



# RENEWABLE ENERGY CHALLENGES AND SOLUTIONS IN CONSTRUCTION



Insurance | Risk Management | Consulting

Energy demand in the United States continues to soar primarily due to rising populations and incomes, increased use of data centers and AI computing, and the shift to domestic manufacturing. According to the US Energy Information Administration (EIA), the US is set to build a record 63 gigawatts of new power capacity in 2025. As the trend continues, all sources of energy are expected to grow, but nearly all the new capacity will be clean and low-carbon sources of electricity generation.

The Inflation Reduction Act has catalyzed \$370 billion worth of investment into renewable energy projects. The result is a surge in renewable energy construction projects that are either underway or about to get started.

Given the immense scale of these projects, there will be exposure to risks that have not really been a feature of the market before now. At the same time, the evolving risk landscape, including the new normal of an increasing frequency and severity of extreme weather losses, will require a robust approach to loss control and resilience.





## New and emerging risk exposures

Successfully managing the construction and operational phases of such megaprojects requires the specialist knowledge and data to anticipate potential sources of loss and disruption. Partnering with the right risk experts can help project owners scan the horizon and consider the full range of scenarios, stress testing how their insurance would respond to a loss and identifying any gaps in coverage.

Some of the key challenges faced by the new generation of renewable energy construction projects include disruptions arising from supply chains, availability of skilled labor and the impact of extreme weather.

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According to one of our major clients in the solar renewables space, the market is experiencing exceptional demand, mostly driven by state mandates, federal incentives like the IRA, and the growing energy needs of data centers. However, significant challenges persist, particularly in supply chain constraints for high-voltage components and the difficulties of utility interconnections.

While labor shortages are less severe than expected, acquiring skilled project managers and superintendents remains critical to the success of each project. Technology and automation offer potential solutions, though hurdles to adoption exist from various sides in the industry.

Additionally, weather-related risks, including hail and hurricanes, pose serious concerns for insurance coverage and project viability. Consequently, companies should focus on strategic planning and innovation to overcome obstacles and capitalize on emerging opportunities.”

**Soyoung Lee, Area Executive Vice President, Gallagher**





## Labor market constraints

The rapid growth of the renewable energy sector has created a surge in demand for skilled workers, leading to significant labor shortages across the industry. According to a 2023 report by the US Bureau of Labor Statistics, the employment of wind turbine technicians and solar photovoltaic installers is projected to grow by 44% and 52% over the next decade — far outpacing the average for all occupations. However, the supply of qualified electricians, engineers and construction professionals is struggling to keep up, causing delays in project implementation and increased competition for talent.

### Addressing the skilled workforce deficit

This talent gap has been particularly pronounced in rural areas where many large-scale wind and solar farms are being developed. Projects can incur greater costs and have extended timelines due to insufficient skilled labor, jeopardizing the attainment of project objectives.

However, addressing the [skills shortage](#) comes with strategic interventions. Broadening specialized training programs and apprenticeships can equip the next generation of workers for stronger performances in the renewable energy sector.

Offering relocation incentives and temporary housing can also entice a mobile workforce into regions of high demand. It is vital, therefore, for collaboration between authorities, industry players and educational institutions to maintain the availability of skilled workers needed for the ongoing growth of the renewable energy sector and for high clean energy targets to be achieved.

### Grid interconnection challenges

Managing the flood of new renewable projects has exposed major challenges with our aging power grid. The heavy influx of new projects has put a strain on the grid infrastructure itself, which was designed without consideration of some of the additional variability and geographical spread for renewable energy resources such as wind and solar.

- **Bottlenecks in utility interconnections:** Many projects face significant delays due to insufficient grid capacity, outdated transmission systems and lengthy approval processes. For example, the interconnection queue for the Midcontinent Independent System Operator (MISO), which covers much of the central US, has seen project wait times extend to an average of 3-4 years.
- **Planning for growth:** According to the American Society of Civil Engineers (ASCE), there is a need for an estimated \$338 billion in grid investments by 2039 to fully accommodate the renewable energy transition.<sup>1</sup>

This investment should address short- and long-term challenges and provide solutions. In the short run, utilities must speed up their approval processes and bring necessary upgrades to their critical grid infrastructure. In the longer run, it is important to focus on wide-ranging grid-modernization capital investments, such as advanced high-voltage lines, energy storage systems and distributed energy resources.





## Environmental and weather risks

Exacerbated by climate change and climatic cycles, the threat to renewable energy infrastructure in the US continues to rise. In 2023 alone, the US experienced 23 weather and climate disasters, each causing damages over \$1 billion, according to the National Oceanic and Atmospheric Administration (NOAA). Natural disasters such as hurricanes, wildfires and extreme heatwaves have widely affected renewable energy projects, causing significant losses.

### Damage from natural events

Hailstorms in the Midwest have become increasingly destructive. Meanwhile, in the western side of the country, recurring wildfires not only physically damage wind and solar installations but also reduce solar efficiency by covering panels with ash and debris.

### Predictive modeling

Through partnerships with specialist brokers and re/insurers, developers and owners can leverage advanced predictive modeling tools to anticipate the impact of such extreme natural peril events now and into the future. The insights can guide the design of resilient infrastructure, such as reinforced solar panel mounts elevated to withstand flooding and materials resistant to high temperatures and hail impacts.



## Risk management and insurance considerations



“Renewable energy is surging forward, propelled by technological advancements, competitive prices, environmental concerns and social influence. Growth trends are not slowing down even with the continued reliance on traditional energy sources to meet current energy demand.

As renewable projects become larger and more complex, their associated risks likewise increase, making risk mitigation advice and insurance an integral component for project success and managing potential losses. Clients are prioritizing early assessment of insurance requirements and pricing, particularly in regions susceptible to natural disasters, to adequately address the insurance implications of renewable energy projects.”

**Stefan Szulc, Executive Director — Energy, Gallagher**

Proactive risk management is essential for overcoming the challenges faced by large-scale renewable energy construction projects and factoring in resilient design so losses will continue to be mitigated once projects go live. Implementing early scenario planning and maintaining continuous risk assessment is critical to preventing unforeseen disruptions.

Companies are embracing different strategies to reduce supply chain disruptions in the renewable energy sector. These methods focus on improving resilience through design and location, modifying the supply of critical resources to mitigate the impact of supply chain constraints and leveraging technology and automation where possible.

- **Diversifying suppliers and resources:** Companies are getting smarter about spreading their risks. Instead of relying on one supplier or region, they're now sourcing materials from different places. This strategy helps avoid risks associated with geopolitical upheaval or natural hazards that may affect particular regions.
- **Proactive inventory management:** Several companies are getting ahead of supply chain headaches by staying one step ahead. Keeping a strategic backup of key materials and components means they're prepared when unexpected shortages hit.
- **Domestic manufacturing:** Collaborations between government entities and private companies can facilitate investment in domestic manufacturing. These partnerships can leverage resources, expertise and funding to build a robust manufacturing ecosystem.



# Understanding the bespoke risks and coverage

The renewable energy industry navigates an increasingly complex risk landscape, making robust insurance strategies indispensable. One of the crucial challenges lies in acquiring comprehensive insurance coverage that appropriately addresses emerging risks.

- **Insurance complexities:** As renewable projects develop in scope, some insurers are becoming more cautious, often introducing exclusions, stricter terms or reduced limits. Solar panel degradation, a gradual decline in efficiency due to wear and tear or environmental exposure, further complicates risk assessments and policy terms. Similarly, securing performance guarantees for renewable projects requires meticulous planning and an in-depth understanding of operational risks.
- **Tailored and alternative risk solutions:** Insurance is playing a key role in addressing climate-related risks. Demand is growing for innovative insurance solutions tailored to a project's requirements. This may involve adopting parametric insurance, which triggers payouts based on predefined events like extreme weather instead of traditional loss assessments. Such policies can provide faster and more reliable financial support when disruptions occur.

## Battery storage and long-term performance

Battery storage is a critical component of renewable energy systems, enabling better management of energy variability. Lithium-ion is the most commonly used battery technology in renewable energy projects, valued for its high energy density and efficiency. Emerging technologies, such as solid-state and flow batteries, are also gaining attention due to their potential to offer safer and more sustainable energy storage solutions.

In the US, battery storage is pivotal in stabilizing the grid and managing peak demand. According to the US Department of Energy, the country's operational battery storage capacity exceeded 10 GW by 2023, with continued growth anticipated in the coming years.<sup>2</sup> This expansion is crucial for supporting the intermittent nature of renewable energy sources like solar and wind.

Some of its challenges and solutions are:

- **Performance variability:** Modern battery technologies have constraints in storage duration and efficiency, necessitating ongoing research and development.
- **Ownership and warranty issues:** There are often conflicts over maintenance responsibilities and warranty terms, highlighting the need for clear contracts and accountability.
- **Fire risks and proper storage:** Lithium-ion batteries come with fire hazards due to thermal runaway, which can lead to overheating and combustion. Proper storage solutions, including fire-resistant enclosures, advanced cooling systems and strict safety protocols, are integral to avoid these risks for long-term reliability.

Investments in advanced battery technologies and innovative storage solutions are vital to achieving long-term sustainability in the renewable energy sector. Clear delineation of ownership responsibilities and comprehensive warranties will further enhance the reliability of these systems.



## Unprecedented levels of risk call for expert partnerships



As the renewable energy sector rapidly expands, industry players face an unprecedented strain on their supply chains, labor pools, and quality control programs, leading to unique challenges for developers, owners, operators and project managers.

With our extensive experience, well-established market relationships and unrivaled expertise, Gallagher is extensively equipped to consult with and provide tailored insurance solutions for renewable energy projects. We provide holistic support from risk management to contractual advice to claims handling and property risk engineering, ensuring our clients are well-protected in this ever-changing renewable energy landscape.

**Michael Hogue, Managing Director — Energy, Gallagher**

2025 is set to be a significant turning point in the development of major renewable energy projects dotting the length and breadth of the US, with a combination of serious investments and a surge in demand for electricity propelled by data centers and electrification. The hurdles faced by megaprojects in renewable construction — such as supply chain disruptions, labor shortages, grid interconnection delays and environmental risks — call for advanced risk management.

Collaborating with brokers who specialize in both construction and renewable energy can help navigate the complex risk landscape. Both the scale of the projects underway and the challenges posed by a rapidly evolving risk landscape require a joined-up approach that leverages risk insights and insurance expertise.

Brokers play a vital role in evaluating project-specific exposures, ensuring that all risks, from construction delays to equipment malfunctions, are managed and/or transferred via specialist insurance. They can also help in exploring the regulatory landscape, ensuring developers are in conformity with local and federal requirements to secure holistic coverage.

Gallagher's extensive experience in renewable energy projects positions us as a critical partner in navigating the complex landscape of renewable energy project construction risks. Through leveraging a deep understanding of industry-specific challenges, Gallagher offers specialized risk management consulting, expertise in claims resolutions and comprehensive coverage options.

By adopting innovative technologies and fostering stakeholder collaboration, businesses in the industry can overcome inherent obstacles and achieve their renewable energy goals. With a clear vision for sustainable growth, renewable energy construction can pave the way for a cleaner, stronger energy future.

<sup>1</sup>"[Failure to Act: Electric Infrastructure Investment Gaps in a Rapidly Changing Environment](#)," *Infrastructure Report Card*, accessed 7 Feb 2025. PDF file.

<sup>2</sup>Colthorpe, Andy. "[US BESS Installations 'Surged' in 2023 with 96% Increase in Cumulative Capacity](#)," *Energy Storage News*, 18 Mar 2024.



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