actis

EXTREME WEATHER RESILIENCE: WHY IT MATTERS AND HOW WE’RE BUILDING IT

July 2026

TACKLING THE $64 TRILLION QUESTION

With nearly $64 trillion of investment needed in infrastructure over the next 25 years,[1] the sector, in our view, is one of the biggest and most compelling long-term opportunities of our time. Investors increasingly recognise this, but it comes with a defining question: how can we ensure these assets remain resilient?

Physical climate risk tends to affect financial performance across many sectors today. It influences valuations, insurance costs, credit assessments and the assumptions that underpin long-term cash flow projections. It's a particular priority in infrastructure, where assets are often remote and the services they provide essential. And it's still more important in emerging markets, where infrastructure is more exposed to extreme weather but is typically less equipped to adapt than that in developed markets.

The commercial and financial consequences of failing to mitigate against extreme weather can be significant. Beyond the costs of asset repair, operators face lost revenues and potential reputational damage from downtime and interrupted services. Insurers are also increasingly focused on physical climate risk: a recent survey found that 96% of insurers were very or extremely concerned about the long-term insurability of infrastructure projects in regions exposed to physical climate risk.[2] A lack of action risks higher premiums – and even a refusal to insure assets.

> *Resilience is increasingly central to long-term investing, and key to protecting value, ensuring that assets providing essential services to communities remain operational. Physical climate risks are no longer abstract, so we look for resilience to be embedded into investment decisions, where material risks are considered early and during the lifecycle of an investment. We expect our partners to be proactive and demonstrate how these measures can support long-term value.*
>
> **Amy Coleman, Sustainability Lead, Impact & Private Equity, M&G Investments**

$64tn OF INVESTMENT NEEDED IN INFRASTRUCTURE OVER THE NEXT 25 YEARS[1]

SOURCE:
1. https://www.aberdeeninvestments.com/en-us/investor/insights-and-research/how-large-are-global-infrastructure-needs-us
2. www.msci-institute.com/wp-content/uploads/2026/03/What-the-market-thinks-How-global-insurers-are-responding-to-rising-physical-risk_260326.pdf

$732bn

NATURAL DISASTERS ARE ESTIMATED TO COST $732 BILLION IN DAMAGE AND LOSS OF INFRASTRUCTURE ASSETS GLOBALLY EVERY YEAR[3]

Inaction can also expose infrastructure operators to legal liability risk, with implications that can undermine financial viability. Witness California-based utility Pacific Gas & Electric's bankruptcy in 2019 after it was found liable for a series of forest fires between 2015 and 2018. The circumstances surrounding this case were the result of US state-level laws, but it is only a matter of time before regulators tighten their requirements elsewhere.

We believe that the costs of inaction far outweigh the investments needed to mitigate extreme weather. Natural disasters are estimated to cost $732 billion in damage and loss of infrastructure assets globally every year,[3] with indirect economic impacts averaging 7.4 times direct infrastructure damage, a recent report by CDRI found.[4]

Physical climate risk could result in some infrastructure investor portfolios losing up to 54% of value by 2050, according to an EDHEC study.[5] Meanwhile, research for the World Economic Forum (WEF) found that, absent evidence-based resilience strategies, listed companies could see an annual decline of 7.3% in average earnings by 2035 as a result of fixed asset losses. The researchers noted that if private businesses were included, the percentage would have been significantly higher.[6]

Yet actions to mitigate extreme weather event risks don't just protect value; they can also create it. Every dollar invested in extreme weather adaptation in 10 emerging markets before 2030 could generate a $12 return from avoiding damage and lost economic growth, according to one study.[7]

Other research demonstrates a "triple dividend", where every dollar invested in climate adaptation yields $10.50 in avoided losses, plus economic, social and environmental gains over a 10-year period.[8]

These are just some of the reasons why our approach at Actis treats resilience – including physical climate resilience – as a financial discipline. This shapes our investment decisions and underpins a systematic and rigorous approach to considering and acting on extreme weather exposures. We look to assess the risks at individual asset level, quantify the commercial consequences and then support targeted mitigation investments. It's a holistic approach, which tends to result in more resilient assets and creates value that could increasingly underpin the exit case - our assets' future buyers will likely apply similar scrutiny in this area.

> *"Investing in climate-resilient infrastructure is both a risk management imperative and a value creation opportunity. Targeted adaptation measures can protect significant value, stabilise revenues, and strengthen risk-adjusted returns. Resilient infrastructure also helps maintain service continuity for households, businesses, and economies—making resilience essential for financial performance, long-term development impact, and jobs.*
>
> **Nicolas Peltier-Thiberge, World Bank Group's Infrastructure Director for Strategy & Operations**

SOURCES:
3. https://dymez6ioe12by.cloudfront.net/media/wp-content/uploads/2025/11/06102116/gir_2025_full_report.pdf
4. https://cdri.world/global-infrastructure-resilience-report-2025-capturing-the-resilience-dividend-2/
5. https://www.edhecinfraprivateassets.com/wp-content/uploads/2023/07/p1102.pdf
6. https://reports.weforum.org/docs/WEF_Business_on_the_Edge_2024.pdf
7. https://standardcharteredbank.turtl.co/story/the-adaptation-economy/page/2/1
8. https://files.wri.org/d8/s3fs-public/2025-06/strengthening-investment-case-climate-adaptation.pdf?VersionId=een52ahEilO4laOA6e8ps4fQCN4xTtph

UNDERSTANDING THE RISKS BEFORE INVESTING

Extreme weather risk assessment and mitigation is embedded through our entire deal lifecycle. Even before investing, we conduct hazard screening at asset locations to determine the scope of our due diligence work. Scenario modelling, mitigation planning, resilience measure reviews, historical weather-related impacts and insurance claims all feed into tailored, data-driven technical risk assessments. With a clear view of how much capital expenditure is needed to build and improve asset resilience, this work directly influences our investment decisions and valuations.

IMAGE: Stride solar plant in India

Indian solar generation platform Stride Climate Investments illustrates this approach. Before investing in 2025, we assessed past extreme weather events affecting Stride's business. In 2017 and 2019, several of its sites flooded after significant rainfall, causing electrical damage, restricted access, operational shutdowns, and safety hazards.

However, we also ascertained that Stride had since invested significantly in resilience measures. These included building water-retaining and flood walls, improvements to drainage, creating run-off ponds and constructing new roads to allow access to the sites. These measures reduced flood-related generation losses by more than 90%, despite its sites' exposure to multiple extreme weather events, including two cyclones – Biparjoy and Tauktae. Vitally, this work meant that insurance covering flooding was also reinstated and that when neighbouring sites flooded in 2024, Stride remained operational. Combined with scenario modelling to test for future risks, our detailed due diligence work meant we had a comprehensive picture of the company's extreme weather resilience and potential risk exposure and could therefore proceed with the investment.

> *Physical climate risk is one of the most consequential challenges facing infrastructure investment today. The compounding nature of extreme weather exposures – across asset values, insurance markets, regulatory environments, and long-term cash flows – demands treating physical climate risk as a rigorous financial discipline rather than a peripheral consideration.*
>
> *As long-term investors and asset owners, this has become a core consideration in how we assess infrastructure assets. The risks are real, and the emerging evidence on the financial returns to resilience investment only strengthens the case for embedding it as a standard part of investment practice. We welcome the continued development of tools, analysis and evidence base, and expect to see that rigour become the norm across the industry.*

Mel de Jager, Director, ESG, Infrastructure & Renewable Resources, BCI

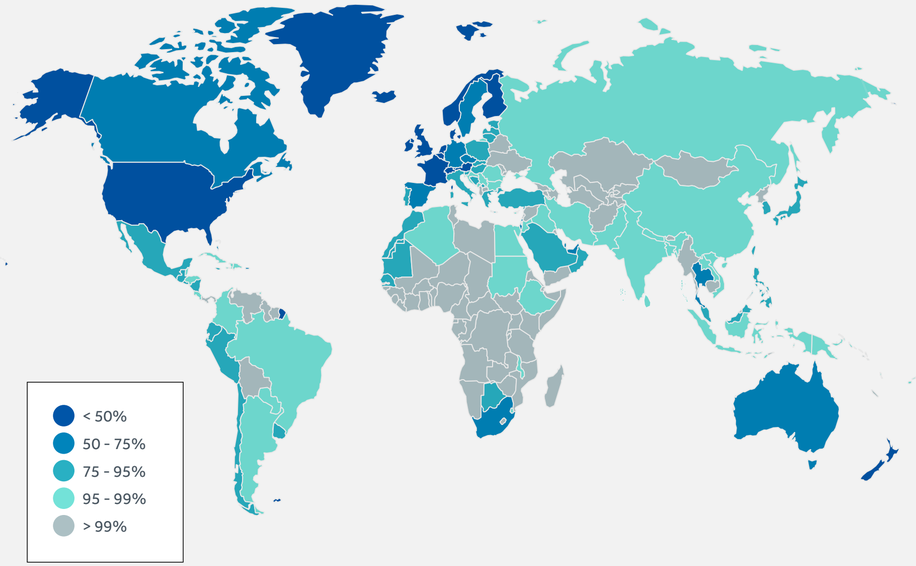
Our stringent climate risk due diligence before investing in Colombian toll road operator, Vialtis, is another example. This included building bespoke indices for flooding and landslide risks based on historical observations and performing risk analysis along the full length of roads. In so doing, we were able to quantify unmitigated probable losses, the capital expenditure needed to mitigate extreme weather risk and the mitigated losses after that investment.

In a market that tends to make reactive investments (after events happen), this work is allowing us to selectively plan remedial interventions at points we know are critical, such as bridges, and consider more proactive investments where there is a financial case for doing so.

Our assessments are similarly meticulous and systematic when choosing where and how our companies build new infrastructure assets. In our data center investments, for example, climate resilience forms part of site selection due diligence alongside traditional natural disaster risk assessments. Data centers' heat generation and need for cooling make them especially vulnerable to extreme heat and water stress – even in more temperate and urban areas in developed markets. For instance, extreme heat could cause $472m of losses annually by 2035 among London's existing data centers, according to research for the WEF.[9]

And it's not just heat and water that can cause losses. In East Asia, nearly one in five current and planned data centers will be at high risk from coastal or riverine flooding or tropical cyclone winds by 2050, a recent report found.[10] The report added that investment in resilience is critical, not just to avoid operational disruption, but also to bring down escalating insurance costs. For these reasons, climate resilience is a major factor in our data centers' design and construction. Our data center in Taipei illustrates this clearly: it withstood a 7.4 magnitude earthquake during construction and, now operational, it has been certified resilient to potential climate risks until 2050.

PROTECTION GAP SINCE 2000 BY COUNTRY



51% GLOBALLY, THERE IS AN ESTIMATED 51% PROTECTION GAP FOR INSURANCE AGAINST CLIMATE-RELATED LOSSES[11]

SOURCES:
9. https://reports.weforum.org/docs/WEF_Business_on_the_Edge_2024.pdf
10. https://app-ap1.hubspotdocuments.com/documents/7735589/view/1285803353?accessId=6631c9
11. https://www.aon.com/en/insights/reports/climate-and-catastrophe-report

UNDERSTANDING THE RISKS IN OUR EXISTING PORTFOLIO

To preserve value and manage downside risk, we will periodically repeat top-down extreme weather scenario analysis in our portfolio.

In the assets we already own, we can only take action if we understand clearly what we are dealing with. In 2024, we commissioned AXA Climate to undertake a top-down extreme weather scenario analysis across our entire portfolio. Using GPS co-ordinates for each of our 225 assets to a resolution of 25 square kilometres, our assessment considered chronic (long lasting, such as water stress) and acute (events, such as flooding) hazards under three different climate scenarios to 2030 and 2050. This exercise scores assets according to low, medium and high risk, identifies the likely hazards, and estimates the timeframe over which they could occur. To preserve value and manage downside risk in a changing environment, it's an exercise we'll be repeating periodically.

We have also developed a proprietary hazard risk assessment tool to understand the bottom-up picture. Having shared the relevant data from our climate scenario study, we tasked our portfolio companies with making a detailed assessment of each of their assets' resilience to the hazards identified. The resulting reports informed their resilience plans, which are to be reviewed annually. These reports have helped prioritise action and investment to mitigate the most material and immediate risks our portfolio companies' assets face. They have also formed the basis for plans to manage medium and longer term physical climate risks.

Keeping all parties focused and accountable is essential to us. Our portfolio companies report annually on implementation progress and resilience status – information we can share with relevant wider stakeholders, including our investors.

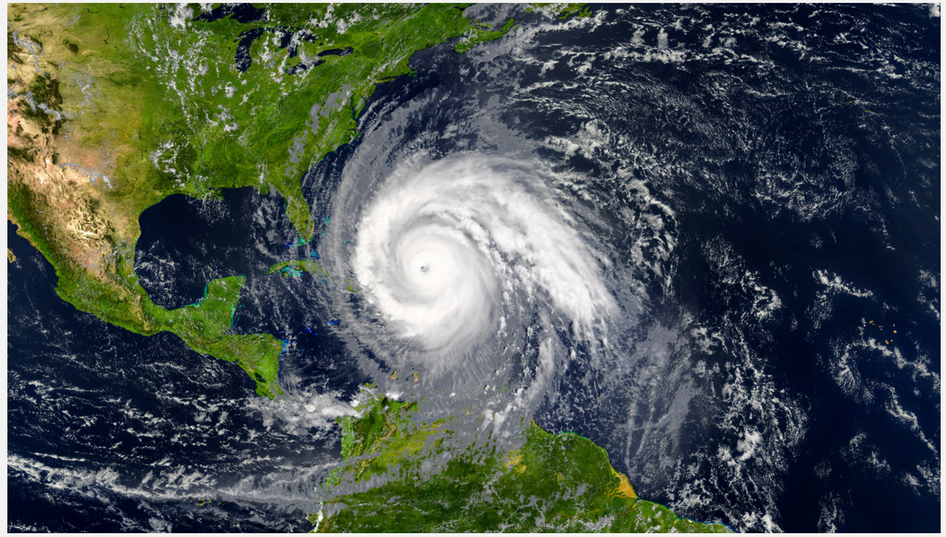
IMAGE: Rezolv Energy's St. George solar plant in Bulgaria

WHY CURRENT MODELS MAY BE UNDERESTIMATING RISK

We know that extreme weather's financial implications are rising: 2025 marked the sixth consecutive year that insured losses from natural catastrophes surpassed $100 billion,[12] while forecasts suggest physical risk could cause $4.6 trillion in damage to assets and lost revenues by 2050.[13]

Even so, we believe that predicting extreme weather risk accurately is far from straightforward. Models naturally rely on historic data, and yet weather patterns and their intensity are shifting in ways that don't conform to the past. Risk modelling also tends to assess hazards, such as high wind, extreme heat or drought, in isolation. Yet in reality, these events often happen in combination or trigger each other, compounding the risk. Wind, heat and drought together, for example, significantly increase the risk and severity of a wildfire.

A recent study of institutional investors' listed equity portfolios found that two-thirds of companies are significantly exposed to three or more physical hazards.[14] As prudent investors, we therefore consider the current models to be underestimating risks. When developing assessment frameworks and mitigation plans, we consider the overlapping and compounding nature of these risks.



>$100bn PER YEAR INSURED LOSSES FROM NATURAL CATASTROPHES[12]

$4.6tn PHYSICAL RISK OF DAMAGE TO ASSETS AND LOST REVENUES BY 2050[13]

SOURCES:
12. https://www.swissre.com/press-release/2025-marks-sixth-year-insured-natural-catastrophe-losses-exceed-USD-100-billion-finds-Swiss-Re-Institute/f710c271-58c8-4c48-9004-05203634d1e0
13. https://www.msci-institute.com/themes/climate/what-the-market-thinks-how-global-insurers-are-responding-to-rising-physical-risk/?cookie_settings_updated=true#_ftnref1
14. https://www.msci.com/research-and-insights/paper/hidden-in-plain-sight-physical-risk-in-asset-owners-portfolios

IMAGE: Adobe Stock

PUTTING PLANS INTO ACTION

Sometimes, the case for making extreme weather adaptation investments is abundantly clear. This was true for Indian renewables business BluPine Energy, which witnessed a changing monsoon pattern in 2025 that caused a longer and more intense season than the historical average. This required a rapid response to protect the company's assets. As a result, the Actis portfolio company commissioned flood resilience studies for all greenfield solar projects and operating assets in Gujarat and a portfolio-wide assessment of natural hazard risk exposures. Importantly, this included extreme heat, which can have a range of impacts, such as reducing energy yield from solar panels.

An action plan for priority sites is now in place, improved drainage and corrective construction works at three sites are nearing completion, and a monsoon preparedness plan, which covers 13 different areas, including heat stress, fire risk equipment maintenance and electrical safety, has been issued.

Serena Energy's comprehensive wildfire mitigation programme also had evident and immediate financial benefits. The Brazilian renewable energy business invested $5 million to increase its transmission infrastructure's resilience to wildfires during warmer and drier conditions. In so doing, it has avoided an insurance premium increase.

> *Building resilience to extreme weather in our energy assets is fundamental to maintaining reliable operations and safeguarding communities. By partnering with Actis, we could act swiftly, applying our combined expertise and resources to identify vulnerabilities, implement mitigation strategies, and strengthen our infrastructure. This proactive collaboration reduced potential risks that could have caused significant disruption and it reinforced our commitment to long-term sustainability and operational excellence.*
>
> **Neerav Nanavaty, Chief Executive Officer, BluPine Energy**

IMAGE: BluPine Energy in India

However, decisions about whether and how to make capital expenditure to avoid a future hypothetical loss are not always straightforward to reach. We are therefore working with our portfolio companies on cost-benefit analysis to guide their judgement on adaptation investments.

It's also important to understand how extreme weather resilience measures translate into financial returns. To achieve this, we systematically analyse the business case for adaptation investments at each portfolio company, taking into account the probable unmitigated losses from inaction, the cost of the resilience measure and the costs or mitigated losses of putting the plan into action. We commissioned an independent study, which sought to quantify value from sustainability improvements across a whole fund. It found that climate resilience measures contributed 180 bps uplift to equity IRR.[15] This will provide a rigorous evidence base to support portfolio companies' future adaptation investment decisions.

We believe that not all mitigation measures have to be costly or complex to generate results. Brazilian electricity transmission company HRZ, for example, added a basis point of IRR simply by optimising its pruning schedule to prevent wildfires. At Indian renewable power business Athena, automated solar panel cleaning systems, upgraded earthing connections and fire protection measures have resulted in 42 basis points of uplift through increased generation and avoided losses.

Indian toll road NXT Infra, meanwhile, has experienced more than 70 basis points of IRR uplift from two of its mitigation initiatives. With roads subject to erosion and flooding from heavy rain during monsoons, the business faces asset integrity and safety risks from surface run-off. The additional IRR comes from its investment in preventive maintenance and flooding mitigation measures.

SOURCE: 15. These IRR statistics have been independently verified by third-party specialist

IMAGE: HRZ Energia in Brazil

IMAGE: NXT Infra road in India

Importantly, the design and installation of NXT's measures also reflected the holistic approach required when implementing mitigation initiatives. Alongside its duty of care to workers and road user safety, the business considered how drainage would affect the wider community and ensured that water redirected from its roads did not increase flood risk to local settlements.

And it's not just surrounding communities that we need to factor into our resilience planning. Nearby infrastructure also needs to remain viable for our assets to operate. Before we invested in Stride, for example, flooding on nearby roads in 2019 made one of its sites inaccessible for more than two weeks. Work on approach roads and drainage since then has prevented this from happening again.

A holistic approach can present opportunities that don't involve hard engineering. Our Bangladesh-based gas generation business Bridgin Power is an example of how this can provide financial returns while contributing to an infrastructure asset's social licence to operate.

With over two-thirds of its land less than five metres above sea level, Bangladesh is particularly vulnerable to coastal inundation, erosion and cyclones. Having carried out detailed flood modelling, we ascertained that Bridgin's site was sufficiently elevated to avoid the worst effects of inundation. We installed sluice gates and pumps to further protect the asset – investments that proved their worth during Cyclone Remal in May 2024, when the plant remained unaffected by flash rainfall and tidal surge events – and we are now piloting a coastal mangrove planting initiative. As they mature, the mangroves will slow and reduce the flow of water coming onshore, protecting both the Bridgin site and local populations. This has added benefits of providing a nursery habitat for young fish, which helps replenish stocks and support the local fishing communities.

> *Actis has been instrumental in advancing climate resilience across our assets. Introductions via the Actis network led to a successful partnership with a mangroves specialist NGO that advised on appropriate species selection and maintenance. This has resulted in a high mangrove survival rate.*

Jean Tay, Head of Sustainability, Bridgin Power

CASE STUDY: ULUDAĞ ENERJI – BUILDING VALUE FROM RESILIENCE

With Türkiye experiencing record high temperatures for two consecutive years, the physical climate risks of heatwaves and wildfires have intensified. In 2025, more than 81,000 hectares of forest burned across the country, marking one of the most destructive years for wildfires in the past decade.[16] For electricity distribution company Uludağ Enerji (Ulug), this risk is particularly relevant – 4,353 kilometres of its network traverse forested terrain.

Armed with data on the company's assets from our climate scenario analysis in 2024, the Actis sustainability committee supported Ulug in designing and then undertaking a comprehensive, integrated wildfire risk analysis. This then formed the basis for a five-year wildfire and extreme heat mitigation plan, with the most high-risk lines and transformers identified and prioritised for investment. Actions included replacing wooden poles in high-risk forest zones, increasing clearing of forest corridors, installing sand-pit firebreaks, improving vegetation management, replacing fuses and insulators, replacing overloaded transformers and de-energising lines when the risk of a wildfire increases.

These interventions are already showing demonstrable value across several strands. By reducing the likelihood of wildfire-related outages, Ulug avoids costly financial penalties imposed by the regulator. The company is also protecting value as it collects real-time monitoring data, inspection records and vegetation management logs. This evidence base is critical for countering compensation claims commonly brought by farmers and local landowners when wildfires break out – Ulug can prove that its assets are not the cause.

As wildfires have increased, the Turkish regulator is intensifying its scrutiny of the sector. In 2025, it invited all distribution companies to explain what they were doing to mitigate wildfire risks. Ulug was the only distribution company able to demonstrate it was already assessing the risks in coordination with local Ministry of Agriculture and Forestry branches and had a plan in place – a direct result of our early action on the issue. This generated important goodwill with the national energy regulator. Yet it also brought a significant financial benefit: Ulug received approval for a capital expenditure increase in its 2026-2030 tariff to specifically address wildfire risks and transformer outages caused by extreme heatwaves.

> *"With Actis' support, we put together a comprehensive and prioritised action plan, using resources from government institutions' data sets and AI applications. We then started to implement the plan meticulously as a crucial item in our annual capex programme. Beginning with this action plan's creation, Actis has supported us throughout the process.*
>
> **Sinan Öktem, Chief Executive Officer, Uludağ Enerji**

SOURCE: 16. https://www.turkishminute.com/2026/03/11/2025-among-turkeys-most-destructive-wildfire-years-with-more-than-81000-hectares-burned/

CASE STUDY: HRZ – GETTING THE FULL PICTURE

Brazil's electricity transmission lines face a range of physical hazards, including flooding, erosion, storms and wildfires. These are risks Brazilian transmission company HRZ knows all too well.

Two assets in HRZ's portfolio suffered major losses in separate extreme weather events shortly before it acquired them and while Actis was conducting due diligence. In October 2023, high-speed winds caused the collapse of two towers at one of the businesses, with repairs and lost revenues coming in at $10.5 million. A few months later, in May 2024, severe flooding at another asset destroyed seven towers and damaged a further 15 at the other business, with total losses of $7.5 million.

After investing, our climate scenario analysis helped us better understand the collapse risk to some of HRZ's pylons from combined high wind and rain. Using this as a starting point, HRZ commissioned a detailed climate risk and resilience study on more than 1,500 of its towers and two substations. Drawing on both climate and technical expertise, the study identified 27 towers as being at high risk from hazards including storms, accumulated rainfall, wildfires and lightning. Engineering teams were then dispatched to inspect all 27 to identify required maintenance.

Additionally, as part of the effort to operationalise climate risk mitigation at HRZ, we established a dedicated task force that included several Actis team members drawn from our sustainability and operations capabilities. Together with Actis, HRZ is now planning to repeat the exercise on the rest of its tower portfolio.

Increased monitoring has strengthened HRZ's physical climate mitigation response, including a new wildfire and weather monitoring system that provides real-time alerts. It has also encouraged the adoption of innovative approaches, such as developing an app in-house for systematising field inspections; it prompts engineers to provide observations and photographic evidence, gives automated corrective actions, and stores records online. These measures are helping HRZ schedule inspections, prevent damage and improve incident response times.

> *Building climate resilience is essential for the reliability and long-term performance of our transmission assets. Our partnership with Actis has strengthened our ability to systematically identify risks, prioritise actions and implement targeted mitigation measures, enhancing both operational performance and value creation.*
>
> **Eduardo Brito, Chief Executive Officer, HRZ Energia**

IMAGE: HRZ Energia in Brazil

LOOKING TO THE FUTURE

As our Uludağ Enerji (Ulug) case study illustrates (see page 11), regulatory scrutiny of infrastructure assets is intensifying. Extreme weather risks are becoming more apparent and the cost of inaction is increasing – in particular given the insurance gap, estimated to be more than 50% for climate-related losses in 2025.[17] Securing insurance will require that asset operators and their owners take concrete and demonstrable action to address physical climate risks.

And while current models cannot yet provide a complete picture of risk (see page 7), there is good potential for improvement as they harness the power of rapidly advancing AI technologies and incorporate new data as it emerges.

In the meantime, new technologies are already strengthening resilience in our portfolio. Ulug, for example, is set to deploy LiDAR drones to provide 3-D mapping of lines that run through forests, and has evaluated using satellite detection for tree and vegetation overgrowth. Meanwhile, Serena is already improving its incident response times by using satellite technology to detect the first sign of fire (such as a wisp of smoke) near its infrastructure and instantly alert its engineering team. Investments in technologies such as these are expected to play an increasingly vital role in building resilience in our assets to protect and enhance financial value.

>50% ESTIMATED INSURANCE GAP FOR CLIMATE-RELATED LOSSES IN 2025[17]

SOURCE: 17. https://www.aon.com/en/insights/reports/climate-and-catastrophe-report

IMAGE: Serena Energy's Delta Piaui wind farm in Brazil

Actis is a leading growth market investor in sustainable infrastructure. Actis invests in structural themes that aim to support long-term, equitable growth in defensive, critical infrastructure across energy transition, digitalisation transition, and supply chain transformation.

Actis believes that the firm's decades of global experience, operational know-how and strong culture allow it to create global sustainability leaders at scale. Actis is a signatory to the Principles for Responsible Investment (PRI), an investor initiative supported by the United Nations.

In October 2024, Actis joined forces with General Atlantic, a leading global growth investor, creating a diversified, global investment platform, together we have approximately $126 billion in combined assets under management. Actis operates as General Atlantic's sustainable infrastructure business. This strategic combination further enhances Actis' focus as a leader in global sustainable infrastructure.

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