

A decorative graphic consisting of overlapping rectangular shapes in teal, purple, and blue, with diagonal hatching patterns, positioned behind the text box.

# Prepare for storms, plan for stability

WTW Renewable Energy Market Review

July 2024

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# Introducing the Renewable Energy Market Review 2024

From the desk of Global Renewable Energy Leader, Steven Munday

So far, 2024 has been characterized by natural catastrophe concerns, supply chain instability, technology maturity, rapidly growing energy storage and globalization of technologies. Each of these presents challenges and opportunities to which organizations and their insurers need to be ready to respond.



## What are the key themes of the year to date?

The significant trends, which we explore in more detail in this year's Renewable Market Energy Review, include:

- The La Niña effect, coupled with increasingly unpredictable weather patterns, is rendering the renewable market far from entering any period of benign complacency.
- Four years on from the COVID-19 pandemic, unstable global supply chains continue to influence assessments of business interruption risk and reinstating assets.
- Better experience and understanding of Chinese technologies are building appetite across global insurance markets as these technologies are increasingly deployed outside of Chinese domestic markets.
- Energy storage is on the rise, with lithium-ion batteries ushering in a new era of energy storage and creating a renaissance in well-known technologies, such as pumped storage and hydrogen.
- The deployment of new, planned and reliable transmission and distribution systems alongside efforts to address electricity system intermittency and outages are helping balance the supply and demand required to achieve net zero by 2050.

## 2024 insurance markets summary

At a glance, we have seen the following trends across global insurance markets so far this year:

- Markets continue to respond differently to risks on the technology-readiness scale. More mature renewable technologies — particularly for onshore wind and solar photovoltaic risks — continue to challenge insurance markets with well-known risks. Meanwhile, less proven technologies — such as larger wind turbines, a global increase in floating solar installations, the evolving green hydrogen industry, the advent of utility scale BESS systems and the move towards intensive energy farming with hybrid systems — are driving markets to reflect on their appetite and innovate their delivery strategies.
- Windstorm seasons created fewer losses than expected. Insurers, together with many renewable energy underwriting portfolios, have finally returned to profitability, though many remain mindful trading conditions may become less favorable in the near future. With the impact of the current La Niña system playing out, markets will be reluctant to drastically shift course. We expect they will cautiously watch the current market dynamics unfold, keen not to lose hard-gained market share and flagship or profitable clients.
- Climate volatility persists and risks and liabilities associated with natural catastrophe events continue to dominate pricing discussions.
- Challenges around demand for experienced insurance market global resources, alongside the continued introduction of new capacity from construction, power and utility, and oil and gas product lines, are driving surplus proportional capacity in support of limited technical leaders.
- Following recent risk-adjusted pricing, since Q1 2024, appetite and capacity are moving the needle from a seller's to a buyer's market for attractive property and revenue clients and some risks are creating an improved position for many in 2024. Casualty remains challenged due to a number of factors, including elevated inflation and rate adequacy.

## What's changed since the Renewable Energy Market Review 2023

In previous reviews, we have reported on how markets focused on adjustment in technical rates to achieve a sustainable and profitable book amid the pressures of the hard market cycle. Driven by a well-reported unprofitable global relationship between risk carriers, actual losses sustained and achieved premium, the pendulum remained weighted to a seller's market throughout the last five to six years.

In more recent years, unprecedented challenges resulting from the global pandemic, supply chain volatility, inflationary factors and increased frequency and severity of natural catastrophe events created headwinds in the insurance markets.

Today, the market has increased its general resilience to unknowns, resulting in a more profitable and sustainable relationship with insurance buyers, particularly when worst-case natural catastrophe events do not materialize.

## What do we expect from the coming year?

The renewable energy risk and insurance buyers best placed to take advantage of emerging market opportunities this year will be those continuing to engage with advisors and markets and managing risk effectively by considering smarter solutions to existing or amplified problems within well-structured programs.

For our part, looking ahead, we'll stay focused on remaining in lockstep with sector and market trends, delivering timely insights to support our clients and insurance partners as they build a sustainable future.



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# The renewable energy insurance markets in 2024

Despite numerous sectoral challenges — such as climate issues, casualty deterioration, social inflation, and geopolitical conflict — that have driven the hard market, 2024 began with optimism among capacity providers in the renewable energy sector. Consistently robust technical rates, a relatively benign Gulf of Mexico windstorm season and natural catastrophe losses below predictions contributed to this positive outlook. Reinsurers' concerns around frequency was reinforced by the reported \$50 billion-plus of severe convective storm losses which arose in North America in 2023. This enabled most actors to achieve positive combined ratios at the end of the first quarter in property classes.

Many insurers also entered the year with new or reinforced plans to engage with and capitalize on the growth projections and targets of a net-zero future.

While low-carbon technologies evolve, we are seeing a widening of underwriting briefs, upskilling of underwriters, or insurers creating dedicated, renewable, low carbon or energy transitions teams and disciplines in the London and global insurance centers. We would estimate that for every experienced underwriter, there are now perhaps three underwriters with fewer than five years' experience.

With the expertise to technically assess and navigate complex terms, insurers are able to differentiate themselves and drive the market's response to the challenges of new technologies in energy storage, carbon abatement, and offshore or subsea risks. Those experienced, or with established renewable energy teams and adjusted appetites over recent years continue to provide the core leading capacity.

While the market continues to evolve, it is acknowledged that new reputable leading capacity is developing more slowly, unlike the following/supporting markets where growth is rapid. We anticipate that in 2024 we will see some of the stronger supporting markets transition to credible technical and capacity leaders of business, having built up their underwriting, engineering, and claims capabilities over the last couple of years.

Increasingly, we also see new capacity entering the sector from the traditional construction, power and utility, and oil and gas markets as these insurers seek to follow and remain relevant with their historical client base or achieve progression towards, and adherence to, their own ESG objectives.



More frequently, we see traditional insurers pooling their renewable energy expertise and distribution through dedicated in-house underwriting specialties, or growth in entrepreneurial managing general agent (MGA) structures. Anecdotal evidence suggests that some of the new MGA entrants are finding it tough to secure or renew capacity, despite continuing to draw talent from traditional insurers already being a scarce commodity. This pooling of collective in-house knowledge and experience supports insurers' ability to navigate the dynamic global opportunities of the renewable energy market, allowing them to write more challenging or diverse risks. These risks include risks arising from onshore renewable construction and commercial operations, offshore wind, wave and tidal risks, floating solar, energy storage risks, as well as developing complex long-chain risks such as green hydrogen where solutions for generation, distribution and use are required. We're seeing increasing investment in specialist underwriting excellence which remains a catalyst for movement of experienced resources impacting carriers' ability to maintain their business objectives of sustainable and profitable growth. There are also several new MGAs, with lead/follow abilities and new capacity entrants pursuing market share directly in renewable energy power generation and energy transition, with aggressive optimism in response to the market opportunity.

Irrespective of the insurers experience and insights into the renewable energy market, achieving profitability remains challenging with variable results on behalf of insurers within renewable energy classes. The market is starting to acknowledge that as an underwriting class their focus is split between frequency risks associated with understanding the technical elements of the risks and assets insured and severity risks. Severity risks are more frequently associated with natural catastrophe events, ranging from severe convective storms, hailstorm, flood, and wildfire. Due to shifting climatic conditions and La Niña, underwriters face challenges when using global natural catastrophe modeling systems that are insufficiently detailed to address renewable energy installations. These systems were originally designed with permanent building structures in mind, not for the unique characteristics of renewable energy occupancies.

The market is conscious that €1 billion Nat Cat losses are becoming more common and renewal discussions are particularly focused around escalating Nat Cat losses.

Analysis by Munich Re identified seven such events in Europe in the first three quarters of 2023, compared to five in 2022 overall and four in 2021.

This includes the Kahramanmaras earthquake sequence in Turkey and Syria, flooding in northeast Italy and adjacent countries and Storms Kai and Lambert in Germany, as well as Storm Unai in northern Italy, Slovenia and Croatia and the subsequent flooding, and Storm Hans in northern Europe.

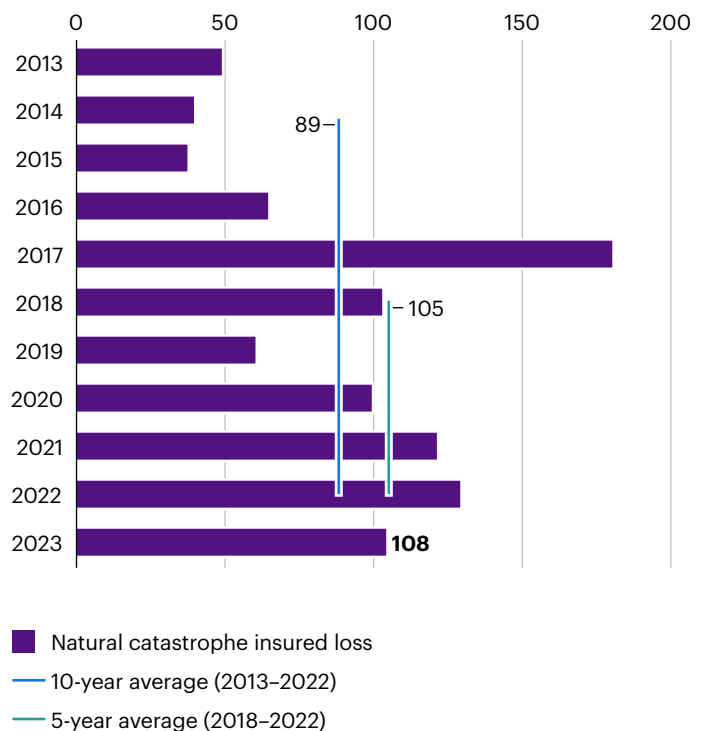
In response to these weather-related events, Munich Re adjusted its reinsurance structures, prices and wordings. In addition, Munich Re is expanding its cat models towards non-peak perils — such as flooding, wildfires, and storms — as these account for the bulk of insured losses last year. Munich Re reporting that mid-sized Nat Cat events accounted for approximately 60% of \$95 billion Nat Cat losses in 2023, down 24% on year but above the 10-year average of \$90 billion, as the severity and frequency of mid-sized events continues to prove costly for the industry.

Aligned to this experience, the renewable energy market has suffered a number of high-profile losses in the Dubai April floods and previously in the Middle East windstorm, also Texas hailstorm losses. The current positive capacity follows challenges after several loss-heavy years for the sector.

A study from Swiss Re forecasts 5% to 7% annual growth in nat cat losses over long term

Figure 1:

### Global Nat Cat insured losses (\$bn, 2023 prices)



Source: Swiss Re Institute



Swiss Re listed the 6 February Turkey-Syria earthquakes as the costliest natural catastrophe event of the year at \$6.2 billion.

The year was marked by a high frequency of low-billion-dollar events, with at least 30 causing insured losses in the \$1 billion to \$5 billion range, compared with the previous 10-year average of 17.

Severe convective storms were the main driver of loss, with global losses from the peril totaling \$64 billion, 85% of which originated in the U.S.

SCS-related insured losses are growing fastest in Europe, Swiss Re said, having now exceeded \$5 billion in each of the last three years. The reinsurer said hail risk is increasing, mainly in Germany, Italy and France. Hail typically accounts for 50% to 80% of SCS-driven losses.

Despite the ever-looming exposure to unpredictable natural catastrophe, the capacity dynamic, with overall favorable insurance carrier group results, is creating a surplus of capacity in the renewable energy markets for some risks, especially with more proven technologies bundled into cross-geography operational programs with good operating experience and lower than average natural catastrophe risk factors. This led to a noticeable flattening of rates during the April 1 renewal season and high competition for participation on attractive risks, with many more confident in their appetite to grow but some struggling to fulfill their premium appetite, as of April 1 some would have been satisfied but a number will be disappointed. Some carriers continue to write for growth and others for margin and this will impact their appetite for risk presented and level of concern for not hitting growth targets.

Insurance buyers may feel spoilt for choice on the proportional capacity relationships. However, until competition increases with the entrance of new quality lead markets seeking to acquire market share by challenging existing capacity leaders, we do not expect to see an outright softening of the market. However, several more experienced supporting markets have demonstrated appetite to transition their capacity to be considered technical leaders and it will be interesting to see how this dynamic develops in 2024-25.

While there has been a better-than-anticipated natural catastrophe wind period, markets are aware it's not certain current trading conditions will continue, particularly given predictions for a turbulent climatic La Niña year.

The London market (which, through Lloyds of London and larger corporate insurers licensing structuring, is most capable of efficiently deploying capital and considering assets globally) continues to respond well to organizations with larger geographically diverse and complex renewable portfolios. London has always achieved a solid footprint in the global conventional power market, embracing the challenge of responding to larger, more complex, evolutionary technology risks often with structures involving higher self-insured retentions or captive structures for experienced and sophisticated buyers.

We are seeing a growth in the conventional power markets responding to the portfolios with mixed technologies encompassing carbon and low-carbon assets. Whilst increasingly there is the technical ability to achieve sufficiently competitive portfolio terms, we see carriers experiencing challenges with high administration and/or frequency losses which their internal infrastructure and resources operating models are not established to handle. This is limiting their participation to those above high self-insured retentions, removing attrition where their structures can most efficiently operate and deploy capacity.

With the volatility in the natural catastrophe markets, parametric solution remains in sharp focus. With the parametric insurance market continuing to grow, [Moody's RMS has teamed up with reinsurance broker Augment Risk](#) to help spur the sector's further development by creating a platform through which catastrophe placements for perils including windstorms, earthquakes, wildfires, and severe convective storms can be syndicated among various capital sources. However, the market continues to struggle blending traditional and non-traditional solutions efficiently for client risks in exposed locations.

## Resources challenges and regional capacity authority

Whilst the global opportunity to participate in renewable energy technologies remains exponential, the increasing complexity and scale of assets being delivered by many independent power producers, as well as power, utility, and oil and gas majors, creates an appealing but challenging market for accurate underwriting.

We see the resource skills gap as a major challenge. Whilst it is possible to transfer skills and resources from traditional construction, downstream power, and upstream oil and gas sectors, the London renewable energy market, despite growing exponentially over the last five years, remains under-resourced to deliver the necessary changes for transitioning global energy infrastructure from carbon to low carbon.

We anticipate that in the next five years we will see substantial growth in decentralized but aligned specialist capacity into key regional hubs. Global carriers will seek to balance the involvement of more limited, experienced underwriters with the regional opportunity and desire to compete locally, against increasing local capacity, in regions where underwriters should have better assessment of local asset and prevailing market conditions. This shift has the potential to position London as a hub for truly global clients, portfolios, and complex risks, with regional centers becoming more capable of responding to local risks through decentralized capacity and regional expertise.

The ability to write market share, while understanding what constitutes an above or below-average risk, applying appropriate terms and conditions for the risk profile at the most competitive terms, remains the key differentiator of experience in the industry.

## Confidence in market leaders

As noted, the London and wider international and regional markets remain awash with proportional supporting capacity behind core respected technical leaders. Leading markets' deployed lines continue to be more conservative than historical levels, with on average 15% to 25% still being considered sufficient to align whole market support.

## ESG considerations

We have previously reported on the market's desire to deliver on its environmental, social and governance (ESG) objectives. This remains a complex journey for many insurers seeking to balance their obligations to their existing client base, which includes transitioning carbon-based industries whilst balancing their development appetite towards new low carbon or renewable energy clients.

In the same way as investment in equities might be aligned to an organization's ESG credentials, it's more common for advisors/brokers to be asked to align organizations with the ESG positioning of proposed insurers.

For example, some capacity is wholly aligned to not writing any carbon power generation technologies. Other capacity, meanwhile, is aligned to supporting organizations with a higher carbon footprint but only where they can demonstrate commitment to a transitional path to low carbon. This commitment often requires independent third-party verification.

Many power and utilities businesses seek to transition their portfolios to lower carbon or move their carbon-based generation to clean gas through carbon capture, usage and storage (CCUS) or blue hydrogen. This is accelerating the appetite of traditional conventional power underwriters to become more actively involved in renewable energy technologies, mitigating the potential loss of market share.





## The changing power and utility market

Many renewable technologies have lower sums insured than their carbon-based alternatives, making it very difficult for insurers to maintain their market share of written premium by supporting the new low-carbon technologies. However, the scale and the speed of the roll-out of low carbon technologies globally is to some extent supplementing this reduction in technical premium by volume of activity. Whilst transitional power and utility companies are rapidly absorbing renewable energy technologies into their businesses.

We see this as having a consequence in insurers, underwriting approach. With less time and experienced resource to complete comprehensive technical reviews of carbon power assets we are seeing this result in a more limited technical portfolio understanding, price and capacity being deployed following a review of historical account profitability performance, underwriting on loss ratio. This is creating a split in underwriting approach between traditional technical underwriters; those assessing and writing on the project risks and those who are seeking to write and adjust terms on overall account performance. Depending on the positioning of the deductible, this does mean that power and utility accounts with a number of aged, out-of-warranty assets have the potential to negatively disturb overall performance and impact other assets which are satisfactorily performing. With sub-optimal experience of the renewable assets, we are more likely to see these fall within the underwriting appetite and the specialist renewable energy market where appropriate and bespoke terms can be negotiated. This intrinsic change in power and utility portfolios (moving from a set number of quantifiable single project risk locations with associated risk engineering reports to a higher level of multi-hybrid technology occupancies, potentially including energy storage together with production) will inevitably result in higher frequency of losses.

While some power and utility organizations will be capable of bearing the higher self-insured retentions likely to be imposed by their insurers, not just financing off balance sheet engaging non-recourse project finance will require lower a lower deductible structure. Efficiently managing this risk gap to the satisfaction of power and utilities and financiers will continue to be a challenge. This delta will either be addressed through market growth in deductible buy-down, or other self-insured and securitized structure.

While traditional (Corporate & Lloyds of London Syndicates) power and utility insurers have excellent underwriting expertise and claims professionals, their resource and business models have historically been aligned to severity, not frequency losses.

There will be pressure to align their capacity and retention to the established specialist renewable energy markets, more familiar with the bespoke challenges of renewable technology assets and organizational structures already matched with higher servicing demands. Should traditional conventional power underwriters compete at the more accepted industry cover terms/deductible levels, it's inevitable they will require additional resources, to meet both underwriting and claims demands. This will create additional pressures for experienced sector underwriting resources.

## Supply chain challenges

It is widely acknowledged that demand across the whole range of transition initiatives — from the generation of clean energy to the infrastructure enhancements needed to build smart grids that can deal with intermittent power supplies to the electrification of vehicles — is going to outstrip supply for some time.

McKinsey's 2023 Renewable Energy Supply Chain report found planned investment between now and 2030 will lead power generation from committed solar and on and offshore wind projects to triple from 125 GW to 459 GW. This level of growth will be challenging and will demand the stable and reliable supply chains shown to be lacking in recent years, with manufacturers and contractors passing on fluctuations in pricing of raw materials and exchange rates (including currency devaluations) on to customers. We consider this issue in more detail in our article on supply chain.



## Pricing projections

Broadly speaking, insurers' results in Q1 2024 have been regularly reported as the best in a decade. Lloyd's has delivered its strongest underwriting result since 2006 with a combined ratio of 84.0% for 2023 as gross written premium tops £52 billion, an improvement of 7.9 percentage points on the prior year and just 0.9 points off the market's modern record.

The market's combined ratio was last recorded at 84.0% in 2007, the year following its record low of 83.1% in 2006. In a full-year trading update, Lloyd's also reported gross written premiums of £52.1 billion for 2023, of which £24 billion was written in the first half of the year. This reflected 4% organic growth and 7% price change. Topping the £50 billion threshold for the first time, it also marked an 11.6% increase from the £46.7 billion written in 2022. Elsewhere, underwriting profit leaped 127% to £5.9 billion, compared to £2.6 billion in the prior year.

Lloyd's chief of markets Patrick Tiernan hailed the energy transition as a "phenomenal opportunity" as he revealed the Corporation was willing to take risks to help facilitate innovation. Tiernan has said Lloyd's was taking a longer-term view as it aimed to attract more climate and sustainability-focused syndicates to One Lime Street. This has been demonstrated by a series of recent launches at Lloyd's, including Axis Energy Transition Syndicate 2050, Hiscox's ESG 3033 sub-syndicate and Oka's Syndicate 1922.

A good indicator of the positive environment is the increasingly positive returns in combined ratios, also reflected in many insurers' share price.

As noted, it has been a good Gulf of Mexico and North American wind season, together with global natural catastrophe events being slightly lower or within predictions. The market has spent several years collectively adjusting its technical rates and terms and conditions and is now seeing the positive benefits of this diligence.

The market has recently achieved the desired sustainable trading environment it has been chasing for many years. However, this year remains one compared to many disappointing years for insurers; the market will be reluctant to pass this through to insurance buyers at speed. The next year is also likely to be turbulent, with natural catastrophe events and losses foremost on insurers' minds.

In the global renewable energy market, trading accounts are growing through the attachment of new business at insurer-acceptable terms, not just technical rate increases. We are not aware of organizations being challenged with securing capacity, unless having experienced high natural catastrophe events, only

at a price and with terms and conditions considered more favorable and aligned to historical experience. As recognized in this review, industry demand is set to increase exponentially and there is an increasingly ready supply of supporting capacity to support the established technical leaders and those about to transition into this space.

While we don't believe the market has completely moved from a sellers' to insurance buyers' market with softening of technical rate, the indicators are more positive than they have been for many years with reputable leaders seeking low single-digit-rate increases at the start of the year. Frequently recognizing that with rising competition and a wish to not lose market share, or profitable accounts an open environment for negotiation on organizations and brokers expectations is experienced.

Last year, we experienced insurers passing on increased costs for the purchase of natural catastrophe. Because of the good wind season, we are seeing greater rate and capacity stability. However, natural catastrophe-exposed accounts, or technologies such as solar photovoltaic for severe convective storm/hailstorm and wildfire will continue to receive the greatest attention through sub-limiting of cover, deductible adjustment, and premium loading. This is due to continued constriction in competitive capacity or market occupancy losses. With one good year after many poor, many insurers are considering that it would be premature to reverse the benefits of the hard-fought technical rate adjustment of the last few years, preferring to achieve some distance before any meaningful adjustments are made. Ultimately likely to only be the market forces of supply and demand which will materially change their course.

For this trading period, we see greater focus on insurers imposing natural catastrophe sub-limits, particularly for solar photovoltaic assets, which might otherwise model well for occupancy and location exposure. With early Q1 2024 signs of over-placement on well-structured programs increasing. As a result, buyers should be in a much-improved position going into H2 2024. However, there will be a continued focus on risk-adjusted rates, and natural catastrophe results have the ability to be a major set-back in the continued rating relief. There are continued concerns over the impact of elevated loss inflation (economic and social inflation) and the impact on both current and forward-looking rate adequacy, especially in the longer tail casualty classes.



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# Forever energy: A mutual approach to renewables

Decarbonization is time-bound. The global narrative remains consistent: we must act now. But delivering a wholesale change in the global energy industry from high-carbon to low-carbon and renewable activities will require trillions of USD investment and innovation. Despite a shorter-term outlook often guiding policymakers and elected institutions driving this change, the energy sector demands longer term continuity, stability and support to develop, plan, finance and deliver the energy transition.

## The challenge facing renewable energy businesses

Amid rapidly evolving technologies and operations, businesses navigating the energy transition are driving capital providers and insurance companies to reassess their products, to innovate and to better align their capacity and solutions to support their clients. If renewable energy businesses are denied longer-term stability and continue to be hampered by the vagaries and volatility of a wide and connected global marketplace, decarbonization commitments are in jeopardy.

The insurance market — built on the concept of pooled risk — encourages its energy clients to share in the risks and sometimes the rewards of cover performance. While a number of mutual companies exist — owned by and for the benefit of its members, particularly in the large protection and indemnity market — there are limited options for the energy market.

## How mutuals approach renewable energy

Originally created to address complex large risks in the oil and gas sectors, mutual energy insurance providers such as Everen offer an interesting opportunity for existing and new members' traditional operations as well as a spectrum of new energy technologies in the wider energy market. Mutual solutions can enable renewable energy businesses to access proven, stable and efficient capacity. In a position to create a risk transfer environment which encourages long term planning and investment within a well-considered program structure, renewable energy businesses are navigating the energy transition with confidence.

Closed mutuals, only open to their members enjoy a level of protection from some of the wider market volatility, losses and profits being a product of the members successes and failures.

Partnering with a mutual insurer with little to no reliance on external capital can provide the financial flexibility and efficiency to support the changing needs and objectives of energy and renewable businesses as part of the energy transition. Bolstering balance sheet strength with a “zero-sum” underwriting approach — where premiums fully fund losses and expenses while maintaining a low expense ratio — returns value to members over time through enhanced products and potential dividends.



In some circles, capacity operating in the same way as a mutual (for itself and co-members) might be considered the ultimate goal.

Specifically, Everen have always covered renewable energy assets but two important changes were made under their latest strategic plan to specifically reflect support:

1. broadened definitions of energy to now include non-hydrocarbon based products/fuels such as biofuels, biochemicals, renewable fuels and hydrogen as well as carbon capture and storage;
2. introduced eight new industry asset types for pricing purposes — offshore and onshore wind, offshore and onshore carbon capture and storage, electrical storage, hydrogen, biofuels and biochemicals, and solar.

### What risk leaders should look for in an insurance partner

Traditional and new insurance market players are thinking strategically about how they can continue to deliver agile insurance products to withstand volatility in an evolving energy landscape. Mutuals have a commitment to core values such as reliability, straightforwardness, transparency and uniqueness to remain true to a long-term outlook which is essential in the context of the global energy transition.

When assessing an insurance partner, risk leaders should consider:

#### Reliable:

- Broad and stable terms and conditions
- Consistent claims payments
- Demonstrable financial strength, such as no reliance on external capital

#### Straightforward:

- Simple annual renewal process
- Formulaic premium mechanism
- Minimal data, forms and engineering reports required
- Single policy form for all members

#### Transparent:

- Transparent premium model
- Members can impact the decision-making process
- Membership portals which provide access to loss and coverage information

#### Unique:

- Premiums fully fund losses and expenses
- Stable investment portfolio drives shareholders' equity growth
- Networking opportunities with world class peer companies

### The ask of renewable energy businesses

To protect the balance sheet, capital structure and the quality of the member pool, insurance companies are increasingly assessing potential members eligibility. Eligibility criteria may include meeting a threshold of asset size, credit quality, risk management philosophy, past loss records, and commitment to the energy transition

The role of a trusted insurance broker will be critical to these negotiations. In an unstable and volatile commercial capacity market peppered with natural catastrophe events, macroeconomic volatility, and geopolitical unrest alongside limitations on cover and hard and soft market cycles, a trusted broking partner is well-placed to access the most appropriate and competitive pools of capacity for some of the more sophisticated renewable energy developers and operators as insurance buyers.

Innovation isn't resting. Contact a trusted advisor to find out how you can keep pace.



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# Unlocking the power of warranty and indemnity insurance in renewable energy M&A

The renewables sector stands out as a vibrant M&A market, characterized by transactions spanning from single assets to international portfolios. Amidst this flurry of activity, warranty and indemnity (W&I) insurance has emerged as an important component of the insurance market, offering essential protection and peace of mind to parties involved.

W&I insurance can prove a particularly important tool to mitigate risks and facilitate smooth transactions, as the uncertainty of global security continues to ebb and flow with supply chains increasingly at risk due to heightened political tensions. For some time now, there has been a robust appetite within the London market for this coverage, with healthy competition and comprehensive terms available across the renewables technology spectrum.

Below, we take a look at the role of W&I insurance in renewable energy M&A deals in overcoming a number of key challenges.

Renewables transactions frequently encounter various hurdles, ranging from tax considerations, regulatory uncertainty, long-term performance risks and environmental liabilities. Throughout the last year in particular, we have seen the following themes impact renewable energy M&A activity and suggest where W&I insurance can help overcome these issues. We leverage our experience in 2023 and 2024 where we advised on over 80 renewable energy related transactions and have successfully placed 13 transactional risk policies in the renewables sector. In terms of the large European transaction — WTW assisted bidders on renewables target with a €75 million policy limit and €500 million Enterprise Value transaction in Europe. For more information, [please see link to our WTW Global Transactional Risk review 2024](#).



- **Known issues:** While W&I insurance typically covers unknown and unforeseen risks, known issues can sometimes be addressed through affirmative coverage for an additional premium. Within renewable energy projects, these may cover issues such as known blade defects on wind turbines. Moreover, contingent risk insurance offers a fast-growing alternative, covering a wide array of potential challenges, from permit issues to development rights disputes. Both options provide essential protection against foreseeable risks, ensuring comprehensive coverage for renewable energy projects.
- **Tax assets:** Securing coverage for tax assets, such as capital allowances or availability of tax losses as part of the main W&I coverage or as a standalone tax policy, has also been a major trend over the last year. This protects the future financial viability of renewable energy projects against the complexities of international tax regulations.
- **Environmental liabilities:** Environmental concerns are paramount in the renewables sector. As such, addressing exclusions related to environmental liabilities under W&I policies or procuring separate environmental liability insurance is vital. Collaborating early with environmental sector specialists and consultants supports securing tailored solutions that mitigate environmental risks effectively, safeguarding the sustainability and reputation of renewable energy projects against potential future losses.
- **Jurisdictional considerations:** With transactions often spanning multiple jurisdictions, with some perceived as higher risk, tapping into local expertise is essential. The knowledge and expertise that M&A teams can offer can prove important in navigating diverse legal frameworks and regulatory landscapes requires a nuanced approach, ensuring compliance and mitigating jurisdiction-specific risks across the entirety of the project lifecycle.

## Conclusion

As the renewables sector continues to evolve, W&I insurance remains a crucial tool for mitigating risks and facilitating smooth transactions. As the uncertainty of global security continues to ebb and flow with supply chains increasingly at risk due to heightened political tensions, the role of W&I and lenders advisors remains all the more essential in providing renewables clients with the necessary expertise they need to secure the future viability of their projects.



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# The developing BESS market 2024

Battery energy storage systems (BESS) are playing an increasingly integral role in the transition to a lower-carbon global economy. Below, we examine the state of the market for BESS this year and beyond.

## The importance of BESS

BESS enables the storage of excess variable energy generation, enhancing the grid's capacity and reliability. BESS are able to store excess energy produced in periods of low demand, which can be discharged into the grid during periods of high demand. BESS operators can therefore receive financial returns for meeting surging energy needs.

The high investment in the BESS industry has brought with it great opportunities and challenges while providing added security to grid infrastructure.

## Further BESS investment expected

Investment in BESS is predicted to continually grow over the course of the 2020s. McKinsey & Company analysis<sup>1</sup> shows more than \$5 billion was invested in BESS in 2022, an almost threefold increase from the previous year. Looking ahead, it's expected the global BESS market will reach \$120-\$150 billion by 2030.

## BESS project operators: Time to review asset valuations

The increasing level of investment in BESS has prompted competition between all major integrators seeking to capitalize on the opportunity to expand market share and capitalize on demand. This has resulted in pricing reductions from all major BESS system integrators.<sup>2</sup>

With the reduction in costs, BESS project operators would be prudent to ensure the replacement costs of their assets are accurately valued for 2024 and declare updated values to their insurers. BESS projects operating for several years may have lower replacement costs in 2024 than they had earlier. If you are declaring higher replacement values to insurers, you could face over-insuring the assets without additional coverage and higher derived premiums.

<sup>1</sup> <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/enabling-renewable-energy-with-battery-energy-storage-systems>

<sup>2</sup> <https://www.energy-storage.news/huawei-and-byd-among-global-top-five-system-integrators-of-2022-amidst-china-price-war/>

## Experienced EPC contractors key to overcoming supply chain delays

The acceleration of investment and construction of BESS has led to bottlenecks along the supply chain. For example, the U.K.'s National Grid has experienced a large number of delays, some in excess of a year, on sites connecting to the grid. The National Grid is looking to resolve these issues by streamlining the connection process, removing the need for non-essential engineering works prior to connection.<sup>3</sup>

The shortage of experienced engineering, procurement and construction (EPC) contractors within the sector has driven project delays. Experienced EPC contractors with demonstrable history of large-scale deployment of BESS are crucial to ensure the successful completion of BESS projects.

## Revenue challenges prompt revised projections

Once operational, we have seen BESS in the U.K. face issues incorporating new projects efficiently to the grid, with operating capacities curtailed. BESS sites are running at below their projected capabilities, which has led to revenues being less than expected a year ago.<sup>4</sup>

Incorporating BESS into grid networks requires upgrading and digitalization of the grid, adding to the complexity and challenges of the electricity market. While BESS can be used as part of a grid's balancing mechanism, currently in the U.K. BESS are being overlooked for more traditional energy sources such as gas. However, Gore Street Energy Storage Fund recently stated its international assets in the U.S., German and Irish markets generated more than two and half times more revenue than U.K counterparts.<sup>5</sup>

With this in mind, revenue projections need to be reviewed and possibly revised. Operators need to ensure they accurately declare annual revenue figures to insurers, broken down into monthly projections. The early high electricity market revenues seen in the last few years appear to be dwindling with increased deployment and a general reduction in the electricity wholesale prices. The market pricing volatility creates a real opportunity for projects to either be over-insured and paying too high a premium or under-insured and not adequately protected in the event of a loss.

Due to volatile energy prices in recent years, insurers have brought in the market-wide adoption of the business interruption volatility clause, which limits revenue coverage increases to 110% of the declared monthly revenue.

## BESS insurance market appetite 2024

Insurer confidence in BESS has steadily grown over the last few years, leading to a marked increase in supply of available capacity and a relative flattening of premium rates. The insurance market had initially started with relative caution for BESS due to several well-publicized incidents in South Korea where there have been around 30 BESS fires since 2017; so many the Korean authorities imposed a moratorium on building BESS until the causes were investigated<sup>6</sup>.

Initially there were only a few lead insurers providing terms, with follow capacity somewhat restricted. While the sector is maturing quickly, regulatory frameworks and best practice fire protections have been struggling to keep up.

The relatively low-level loss activity in 2023<sup>7</sup> in the context of large-scale global deployment has given insurers confidence to enter the market, providing increased competition on rates and terms. However, insurers are closely watching equipment performance and are likely to rapidly adjust their appetite and capacity where there is evidence of sub-optimal performance. The market is already positioned around preferred and less preferred technology providers, equipment, and manufacturers and integrators, but the landscape is highly dynamic and liable to substantial development over the next few years.

A BESS project's ability to demonstrate effective risk management against thermal runaway during the design and planning stage is of primary risk focus for insurers. Site layout, battery manufacturer quality, and experience and compliance with (National Fire Protection Association) NFPA 855 and (Underwriter Laboratories) UL9540a testing are some of the main components to demonstrate equipment and a BESS site's long-term risk resilience.

As noted, manufacturers and integrators are not all viewed equally by insurers and each are formulating their own views with their in-house engineers. Insurers' analysis of a technology is largely formed by battery chemistry, UL testing results and the large-scale deployment of the technology versus the number of known incidents.

<sup>3</sup> <https://www.solarpowerportal.co.uk/national-grid-to-streamline-10gw-of-battery-storage-for-connection/>

<sup>4</sup> <https://www.solarpowerportal.co.uk/gresham-house-uk-bess-subject-to-weak-revenue-environment/>

<sup>5</sup> <https://www.energy-storage.news/gore-streets-international-assets-generate-2-6x-more-revenue-than-gb-ones-nav-down-2-3/>

<sup>6</sup> <https://www.pv-magazine.com/2023/07/04/whats-behind-south-koreas-battery-fire-accidents/>

<sup>7</sup> [https://storagewiki.epri.com/index.php/BESS\\_Failure\\_Event\\_Database](https://storagewiki.epri.com/index.php/BESS_Failure_Event_Database)

## Preferred lithium chemistry

Lithium nickel manganese cobalt oxide (NMC) chemistry was used in many of the early utility scale BESS projects. NMC has better energy density than LFP (lithium iron phosphate), meaning more power per MW than its LFP counterpart.

However, the sourcing of cobalt in Central Africa comes with concerns in supply and ethical considerations for manufacturers' environmental, social and governance (ESG) credentials. As the sector has developed with safety at the forefront, LFP has become the more popular chemistry for manufacturers and insurers alike, being cheaper to manufacturer and with better resilience to thermal runaway than NMC.

## UL9540a testing: What to look at from a risk perspective

(Det Norske Veritas) DNV Scorecard 2022 goes into detailed analysis about the safety of anonymous OEM's (Original Equipment Manufacturers') UL (Underwriter Laboratories) testing data. The scorecard demonstrates how the different battery chemistry and OEM selection can affect performance results and failures leading to thermal runaway incidents and claims.

The venting temperature and the thermal runaway temperatures are key to thermal runaway exposure evaluation. Higher temperatures for both venting and thermal runaway are viewed more favorably. A good distance between the venting and thermal runaway temperatures is a desirable result from the test.<sup>6</sup> UL results for LFP versus NMC varies from manufacturer to manufacturer, from model to model. As a general trend, LFP is seen as more resilient to thermal runaway.

Insurers require full UL9540a cell, unit and module testing data for the model of batteries selected for their site. If full UL testing is provided, London Engineering Group 2 (LEG2) coverage will be available for consequential loss and damage from the defective part. For example, if the battery catches fire, insurers will cover the damage to the surrounding site. The damage to the battery itself should be covered under the manufacturer's warranty provisions.

If full UL9540a is not provided, then insurers will be likely to increase their premium ratings and also restrict coverage to LEG1, as the technology is not yet test proven and deemed prototypical. LEG1 offers the most limited form of defects-in-design clause and would not respond for defects to the defective item, or any ensuing consequential loss and damage.



For example, a fire arising from an inherent manufacturing defect, with loss or damage sustained to the property surrounding the inherent defective component part (the downstream consequential damage resulting from the defect), would not be covered under the insurance. This downstream consequential damage to the original defective part being damaged would also need to be part of the policy response and indemnified to trigger coverage for the ensuing loss of revenue. Such restricted defects coverage would not meet lenders' insurance requirements as a bankable proposition.

<sup>6</sup> <https://www.dnv.com/power-renewables/energy-storage/2022-battery-scorecard.html>



## Layout design impacting insurer risk ratings

Early engagement with insurance advisors and insurers' engineers at the site outline planning stage, can help BESS projects operators reflect best practice guidance in the site layout and ensure they optimize megawatts per m<sup>2</sup>. The site layout has a significant impact on insurers' probable maximum loss (PML) or worst-case scenario loss at site.

The higher the PML at site, the higher insurers' risk ratings and premiums. The most significant driver for a high PML is container spacing. When spacing is less than 3 meters, it increases the risk that thermal runaway would spread between containers, resulting in a larger loss.

Another major exposure insurers consider is whether export equipment, such as the site transformer or substation, is fewer than 8 meters to the nearest container. While exporting power to the grid moves through these components, if they are the subject of an outage, the whole site's ability to export is diminished. With transformer replacement potentially having long lead times, the site's revenue will be significantly impacted, resulting in a large business interruption claim.

## Establishing tomorrow's risk-resilient BESS projects

The development of the BESS market is still in its relative infancy, compared to more established clean energy markets. As the industry matures, there will undoubtedly be challenges along the way. The large-scale deployment of safe, robust technology, in an effective regulatory framework, will be of paramount importance for the long-term viability of the industry.

A cost-effective risk transfer strategy that aligns best practice site layout, battery chemistry, manufacturers and/or integrators, can form the foundations of a risk-resilient BESS project, providing bankability for developers in the long term and confidence for insurers.

**To discover further insight on recent developments in insurance markets for the key natural resources sectors, [watch this video](#).**



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# Understanding OEM technology concerns

This technical article details the increasing scrutiny around the performance of original equipment manufacturers (OEMs) in both the onshore and offshore wind industry.

The wind industry continues to face challenges resulting from both the rising costs of raw materials and challenges around design and workmanship of OEMs as they struggle to scale technology and meet demand.

While future opportunities remain for OEMs, there are many insurance market participants that would prefer OEMs to consistently 'get it right first time' on existing technology platforms in operation.

Below, we explore the major challenges with OEMs over the past year and how they may continue into 2024 and beyond.

## Locking pin challenges rising to the fore in 2024

Hub locking pins are a critical link in the safety chain when performing turbine erection and maintenance tasks. There are three pins that, when engaged, provide a positive lock, preventing the rotor from turning during construction or routine operations and maintenance.

Before the rotor is put back into operation or allowed to turn, it's essential the operator ensures all three pins have been fully disengaged. Allowing the rotor to turn, or operating the rotor turning gear when a pin is engaged, can cause catastrophic damage to the rotor, drive train, nacelle and potentially other components.

There were several measures introduced by OEMs to alleviate this issue. However, there were some notable issues in 2023 where the locking pins were not properly disengaged resulting in physical damage to turbines. These incidents have prompted some insurers to exclude coverage for contractor negligence (defective workmanship) when OEMs are jointly covered as co-insureds within owner-procured insurance policies. Many insurers are excluding coverage for breaches of 'good industry practice,' as defined within engineering procurement construction (EPC) and/or turbine supply agreement (TSA) contracts.

We would argue the definition of good industry practice can be highly subjective and is likely to lead to disputes in the future.

## Lightning protection systems (LPS): Issues remain while retrofits awaited

In our 2023 Renewable Energy Market Review<sup>1</sup>, we examined concerns over the adequacy of the design of the lightning protection system for the Vestas V110, V126, V136 and V164 wind turbine models. These models use Vestas' LPS2, which features a single down conductor placed into the blade to divert lightning attachment.

<sup>1</sup> <https://www.wtwco.com/en-us/insights/2023/01/renewable-energy-market-review-2023>

Some insurers view the current design as lacking adequate equipotential bonding along the blade length in light of several large-scale lightning damage claims. The insurance market took a hard stance that the LPS2 was not effective and, as such, any lightning damage would not be sudden and unforeseen and excluded coverage for lightning damage for any turbines utilising LPS2. We understand the LPS2 has required substantial provisions to be made to accommodate probable warranty claims.

While Vestas has not formally admitted inefficiency of the LPS2, it has worked on a global solution to retrofit a second down conductor in the blades, which we understand the insurance market hopes will address the issue.

We also understand Vestas has been in discussion with DNV-GL (Det Norske Veritas) to update the type certification and also seek full verification for the retrofit. Vestas has also brought out an updated optimized lightning protection system (OLPS) on its new fleet.

Insurers, meanwhile, have started to reinstate lightning damage coverage. There remains a challenge in the event of damage to a retro-blade requiring replacement, as all three blades on the turbine will need to be replaced, due to the need to balance the blades. It's likely the replacement blade will use OLPS rather than the retrofitted LPS2 due to Vestas taking them out of production.

Whilst the issue is known, there remains a challenge in the insurance market and to developers. The manufacturer is still in the process of undertaking the retrofit on the affected turbines across their global fleet. We understand only a minority of the fleet has had the retrofit completed. This leaves a potential gap for owners/operators with insurers excluding lightning damage for LPS2 where it is unclear which party would pick up the costs. We believe this should ultimately be picked up by the OEM, but this needs to be a consideration within original procurement contracts.

### **Blade innovation is splitting the market**

While bigger turbines should, in theory, mean better capacity output and efficiency for the future, they also present greater logistical challenges. Turbines are getting bigger and so are their associated major components, with the largest turbines having blade lengths exceeding 100m, creating challenges with storage on cargo vessels, inland transit and storage at site.

Historically, developers would commonly store spare blades and other components in site warehouses, but this now requires substantially more land mass. An American turbine manufacturer devised a solution to alleviate these issues and drive down logistical costs by delivering a two-piece blade design where the blades could be manufactured at longer lengths but be assembled on site. Unfortunately, we have seen the following significant issues with the design, which has resulted in blade failures<sup>2</sup> and we understand that the manufacturer no is longer manufacturing the two-piece blade:

- Connection/locking pin coming loose during operation
- Adhesive bond in the joint being insufficient
- Manufacturing inconsistencies, which have caused distortion in the structural laminate.

The challenge to developers on sourcing replacement blades (and with the two-piece no longer manufactured) is around potentially needing to replace all three blades on the rotor in the event of failure of one of the two-piece blades.

### **Manufacturers must work more closely with insurers**

In 2023, Siemens Gamesa raised concerns around the quality of its 4.X and 5.X turbines<sup>3</sup>, due to wrinkles in rotor blades as well as main bearing issues, attributing the issues at individual manufacturing facilities/suppliers without publicly stating which ones in particular were at fault.

The company recently estimated<sup>4</sup> it has around 3,000 4.X and 5.X turbines in the field, but not all of these have been affected, also estimating rectifying these issues could cost it upwards of €1.5 billion — a large portion of its existing market cap.

OEMs are feeling the pain of historical workmanship and manufacturing issues, and will continue to if there isn't a drastic improvement in workmanship standards as they also continue to push the design envelope on the aspiration for next generation technologies.

Insurance market sentiment suggests coverage will continue to be provided where insurers understand the technology and risks. We believe manufacturers must have skin in the game, suggesting increasingly high retentions are passed to the technology owners; thereby limiting risk transfer to insurance markets for developmental technology risks and insisting developers work closely with insurers at every stage of new technology deployment and/or project development.

<sup>2</sup> <https://www.rechargenews.com/wind/another-blade-break-hits-ge-wind-turbine-in-germany/2-1-1544040>

<sup>3</sup> <https://www.reuters.com/business/energy/what-are-issues-with-siemens-gamesas-wind-turbines-2023-06-23/>

<sup>4</sup> <https://www.reuters.com/business/energy/what-are-issues-with-siemens-gamesas-wind-turbines-2023-06-23/>



## The importance of contract wording

The prevalent OEM issues and the insurance market's position of not providing cover for known issues not considered sudden and unforeseen, highlights the importance of engaging with insurance advisors at the earliest possible stage in the project lifecycle. This is so they can assist with drafting EPC/TSA and Operation and Maintenance (O&M) agreements. This ensures the balance of risk is reasonably spread, aligned to commercial availability of risk transferred and prevailing market practice.

While warranty issues will often be picked up by OEMs during the defect notification period, it is important to have an all-encompassing O&M agreement. This will provide protection during the operational life of the project by ensuring there is sufficient availability guarantee, spare parts, crane availability and labor to resolve any contractor issues at the earliest possible stage.

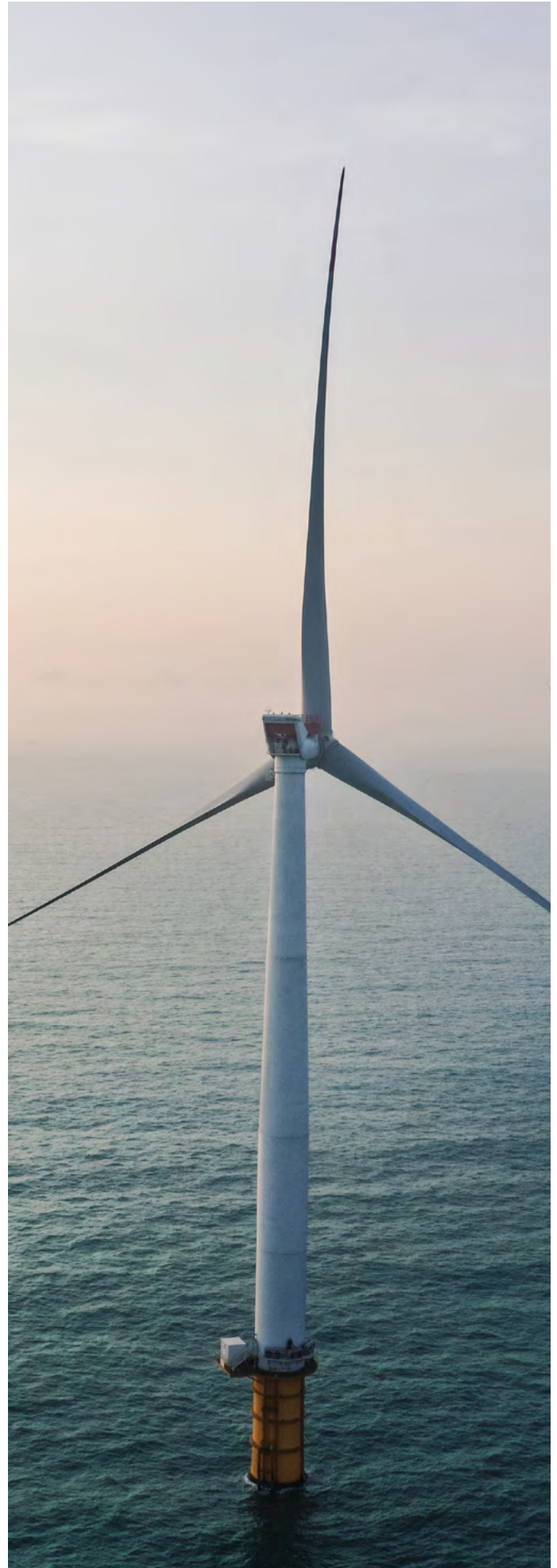
Ultimately, the contracts need to ensure the contractors deliver the project within a timely and financially viable manner and to the expected quality. They need to exclude defects in design, engineering and contractor performance as well as any consequential damage. They also need to include a clear definition of what constitutes a force majeure risk.

We believe for too long EPC/TSA contracts have sought to include very broad force majeure definitions, such as all lightning loss or damage irrespective of the incident being within design specifications. This remains a commercial negotiation between the buyer and seller of technology, however developers are not always aware of the risk allocation under contract and whether this meets good industry practice.



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# The rise of Chinese wind turbine generator OEMs in the global renewable energy sector

How did Chinese wind turbine generator (WTG) original equipment manufacturers (OEMs) become increasingly pivotal players on the global renewable energy stage and how can insurers respond?

China has long been recognized as a global powerhouse for its manufacturing base but may be at a turning point where its WTG OEMs become increasingly pivotal players on the global renewable energy stage.

In 2022, Chinese OEM Goldwind emerged as a leader in global market share for the first time with the addition of 12.5 GW<sup>1</sup> of new capacity. This transition consolidated positive perceptions of the OEM, variously driven by Goldwind's innovation, focus on quality, more robust warranties, enhanced performance metrics and a supportive regulatory environment coupled with government incentives.

Yet the integration of Chinese OEMs into the global market introduces complex challenges from an insurance standpoint.

The global market has been dominated by non-Chinese

manufacturers for many years and insurers have been vocal on the challenges around understanding performance when compared to more traditional manufacturers' performance. However, we would argue it's important for the good of increasing competition in the sector that global insurers can achieve a clearer view of Chinese OEMs.

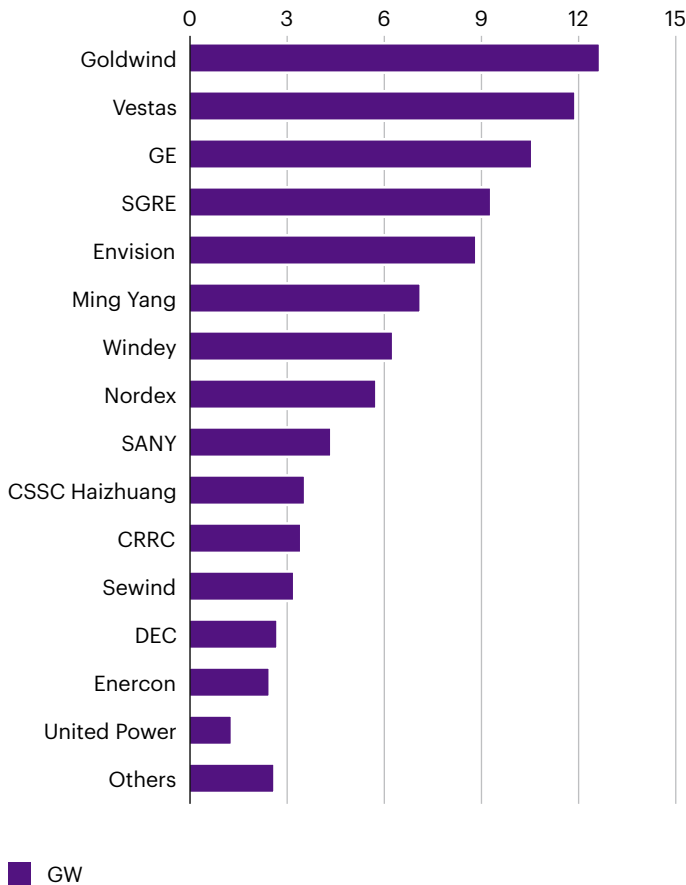
Below, we examine how insurance markets can get a better understanding of Chinese manufacturers' quality assurance and control, validated historical domestic performance, expanding supply chain connections and spares availability.

<sup>1</sup> <https://www.woodmac.com/news/opinion/goldwind-captures-the-top-spot-for-global-wind-turbine-supply/>

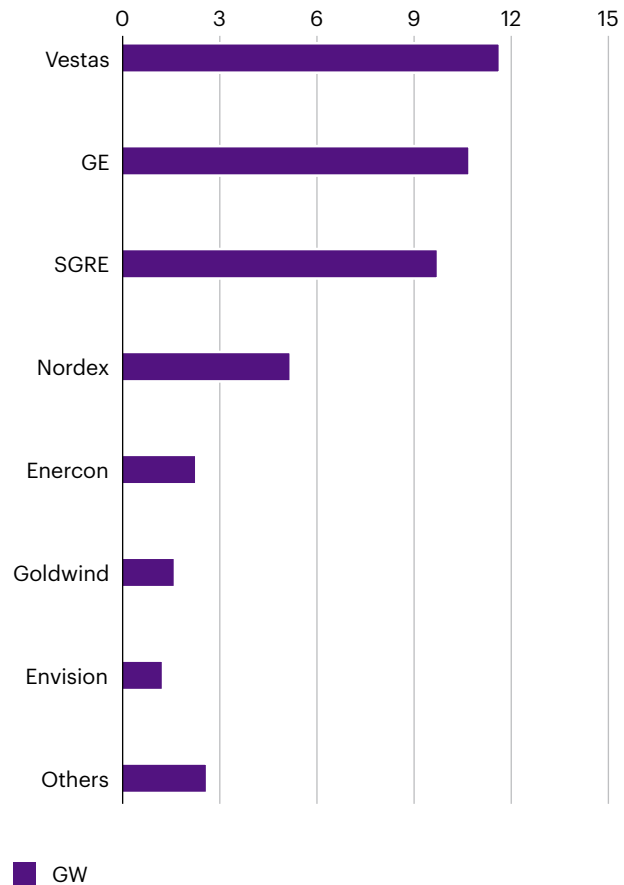
Figure 1:

## The top five wind turbine OEMs collectively captured almost 60% of the global market in 2022

Global top 15 OEMs: Market share 2022



Global top 7 OEMs excluding China: Market share 2022



Source: Wood Mackenzie

Note: Wood Mackenzie bases its analysis on grid-connected capacity in all wind markets except for China and Vietnam

### Realigning perceptions

In the early 2000s, Chinese government incentives for domestic deployment in China focused on installed capacity with less emphasis on quality or efficiency. This approach fostered a market driven by delivery speed, low cost and volume, inadvertently cultivating a perception of lower quality and higher risk of defects.

During the advent of new onshore and offshore wind projects during this period, Chinese OEMs were not seen as viable competitors or alternatives to their European and U.S. competitors in the global marketplace.

The Chinese government approach changed around 2010 wherein a tariff-based scheme was introduced for domestic deployment with the aim of focusing on accountability, performance efficiency and profitability,

rather than on MW/GW of installed capacity only. A few major Chinese OEMs grasped the vision and opportunity to meet these goals.

Whilst many Chinese manufacturers, or projects with Chinese interests, have historically been insured in the international markets, there remains limited experience with Chinese WTG OEMs, but it is broadly acknowledged that earlier models from companies like Goldwind and Ming Yang experienced quality issues (although this was frequently in common with European manufacturers). However, Goldwind has notably enhanced its competitive international business model and technology performance, leading to a broader acceptance by international developers and operators and consequently within the global insurance markets.



Despite some lingering perception of Chinese WTGs as lower quality and at higher risk of defects, the reality paints a different picture. In fact, quality and reliability issues are proving to be an ongoing problem for WTG OEMs in Europe and U.S., negatively affecting profitability — warranty provisions frequently now negatively accounting for 10% of OEMs, revenues globally.

While counterparts in Europe and North American territories experienced slowed growth in 2022-23, average offshore turbine ratings in China surpassed Europe in 2023 with 9.5 MW and 9.4 MW, respectively. Meanwhile onshore Chinese OEMs leapfrogged peers in these territories by installing 5.4 MW and 5.1 MW, respectively.

We would argue all of these developments indicate global insurers' historical perceptions should require a rethink.

### Overcoming performance data and risk management challenges

The integration of Chinese OEMs into the global renewable energy market has highlighted the critical role of data sharing and collaboration, an issue corroborated by a number of experienced renewable energy underwriters in the London and international markets.

Currently, insurers struggle to access reliable performance data to understand how Chinese WTG OEMs' assets operate and how well they are maintained overseas. This suggests all stakeholders would benefit from collaboration and sharing accessibility to comprehensive and detailed performance records of WTGs covering both domestic and international operations. Recommendations from insurers we've heard, in particular at our November 2023 European Renewable Energy conference, include:

- Wind energy companies developing a better understanding of risk management and the positive contribution insurance can make to the industry
- Building awareness of how effective quality assurance can reduce risk for all stakeholders
- Better understanding of the impact of claims
- Encouraging independent third-party technical institutions to work closely with all stakeholders, channelling available data on damages and losses to improve communication and relationships<sup>4</sup>
- Increasing the accessibility of visits to manufacturers' facilities and warehouses, increasing understanding and comfort around standards and quality controls.

This transparency would not only facilitate a deeper understanding of the operational efficiency and maintenance practices of these assets, but also support the development of more robust underwriting to more accurately reflect the risks associated with these WTGs. This approach could serve as a foundation for building trust and overcoming the scepticism that has historically characterized international insurers' perceptions of Chinese WTGs.

By establishing channels for data exchange, international insurers can also monitor the performance and reliability of these turbines over time more closely, further refining their risk models and underwriting processes. This evolving understanding, underpinned by real-world data, would enable insurers to adjust premiums, terms and conditions that more fairly reflect the actual risk posed by these assets.

**We'll be sharing further thought leadership on this important area later this year. Follow us on [LinkedIn](#) for in-depth explorations of supply chain dynamics, subrogation of losses and the intricacies of OEM warranties.**



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<sup>2</sup> <https://www.woodmac.com/news/opinion/wind-turbine-technology-evolution-is-diverging-quickly-between-china-and-the-rest-of-the-world/>

<sup>3</sup> <https://www.woodmac.com/news/opinion/wind-turbine-technology-evolution-is-diverging-quickly-between-china-and-the-rest-of-the-world/>

<sup>4</sup> [https://awsassets.panda.org/downloads/wind\\_energy\\_insurance\\_in\\_china\\_opportunities\\_\\_challenges\\_english\\_executive\\_summary.pdf](https://awsassets.panda.org/downloads/wind_energy_insurance_in_china_opportunities__challenges_english_executive_summary.pdf)



# Addressing environmental risks and liabilities in the renewable energy sector

While renewable energy is often termed ‘clean,’ projects can create environmental risks and liabilities that project owners need to identify, manage, and transfer effectively.

Renewable energy sector projects are increasing in size, scope, and complexity. Project assets are also increasingly likely to be built in brownfield locations. This means project owners should carefully consider any associated increases in environmental exposures at every stage.

From project origination, planning and consent, through to construction and delivery, operating and ultimate decommissioning, you will need to identify potentially wide-ranging environmental risks and understand how you may or may not be covered for them.

In this brief insight, we highlight some key environmental risk and liability areas you may need to be aware of, including what some exposures mean for your insurance coverage.

## BESS and environmental risks

Battery energy storage systems (BESS) can give rise to a range of threats. We’re currently seeing incident notifications and claims presented from a multitude of angles, including:

- **Battery fires** — A battery fire can produce a dangerous cloud of hydrogen fluoride, methane, and carbon monoxide. If the vapor cloud from a battery fire meets an ignition point, it can also explode.
- **Uncontrolled soil erosion leading to environmental damage** — A recently constructed ground-mounted solar farm was required to pay more than \$135.5 million in damages due to uncontrolled soil erosion that silted up wetlands and a fishing lake.<sup>1</sup>

## Biodiversity threats

BESS, solar farms, on and offshore windfarms and green hydrogen storage projects each have unique environmental and biodiversity exposures which have the potential to manifest into significant liabilities and claims.

Due to the level of deployment globally of renewable energy systems, we’re seeing an increase in the number of projects being developed on brownfield land or adjacent to sensitive biodiversity or environmental resources. This means project owners could require specific environmental insurance policies that include (but aren’t limited to) coverage for biodiversity damage, first-party clean-up costs, gradual pollution, loss mitigation costs and mobilization and exacerbation of historical pollution.

<sup>1</sup> <https://www.pv-magazine.com/2023/05/10/u-s-court-orders-developer-to-pay-135-5-million-in-100-mw-solar-property-damage-case>

## Identifying and closing insurance gaps for renewable energy environmental risks

Traditional construction all risks and third-party liability policies may have significant gaps in cover when considering sudden and unforeseen and gradual environmental liabilities.

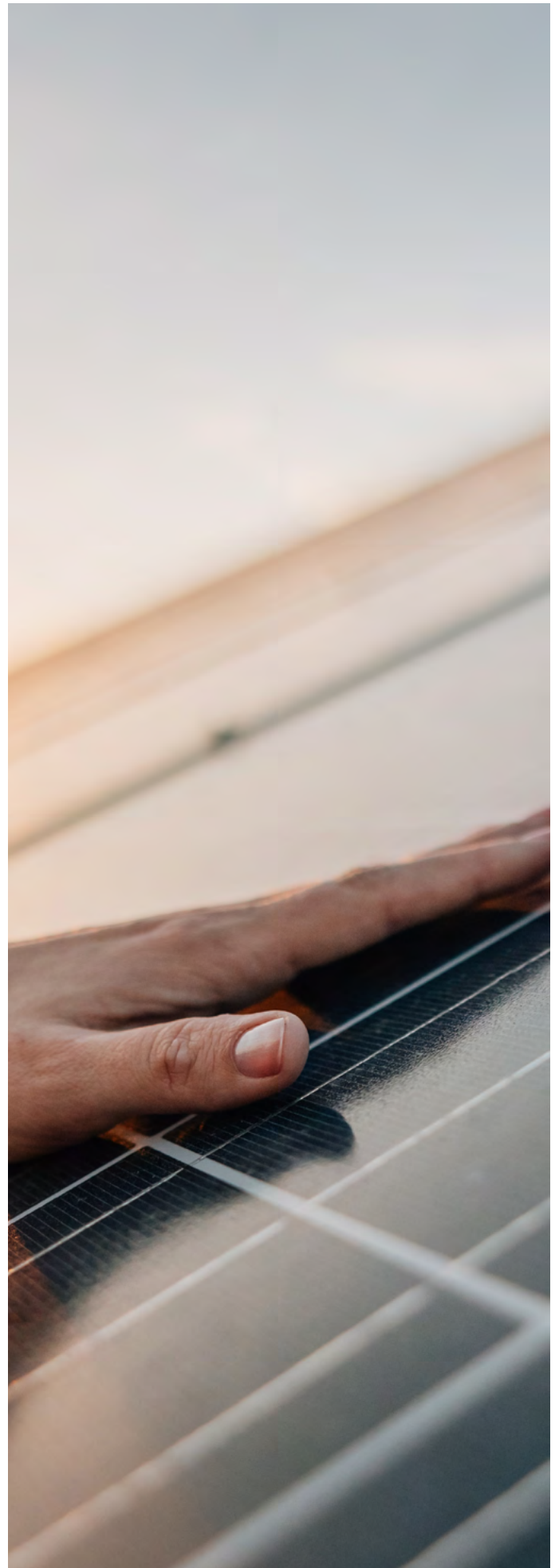
You may need specialist environmental insurance to dovetail with your traditional lines of coverage to ensure you're covered for all potential risks.

## ESG risks across the lifecycle of renewable energy project and assets

Environmental, social and governance (ESG) considerations mean you will want to consider the ESG credentials of your assets and projects' integrated supply chain and the entire lifecycle up to decommissioning. How do you plan to address the ESG and reputational risks associated with wind turbine 'graveyards' and the like from the outset?



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# The next phase of energy transition: Five key trends to prepare for

From regulatory changes to shifts in investment flows, Dr Steve Fawkes provides the key trends likely to define the continued transition from fossil fuels to greater electrification.

The move away from fossil fuels and towards greater electrification, coupled with the growth of renewables and storage technologies, is well underway. To date, we have been in what we can consider the first phase of the energy transition, a period characterized by grid-scale renewable energy generation of mainly wind and solar.

We're now entering a new phase of energy transition. Here, the focus will shift towards decentralized energy demand rather than centralized supply. This progress to a more decentralized, decarbonized and digital energy system will see whole new markets emerge and bring greater economic and environmental benefits.

Below, we consider five key trends to expect from the next phase of energy transition sector players should be prepared for.

## **Trend 1: Decentralized energy generation and storage will transform markets**

Into the next phase we will, of course, continue to see the growth of large-scale renewable generation plants. However, behind the scenes, greater numbers of diverse energy users will be adopting decentralized energy generation, storage and flexibility techniques. This change is already starting to transform energy markets.

The rapidly falling cost of solar and battery systems, the switch to EVs, alongside the widespread problem of grid constraints, is leading energy consumers to shift towards being 'prosumers,' that is, both producers and consumers.

The essentially monopolistic, or at best oligopolist, structure of energy markets — where only a handful of companies exert significant control — won't continue unchallenged into the next phase of transition. You can expect to see the acceleration of the move towards a highly decentralized model where there will be millions of distributed energy resources and millions of energy producers.

Each of these will produce when they can and trade energy and flexibility across their local areas.

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**Expect to see the acceleration of the move towards a highly decentralized model.**

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## Trend 2: Old-world regulation will change to be new-world ready

Global electricity market design and regulation has been designed for the old world and is struggling to keep up with the rapidly changing reality on the ground. However, regulation will ultimately have to change to respond to the technical and financial developments that characterize the next phase of the energy transition.

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**Regulation will ultimately have to change to respond to the technical and financial developments that characterize the next phase of the energy transition.**

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## Trend 3: Converging technologies will reduce costs and constraints

For energy consumers of all types, it now makes economic sense to generate as much power as you can from solar PV, store what you can in batteries, improve energy efficiency and electrify vehicles and heat.

The economics of this have changed so rapidly that not everyone has caught up, but they will. This convergence of technologies reduces energy costs, reduces dependence on a constrained grid, reduces carbon emissions and can also create new sources of revenue.

For the grid, these converged technologies can overcome constraints and reduce the capital cost of upgrades. At a national level, it can also increase energy security by reducing the need to burn imported gas in power stations. This represents what we can think of as a 'win-win-win' proposition.



## Trend 4: The rise of 'energy as a service' companies

The energy companies of the future are starting to emerge and they will look very different to the old ones. They will offer 'energy as a service', with the emphasis being on delivering the end-use energy and services that consumers need, rather than centralized generation or commodity power.

The energy company of the next phase of transition will make it easier for energy users to develop, adopt and use the new, distributed energy infrastructure.

Expect the winners here to be systems integrators that can design and finance integrated local energy solutions. They will also be able to aggregate multiple small projects using multiple technologies overlaid with digital technology to offer services to their local consumers and the wider grid.

## Trend 5: Accelerated improvements in energy efficiency and cuts in emissions

Over the next decade you can expect investment in distributed, integrated solutions to grow, ultimately seeing more investment than that in centralized solutions.

This will accelerate improvements in overall national energy efficiency and reduction in emissions.

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# Predicting renewable energy droughts and surplus by modeling tropical Pacific climate

El Niño and La Niña are the leading causes of year-over-year changes in global weather. Keeping a watch on the tropical Pacific can help you predict high or low renewable power generation months in advance.

Renewable energy from wind, water or solar power is intrinsically variable. In the absence of significantly oversized production or the widespread deployment of high-capacity storage devices, these sources will continue to be vulnerable to disruption caused by weak winds, dry spells and cloudy skies. How can renewable energy stakeholders use modeling insight on El Niño and La Niña to get ahead of potential supply challenges and use these perspectives to inform greater resilience?

Below, we examine the characteristics and implications of El Niño and La Niña for renewable energy providers and customers and how being forewarned of weather systems can have wide-ranging implications for renewable energy.

## What are El Niño and La Niña and how do they impact renewable energy production?

Most of the time, the trade winds over the Pacific blow west across the equator, pushing warm water away from South U.S. and toward Indonesia and Papua New Guinea. Those waters — the hottest parts of the global oceans

— function as an enormous engine, pumping heat and moisture into the atmosphere over the western tropical Pacific and giving rise to exceptional thunderstorms more than 15 km tall.

But every few years, the normal interplay between the ocean and atmosphere over the tropical Pacific either speeds up or breaks down. These changes have major repercussions for weather and climate across the globe and, in certain places, can significantly affect the natural resources we depend upon to produce renewable energy. Understanding what lies ahead for the tropical Pacific could help anticipate renewable energy droughts or oversupply a season or two ahead.

Normally, the atmosphere above the Pacific forms a single loop, where air rises in the west, tracks eastward at higher altitudes, sinks back down off the coast of South U.S., and then rejoins the trade winds. When this interaction of air and ocean currents intensifies, with energized winds and even hotter water in the west, we describe this supercharged state as La Niña<sup>1</sup>.

<sup>1</sup> National Oceanographic and Atmospheric Administration (2023), What are El Niño and La Niña? <https://oceanservice.noaa.gov/facts/ninonina.html>



Alternatively, when that normal configuration breaks down, we declare an El Niño. Under El Niño, trade winds slacken and the massive pool of warm water in the west slouches eastward, taking up a position in the central Pacific. The grand column of convection rises from the middle of the Pacific, rather than its western arm, pushing air both east and west from that central location.<sup>2</sup>

These rearrangements and reversals toss the tropical Pacific's weather upside down. El Niño brings drought and wildfire to Indonesia, delivering surprise rainstorms and floods into the normally dry areas of Ecuador and Peru, prompting the marine food web surrounding the Galapagos Islands to collapse.<sup>3</sup>

The local impacts of La Niña are often more subtle, but typically include heavy rainfall and flooding in the Insular Region of Southeast Asia, and wet spring and summer weather in Australia. But because the tropical Pacific Ocean is so enormous and holds so much heat, El Niño and La Niña both reach far beyond the confines of the basin itself. As climate scientist and oceanographer at NASA's Jet Propulsion Laboratory Josh Willis once said, "When the Pacific speaks, the whole world listens."<sup>4</sup>

### The implications of El Niño and La Niña for water hazards and supplies

The ocean's surface is by far the largest supplier of water to our atmosphere. So when warm and cold waters are rearranged over an area as large as the tropical Pacific, there are major consequences for water hazards and water supplies across the world. For El Niño, usually the most spectacular changes in the hydrological cycle happen along the western coast of the South U.S.

Centuries ago, Peruvian fishers noticed warm water from the tropics would sometimes arrive in December or February to drive the fish away. Scientists from Peru were the first to use the term 'El Niño' in print and in 1895, Federico Pezet<sup>5</sup> linked this *contracorriente El Niño* (or countercurrent El Niño) to torrential rains in the northwestern department of Piura. This was the first report of a 'teleconnection' between the tropical Pacific and weather inland.

More than a century later, that relationship still holds firm: flood damages for coastal Peru are 25-50% higher in El Niño years.<sup>6</sup>

Over southern Africa, El Niño and La Niña are the main influences on the region's climate between December and March, the middle of the local rainy season. During El Niño events, we see major reductions in both total rainfall and the number of rain days over a wide east-west band spanning central and southern Mozambique, Zimbabwe, Botswana, southwestern Zambia, southeastern Angola, and northeastern Namibia.<sup>7</sup>

When forecasts declare El Niño, these countries may be challenged by less-than-expected water supplies for rain-fed agriculture and hydroelectric power.

The regional response to La Niña is not equal nor opposite to that of El Niño, but generally includes more rainy days and heavy rainstorms, especially over Zimbabwe and southern Mozambique.



<sup>2</sup> Di Liberto (2014), The Walker Circulation: ENSO's atmospheric buddy.

<https://www.climate.gov/news-features/blogs/enso/walker-circulation-ensos-atmospheric-buddy>

<sup>3</sup> Karnauskas (2015), El Niño and the Galápagos. <https://www.climate.gov/news-features/blogs/enso/el-niño-and-galápagos>

<sup>4</sup> NASA Earth Observatory (2022), La Niña times three, <https://earthobservatory.nasa.gov/images/150691/la-nina-times-three>

<sup>5</sup> Pezet (1896), La Contracorriente 'El Niño' en la costa norte del Perú, Boletín de la Sociedad Geográfica de Lima, 5.

<sup>6</sup> Ward et al. (2014), Strong influence of El Niño Southern Oscillation on flood risk around the world. Proceedings of the National Academy of Sciences 111 (44) 15659-15664. <https://doi.org/10.1073/pnas.1409822111>

<sup>7</sup> Hoell et al. (2023), The modulation of daily southern Africa precipitation by El Niño–Southern Oscillation across the summertime wet season. Journal of Climate 34, 1115-1134. <https://doi.org/10.1175/JCLI-D-20-0379.1>

## Understanding the impact of future weather events on renewable energy

Renewables now provide 5.5% of global energy supply. If we hope to achieve net-zero carbon emissions by 2050, global production needs to ramp up by roughly 13% per year over the next three decades.<sup>8</sup>

Although more solar, wind, hydro, geothermal and ocean energy are critical to delay or halt climate change, these renewable energy sources are strongly dependent on prevailing weather. As energy systems become increasingly reliant on renewables, we will face greater risks around inclement conditions that could reduce total power supply and create renewable energy ‘droughts’.<sup>9</sup>

Because El Niño and La Niña have had an appreciable impact on both renewable resources and production in the past, renewable energy sector stakeholders should pay attention to the potential of future events to function as either a benefit or challenge to specific situations. For example:

- More than a decade ago, a colleague and I showed prolonged episodes of low winds on the southern Canadian Prairies, sometimes lasting for several months, nearly always happened during an El Niño.<sup>10</sup> A few months later, underperforming wind power production at several important regions in Canada and the U.S. was attributed to the 2009/10 El Niño.<sup>11</sup> Subsequent research showed El Niño is associated with slack winds across most of the western Great Plains, including Texas, and the lower Mississippi River Valley.<sup>12</sup> However, the opposite does not hold: La Niña conditions do not lead to noticeably stronger winds or higher production for wind energy facilities.
- Solar energy can also be influenced by the tropical Pacific, even in places of solar abundance. During the austral winter, La Niña usually brings rainy weather with heavy clouds to the eastern northeastern part of Australia, which serves to decrease solar radiation.<sup>13</sup> On the other hand, El Niño should be good news for energy production because it raises solar exposure across much of Queensland, New South Wales, and the Northern Territory. But because El Niño usually makes summer in Australia hotter and drier, the solar industry

could still face undesirable consequences should heatwaves increase demand for electricity or lead to facilities producing power less efficiently.<sup>14</sup>

- For hybrid renewable systems, the particular effects of El Niño can be quite different, depending on both geography and energy source. A recent study<sup>15</sup> led by Dr Hannah Bloomfield tested the influence of the tropical Pacific on wind and solar power generation in sub-Saharan Africa. The research team found in Kenya, El Niño causes wintertime wind power to drop by 15% and prompts similar but more modest downturns in solar energy production. By contrast, renewable energy production in Senegal appears to be resilient with respect to El Niño, with solar power generation increasing slightly by 1% during El Niño-like summers.



<sup>8</sup> International Energy Agency (2023), Renewables. <https://www.iea.org/energy-system/renewables#>

<sup>9</sup> Allen and Otero (2023), Standardised indices to monitor energy droughts. Renewable Energy 217, 119206. <https://doi.org/10.1016/j.renene.2023.119206>

<sup>10</sup> St. George and Wolfe (2009), El Niño stills winter winds across the southern Canadian Prairies. Geophysical Research Letters 36, L23806. <https://doi.org/10.1029/2009GL041282>

<sup>11</sup> Renewable Energy Magazine (2010), El Niño causes drop in wind power production. <https://www.renewableenergymagazine.com/wind/el-nino-causes-drop-in-wind-power>

<sup>12</sup> Hamlington et al. (2014), Effects of climate oscillations on wind resource variability in the United States. Geophysical Research Letters 42, 145-152. <https://doi.org/10.1002/2014GL062370>

<sup>13</sup> Davi and Troccoli (2012), Interannual variability of solar energy generation in Australia. Solar Energy 86, 3554-3560. <https://doi.org/10.1016/j.solener.2011.12.004>

<sup>14</sup> McConnell and MacGill (2023), An El Niño looms over Australia's stressed electricity system — and we must plan for the worst. University of New South Wales — Sydney. <https://newsroom.unsw.edu.au/news/science-tech/el-niño-looms-over-australia's-stressed-electricity-system---and-we-must-plan>

<sup>15</sup> Bloomfield et al. (2022), Characterizing the variability and meteorological drivers of wind power and solar power generation over Africa. Meteorological Applications 29, e2093. <https://doi.org/10.1002/met.2093>



## Using modeling to inform energy grid design and anticipate energy drought

By reading the signs in the tropical Pacific, climate scientists are able to spot El Niño and La Niña on the horizon one or two seasons in advance.

Currently scientists make these long-term forecasts in one of three ways.<sup>16</sup> The first and oldest approach builds statistical models that predict an index of the El Niño/La Niña system based on other measured aspects of the tropical Pacific, such as deep ocean temperatures, air pressure patterns, or even the state of the index in previous months. The second approach — dynamic modeling — uses high-performance computers to simulate the physical behavior of the ocean and atmosphere over the coming months. The third, and newest, technique searches the huge database of climate model output to find all cases where the simulation closely resembles the current state of the Pacific Ocean.<sup>17</sup> Researchers can then trace how ‘lookalikes’ evolved over the next several months within the simulation and use this insight to forecast El Niño and La Niña in the real world.

Much of what we know about El Niño’s effects on climate is based on weather observations made over the past several decades. That experience is crucial for us to understand what’s possible over the months ahead. But we should also be mindful that future El Niño and La Niña events will play out across a world much warmer than those influenced by their predecessors.

Because our forecasting techniques are operating in uncharted waters, we should maintain caution on predicting the future arc of the tropical Pacific. Renewable energy from wind, water or solar power is intrinsically variable. In the absence of significantly oversized production or the widespread deployment of high-capacity storage devices, these sources will continue to be vulnerable to disruption caused by weak winds, dry spells and cloudy skies.

However, because El Niño and La Niña are predictable several months in advance, understanding their impact can both help inform the design of regional energy grids and anticipate impending energy droughts.

The tropical Pacific Ocean regularly switches between El Niño, La Niña, and neutral conditions. Understanding its current and future behavior can help anticipate generally high or low production from renewable energy sources (wind, solar and hydroelectric) several months in advance. Data are from the U.S. Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/data/indices/oni.ascii.txt>).



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<sup>16</sup> Barnston (2014), How good have ENSO forecasts been lately?  
<https://www.climate.gov/news-features/blogs/enso/how-good-have-enso-forecasts-been-lately>

<sup>17</sup> Cooperative Institute for Research in Environmental Sciences (2019), Mining climate models for seasonal forecasts.  
<https://cires.colorado.edu/news/mining-climate-models-seasonal-forecasts>





# Severe convective storms: What next for a solar energy marketplace already battered by significant losses?

How are insurers and solar energy producers responding to the damage severe convective storms (SCS) can wreak on solar farms and what technological trade-offs do producers need to evaluate now?

Accelerated by climate change, severe convective storms (SCS) (large thunderstorms that can cause tornadoes, large hailstorms, heavy rainfall and damaging winds) are now among the largest drivers of insurer losses. And while the destructive power of hail continues to impact solar farms — even in areas previously considered low risk — thin margins in the competitive solar energy market have led manufacturers and developers to deploy technology that may now be making it meaningfully harder to purchase adequate insurance protection against these events. As a consequence, it's now more important than ever that a holistic approach is taken to risk management and insurance procurement.

The financial damage of a severe hail event can be in the tens of millions USD. We're already seeing insurance markets respond with increased costs of coverage and a reduction in overall available capacity. Solar energy producers will need to demonstrate their sites' resilience to SCS or face their options for affordable insurance even harder to secure.

Insurers are already requiring significant deductibles, while offering lower limits. Solar energy producers are therefore facing increasingly tough decisions about the level of coverage they can afford to buy, particularly when operating multiple sites that may sit under a single combined limit.

Below, we explore these challenges and how solar energy producers might better navigate the challenges around securing appropriate protection and resilience in the face of SCS.

## Challenges on cover adequacy

As solar farm sites are built on unused land for which little or no historical loss data may exist, some insurers' models could be at risk of underestimating actual exposure. We've seen some significant hail events in recent years at locations previously considered relatively low risk, prompting concerns over the accuracy of modeling. In the same vein, coverage limits, which have been set according to forecast losses, may now leave solar energy producers at risk of under-insurance.

If this trend continues, it's not unreasonable to expect insurers to begin to push this risk back onto original equipment manufacturers of solar panels and the trackers on which they're mounted. While panels and trackers are factory-certified to certain levels by their manufacturers (such as IEC 61215-2) those same manufacturers frequently exclude external forces, such as hail, from their warranties.

As the industry moves to adopt more stringent testing standards, it's important policyholders check that test results are specific to the common bill of materials used on a given project, remembering certifications are not indicative of overall product performance when substituting components.

Arguably, manufacturers are in the best position to manage the risk, so, looking ahead, we'd hope they avoid scenarios that push greater risk onto their customers, and in turn, project insurers.

### On track to improve?

One area where the market is seeing some good progress is the development of more effective tracking systems. We expect to see steeper stow angles available, which offer enhanced resilience by reducing the angle of incidence of falling hail. Solar farm site operators need to remain well-drilled in how to deploy the different stow modes available to respond to hail or windstorm and know to engage these at the first sign of SCS or adverse conditions.

While recent history may suggest these stow modes cannot be relied upon — with reported instances of stow modes failing to deploy correctly, with disastrous consequences — tracker manufacturers are now offering enhanced hardware that should eventually contribute to a reduction in industry losses.

### Issues and opportunities on panel design

Solar energy market players are now accepting that thinner, more fragile bi-facial solar panels (which allow farms to generate solar energy from the front that faces the sun and the back that faces the ground) while offering improved energy yields, may in fact have been a step in the wrong direction. This may be particularly true as panel sizes have become increasingly large.

Looking ahead, we expect more solar farms to consider 4mm glass-fronted panels, stepping away from the more fragile bi-facial panels. Initial testing for thicker panels appears promising.<sup>1</sup> However, there is a proportionate increase in weight and a reduction in output, so those making future procurement decisions on panels need to evaluate these trade-offs carefully.

### Parametric solutions to address coverage gaps

One way for solar energy producers to address SCS coverage challenges are parametric solutions. Rather than using the damage trigger of a traditional indemnity-based insurance policy, parametric coverage can pay out based on, for example, the size of hail which hits a site, regardless of the amount of damage sustained.

However, there are some obstacles to overcome in the widespread use of parametric alternatives. All parties will need to thoroughly understand the parameters of the coverage and in the short term, it's unlikely lenders will be comfortable with replacing traditional coverage. That said, we expect parametric coverage to become increasingly appealing as a supplement to traditional insurance structures, to offset the cost of a deductible, as well as offer further coverage at a more competitive price.

As insurance costs come to the attention of key project decision makers, and major SCS losses continue to hit headlines, there will be increasing pressure on all parties to find innovative insurance and technological solutions.



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<sup>1</sup> <https://www.pv-magazine.com/2023/08/09/hail-prone-areas-may-require-solar-modules-with-4-mm-thick-front-glass/>





# Is net zero achievable? Yes, if we solve the renewable energy supply chain puzzle

Attracting talent and fostering collaboration and transparency are key to renewable energy supply chain resilience and the sector's contribution to net zero emission ambitions.

In 2024, the renewable energy sector finds itself at a pivotal juncture. The push for clean energy, coupled with ambitious climate targets, has set the stage for significant growth. However, this expansion is not without its complexities.

The push to achieve net zero emissions (NZE) will require a strong, secure, and sustainable supply chain to deliver an effective energy transition.<sup>1</sup> This puts the spotlight on the supply of minerals, materials and manufacturing capacity needed to deliver on NZE.

In this insight — which call on perspectives from [WTW's latest Renewable Energy Supply Chain Risk Report 2023](#) — we consider global renewable energy supply chain challenges and provide pathways for overcoming these obstacles to build the resilience the sector will need to make a substantial contribution to reaching net zero.

## Tackling raw material shortages and dependencies

The renewable energy sector heavily relies on critical raw materials such as lithium, cobalt, nickel and graphite for technologies like batteries and solar panels. According to the International Energy Agency<sup>2</sup>, China accounts for 60% of global turbine capacity and half of total exports, as well as a large proportion of solar panels, batteries and heat pumps. This concentration of production creates vulnerabilities and supply chain risks.

To overcome this obstacle, the sector should focus on diversifying its supply chain by exploring alternative sources and developing partnerships with new suppliers. Investing in research and development to find alternative materials or improve recycling processes can also help reduce dependencies and ensure a steady supply of critical raw materials.

<sup>1</sup> H. Mountford, D. Waskow, L. Gonzalez, C. Gajjar, N. Cogswell, M. Holt, T. Fransen, M. Bergen and R. Gerholdt (2021), COP26: Key Outcomes From the UN Climate Talks in Glasgow, <https://www.wri.org/insights/cop26-key-outcomes-un-climate-talks-glasgow>

<sup>2</sup> <https://www.iea.org/reports/renewables-2023/executive-summary>



## Navigating geopolitical risks and trade tensions

Geopolitical tensions and trade disputes can disrupt supply chains and hinder the growth of the renewable energy sector. For example, conflicts in countries that produce critical minerals can lead to shortages and price volatility. According to our Renewable Energy Supply Chain Risk Report 2023, 25% of respondents rated geopolitical risk as having a high impact on supply chain risks, while 57% rated it as having a medium impact. To mitigate these risks, the sector should actively engage in diplomacy and advocacy efforts to promote stable trade relationships and reduce geopolitical tensions.

Collaborating with governments and international organizations can help create a more favorable environment for renewable energy supply chains. Investing in local manufacturing capabilities and reducing reliance on imports can also enhance supply chain resilience and reduce exposure to geopolitical risks.

## Overcoming renewable energy skills gaps

The rapid growth of the renewable energy sector has created additional demand for a skilled workforce, including engineers, technicians and project managers. However, there is a shortage of qualified workers, which can lead to delays and inefficiencies in supply chain operations. According to our Renewable Energy Supply Chain Risk Report 2023, 32% of respondents ranked supplier difficulties in attracting and retaining talent as one of the top factors underlying supply chain risks.

To address this challenge, the sector should invest in workforce development programs, including training and education initiatives. Collaborating with educational institutions and industry associations can help bridge skills gaps, ensuring a steady supply of skilled workers. Moreover, promoting diversity and inclusion in the sector can attract a broader talent pool and foster innovation.

## The role of supply chain visibility and transparency in building resilience

Ensuring end-to-end visibility and transparency in the supply chain is crucial for identifying vulnerabilities and mitigating risks. The renewable energy sector should leverage digital technologies and data analytics to enhance supply chain visibility. According to our Renewable Energy Supply Chain Risk Report 2023, 51% of respondents identified using supply chain mapping software as one of the measures that would have the greatest impact on managing supply chain risks.

Implementing supply chain management systems and using blockchain technology can provide real-time tracking of materials, components and equipment, enabling proactive risk management.

Fostering collaboration and information sharing among stakeholders, including suppliers, manufacturers, and project developers, can improve transparency and facilitate risk assessment and mitigation.

## Harnessing collaboration to create stronger renewable energy supply chains

Building a resilient supply chain requires collaboration and partnerships across the renewable energy sector. Stakeholders should work together to share best practices, exchange knowledge and develop common standards for supply chain resilience. According to our Renewable Energy Supply Chain Risk Report 2023, 62% of respondents identified improving relationships with suppliers and customers as one of the measures that would have the greatest impact on managing supply chain risks.

Collaborative initiatives can include joint research and development projects, information sharing platforms and industry-wide risk assessments.

Again, by fostering a culture of collaboration, the sector can collectively address challenges and build a robust and sustainable supply chain.

Figure 1:

## WTW Renewable Energy Supply Chain Risk Report 2023: Five key findings

**74%** of business said losses related to the supply chain had been higher or much higher than expected over the last two years.

**44%** named a shortage of raw materials to be among the biggest supply chain factors expected to impact their businesses over the next two years, topping the list of concerns.

**84%** said they have made at least some improvements in their approach to supply chain management in response to the pandemic.

**85%** said a lack of data, knowledge and understanding were among the factors posing the greatest challenge to addressing risks over the next three to five years.

**80%** agreed or strongly agreed that a lack of alternative suppliers impeded their ability to implement an effective dual or multi-source strategy.

## Looking back and the roadmap to a resilient future

Lack of investment has made the global energy system vulnerable to the level of shocks we saw in 2022.<sup>3</sup>

Investment shortfalls in the coming years will have a major impact on countries' and governments' ability to achieve the 2030 and 2050 targets on reducing the gap on global warming to 1.5 degrees and eventually achieving NZE in the long term.<sup>4</sup>

The International Energy Agency estimates it will require a near-tripling of investment in clean energy infrastructure to 2030 get the world back on track to achieve NZE, potentially more than this level in developing countries.<sup>5</sup>

Delivering this will take unprecedented levels of support and cooperation from governments — many of which are pursuing energy independence — as well as private and public sector enterprises.

Investment in manufacturing capacities in multiple geographies to keep up with the needs and demands of the renewable energy industry across all technologies such as wind, solar, hydrogen and battery storage is the first step.

The second step will be for governments, authorities, agencies and other stakeholders to focus on reducing the barriers to ramping up renewable energy projects. Such moves include increasing the investment in the infrastructure eco-system, such as the roads, ports, and grid systems, needed to make renewable energy projects and the associated supply chains viable.

The final step is for both the private and public sector to do more to attract more people into this sector. Bridging the renewable energy skills gap will require a drastic increase in the workforce available to ensure the sector's wider goals are deliverable.

As daunting as these upfront costs are, the long-term payoffs from an economic and an environmental perspective may prove invaluable. As Barack Obama said in 2009, "To truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy."<sup>6</sup>



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<sup>3</sup> IEA (2020), Renewable energy market update, IEA, Paris <https://www.iea.org/reports/renewable-energy-market-update>

<sup>4</sup> United Nations (2022), Renewable energy — powering a safer future, <https://www.un.org/en/climatechange/raising-ambition/renewable-energy>

<sup>5</sup> IEA (2022), World Energy Outlook 2022, IEA, Paris <https://www.iea.org/reports/world-energy-outlook-2022>

<sup>6</sup> <https://www.theguardian.com/world/2009/feb/25/barack-obama-green-economy-environment>





# Green hydrogen: Overcoming barriers to realize potential for net-zero transition

Green hydrogen represents an exciting opportunity for energy companies seeking to decarbonize. How can they overcome the financial, engineering and manufacturing obstacles to take advantage?

There are around 1,400 planned low-emission and green hydrogen projects due to start construction across the globe between now and 2050.<sup>1</sup> But despite this buoyancy, energy companies face significant challenges in realizing the potential of green hydrogen to help the renewable energy market achieve its 2050 net-zero target.

Below, we assess the political context before examining the financial, engineering and manufacturing obstacles those hoping to harness green hydrogen will need to overcome. We also offer practical guidance on how early engagement with risk broking and risk engineering specialists can de-risk projects and secure the coverage green hydrogen project developers need to pursue the emerging opportunities.

## Overcoming financial barriers to political support for green hydrogen

Many governments are recognizing the opportunity investing in green hydrogen represents in delivering lower-carbon economies. At the end of 2022, **41 countries had some form of hydrogen strategy in place**. These often include targets for developing hydrogen production technologies within both the energy and chemical production industries.

China is currently the front-runner as the leading manufacturer of electrolyzer technology, with a strong pipeline of low-emission hydrogen projects. These include the world's largest green hydrogen project — Sinopec's 260MW Kuqa facility in Xinjiang, northwest China, which went operational in 2023.<sup>2</sup> The European Union's Clean Hydrogen Partnership, meanwhile, lays a regulatory foundation for electrolyzer manufacturing and providing financial incentives to green hydrogen projects for member states.<sup>3</sup>

<sup>1</sup> Hydrogen Insights 2023, The Hydrogen Council, available at: <https://hydrogencouncil.com/wp-content/uploads/2023/12/Hydrogen-Insights-Dec-2023-Update.pdf>

<sup>2</sup> World's largest green hydrogen project begins production in China, available at: <https://www.hydrogeninsight.com/production/worlds-largest-green-hydrogen-project-begins-production-in-china/2-1-1478233>

<sup>3</sup> EU Hydrogen Strategy, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0301>



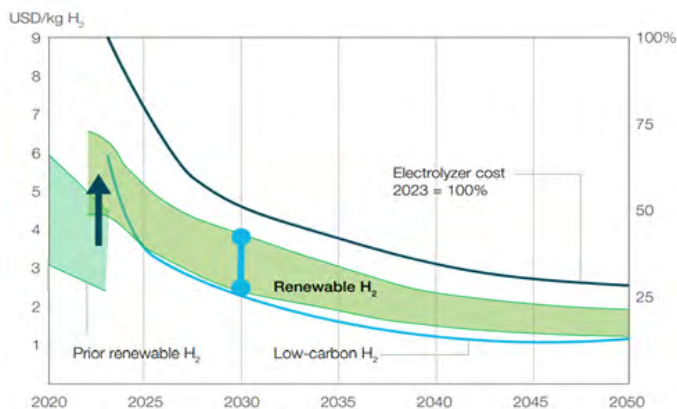
Likewise, the U.K.'s Hydrogen Strategy provides a detailed roadmap for creating a viable hydrogen economy and installing the necessary generation, transmission and distribution infrastructure across the country's energy and transport industries.<sup>4</sup>

But despite political will across the globe, substantial barriers remain to creating a fertile investment environment for the green hydrogen sector. Chief among these are the costs associated with producing and storing hydrogen. In 2020, the cost of grey hydrogen was around \$1.6 per kilogram (p/kg), with blue hydrogen at \$2.15 p/kg, compared with green hydrogen at between \$3–5 p/kg. The additional cost is largely driven by the relative novelty of green hydrogen production, which accounted for only 0.7% of global demand as of 2022.<sup>5</sup>

To combat this price differential, some governments' policy focus has shifted to stimulating demand for green hydrogen, as well as developing supply. For some project developers, securing offtake agreements — where a buyer or 'off-taker' agrees to buy all or a substantial portion of an energy provider's future output from a project — has been paramount to the longevity of their business model. In Europe, the European Commission has approved subsidies for investments into green hydrogen, giving companies a pathway to offset the high costs currently besetting potential projects capital and operational expenditure.<sup>6</sup> As these types of subsidies begin to take effect and manufacturing costs decrease, it's estimated the levelized cost of renewable hydrogen will decrease to \$2.5–4 p/kg by 2030 (see Figure 1).

Figure 1:

## Projected renewable hydrogen and electrolyzer costs out to 2050<sup>7</sup>



Source: Hydrogen Insights 2023, The Hydrogen Council

<sup>4</sup> UK Hydrogen Strategy, available at:

[https://assets.publishing.service.gov.uk/media/64c7e8bad8b1a70011b05e38/UK-Hydrogen-Strategy\\_web.pdf](https://assets.publishing.service.gov.uk/media/64c7e8bad8b1a70011b05e38/UK-Hydrogen-Strategy_web.pdf)

<sup>5</sup> 'Global Hydrogen Review', International Energy Agency, available at: <https://www.iea.org/reports/global-hydrogen-review-2023>

<sup>6</sup> Hy2Use, European Commission, available at: <https://ipcei-hydrogen.eu/page/view/980c9e77-9251-49cc-8037-dd1355c7d550/hy2use>

<sup>7</sup> Hydrogen Insights 2023, The Hydrogen Council, available at: <https://hydrogencouncil.com/wp-content/uploads/2023/12/Hydrogen-Insights-Dec-2023-Update.pdf>

<sup>8</sup> Supply Chains to Support a Hydrogen Economy, Department of Business, Energy & Industrial Strategy, available at: <https://assets.publishing.service.gov.uk/media/62d6f573e90e071e798d11bb/supply-chains-to-support-uk-hydrogen-economy-wood-template.pdf>

<sup>9</sup> Hydrogen Insights 2023, The Hydrogen Council, available at: <https://hydrogencouncil.com/wp-content/uploads/2023/12/Hydrogen-Insights-Dec-2023-Update.pdf>



## Infrastructure and supply chain obstacles to green hydrogen

Compounding the concerns surrounding project financing are questions around the infrastructure and supply chains necessary to achieve national targets for green hydrogen production.

Let's take the British Energy Security Strategy's target of producing 10GW of renewable hydrogen by 2030 as an example. Reforming the U.K.'s infrastructure and supply chain to achieve this ambitious target will require overcoming a range of practical problems at an estimated cost of up to £5 billion.<sup>8</sup> Challenges include shortages of qualified producers of line pipe steel for hydrogen pipelines, a lack of specialist manufacturers of high-integrity valves and shortages of compression equipment capable of producing medium-pressure hydrogen transmission systems at scale. The infrastructure for transporting and transmitting green hydrogen also needs tackling.

For heavy industry, direct on-site usage is usual and has robust risk management processes in place. For transportation via road to service stations where hydrogen is converted to ammonia, systems are being rapidly developed across the country, though further investment is still needed.

Although this apparent lack of critical infrastructure may have deterred some prospective developers, others show greater confidence. The likes of U.K.-based carbon dioxide capture, removal, and storage solutions provider Storegga, for example, is harnessing the opportunities green hydrogen represent, with a number of projects currently under construction.

More broadly, the global project pipeline has experienced substantial growth, with more than 300 GW of electrolysis capacity announced through to 2030, led principally by China, followed by the Middle East and Europe.<sup>9</sup>

Figure 2:

## Comparison of key attributes in the three main types of commercially available electrolyzer<sup>10</sup>

Electrolysis technology	Polymer electrolyte membrane (PEM)	Alkaline electrolyte cell (AEC)	Solid oxide electrolyte cell (SOEC)
Electrolyte	Acidic solid (polymer)	Alkaline liquid	O <sub>2</sub> or H <sup>+</sup> conducting solid (ceramic)
System			
Operating temperature	50°C-80°C	60°C-95°C	500°C-900°C
Manufacturers			

Source: Solid Oxide Electrolysis: A Technology Status Assessment, Clean Air Task Force

### Mitigating green hydrogen engineering and technological risks

Underpinning financial and economic concerns are the inherent engineering and technological risks unique to working with hydrogen as a fuel source.

Hydrogen is a simple, highly flammable element prone to leakage. These innate risks highlight the need for high-quality compression and storage systems across the value chain, from production to distribution, with supply chain partners paying particular attention to sealing interfaces within pipework to mitigate the risks.

Closely related to this is the risk of embrittlement and cracking, where hydrogen stored and transmitted via steel piping reduces the tensile strength of the steel through gradual absorption into the metal grain boundaries.

For green hydrogen, electrolyzers are the central components in the value chain and present their own set of engineering risks. Currently, alkaline electrolyte cell (AEC) and polymer electrolyte membrane (PEM)

electrolyzers are the most popular variant due to their historic use in the chemicals industry, although solid oxide electrolyte cell technology is fast approaching commercialization.<sup>10</sup> Although these technologies have some fundamental differences (as described in Figure 2), they share common issues around corrosion, electrode degradation and efficiency owing to the high temperatures required to operate them.<sup>11</sup>

A further complication is an increased need for fresh water when producing green hydrogen. To meet the significant increases in supply and green hydrogen future promises, project developers will need to invest additional technical innovation to procure the necessary water at a fair price.

One option is to construct reverse osmosis plants, although this would increase the base price of the water involved in the electrolysis process. Another option is for project developers to invest in innovation around electrolysis technology that relies on saltwater. However, this could delay the uptake of green hydrogen energy in its current form due to the high costs of desalinating salt water at scale.

<sup>10</sup> Solid Oxide Electrolysis: A Technology Status Assessment, Clean Air Task Force, available at:

<https://cdn.catf.us/wp-content/uploads/2023/11/15092028/solid-oxide-electrolysis-report.pdf>

<sup>11</sup> Electrolyzers, International Energy Agency, available at: <https://www.iea.org/energy-system/low-emission-fuels/electrolyzers>

<sup>12</sup> De-risking the hydrogen economy, Swiss Re, available at:

<https://corporatesolutions.swissre.com/insights/knowledge/in-6-charts-de-risking-the-hydrogen-economy.html>

## Green hydrogen and the insurance market

Compared to other forms of renewable energy, such as wind and solar, green hydrogen is still in its relative infancy. From an insurance perspective, loss data for major projects remains scarce, meaning many underwriters are adopting a cross-class business strategy when reviewing hydrogen risks. This approach brings together renewables expertise with that of construction and upstream teams more likely to have knowledge of grey and blue hydrogen to achieve reasonable premium rates.

By leveraging this breadth of experience, insurers can provide early-stage risk management advice and solutions for green hydrogen projects. And by engaging early with risk advisory services, project developers can devise plans to mitigate against the major risks insurers will be concerned about, such as property damage (PD), business interruption (BI) and delay in start-up (DSU).

In addition, engaging with brokers and risk engineers at an early stage in the green hydrogen project pipeline can allow project developers to seek advice on preferred original equipment manufacturers (OEMs), based on brokers' and risk engineers' wider experience of the hydrogen industry. These specialists can also give project developers design risk reviews ahead of construction. Such insight can enable project developers to choose the equipment insurers will view favorably, giving developers coverage and long-term cost resilience.

More informed risk and broking strategies — underpinned by brokers' knowledge of the typical risk factors associated with more traditional renewables, such as wind and solar — can enable green project developers to choose the right technology for their project, minimizing risk and maximizing efficiency.

Given the complex supply chains involved in traditional renewables projects, securing adequate DSU and BI cover will be of particular concern to project developers. By using established technology, project developers can minimize risk and costs as newer prototypical technology is more expensive and potentially less dependable.

## The outlook for green hydrogen to 2030

The technological and financial issues present significant challenges for developers, investors, and insurers. The insurance market is ready to accelerate the development of the burgeoning green hydrogen sector. However, leveraging risk and insurance specialists' knowledge of the supply chain, construction, and operation risks inherent in any form of hydrogen project — green, grey, blue, or otherwise — the outlook may be more positive than it appears.

Looking ahead, to make the most of green hydrogen's potential, project developers are adopting a collaborative approach with risk management professionals to deliver cost efficiency, increase bankability and achieve long term insurability resilience.



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# Focus: Renewables in Australia

## Overview

Renewable energy continues to be a growth sector across Australia, with renewable energy sources accounting for 40% of the generation into Australia's National Electricity Market (NEM) in 2023, up from 35% in 2022.<sup>1</sup>

In the last year, projects have grown in scale and complexity to meet the growing needs of the 82% clean energy target by 2030 set by the Australian Dept of Climate Change, Energy, the Environment and Water.<sup>2</sup> Construction has begun on the largest solar, wind, and battery projects ever seen in the region, including New England Solar Farm, Golden Plains Wind Farm and Collie battery energy storage system. Investment for renewables continues to grow, especially with the recent introduction of the Capacity Investment Scheme (CIS) by the [Australian Federal Government](#).

## Key theme: Capacity Investment Scheme

The CIS provides a national framework to encourage new investment in solar, wind and battery projects, as well as other novel renewable energy technologies. The scheme aims to deliver an additional 32GW of renewable energy by 2030 to ensure there are no reliability gaps as aging coal-fire stations across the region exit the market.

The CIS operates by providing 'revenue underwriting' for successful CIS tender projects, with an agreed revenue 'floor' and 'ceiling', meaning that there is a minimum and maximum cap on spot pricing. Of the 32GW of new capacity currently planned under the CIS, this includes 23GW of renewable energy capacity, estimated at AUD52 billion in additional investment, and 9GW of clean dispatchable capacity, estimated at AUD15 billion in additional investment.<sup>3</sup>

Despite perceived long-term positives of the CIS, its introduction has caused developers and lenders to question and re-evaluate financial modeling for projects in the region. The scheme has also led to overall delays, as developers seek to compete for investment from the CIS.

The renewable energy market in Australia is still maturing and has not reached the levels of traditional power and energy markets. We expect short-term challenges posed by the CIS to be overcome and the scheme to contribute to the development of a more sophisticated industry, positioning the renewables sector well for long-term growth and stability.

The CIS has been bolstered by additional investment, including the reintroduction of the State Electricity Commission of Victoria (SECV). SECV was previously privatized but was revived in 2023 by the Victorian State Government to further invest in local renewable energy and storage.

<sup>1</sup> <https://assets.cleanenergycouncil.org.au/documents/resources/reports/clean-energy-australia/Clean-Energy-Australia-2024.pdf>

<sup>2</sup> <https://www.dcceew.gov.au/energy/strategies-and-frameworks/powering-australia>

<sup>3</sup> <https://www.afr.com/companies/energy/expanded-renewables-scheme-to-spur-67b-of-energy-projects-20240303-p5f9d1>

## AEMO Integrated System Plan for 2024

Alongside strong commitment at government-level, Australia is seeing an increased focus and investment from developers, both local and global, who have strong pipelines across the region.

The Australian Energy Market Operator (AEMO) has released its draft Integrated System Plan for 2024<sup>4</sup>, which targets 10,000km of new and upgraded transmission infrastructure. This represents a tripling of renewable energy generation to 57GW by 2030, quadrupling rooftop solar output to 72GW by 2050 and further accelerating the retirement of coal-fire gas stations in the region by 2038.

## Looking ahead

While Australia's focus remains on bolstering its already strong solar, onshore wind and battery infrastructure, there is an increased focus on preparing for offshore wind, green hydrogen and pumped hydro opportunities in the region.

Sentiment remains highly positive on the culmination of the existing construction and development pipelines and the clean energy transition is front-of-mind for many Australians within the energy sector and beyond.



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<sup>4</sup> <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>



# International market perspectives



## North America

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North America renewable energy continues to see strong growth in wind, solar, and BESS developments. This growth is met with strong appetite for carriers to grow the market share of North American renewable energy exposure. New market entrances in 2023 and 2024 continue to provide competitive capacity.

A flight to quality will drive insurance program standardization of terms and conditions and deductibles. A desired risk profile will also drive rates to go flat/negative through 2024. Geographically challenged facilities will remain higher as severe convective storms, wildfire and named windstorms exposure still remains in focus.

Renewable energy casualty programs continue to remain profitable post Winter Storm Uri. Carriers have limited lead umbrella capacity to \$10-15 million with modest changes. Auto liability continues to be on the rise with underinsured and uninsured motor claims driving severity. Limitations on umbrella and excess coverage will drive casualty terms for renewable energy worldwide. Rates remain modest in general liability/umbrella while auto rates will continue to rise.

The growth rate of renewable energy is causing a strain on resources for both underwriting and site operators. A rise in human-related errors continues to show in loss activity. Clients, insurers and brokers are all struggling to find qualified individuals.



## Scandinavia

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The Nordic region is moving fast in the renewable energy transition. A more efficient and lean regulatory landscape is the new reality, especially within the onshore wind, solar and BESS asset classes. Nordic-based renewable energy companies are gaining traction both in the region but also around the world, putting the Nordic renewable energy sector on the global energy map.

However, the Norwegian government has been struggling with offshore wind licensing rounds for both Sørlige Nordsjø II (bottom fixed) and Utsira Nord (floating). The industry, public opinion and investors have all been frustrated with long processes and delays, but the outlook for the 2024 project pipeline remains optimistic in spite of these setbacks.

The Norwegian oil and gas industry has laid the foundation for the country to be successful in the offshore wind industry, using engineering, supply chain, ports and shipping expertise developed over nearly 60 years. This has truly become visible over the past years and looking forward we see a massive pipeline of Norwegian contractors being involved in a broad spectrum of the offshore wind value chain.

Looking at the insurance market in the region, the current status is quite fragmented, depending on technology and line of insurance. From a general perspective, we see the renewable energy market levelling out, where key markets have increased appetite taking larger shares on placements and new capacity is entering the market via existing carriers.

The markets are heavily emphasizing the underlying risk management and risk control the client performs, where progression and solid results are rewarded by the underwriters. For offshore renewables the contractual regime creates a demand for various specialty solutions.

New emerging technologies are taking up more and more space in media and in the energy discussion, such as carbon capture and storage, and hydrogen. Looking ahead, we anticipate 2024 to be an exciting year for the Nordic renewable energy market due to this range of emerging technological and regulatory factors.



## Singapore & Asia

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Countries in Asia are increasingly embracing renewable energy and we anticipate a continued surge in investments in 2024, particularly within the Southeast Asia region with countries setting ambitious targets to meet their net zero emissions goals.

We are also seeing increased cross-border projects being announced to import and export electricity within the region. This includes the Energy Market Authority of Singapore granting conditional approval to import 2GW of clean energy from Indonesia whilst Laos is positioning itself to be the 'Battery of Southeast Asia' and accelerating development of large-scale projects such as hydropower and wind farms to increase electricity export to the neighboring countries.

However, challenges remain for these projects, such as cross-border regulations and complex transmission facilities, for example, subsea cables and financing.

Meanwhile, Malaysia has also identified hydrogen as a key element of its energy transition strategy and is developing a large-scale clean hydrogen hub in Sarawak, generating interest from Japanese and Korean investors. There has also been a shift to develop more hybrid projects to increase reliability, grid stability and optimize resource utilization but which also increases the interfacing risk between the different technologies.

Insurance market capacities remain stable with new entrants entering the sector. However, we still expect tightening of capacities and coverages for emerging technologies and natural catastrophe risks, which remains the key underwriting concerns due to large losses happening globally.

We are seeing signs of market easing, with some insurers taking a more commercial approach and receptive to long-term deals and increasing appetite to support portfolio programs to improve the efficiency and increase economies of scale.

Overall, the insurance market is well-positioned to cope with the rapid growth but we still expect disciplined underwriting approaches to persist.



## Latin America

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For the renewable market, rate increases will continue as in 2024, especially in natural catastrophe exposed countries, with average increases between 5-10% depending on claims, size and quality of risks. These increases have also been driven by a combination of factors such as inflation, revaluation of exposed risk and capacity reduction in some countries.

For projects where these exposures present substantial risks, technical due diligence remains paramount in procuring and renewing terms. Having robust inspections regimes, detailed engineering surveys and a clear risk mitigation plan have proven central to renewables power generation facilities where these concerns are at the forefront of underwriters analysis. Likewise, maintenance reports and thermal imaging are essential for all equipment over 10 years old to reassure markets as to predictive and preventive maintenance, as well as replacement and warranty policies as they are paying close attention to asset values and depreciation.

Latin American markets continue to show discipline in the underwriting process of their renewables book. By way of a summary, markets are currently characterized by the following:

- Rating levels which vary from -5% to +10% for clean risks
- Scrutiny on information for both property damage values and business interruption claims.
- Renewals for 'excellent' risks are expected to have single-digit rate increases; however, portfolios with claims or technical complications are still expected to incur double-digit rate increases.
- BESS projects will be a key point during 2024, as well as green hydrogen projects.



## China

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Chinese insurance companies continues to focus on the growth of the domestic Chinese market with investment in solar farms and wind farms reaching more than 1 trillion CNY in 2023. Capacity for all lines of insurance is over supplied which has caused the domestic market remain soft in 2023.

But for Energy Storage Systems, even though the innovation prowess of Chinese new energy companies continues to surge and the market investment grew to 100 billion CNY in 2023, the insurance market remains cautious with capacity noting risks around thermal runaway and potential manufacturing faults.

For overseas projects, the release of both lead and follow capacity has presented a huge challenge for Chinese insurers who are reluctant to support projects outside of the domestic Chinese market, instead preferring to support projects chiefly state owned projects that fall within the Chinese governments portfolio.

However, this dilemma might be solved in the second half of 2024. Shanghai Lingang Reinsurance Center is on course to achieve the target of trading reinsurance placements on platform transactions. Most insurers in China have finished registration and set up offices there and will be granted the authorization to write a variety of business with both Chinese interest or non-Chinese interest.



## Australia

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From an insurance perspective, renewable energy in Australia is still seeing active engagement from local markets. Natural catastrophe risks continue to be front of mind for insurers in the region, with global and local hail losses contributing to heavy restrictions on solar portfolios and the need to seek out additional global capacity and support to build sustainable limits. This has led to increased scrutiny on the risk management and mitigation processes in place for developers and contractors. Alongside hail, bushfire and windstorm risks continue to be a concern for local insurers, particularly noting the introduction of concentrated Renewable Energy Zones (REZs) where we see heavy development in natural catastrophe-prone areas and the risk of a high or full-limit loss across multiple sites because a single natural catastrophe event becomes a more realistic concern.

We have also seen new local entrants in the local market with strong experience globally in renewable energy. While we expect to see an increase in competitive tension locally with experience in renewable energy growing, for the foreseeable future we anticipate corrective action to continue as the market further responds to, and understands, the losses sustained.



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