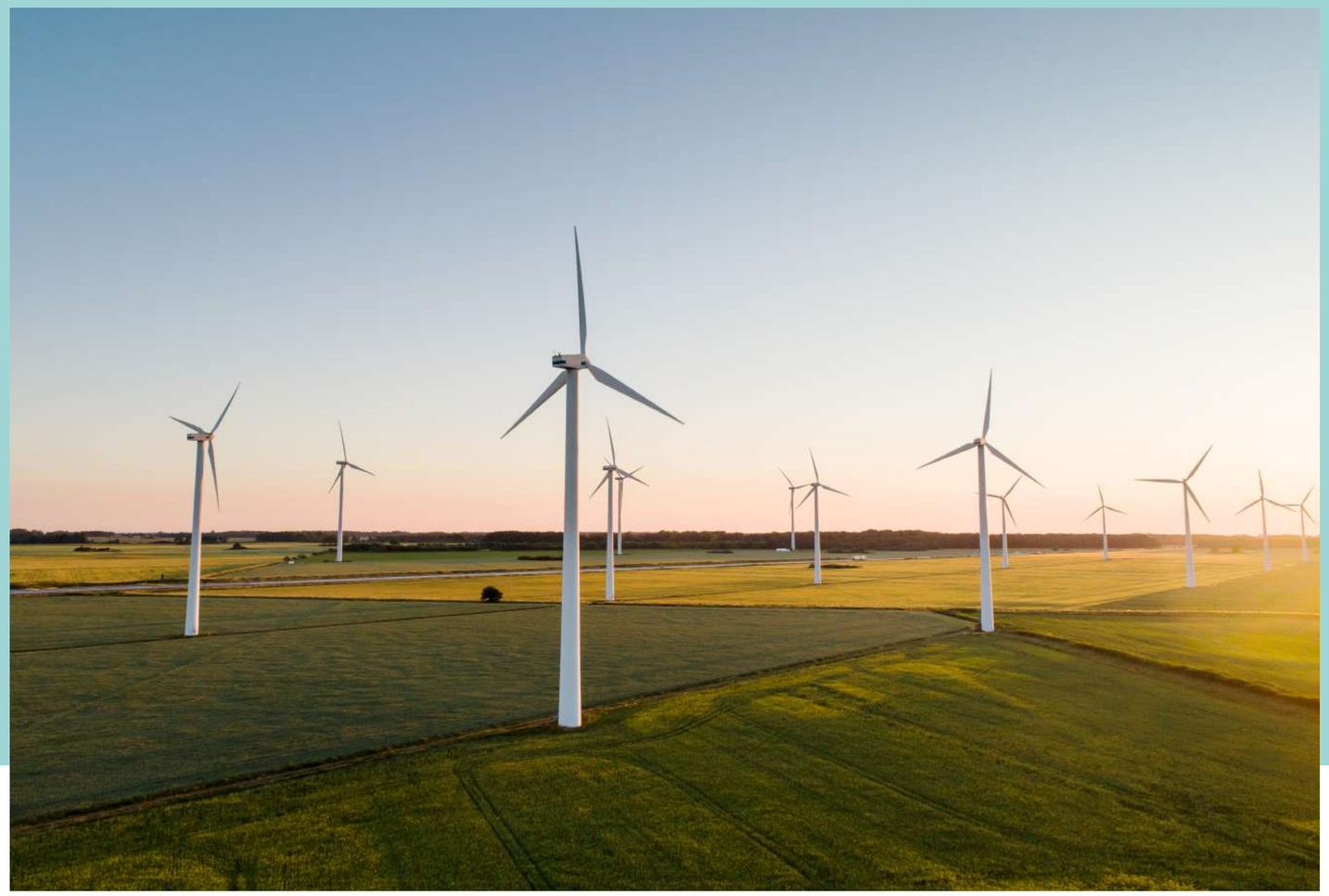
In addition to looking for areas in which innovative insurance solutions can help unlock financing, the industry should also look for ways in which emerging practices can be applied more broadly. For instance, the shift from "repair and replace" to a "predict and prevent" approach, where monitoring devices predict and help prevent damage occurring, offers as much utility for clean tech and nature protection as it does for homeowner property or machinery breakdown covers. This approach is already being applied to wind turbines, to give one example, but there is considerable scope for expansion to other climate projects such as battery storage fire risk and forestry wildfire protection. [31]

29 Regenerative agriculture's profitability for US farmers - BCG

30 Global alliance for the future of food (2023). "Cultivating change: accelerating and scaling agroecology and regenerative approaches", 4.

31 Liu, S., Ren, S., & Jiang, H. (2023). "Predictive maintenance of wind turbines based on digital twin technology." Energy reports, 9, 1344-1352.

Future collaboration



Key areas for future collaboration.

The availability of both traditional and innovative types of coverage is critical to the investability of climate-related projects. However, a range of challenges need to be addressed to fully leverage the enabling power of insurance. These challenges are multi-faceted and include issues related to visibility, capacity, regulatory environments, the short-term nature of insurance products, and data availability—all of which limit the ability of insurance to reach its full potential as a key enabler of the climate transition.

Capacity constraints to scaling insurance products in line with growing demand

The increased flow of investment into transition projects is expected to coincide with increased levels of physical risk from climate-related events. Together, these forces have the potential to challenge the insurance market's capacity to meet the growing demand for coverage of all kinds. Key obstacles to scaling insurance products quickly and affordably include a lack of long-term data about the risk profiles of new products and a sense among some insurers that they lack sufficient expertise to deploy these solutions.

Unequal capacity across markets presents an additional challenge. Low penetration for traditional non-life insurance in regions such as Latin America and Emerging Asia reflects limited market maturity, and this may translate into limited capacity to support high-value, long-term insurance solutions. However, the sheer scale of coverage required, together with the speed at which it needs to be deployed, also threatens to outpace capacity in more developed regions (e.g., battery storage facilities in North America can now need insurance capacity of over $1 billion at a single facility) as insurers exercise prudent restraint on their aggregate exposure to less well understood, albeit likely profitable risks. This capacity gap will likely be most pronounced for products such as technical performance insurance for new technologies and offtaker credit guarantees given the long-term horizons and elevated risk levels that are typical of these products.

Non-life premium volume by region in 2023, as a percentage of GDP

Source: Swiss Re sigma 3/2024

Advanced Europe

3.1

US and Canada

8.9

Emerging Europe

1.7

Advanced Asia-Pacific

3.1

Emerging Asia

1.6

Latin America and Caribbean

1.7

Middle East and Africa

1.3

Short-term nature of insurance products

Almost all insurance products outside the life insurance market are designed with an annual renewal cycle in mind. This short-term horizon allows insurers to price risk efficiently and gives clients regular opportunities to review their insurance needs. While this model has become the settled norm in the industry, it aligns poorly with the long-term nature of many climate projects and with the evolving nature of physical risk today. Projects like reforestation, wetland restoration, and renewable energy infrastructure often require multi-decade commitments for financing and risk management. The lack of long-term insurance solutions leaves these projects vulnerable.

For instance, reforestation projects that aim for carbon sequestration over twenty to thirty years need continuous risk coverage for events such as drought, wildfires, or long-term ecosystem degradation. Without proper long-term assurance that risks will be covered throughout the project's lifecycle, investors will remain hesitant to commit. Additionally, insurance pricing should reflect the evolution of risks throughout the lifecycle of longer-term projects. Balancing adequate coverage with acceptable costs for financiers remains a key challenge.

There are examples of longer-term products being developed and deployed, but across limited use-cases and not at the speed and scale required. This innovation demonstrates that insurance industry can structure long term polices, and should encourage further adoption.

Lack of visibility and late integration of insurance solutions

Many climate financiers and project developers are unaware of the critical role insurance can play in unlocking finance for climate-related projects. The result is that insurers are often not engaged until late in the project development process. This limits the ability of the insurance industry to customise packages of solutions (such as technology performance and offtaker guarantees) that can derisk projects from the outset, leading to higher capital costs and missed opportunities for improving project viability.

Regulatory environment

Some jurisdictions face a variety of socio-political risks that hinder the availability of insurance and investment capital. Political instability, weak governance, and uncertain regulatory environments make it difficult for insurers to assess and price risks accurately, especially for long-term initiatives like nature-based solutions and renewable energy infrastructure. The insurance industry can only operate effectively in jurisdictions in which the rule of law is robust, fraudulent claims can be identified, and local representatives can be relied upon to act impartially. Without these foundations, insurers cannot confidently enforce contracts or assume that claims will be processed fairly, leading to higher premiums or underinsurance. This complexity is further exacerbated by geopolitical tensions, which can disrupt cross-border climate initiatives, further limiting the ability of insurers to underwrite climate transition projects in some of the regions that need them most.

Data gaps in risk assessment for nature-based solutions

Nature-based solution projects, such as reforestation, regenerative agriculture, and ecosystem restoration present an additional challenge to insurers. Accurate assessment of the risks involved can be difficult because the insurance industry lacks reliable, long-term data and models relating to the impact of natural processes and the performance and sustainability of nature-based solutions. This uncertainty can lead insurers either to overprice coverage or to avoid insuring these projects altogether, reducing investor confidence and limiting the scalability of these solutions.

Insurance solutions

High-impact insurance solutions to accelerate the climate transition.

Insurance has a critical role to play in enabling investment in the climate transition at the pace and scale required to meet the targets of the 2030 Breakthroughs. While there are many possible solutions for unlocking climate finance in different sectors and contexts, the examples below offer particularly high-impact options.

Collaboration on a prioritised set of thematically focussed deal pipelines to accelerate the benefits of insurance

If insurers are to scale their efforts to support new product types, technologies, and jurisdictions, a clearer path to profit is needed than the current approach of innovating on a small number of strategically disconnected one-off projects. Identifying and collaborating on a prioritised set of thematically focussed deal pipelines, such as accelerating the roll-out of large-scale energy storage systems across a number of key markets, could enhance currently available insurance solutions while pooling knowledge across the industry. Defining the themes to be those that will most help enable delivery of the 2030 Breakthroughs, will help accelerate the roll-out of societally prioritised clean technologies and increase the scale of insurance solutions available.

Blended insurance mechanisms to expand capacity

One way to expand insurance capacity in underserved sectors and countries is through the development of blended insurance mechanisms that bring for-profit insurance capital together with risk capacity from concessional capital. For risks that lack sufficient for-profit insurance capacity, these mechanisms would seek to determine and socialise risk levels quickly, with the goal of expanding appetite among traditional insurers and encouraging them to “crowd out” the concessional capital as rapidly as possible.

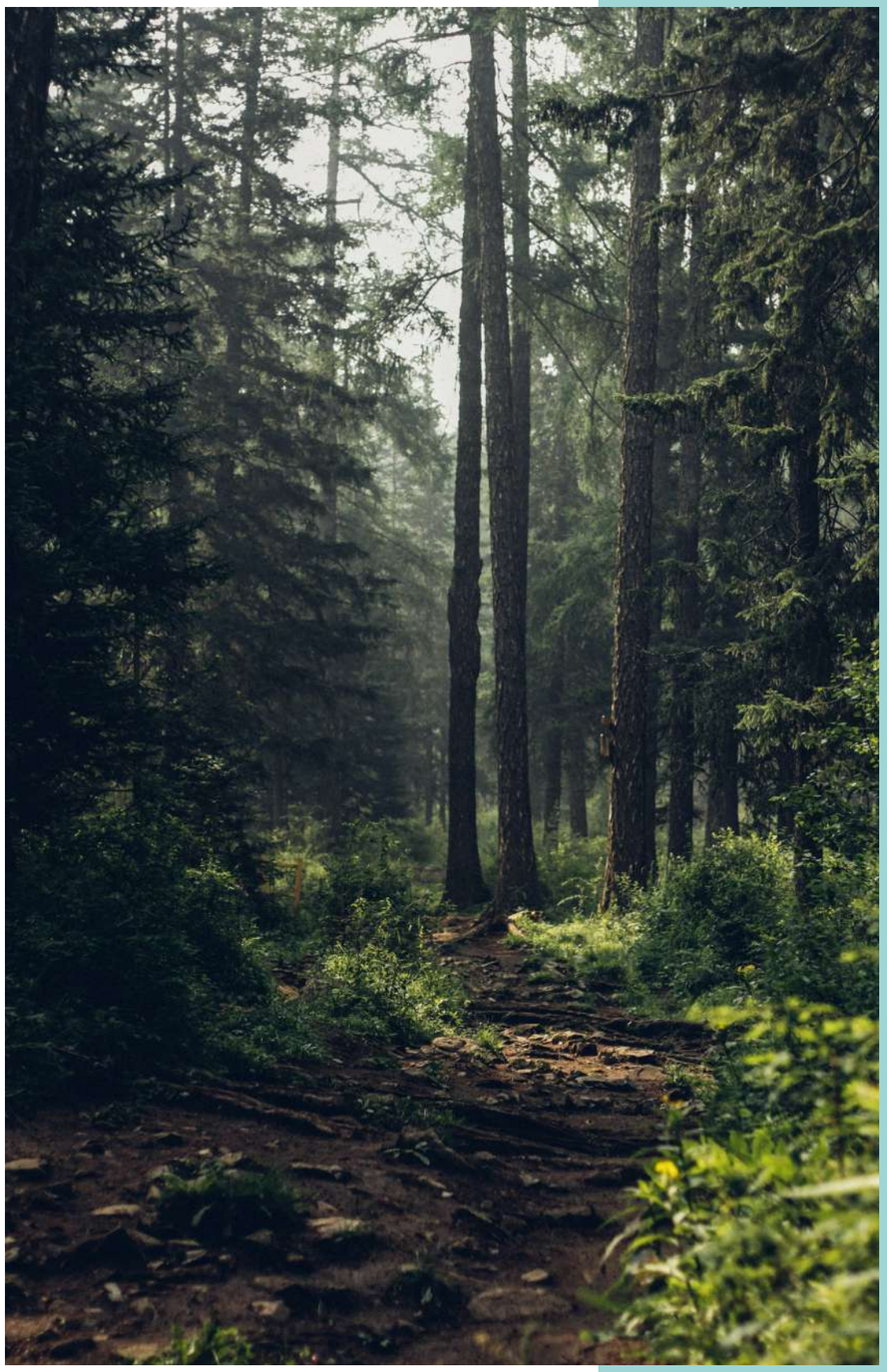
Multi-year insurance solutions for long-term projects

Climate trends and the duration of climate investments increasingly challenge the default one-year time-horizon of the insurance industry. To accelerate the climate transition, commercial insurers should expand their offering of long-term policies, providing private sector-driven solutions that align with the long-term nature of climate projects. Insurers should also share their leading expertise in forward-looking analytics, using these capabilities to signal the riskiness of different transition projects and to nudge investments towards those that will be sufficiently resilient to stand the test of time. Governments can accelerate this process by mandating that project planners obtain property insurance cost estimates for the duration of the project lifetime, in accordance with a prescribed format delivered by accredited providers. Such a requirement could be integrated into the country's National Adaptation Plan.

Scaling insurance for clean technologies through international collaboration

Collaboration on an international scale, such as that taking place within the framework of the Breakthrough Agenda, will allow scalable insurance solutions to be deployed rapidly across multiple sectors. Coordinating efforts between insurers, governments, and clean tech developers will support the collection of risk data and the planning and testing approaches needed to scale clean technologies effectively, allowing governments and insurers to endorse these technologies at a global level. For instance, the Geneva Association's Insurability Readiness Framework offers structured guidance to help assess the insurability of emerging climate solutions, focusing on critical factors such as data availability, regulatory stability, and risk modelling capabilities.[32] By applying this framework, insurers can evaluate risks with greater confidence and develop insurance products tailored to the demands of the climate transition.

32 Bringing climate tech to market: the powerful role of insurance (genevaassociation.org)



Governance and legal reforms to strengthen insurance frameworks

Governments and international bodies must collaborate with insurers to strengthen multilateral and local legal frameworks and improve the rule of law in regions where climate projects are needed. Ensuring that contracts are enforceable, claims are handled transparently, and local governance structures are reliable will give insurers the confidence to expand coverage in regions where it may be needed most.

Data-driven risk models for nature-based solutions

The development of global platforms that collect and share real-time environmental data will improve the accuracy of risk models for nature-based solutions. Insurers must collaborate with governments, environmental bodies, and scientists to develop comprehensive risk models that reflect the complexities of nature-based solutions. To ensure better risk modelling, governments should incentivise project developers to share detailed data throughout the lifecycle of nature-based projects, enabling insurers to offer more affordable and scalable coverage.

Conclusions

Insurance is critical to accelerating climate finance.

- It is vital that insurers, businesses, and financiers now recognise that insurance has a critical role to play in enabling and accelerating a just, resilient transition. Without the right types of insurance to derisk markets and communities, a smooth and swift transition will be impossible.

- Insurance is a fundamental part of the financial sector. It provides capital in the form of contingent capital and needs to be raised to a strategic level alongside traditional investment capital. As the foundation of the capital stack, it will be a critical and essential enabler to unlocking the increased levels of transition finance that we urgently need.

- Access to insurance can no longer be taken for granted. $19 trillion has already been committed to financing climate transition and resiliency projects by 2030.[33] Demand for insurance will grow rapidly as this enormous sum is unlocked, with increasing weather risks creating further pressure on insurance market capacity.

- Businesses should now view insurance as a strategic priority and should engage early with insurers to enhance the investability and insurability of their transition plans and to help assess exposure to physical and nature risks.

- Insurance already has a range of powerful solutions available to unlock transition finance flows, decrease the cost of finance, and increase the attractiveness of clean tech. These can help increase both the supply of and demand for clean tech and nature-based solutions.

- Unlike most areas of finance, insurance decreases the real-world cost of risk, amplifying its ability to accelerate the climate transition.

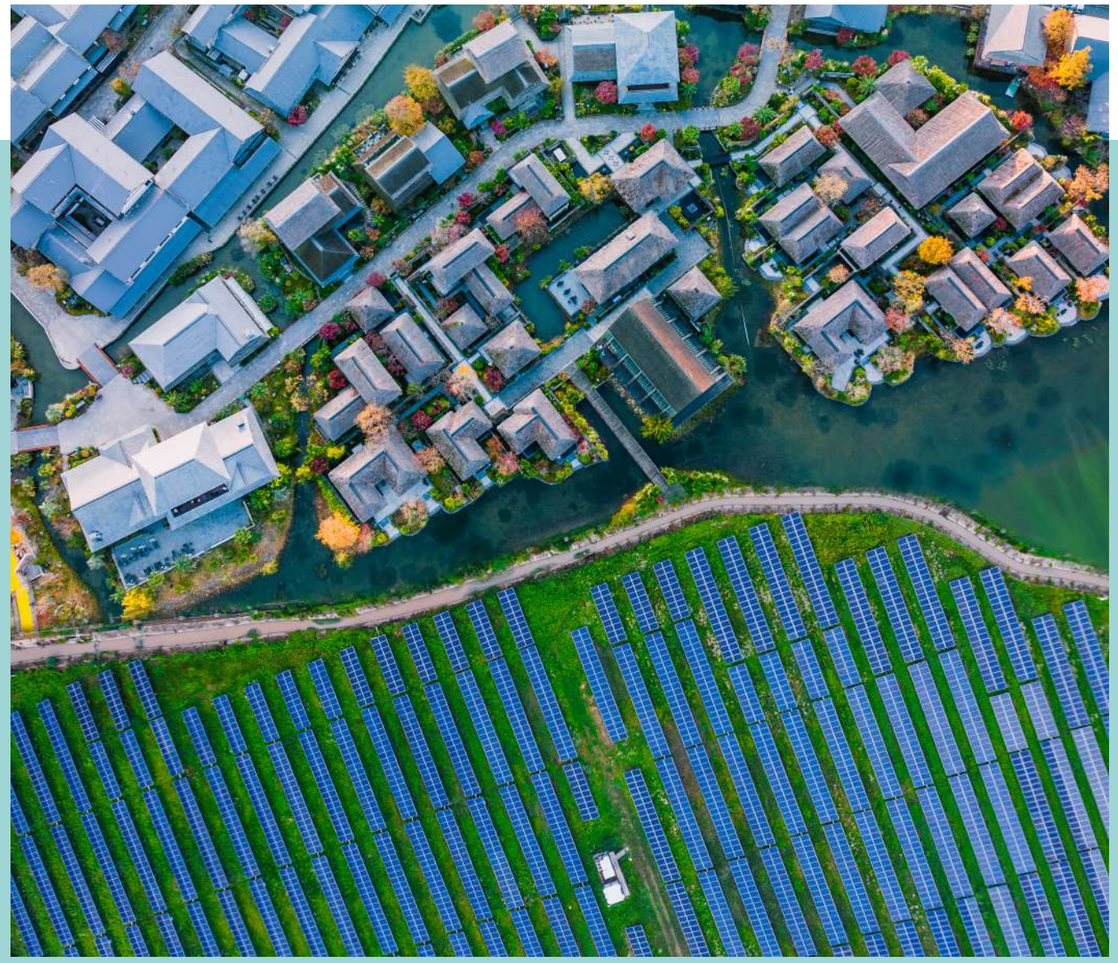
- Insurance can and should share its leading expertise in forward-looking analytics, using these capabilities to signal the riskiness of different transition projects and to nudge investments towards those that will be more resilient.

- Potential beneficiaries are largely unaware of the insurance solutions that are currently available for climate-related projects, and the ability of the insurance market to deliver them at the speed and scale society needs is likely insufficient.

- Policymakers and concessional capital providers have clear opportunities for amplifying and accelerating the impact of the for-profit insurance industry.

- Radical collaboration will be needed between insurers, businesses, financiers, concessional capital providers, philanthropists, and policymakers to mobilise the insurance industry with the scope, and at the speed and scale, required.

33 The bigger picture: The $10 trillion role of insurance in mobilising the climate transition - Howden, BCG, 2024 ⓘ



Taking action

Multiple actors have key roles to play in their areas of expertise to activate these opportunities.

Policymakers

- Emphasise insurance as a key element of finance from COP29 onwards.
- Consider which benefits of insurance could most usefully be included and deployed in their jurisdictions, especially when developing their Nationally Determined Contributions and National Adaptation Plans.

Businesses and their financiers

- Engage with insurers when developing transition plans to ensure investability.
- Engage with insurers at the project design phase to optimise project resilience and access to finance.
- Engage with insurers to review the resiliency of existing operations and supply chains.

Insurers

- Align pricing and coverage with evolving project risks, matching risk profiles over time through close collaboration with financiers.
- Close the talent gap by developing in-house expertise on climate risks. Equip underwriters and brokers with the skills to assess and support complex, long-term projects, ensuring effective risk management.
- Provide support to businesses and their financiers to help them rapidly master the ways in which these solutions can be integrated with, and can derisk, their climate strategies.

All stakeholders

- Create a radically collaborative vehicle within the framework of the Enabling Insurance Breakthrough to help deliver the goals of the 2030 Climate Solutions across all industries and sectors.
- Define and implement the priority set of impactful changes that can be achieved by addressing the opportunities and barriers highlighted in this paper.

Appendices

A. How insurance can improve bankability of transition finance

Phase	Pre-FID*	Construction	Operational	Exit
Benefit	• Stabilise revenues • Enhance credit • Reduced costs	• Protect capital investment against outside events • Hedging and resilience against interruption and delays	• Protect capital investment against outside events • Hedging and resilience against interruption and delays	• Stabilise revenues • Enhance credit • Reduce costs
Risk transfer examples	• Offtake credit • Technology performance • Tax equity • PPA alternatives • Equity contribution guarantee • Supply chain • Marine cargo and transit • Surety bonds	• Construction all risk • Delay in start-up • Terrorism • Third party (public) liability • Latent defects • Contractual financial loss • Construction plant and equipment • Environmental liability • Professional indemnity	• Operational all risk • Technology performance • Revenue protection • Property damage • Loss of rent • Property owners' liability • Environmental liability • Engineering inspection • Carbon leakage • Natural catastrophes	• Warranties and indemnities • Title and contingent risks 1. Mines and minerals 2. Adverse possession 3. Missing searches • Litigation • Tax risks • Surety solutions

* FID = Final investment decision

B. Solution summary for land transport

Products that help increase the scale of finance, decrease it's cost and/or increase the demand for clean tech.

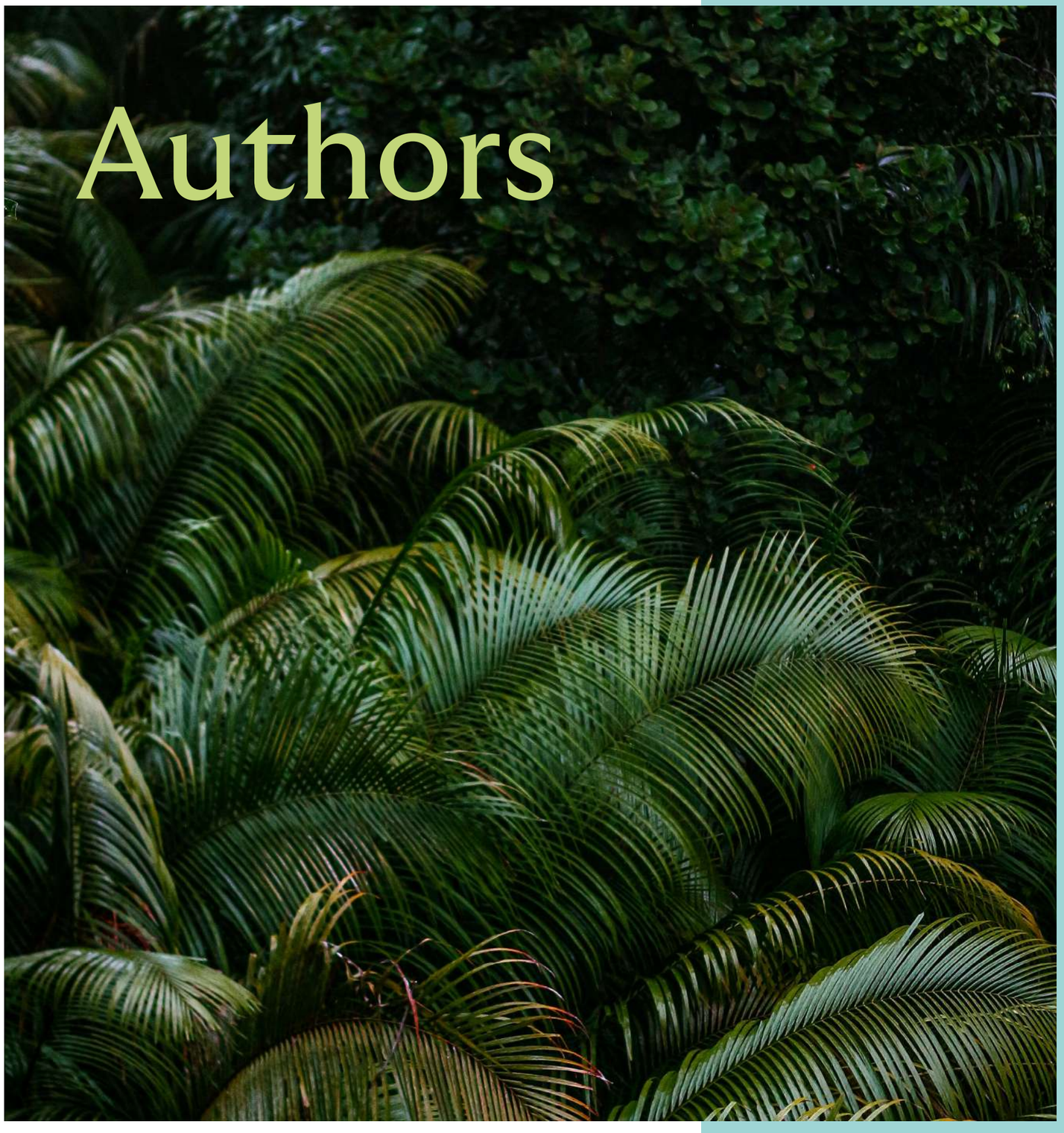
Risk type	Consequences	Insurance	Key benefits	Case studies
Warranty risk of equipment/ service	• Unbankable • Profitability loss	Technology performance guarantee	Increases investability, decreases cost of finance, and helps accelerate closing by protecting debt repayments if technology efficacy falls below a defined level.	
		Product warranty or backstop warranty	Increases customer confidence, sales, and product perceived value by protecting product purchaser(s) against insufficient performance. Can plug gaps and extend the duration in OEM warranties, enhance their credit worthiness (backstop), or step in when OEM/producer warranties are invalidated.	Altelium and Tokio Marine Kiln Munich Re
Political and credit risks	• Unbankable • Complete project loss • Revenue loss	Political risk	Protection from impact of political events, decisions, or changes in government or quasi-state entity policies on a project's operations.	Parc Eolien and MIGA
		Credit risk: off-taker, contractor or supplier	Protects the project should a project offtaker, operator, or supplier default on their agreements.	Musical Solar and Energetic Capital
	• Unbankable	Equity contribution guarantee	Expands sources of funds while retaining project finance integrity by enabling investors to defer their financing payments, thereby increasing investor returns.	Mainstream Renewable Power et al
Ancillary revenue risks	• Unbankable	Tax credit insurance	Protects against the risk that tax credits (e.g. per the IRA) are ultimately less than planned.	
	• Revenue loss	Carbon credit insurances	Protects project revenues should planned carbon credit receipts be less than planned and can enhance credit sale value by helping ensure their integrity.	Respira and Howden

C. Pre-FID solution summary for energy

Products that help increase the scale of finance, decrease it's cost and/or increase the demand for clean tech.

Risk type	Consequences	Insurance	Key benefits	Examples	Case studies
Warranty risk of equipment/service	• Unbankable • Profitability loss	Technology performance guarantee	Increases bankability, decreases cost of finance and helps accelerate closing by protecting debt payments if technology efficacy falls below a defined level.	• Deep sea floating off-shore wind • Battery energy storage solutions • Waste to energy	Brightmark Energy and New Energy Risk EcoTech and Ariel Green Bloom Energy and New Energy Risk
		Product warranty or backstop warranty	Increases customer confidence, sales and product perceived value by protecting product purchaser(s) against insufficient performance; can plug gaps and extend the duration in OEM warranties, enhance their credit worthiness (backstop) or step in when OEM/ producer warranties are invalidated.	• Solar PV • Battery energy storage solutions (commercial or retail scale) • Second-life battery use	Powin, InvEnergy and Ariel Green NovaSource and Ariel Green
		Energy efficiency insurance	Protects an energy service company or a facility owner against the actual energy savings being less than a guaranteed level.	Measures such as heating, ventilation and air conditioning, lighting, air handling, control system upgrades, insulation improvements and solar panels at virtually all building types.	Secure Source Energy and Ariel Green The IDB
Political and credit risks	• Unbankable • Complete project loss • Revenue loss	Political risk	Protection from impact of political events, decisions or changes in government or quasi-state entity policies on a projects operations.	Confiscation, expropriation, nationalisation, default	Parc Eolien and MIGA
		Credit risk: off-taker	Protects seller should the offtaker(s) default on their purchase agreement.	Can include sub-investment grade obligors	Musical Solar and Energetic Capital
		Credit risk: contractor or supplier	Protects the project should a project operator or supplier default on their agreements.		
	• Unbankable	Equity contribution guarantee	Expands sources of funds, whilst retaining project finance integrity, by enabling investors to defer their financing payments thereby increasing investor returns.	Equity investors delay the bulk of their financial contribution until the build phase.	Mainstream Renewable Power et al
Ancillary revenue risks	• Unbankable	Tax credit insurance	Protects against the risk that tax credits (e.g. per IRA) are ultimately less than planned.	Replace project equity with debt that's repaid by the planned tax credit revenue stream. Can be 50% of total per IRA.	
	• Revenue loss	Carbon credit insurances	Protects project revenues should planned carbon credit receipts be less than planned and can enhance credit sale value by helping ensure their integrity.	Perils include fraud and negligence, political risk and physical risks.	Respira and Howden
Input supply risks	• Revenue loss	Weather revenue protection	Protects against revenue loss if weather conditions hit production; can decrease amount of debt required, increasing returns.	Solar (too little) and wind (too little and too much) often in parametric format.	Greenbacker Capital Management et al Arava Power et al
		"Feedstock" guarantee	Protects against revenue loss if the volume or quality of feedstock is below defined levels.	Biogas feedstock supply shortage due to poor harvest or high price or contaminated/lower quality.	

Authors



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Acknowledgements

The authors would like to thank all those listed below for their support and sharing the vision for the insurance industry supporting the broader society in tackling the twin challenges of climate change and biodiversity loss. Their involvement does not necessarily reflect their viewpoints nor signify endorsement of the entire report and its recommendations.

Gonzalo Muñoz
UN Climate Change High-Level Champion from COP25 Presidency

Nigel Topping
UN Climate Change High-Level Champion from COP26 Presidency

Altelium
Ambition Loop
Ariel Green, the Clean Energy division of Ariel Re
Aviva
AXA XL
Axa Climate
AZSIGORTA OJSC
Bankers for NetZero
Beazley
British International Investment
Cambridge Institute for Sustainable Leadership (CISL)
Capital for Climate
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NatWest
New Energy Risk, Inc.
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Tokio Marine Kiln
United States Department of Energy, Office of Technology Transitions

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The UN Climate Change High-Level Champions, mandated at COP21 and appointed by COP Presidents each year, drive ambitious climate action by connecting the work of governments with the many voluntary and collaborative solutions provided by cities, regions, businesses, investors and more. This includes delivering the five-year plan of the Marrakech Partnership, in collaboration with the UNFCCC secretariat and other partners. H.E. Ms. Razan Al Mubarak and Ms. Nigar Arpadarai serve as the current High-Level Champions for COP28 and COP29.

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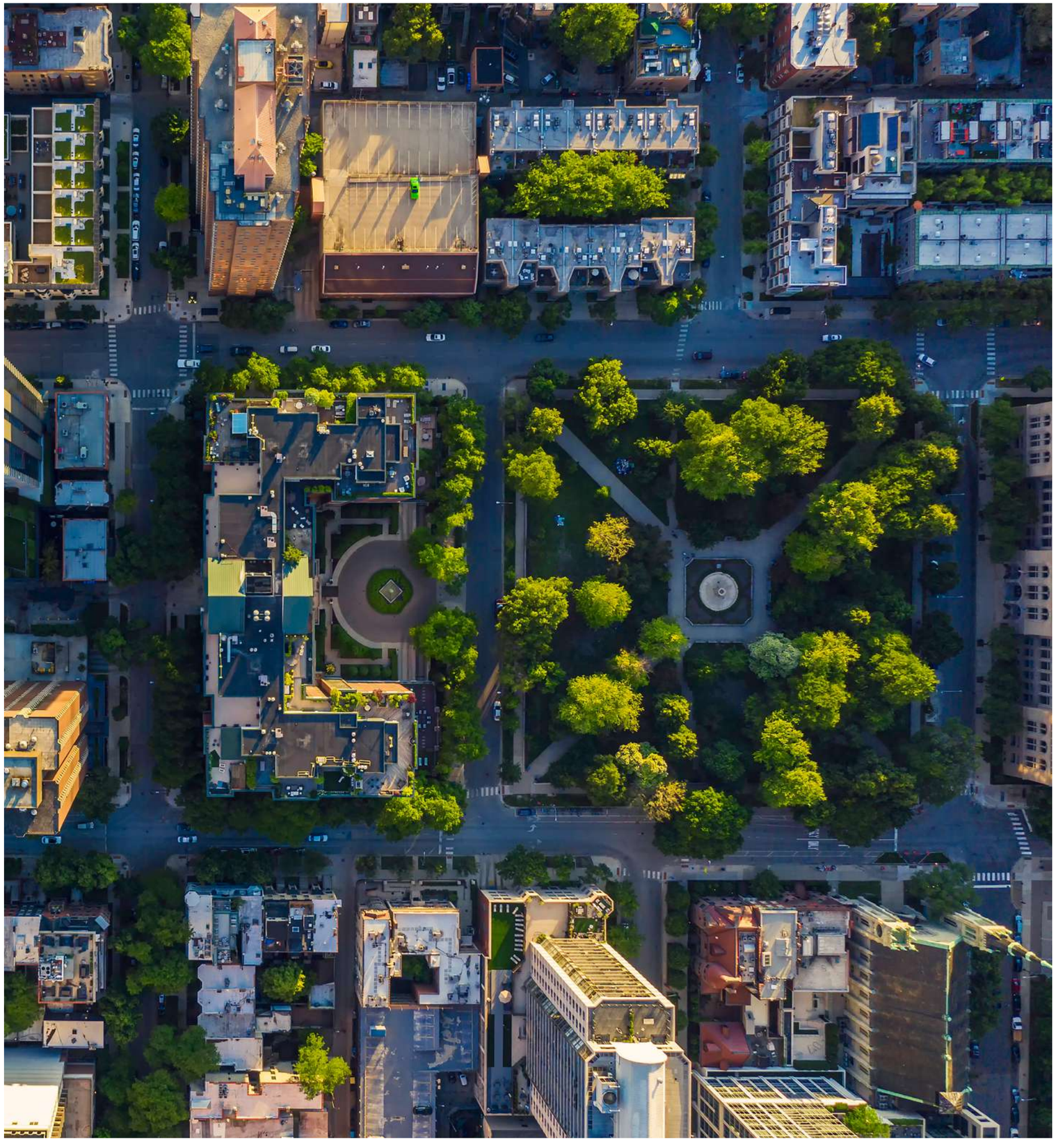

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