Willis Towers Watson

Facing up to new realities

Renewable Energy Market Review 2020

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Style

Our Review uses a mixture of American and English spelling, depending on the nationality of the author concerned.

We have used capital letters to describe various classes of insurance products and markets, but otherwise we have used lower case to describe various parts of the renewable energy industry itself.

Introduction: facing up to new realities

Welcome to Willis Towers Watson's inaugural Renewable Energy Market Review. We are going to press at a time of unprecedented change in both the renewable and insurance/risk transfer industries, so this a good time to produce a stand-alone Renewables Review as we move into a new decade.

A glance at the news headlines tells us all that we all live under particularly gloomy geopolitical clouds. Conflicts and other international tensions are seemingly threatening every kind of business landscape – not only stand offs such as the US/Iran situation and the issue of North Korea but also serious conflicts between Turkey and Syria, between India and Pakistan. To these we might add the threat to economic and political stability from growing populist movements in Europe, notably in Spain, Italy, France, Germany and Hungary as well as the UK.

Then there's the climate change challenge, as the world watches the bushfire tragedy unfolding in Australia and as climate activism around the world increases. Here in Europe, the commitment to act in the face of the climate change threat is very evident. The EU has already committed to cut CO2 emissions by at least 40% by 2030[1], while modernising the EU's economy and delivering on jobs and growth for all European citizens. This will enable the EU to move towards a low-carbon economy and implement its commitments under the Paris Agreement.

On this critical issue, Willis Towers Watson is leading the private sector response. Our CEO John Haley was at the UN last September launching the CCRI, the Coalition for Climate Resilience Investment[2]. This is a public/private partnership motivated by the UN secretary general's recent call for action on climate change. Our goal is to transform mainstream infrastructure investment across the globe and to drive a permanent shift towards a climate resilient economy.

Of course, it's always possible to try to run and hide from change or bury one's head in the sand in true ostrich fashion. But in the end, we all know that we must face up to the new realities of change. From a renewable energy industry perspective, what are the new realities that we face today?

Firstly, there is the reality of **change in the renewable energy industry itself.** As the threat of climate change makes itself more apparent with every passing year, the exponential growth of the renewable energy industry has attracted the attention of a range of different stakeholders, from traditional energy players to national governments, from new start-ups to climate change protestors. Indeed, it is now generally accepted that renewables are likely to make up the largest share of total global energy supply by 2050. But increasingly, renewable energy industry growth is the bringing with it new risks and issues which need to be faced. That's why the first part of this Review focuses on series losses, floating offshore wind, bankability, hybrid renewable energy, CSPs and cyber (as well as geopolitics and climate change) - all issues where risk landscapes are in a constant state of flux.

Secondly, there is the reality of **change in the global (re)insurance markets.** The long period of soft market conditions, characterised by an excess of (re)insurance capital and an emphasis on meeting premium income targets, has finally come to an end. Instead, faced with deteriorating loss ratios and increasing costs, the Renewable Energy insurance market seems to have come to a tipping point; we are now seeing a real determination across the marketplace to arrest the overall slide in rating levels. What's more, individual insurers are insisting on their own terms and conditions, making the broker's job of marrying different underwriting philosophies together increasingly challenging. Part Two of this Review therefore focus on the London, International and USA markets and examines how best insureds can manage their risk and mitigate these challenging market conditions.

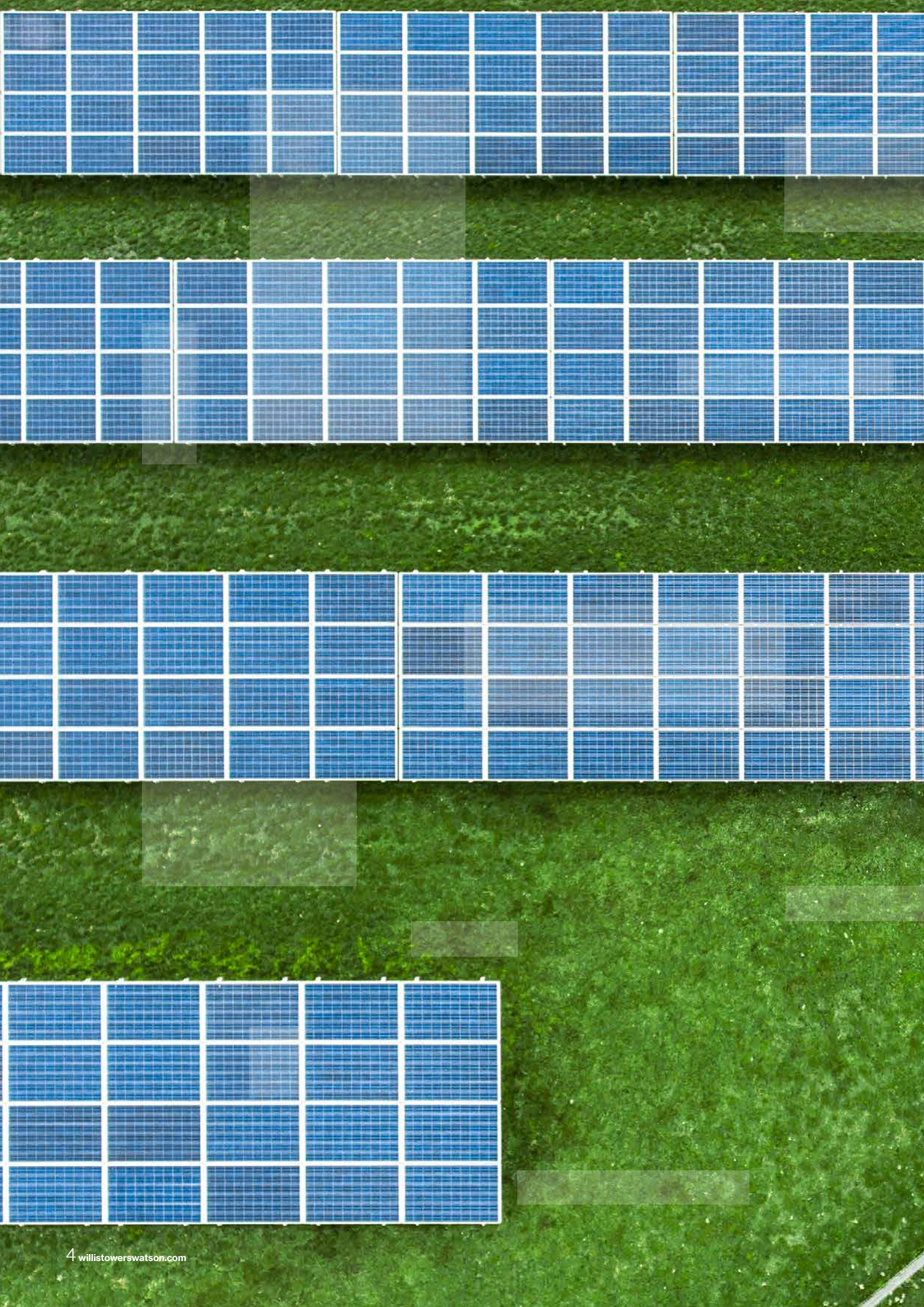
Thirdly, the industry needs to take note and face up to **changes from around the world** as both industries become increasingly global. In Part Three of this Review, we are delighted to include contributions from our colleagues from Australia, China, Ireland, Japan, Peru, Singapore South Africa, as well as a recap of our successful renewable energy seminar in Prague last October. Please be in no doubt that we at Willis Towers Watson are fully committed to supporting the global renewable energy as it evolves; we have a global view of the industry and we're at the cutting edge of the risk issues you face.

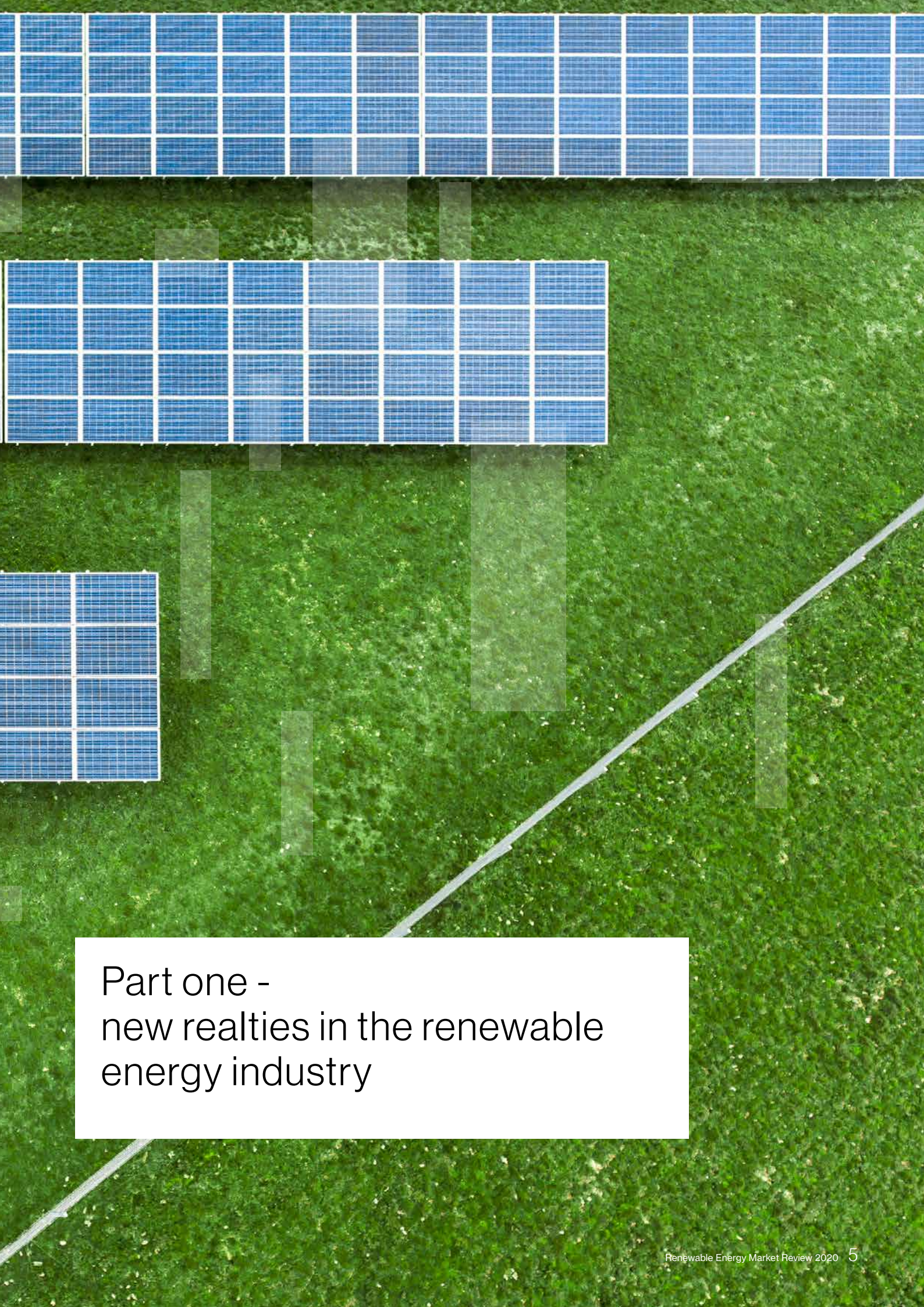
We hope you enjoy this Review. All skills at our disposal - forensic accounting, risk and analytics, risk engineering, cyber, geopolitical expertise as well as broking and claims - can be brought to together to help the renewables industry as together we face up to recent changes and a less than certain future.

Graham Knight is Head of Global Natural Resources, Willis Towers Watson.

[1] https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_18_4155

[2] https://www.iigcc.org/news/launch-of-coalition-for-climate-resilient-investment-ccri/





Part one - new realties in the renewable energy industry

Addressing climate risk: a UK perspective

Introduction

2019 was the year that climate risk became embedded in the UK public conscience. Powered by the connecting forces of social media, strong, clear, messages from the younger members of society and powerful images of natural catastrophes from around the globe, climate has become the defining issue of our age. It's presenting all of us with a core challenge: "How do we effectively manage a speedy transition to a low carbon economy and how do we take everybody with us on this journey?"

Power generation sits at the very centre of this new global challenge, while the insurance industry has a pivotal role in supporting the power industry in its own global transition.

The political and policy backdrop

COP 26

The political and policy backdrop is worthy of detailed comment. 2020 will see the annual Conference of Parties to the UN Convention on Climate Change (called "COP26" because it is the 26th such COP) being hosted by the UK for the first time ever, in Glasgow from November 9-20[1].

Arguably this will be the biggest COP since the Paris Agreement (PA) was signed in 2015. The PA saw countries committing to emission reduction pledges (known as "Nationally Determined Contributions" or "NDCs"). Because these NDCs were nothing like enough to put the world on track for 2 degrees (let alone 1.5 degrees, which has increasingly been the focus since the Integrated Pollution Prevention and Control (IPPC)[2] to report last year), the PA established a five yearly review cycle where countries are expected to seek to raise ambition. Glasgow will see the first of these reviews.

Unrealistic targets

Existing NDCs see 2030 emissions remain very broadly at the level of today's emissions. This is much better than where they would have been under "Business as Usual" but is nothing like enough. To be on track for 1.5 degrees by 2030, countries would need to halve their collective emissions from today's levels; and for 2 degrees, to reduce them by something like a quarter. Unfortunately, it is already clear that countries will not raise their ambitions by anything like this, especially given the very challenging geopolitical situation.

The UK position

The UK Government has not set out their detailed strategy as yet, but they are likely to look to move away from an exclusive focus on raising NDCs to a broader based approach and have hinted at a three-part strategy.

First, achieving as much progress as possible on NDCs for 2030, whilst knowing we won't come close to closing the gap. China matters above all here, as it is easily the world's biggest emitter. The EU is likely to raise its ambition this year; the big question will be whether it can persuade others, above all China, to do the same at a difficult political moment for China. A key moment will be an extraordinary EU-China Summit convened by Chancellor Merkel in Leipzig in September 2020 where climate will be one of the issues on the agenda.

Second, complementing countries' 2030 targets, with commitments to net zero in the longer term (mid-century and later) from key countries and other actors. The EU is likely to agree early this year to set a net zero date of 2050. China is working on a strategy; a date within 10 or 20 years of 2050 would be a big win.

[1] https://sdg.iisd.org/events/2020-un-climate-change-conference-unfccc-cop-26/
[2] All statistics quoted in this article are from the source as per footnote above

Third, sectoral announcements, often with non-state actors like business and cities, playing a key role:

- **Private finance** could be the most impactful. Mark Carney will be leading work for the UN Secretary General to mainstream climate risks into investments and business strategy, and he has been clear that he sees these becoming mandatory over time. The Willis Towers Watson-led Coalition for Climate Resilient Investment (CCRI) is an important part of this movement.
- **Resilience and adaptation.** Any credible climate strategy for the planet must address this, and again Willis Towers Watson will have an important part to play. Vulnerable countries will expect to see serious progress, including on public finance.
- **Nature-based solutions.** A big part of the solution to climate is reducing deforestation. There are synergies with other important events this year, including the Oceans Conference in Lisbon in June, and the Biodiversity COP to be hosted in Kunming, China in October.
- Other **green economy** initiatives such as: continued pressure for coal phase out, especially coal financing; targets for phasing out internal combustion engines; and perhaps something on Carbon Capture and Storage. The underlying message will be that low carbon is good business, with the huge success in bringing down the cost of renewable energy over recent years set to continue, and now being followed by falling costs of electric vehicles.

High public expectations

But the COP will not be easy. A particular challenge will be very high public expectations, especially in Europe. The aspirations of youth and other groups are likely to be unfulfilled. The UK Government will need to achieve an outcome which can credibly be presented as sufficient to be called "progress"; maybe by keeping 1.5/2 degrees within reach by later action and by continued technological progress in the real economy. But there will nonetheless be widespread anger; green strategists are likely to direct this anger at companies and sectors perceived not to be pulling their weight.

Awkward timing

The timing of the US election is also awkward, falling on November 3 2020, less than a week before the COP starts. A victory for Mr Trump will make it harder to articulate a compelling narrative that global action in the coming years will continue to ramp up. A Democrat victory may make that story easier but could see the debate about raising major economy ambition pushed back a year to allow the new Administration more time.

Furthermore, the relations between the UK Government in London and the Scottish Assembly in Edinburgh may not always be smooth, while the UK's own delivery will be under a very bright spotlight from policies to meet the 4th and 5th Carbon Budgets, to export credits for oil and gas, to the issue of Heathrow airport.

The effect of ESG

The investment community is also substantial changing its position in terms of what qualifies as "investable" assets. The common reference point is an investments ESG (Environmental, Social, Governance) rating and capital owners are placing increasingly significant percentages of their portfolios under full ESG mandates; green finance is just becoming regular finance.

The insurance industry response

New products

So how does the global insurance industry respond to this rapidly evolving environment? There is an opportunity to contribute positively to the adaption of our key infrastructure and mitigation of climate risk whilst using our well-established skills to some commercial advantage. Insurance has a fundamental role of underpinning and de risking investments and with a 60 plus trillion-dollar number being quoted as the price to build the necessary low carbon infrastructure around the globe, the opportunities to build new insurance products and make new markets will be very significant.

Helping our clients

We can help our clients stay in business as they begin their transition journey. We can lend our insights, data, analytics and pricing models to the broader financial community, to speed up the vital work of building new global investment frameworks and metrics. We can bring our well-established, innovative broking and underwriting skills to support new technologies. Perhaps above all, we can step out of our own (re)insurance universe and become a leading force for collaboration to solve these new risk challenges.

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Geopolitics of energy: navigating threats to the renewable industry

Introduction: new geopolitical challenges and risks

The lenses through which geopolitical risk can be viewed apply to almost every area, and the renewable energy industry is no exception. But how do these risks manifest themselves and how can they be mitigated?

At every stage of the lifecycle of a typical renewable energy project, new challenges and risks are emerging that, if not managed correctly, can threaten the very viability and long-term profitability of the project concerned. Geopolitical risks have always been with us, yet industry dynamics and global trends have caused their importance to rocket up board agendas over the last year.

Understanding geopolitics

The outbreaks of mass unrest in Chile, France and Hong Kong have made it clear that political risk events can arise suddenly in regions traditionally seen as risk-free. 61% of respondents of the Association of Insurance and Risk Managers in Industry and Commerce Limited (Airmic) member survey expected geopolitical risk to become "harder to manage" in the next three years – 14% higher than the next biggest risk: climate and environmental disruption[1]. This is causing uncertainty for investors, and 40% of respondents in the 2019 Willis Towers Watson Political Risk Survey felt that they were facing more pressure from investors regarding political risk management[2].

For the renewable energy sector, exploring geopolitical risks is important not only because the industry experiences the global ripples of geopolitics, but also because the sector is making waves of its own.

The promise of energy security and independence is changing the power structures of regions and states and enabling downstream sectors such as electric vehicles and heat pumps, which in turn are transforming the future of transport and infrastructure.

2019 saw the first dedicated report from the Assembly of the International Renewable Energy Agency (IRENA) on the Geopolitics of the Energy Transformation as the sector looks to build understanding, and publications such as this Review can help get a sense of the trends experienced across the industry[3].

Dialling in on risk

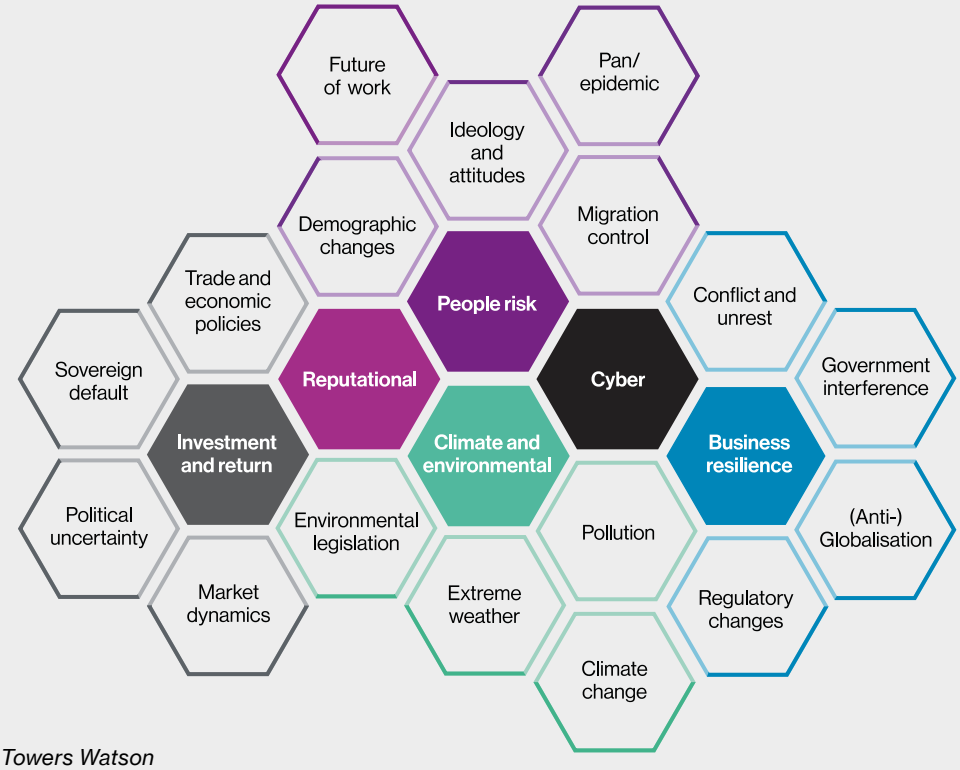
In the last Willis Towers Watson Renewable Energy Market Review[4], we introduced you to the six lenses used to explore these nuances and build an integrated view of risk. In an increasingly connected world, many of the geopolitical drivers of risk are interrelated, and effects often cascade beyond local geographies or individual industry sectors.

Think of these lenses as focusing dials on a microscope. There isn't one answer to viewing geopolitical risk under the lens – every company's exposure is different, and the real value is in uncovering different perspectives to ask useful questions. Do you want to zoom out for the global macro view, or zoom in to a local issue? If you don't have the expertise in-house to understand them, who do we need to talk to?

The lenses cover a broad range of risks – from cyber-attacks to the impact of sanctions – and recognises the interconnecting global trends such as shifting public sentiment, population dynamics and technological innovation.

[1] 2019 Airmic member survey https://www.airmic.com/news/guest-stories/rethinking-geopolitical-risk
[2] 2019 Political risk survey report https://www.willistowerswatson.com/en-GB/Insights/2019/12/2019-political-risk-survey-report
[3] IRENA http://www.geopoliticsofrenewables.org
[4] https://www.towerswatson.com/assets/pdf/power-renewable-energy-market-review-2019.pdf

Figure 1 – The six lenses in the context of the wider risk landscape



Source: Willis Towers Watson

Six lenses – an integrated approach to geopolitical drivers of risk

The six lenses that we deploy to examine geopolitical risk fall into the following categories:

1. **People risk.** Safety and security issues can pose clear risks to employees; however, there are also risks associated with workforce management, including recruitment and retention, which must be understood and managed.
2. **Investment and return.** Exposure across multiple geographic locales means geopolitical drivers of risk can be diverse. In order to protect assets and investments, this diversity of risk must be critically considered and appropriate risk management tools deployed.
3. **Business resilience and value chain.** When risks materialise as incidents and events it is crucial to have effective business continuity practices implemented. Response and recovery plans, which have been properly tested and exercised, can limit the impact of incidents and help companies quickly resume business operations.
4. **Climate and environmental.** The risks presented by climate and environmental factors, including storms and earthquakes, can be better understood with advanced analytics. By modelling environmental events and physical assets, risks to property and people can be quantified and managed.
5. **Cyber risk.** Digital ecosystems and connected devices fundamentally underpin the modern power sector. Having a comprehensive understanding of a company's cyber footprint is critical to managing this source of risk, including network outages and regulatory impositions. (Please see our dedicated chapter on cyber risk later in this Review for an in-depth analysis.)
6. **Reputational risk.** Impacts on brand and reputation can affect the ability of a company to attract customers, recruit talent or even to gain an operating license in a country. Being attuned to the relationships between geopolitical drivers and reputation helps anticipate and mitigate these risks.

Using scenarios to bring the lenses to life

As our contribution to this Review, we wanted to set out three possibilities that bring these lenses to life, and which could be used to construct bespoke scenarios for clients.

Scenario planning uses alternative narratives about the future, many with improbable and radical twists, to develop future-proof strategies. A classic example of the power of scenario planning is the approach pioneered by Shell. When the 1973 oil crisis hit, Shell was better prepared than its competitors because its management had already considered a comparable scenario.

In particular, storylines have been advocated as a better way to provide actionable information because storylines seek to improve risk awareness; these scenarios better correspond to how people perceive and respond to risk[5].

Storyline One - geopolitics of power: people, business resilience, investment and return lenses

With the development of large-scale regional networks, electricity networks will strengthen their role as geopolitical nodes in the coming years. While the issue of cybersecurity is often highlighted, the geopolitics of power cuts and the potential for local conflict need to be explored[6].

At an international level, the potential for cross-border electricity trading and the creation of grid communities[7] raises the opportunity for nations to use inter-state electricity cut-offs as a foreign policy tool. We could see a future where policy changes and embargoes could be applied strategically in the same way as oil and gas sanctions[8], or through network disruptions via state sponsored cyber-attacks.

At a local level, establishing new sites can result in land use conflict and trigger localised political risk[9]. The distribution and use of renewable energy can be designed to have a low risk of interacting with conflicts but the success of this depends on the technologies implemented and robust sustainability policies. Having an onsite engagement plan with local stakeholders and an assessment of regional interests will be essential to understand land use dynamics.

We also expect institutional investors to increasingly demand that Environmental Social Government (ESG) risk is addressed before investing in projects in many parts of the world, so this needs to be part of the planning process and outputs used to inform employee risk assessments. Predicting the occurrence and nature of political and social disruptions is nearly impossible. However, investing time in preparing a crisis communication plan is imperative and while it may never be needed, it could save a company's reputation and protect employees from potential harm.

"Scenario planning uses alternative narratives about the future, many with improbable and radical twists, to develop future-proof strategies."

[5] The summer reader's guide to scenario planning https://www.willistowerswatson.com/en-GB/Insights/2019/08/the-summer-readers-guide-to-scenario-planning

[6] https://www.iris-france.org/wp-content/uploads/2019/03/GENERATE-Working-Paper-4.pdf

[7] https://research.hks.harvard.edu/publications/getFile.aspx?Id=1554

[8] https://energypolicy.columbia.edu/sites/default/files/CGEPTheGeopoliticsOfRenewables.pdf

[9] https://doi.org/10.1016/j.erss.2015.06.008

Storyline Two - navigating global trade flows: business resilience, investment and return lenses

The physical differences between the transport and flow of renewable and non-renewable energy will likely reduce the risk for interstate conflict because the potential for blockades or embargoes is limited. However, there are numerous examples in history of nations using the flow of resources to influence global trade. This could include new strategic chokepoints based on key resources and supply chain components.

Understanding and mapping supply chain dynamics below Tier One suppliers and having alternate agreements in place is one way to manage these disruptions. For example, while most of the 17 rare earth minerals found in renewable technologies are not geologically rare, the mining and refining process is resource intensive and produces by-products that require long term planning to reduce environmental impacts[10]. China accounts for 80% of the world's rare earth elements[11]; it is also the largest producer of solar panels, wind turbines, and batteries.

If a trade embargo such as the US government's attempt to block Huawei's involvement in 5G networks[12] were to hit the power sector, does the industry understand what the impact would be? Do suppliers share common sources further down the chain? Continual engagement with the supply chain to understand what could impact them before it impacts the company itself is only going to become more important, and is mutually beneficial for the whole chain. Understanding the processes and conditions in which assets are moved, continually assessing key vulnerabilities and maintaining a full understanding of the protective measures offered by the logistic operators can be an effective approach to risk mitigation.

Storyline Three - designing for safety and efficiency: reputation, cyber, business resilience lenses

With inherently global economies becoming progressively dependent on digital links, it is essential to understand the strengths and weaknesses of these links. Technology has improved resilience to countless threats from an individual level to a societal level. However, increased dependence on connectivity and the reliance on power puts the reputation of companies under the spotlight, as we saw with various power companies that were caught up in wildfires over the last few years.

2019 saw the first-of-its kind cyber-attack to hit a US renewable energy provider that also intermittently disconnected the generating station from the grid for several hours[13]. While the impacts were far less serious than the 2015 Ukraine attack and the 2019 wildfires, these examples could form the basis of a disruption scenario for boards to run. While most of the intrusions detected by power companies seem to have been basic reconnaissance operations or intellectual property theft, malicious actors are getting into systems through unpatched vulnerabilities. There are also untargeted risks with malware weapons WannaCry and NotPetya. The range of cyber drivers and vulnerabilities is vast, and the need for cyber expertise or a dedicated Chief Information Security Officer (CISO) have never been more crucial for business resilience.

Delivering cyber resilience is a core part of effective corporate governance for power and renewable energy companies. This year we've seen energy companies participating in initiatives such as the World Economic Forum Systems and Cyber Resilience working group to produce guidance and principles that will help board members meet the unique challenges of managing cyber risk in the electricity ecosystem. Cross sector working groups and access to state-of-the art science can play a role in understanding the art of the possible, and our team is tapping in to this knowledge and bringing it closer to our clients through initiatives such as the Willis Research Network.

"2019 saw the first-of-its kind cyber-attack to hit a US renewable energy provider that also intermittently disconnected the generating station from the grid for several hours."

[10] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/Global_commission_geopolitics_new_world_2019.pdf

[11] https://www.ft.com/content/3cd18372-85e0-11e9-a028-86cea8523dc2

[12] https://edition.cnn.com/2019/05/16/tech/huawei-us-5g-rollout/index.html

[13] https://www.cyberscoop.com/spower-power-grid-cyberattack-foia/

Conclusion: multiple perspectives to build resilience

When designing scenarios, renewable energy companies should assemble multi-disciplinary, diverse teams from across the organization. This is the approach that our geopolitical team takes, and it reduces the possibility of blind spots.

In one of our recent articles, General Sir Richard Shirreff set out how the military approach to risk management might help the boardroom[14], and this should be a question that all mature companies ask themselves. What risks are on the horizon and who can speak to them or be invited in to build awareness and understanding? This is where board composition, NED selection, and trusted advisors are increasingly important to encourage a holistic view that recognises and explores interconnectivity of risks.

We would encourage readers to think about the common themes and what drivers and trends might result in risks and opportunities. Are they on your company's risk register and does your company have a plan for them? For example, for political risks, solutions such as VAPOR[15] allow global companies to assess the financial impact of political risk exposure that can feed into your company's business continuity planning, but if your company examines its supply chain dynamics to understand the impact of the Chilean Water Directive on lithium production[16], then being able to draw on expertise is essential and strong links to the scientific community, e.g. via the Willis Research Network can help find the relevant experts.

Lucy Stanbrough is Emerging Risks research manager for the Willis Research Network at Willis Towers Watson, London.

[14] https://www.willistowerswatson.com/en-GB/Insights/2019/12/geopolitical-risk-and-how-experience-of-the-battlefield-might-help-the-boardroom

[15] https://www.willistowerswatson.com/en-GB/Solutions/services/vapor

[16] https://eandt.theiet.org/content/articles/2019/08/lithium-firms-are-depleting-vital-water-supplies-in-chile-according-to-et-analysis/

Series losses in renewable energy: singular or plural?

Introduction: the preserve of those in the know?

Series (or Serial) Loss Clauses, are often heard mentioned with bated breath in the public houses and barista shops in and around Lime Street and the square mile. London has historically been a technical centre for insurance and engineering classes and the decisions made here frequently reverberate around the world. The recent soft insurance market supported the advent of many bespoke wording forms, within which serial or series loss clauses were tweaked, amended or removed entirely without requisite consideration and so were often widely misunderstood when applied.

Whilst such exclusion clauses are not widely applied in the Oil & Gas, Conventional Power or Property markets, the correct understanding/interpretation of the risks and application of the clauses relative to global deployment of these assets have remained the privileged jurisdiction of a few dedicated individuals in the Renewable Energy insurance market and their claims teams.

Background

In the heady days of cheap and widely available capacity, the Facultative Property market was falling over itself to offer extremely competitive capacity for operational solar and wind projects, often without any due concern or consideration to series loss clauses: surely an operational solar farm is just a static property risk?

Failure to recognise modular technology risk

The conventional Power market is familiar with the concept of serial losses. However, in delivering many renewable projects to the market under conventional Power wordings, it had failed to recognise any modular technology risk. This has mainly been because of the steadily reducing flow of single site coal and gas projects; as a result, they have been keen to maintain premium income levels and have often fallen foul of influential brokers pleading to treat renewables like any other power generation technology, or at least to support their clients' diversification into new renewable technologies.

A ghostly memory

In the soft market, series losses remained a ghostly memory for those with dedicated green capacity, with mandatory application of a Series Loss Clause remaining part of their reinsurance treaty arrangements. Taking into account the history and the lessons learned during the evolution of the renewable energy industry, Series Loss Clauses remained one of the "dark art" secrets or defences of the Renewable Energy market. Whilst treaties often required the application of a Series Exclusion Clause, there remained considerable flexibility as to language, application and interpretation in a market seeking contract certainty.

Figure 1 – Example of variability of loss events and amounts commonly seen in the market

Insurer indemnification

Loss	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
	100%	100%	80%	80%	80%	60%	60%	60%	40%	40%	40%	0%
	100%	100%	100%	75%	75%	75%	50%	50%	50%	0%	0%	0%
	100%	100%	100%	75%	75%	75%	50%	50%	50%	0%	0%	0%
	100%	100%	100%	75%	75%	75%	50%	50%	50%	0%	0%	0%
	100%	100%	100%	75%	75%	75%	50%	50%	50%	0%	0%	0%
	100%	100%	100%	100%	75%	75%	50%	50%	0%	0%	0%	0%
	100%	100%	100%	100%	75%	75%	50%	50%	0%	0%	0%	0%
	100%	100%	75%	75%	50%	50%	0%	0%	0%	0%	0%	0%
	100%	100%	75%	75%	50%	50%	0%	0%	0%	0%	0%	0%
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	100%	80%	60%	40%	0%	0%	0%	0%	0%	0%	0%	0%
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	100%	80%	60%	40%	0%	0%	0%	0%	0%	0%	0%	0%
	100%	75%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%
	100%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Source: Willis Towers Watson

Increasing exposure to new technologies

The modular nature and rapid evolution of technology, particularly in the wind and solar sectors, means that the Renewable Energy market is increasingly exposed to project risks involving nascent or emerging technologies, which through their novelty can make them prone to claims arising out of the defects in design, plan, specification, workmanship or materials. It's this modular nature, inherent in wind and solar technologies, where multiple claims can arise if identical products contain identical defects that caused a series of Serial Defects Clauses to increasingly become a mandatory requirement in persuading underwriters to deploy their capacity.

How Serial Loss Clauses work

Through the application of this exclusion, the All Risks of sudden or unforeseen Physical Loss or Damage policy is moderated to indemnify only a percentage of a loss, often reducing on a sliding scale for each loss after the first known loss.

It's common to see a sliding scale as shown in Figure 1 above. After application of the deductible specified in the schedule, the insurer shall indemnify the insured for:

- 100% of the first and second loss amounts
- 75% of the third loss amount
- 50% of the fourth loss amount
- 25% of the fifth loss amount

Then the insurer shall not indemnify the insured for the sixth and following cases of loss or damage resulting from causes of the same nature.

This condition is intended to prevent the same design defect from causing multiple claims under the same insurance policy. It is also designed to ensure that this type of claim is being more properly directed to the manufacturer under the original equipment or supplier warranty.

It should also be noted that whilst a traditional Property & Casualty insurance policy is intended to pay only in the event of damage, it is possible that a series loss (or serial event) may be identified prior to actual damage being sustained. In such instances the only recourse available is usually through the supply and installation contracts, potentially underpinned by any original equipment manufacturer or supplier warranties, or professional indemnity insurance.

The general premise is that if the development of or discovery of a defect shall indicate or suggest that similar defects exist elsewhere in the insured property, the contractor shall forthwith investigate and, if necessary, rectify the defects in such insured property at its own expense or alternatively bear all losses arising out of such defects.

Insurance market application

As we have seen, following the first loss the above position is moderated by affording a reduced level of insurance cover to the project, if the serial defect has resulted in damage.

Soft market

In the soft market, it was common to see sliding scale multipliers being applied for up to 12 or perhaps 15 losses where some insurers had close relationships with the original equipment manufacturers resulting in increased comfort, or oversight of the quality of the manufacturing process.

Hard market

However, in the current hardening insurance market where capacity is more restricted, insurers are seeking to "throttle" open ended terms and conditions. The balance of power has swung from a buyer to a sellers' market; it is now common to see Renewable Energy insurers seeking to push the pendulum further in their favour by restricting the number of serial claims or percentage of loss for which they will be responsible under the insurance policy. Their ultimate aim is to move back to the somewhat utopian position whereby after an identified loss, and 100% indemnity for the first Physical Damage sustained, the contractor should investigate and take the necessary remedial action at its own expense or bear all further losses arising out of such defects.

Underwriting factors

How far the pendulum swings - between a single loss and perhaps up to 15 losses - will depend on the specific underwriting/broking dynamics. These are likely to include:

- The insurer's experience with the technology
- Their personal account experience
- The underwriter's knowledge
- The proven nature of the equipment
- The experience of the installation contractor
- Pricing
- Deductible level
- Level of defects in design coverage requested

Even traditional Property insurers are responding to clients' broad and disparate composite asset portfolios by considering the potential risks and challenges inherent with modular engineering risks, as well of course as traditional conventional single site Power underwriters.

Increasing uncertainty?

Whilst applying a total or increasing exclusion after the **first loss** might be insurers' preferred position, the simple exclusion of defects resulting in serial losses where there is physical loss or damage is in stark contradiction to the accepted market position; if there is physical loss or damage, the policy will respond. It is the comfort placed in the knowledge that an insurer's primary response in the event of physical loss or damage in which many contractors, sponsors, developers, financiers and their advisors rely on when completing their risk assessment. Relying on insurers' *prima facie* duty if there has been physical loss or damage, the insurance policy will respond as primary to reinstate the loss, reducing volatility of unknown risk and increasing bankability.

Contractor responsibility?

Where claims settlements for physical loss or damage have been moderated by the application of a Series Loss Clause, there should be an acknowledgment, for owner procured project policies, that if there is a failure of the owner procured insurance to respond, the contractor will contractually retain the risk of further physical loss or damage through to substantial completion, or expiry of the defects liability period, although this may be mitigated by their potential contractual recourse to any manufacturer or supplier warranties.

Whilst the primary risk of not having insurance funds to reinstate such additional modular losses during the construction phase falls on the contractor, whilst this would be outside the assigned securitisation of the regulated insurance package, a more onerous series loss clause may be considered an increased credit risk to some project financiers, relative to the financial stability of the contractor party and manufacturer warranties.

Many insurers' initial positioning is that the contractor, as the delivering party, is responsible for the manufacture or provision of materials to be free from defects and would be responsible under contract in the absence of damage for such defects. As such, they consider that it is right and proper that manufacturers, suppliers and contractors should not indefinitely devolve their responsibility for the consequences of such defects to insurers when there is indemnifiable loss or damage. With new and developing technology, the market rhetoric is that it should not be used to bankroll risk which would otherwise be considered a commercial research and development risk to the technology provider.

Series Loss Clauses interpretations

The application of a Serial Loss Exclusion Clause is often open to subtle interpretation. The incident frequency and percentage indemnity can be applied to losses, incidents, claims and other designations which all have their own interpretation.

It is also often unclear to clients (and insurance professionals) as to whether the applications are - or should be - per loss incident, per site or project insured, per umbrella or portfolio insurance policy, or should instead be moderated by wider industry experience, i.e. known market technology issues being called to regulate the response on individual projects which have not previously experienced the technology issue in question.

Concept of knowledge

The concept of knowledge is also open to interpretation. If there is a known insured loss, then identical subsequent losses would then be considered known. However, if there was a known manufacturer issue with a component, some clauses will respond to known losses (i.e. where a technical bulletin has been issued by the manufacturer to the insured client). However, if it had not yet been possible to replace the known defect (perhaps delayed so as to be addressed during a planned outage), others will apply a subjective position of known, or should have reasonably known - which implies an element of negligence on behalf of the owner or operator.

Application to modular element

It is now more common to see the application of a Series Loss Clause to the modular element over which insurers have concern (i.e. panels or inverters for solar projects or towers, nacelles & blades for wind projects) thereby leaving the other traditional civil and steelwork constructional risks unabated by a Serial Defect Clause. However, following some recent negative experiences with balance of plant contractors where workmanship and defects issues have been discovered in multiple foundations, insurers' opinions remain divided.

Position under construction contracts

When considering serial losses, it's also necessary to consider the position under the construction contracts which will often contractually determine at which point responsibility is assumed. For a turbine supply and installation contract, this might be when more than 25% of the supplied equipment exhibits identical defects. As such point, the contractor will take responsibility for the financial loss incurred by replacing the faulty or defective equipment at their cost. This percentage is open for commercial discussion and could range between 10% and 40%. As the project moves into full commercial operations and is subject to the operations and maintenance contract, similar provisions, responsibility and recourse may be available under the supplier or manufacturer warranty.

Financial loss following delay

When there is contractual acceptance by the contractor or manufacturer for the defect in design, plan, specification, materials or workmanship issue identified, such acceptance is normally limited to the replacement, repair or rectification of the defective physical equipment itself - whether damage has been occasioned or not. However, it will not indemnify the owner or operator for this full financial loss of revenue resulting from the identified loss or damage, or potential future interruption which might

be incurred whilst remedial works are performed to the equipment where a serial defect has been identified but damage has not yet been occasioned.

In these circumstances, the insurance policy might be expected to respond for the loss of revenue. The physical loss or damage trigger would have been met to create a valid claim under the insurance policy (i.e. would have responded in any case but for the acceptance of the identified serial defect under the construction contract or warranty). Should the scheduled commercial operations be delayed. It is likely that for a construction policy any available liquidated delay damages would be utilised to partially offset such reduction in lost revenue. Additionally, during commercial operations any financial damages from an availability warranty would be applied for the lost performance.

Warranties

These serial losses are often the result of defective manufacturing or design flaws that lead to early and repeated failures. For example, in the past few years some Original Equipment Manufacturers (OEMs) have experienced serial failures in blades and drive trains, resulting in hundreds of blade sets needing replacement and remediation required on drive trains. Where these cases are well documented such risks are unlikely to be covered by insurance as they would not be considered fortuitous.

A case study from 2019

Most insurance companies have a serial loss clause in their policy, and one leading insurer (let's call them Insurer A) is no exception. Insurer A's Serial Loss Clause covers faulty equipment on a sliding scale, so the first blade or gearbox is covered by 100%, the second by 75% and so on, until no coverage is paid. Insurer A's view, as stated to us recently, is that any further losses incurred after that point are no longer fortuitous, which goes against the point of insurance; after that point, insists Insurer A, the insurer would be just paying for something that's defective.

It's perhaps not so surprising that there can be some very sensitive and high-stakes conversations when things go wrong. In February 2019, a storm passed through southern California and damaged the majority of blades at a 50 MW wind plant owned by an Australian energy company. A disagreement followed between the energy company and the turbine provider over whether the blade cracking was caused by deficient blades (defective equipment) or by the pitch control systems being improperly set by the operator (defective workmanship).

The insurer (Insurer A above) was closely involved because it might have had to pay out on a claim, depending on the results of the negotiations. None of the parties involved would disclose the outcome, but Insurer A suggests that the example highlights the complexities around damage claims. The insurer believes that these conversations can be sensitive, because eventually somebody has to assume responsibility. The loss may be considered a serial loss, but some may disagree – so it is vital, as the insurer who is going to pay for the loss, that the issue is decided once and for all.

Insurance is not the same as an extension of a warranty!

A risk for operators of wind farms shopping for insurance is to assume that all their risk will be covered in the policies. One operator suggested to us recently that it was a myth among wind farm managers that, when their warranty runs out, all they need to do is buy property insurance and just give future losses to the insurance company.

Extended warranty coverage from an OEM for a wind turbine varies from US$30,000 to US$100,000 per year, depending on makes, models and other factors and OEMs have been making brisk sales as warranties run out.

Applicable to both physical damage and loss of revenue sections?

When considering the above, it is a concern that the insurance market, as it hardens, will move to apply a serial loss clause sliding scale response to all sections as a general condition - not just to the physical damage sections, where loss of revenue would apply in full, until the exhaustion of the number of identifiable physical damage losses. Such a strict application could have the dire effect of applying the sliding scale of indemnity to loss of revenue losses, leaving sponsors and developers short of insurance indemnity from which to service their debt - thereby undermining some of the fundamental principles in non-recourse or project finance insurance.

"A strict application could have the dire effect of applying the sliding scale of indemnity to loss of revenue losses, leaving sponsors and developers short of insurance indemnity from which to service their debt."

Defects clauses and serial loss

It's often overlooked that the Serial Loss Clauses are inextricably linked with the Defects in Design Exclusion Clauses, commonly London Engineering Group (LEG) LEG1, LEG2 and LEG3.

LEG2

If the cover benefits from a LEG2/96 defect in design exclusion, for simplicity in the event the defect was associated with a specific item (e.g. an inverter junction box – the component part), the insurance policy should only respond to indemnify the physical damage losses consequent upon the defect which damaged the inverter box - not the defect and damage to inverter junction box itself . As such, the serial loss clause would only be applied to the indemnifiable consequential physical loss or damage.

However, there may not be a sufficient quantity of similar defects for the contractor or technology provider to contractually accept that a serial defect has occurred. Alternatively, their response may be limited to the sole replacement of their supplied equipment, rather than the consequential physical loss or damage; in which case, the insurance policy may respond for physical damage in addition to loss of revenue without recourse to or acceptance by the technology provider.

LEG3

Let us turn now to a scenario where the cover benefited from a LEG3/96 Defect in Design Exclusion Clause. In the event the defect was associated with a specific item (e.g. the inverter junction box (being the component part) the insurance policy should respond to indemnify the physical damage losses consequent upon the defect which damaged the inverter box, and the defect if resulting in damage to inverter junction box. As such, the serial loss clause should apply to all physical loss or damage, the inverter junction box and consequential physical damage.

Again, there may not be a sufficient quality of similar defects for the contractor or technology provider to contractually accept that a serial defect has occurred. Alternatively, their response may be limited to the sole replacement of their supplied equipment, not the consequential physical damage - in which case the insurance policy may respond for physical damage in addition to loss of revenue. However, if there is a sufficiently high LEG3/96 deductible, say US$100,000 for component parts (particularly for solar projects), this is likely to remove the increased physical damage risk to insurers providing a broader Defects in Design clause, leaving only an increased exposure to loss of revenue.

Conclusion: insurance is not the only answer!

The insurance sector has been growing more comfortable with renewable technologies and the soft market had removed a degree of focus from series loss incidents.

However, serial losses are often the result of defective manufacturing or design flaws that lead to early and repeated failures. In the past few years, some original equipment manufacturers (OEMs) have experienced serial failures in blades and drive trains on windfarms, resulting in hundreds of blade sets needing replacement and remediation needed on drive trains.

Where these cases are well documented, they are not a risk that can be covered by insurance, not being considered fortuitous. Insurance policies are not a replacement for a warranty and will not protect an owner against recurring or multiple losses.

The positioning of the level of indemnity and amount is subjective, depending on the insurer perception and understanding of fortuity. As the hard market continues, there will be a greater pressure to reduce the number of incidents and loss amounts for which an indemnity is provided under the sliding scale, increasing the exposure to contractor and technology providers' balance sheets. It is also a concern to see the movement of the series loss clause from the property damage section of covers to be applied equally to moderate loss of revenue claims before the maximum number of physical damage losses have been exceeded.

Steve Munday is Head of Renewables, GB at Willis Towers Watson, London.

"Insurance policies are not a replacement for a warranty and will not protect an owner against recurring or multiple losses."

The future of Floating Offshore Wind

Introduction: FOW investment gathers momentum

The market for Floating Offshore Wind (FOW) is beginning to gather momentum following a cautious beginning. Between 2008 and 2018, global installed capacity increased from near zero to 57 MW. Forecasts suggest that growth during the next ten years will be exponential in comparison, with industry experts estimating that installed capacity could increase to anywhere between 5 and 30 GW by 2030[1]. Of the 57 MW installed, 30 MW is accounted for by Equinor's five-turbine Hywind Scotland farm. It is currently the only floating farm of any significant scale but has provided optimism for the future of floating platforms, having operated at 65% of its maximum theoretical capacity since its commissioning in 2017[2].

The commitment to the development of this market can be seen through the prism of government targets and investment:

- Despite the current US government's stance on coal power plants, the US still remains a growth leader for FOW - the US Department of Energy announced up to $28 million in funding for new floating turbines, in order to help reach their target of installing 2 GW of floating offshore wind by 2030[3].

- In 2018, the European Investment Bank (EIB) awarded a $68 million loan[4] for the construction of a 25 MW wind farm to the WindPlus consortium, made up of EDP Renewables, Engie, Repsol and Principle Power, which demonstrates the commitment to this market from both the EIB and large, established oil and gas companies.

- Total CapEx for near-to-medium-term projects, classified as either under development or planned, currently totals $15.9 billion with Asia-Pacific taking the highest share, followed by the US and then Europe[5]. This aligns with 2030 targets set for installed capacity by high potential markets: 4 GW in Japan, 1 GW in Taiwan, 2 GW in the US and 2 GW in both the UK and France[6].

FOW project advantages and disadvantages

The primary advantage of FOW projects is the fact that the technology allows farms to be located in deeper water sites than is currently economically viable with fixed platforms. At present, it is generally accepted that fixed-bottom foundations are not appropriate past 60m in depth, whereas these deeper site locations offer stronger, more stable wind speeds, which can help to reduce the overall cost of energy for offshore wind. Furthermore, it may become a necessity for farms to be moved further offshore, as the availability of suitable near-shore sites decreases following a surge in developer demand. Secondly, installation costs may be reduced due to a greater proportion of the assembly taking place onshore. With floating platforms, turbines can be mounted onto their foundations and floated to the site of the farm, provided that there is a port with suitable facilities in close enough proximity to the site. As a result, costs can be dramatically reduced as there is no need for specialised assembly vessels.

[1] GlobalData (2019a), Floating foundations: The future of deeper offshore wind, GlobalData, London.
[2] https://www.power-technology.com/comment/floating-offshore-wind-2019/
[3] https://www.power-technology.com/comment/floating-offshore-wind-2019/
[4] https://www.power-technology.com/comment/floating-offshore-wind-2019/
[5] Quest Floating Wind Energy (2019). 2020 Global Floating Wind Energy Market & Forecast [online]. Available at: https://questfwe.com/executive-summary/ [Accessed 30 Dec. 2019]
[6] https://www.power-technology.com/comment/floating-offshore-wind-2019/

The issue of poor offshore weather conditions may also be mitigated, which can often limit the window in which developers can install fixed foundations due to the considerable amount of offshore assembly[7]. The designs also allow for electrical and mooring systems to be unplugged, allowing the structure to be taken back to shore for maintenance or repair works, decreasing both the cost of the repairs; this is not only because there is no need to use specialised vessels, but also because the risk of performing the repairs decreases[8]. Finally, the fact that the sites can be located in deeper, more remote waters means that the risk of bird strikes, and the subsequent damage caused, may also be reduced[9].

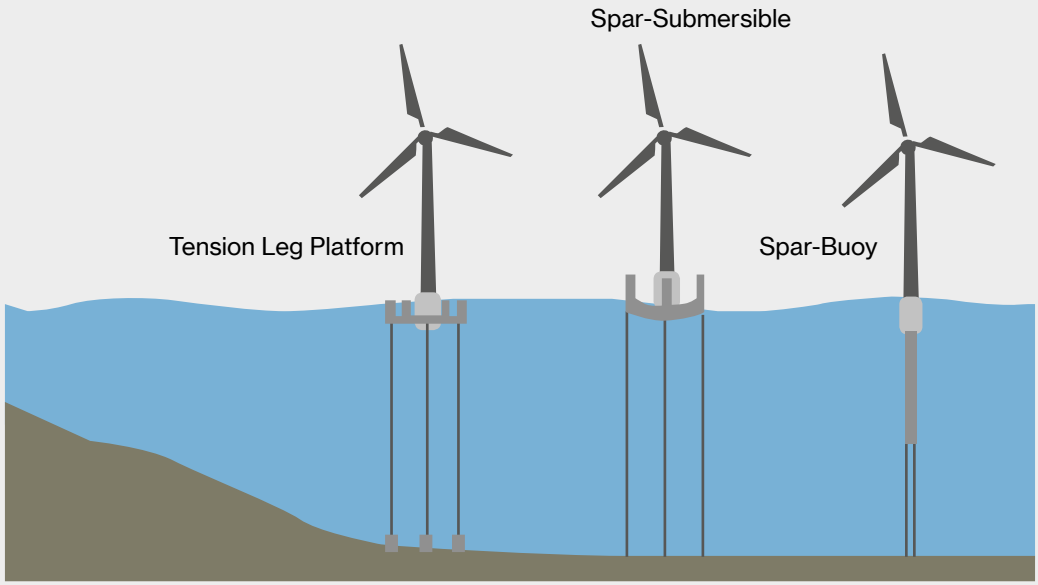
The major disadvantage for developers currently is that FOW project costs are higher than the fixed-bottom alternatives, and there are still sites that provide good conditions for wind farms at less than 60m in depth.

However, this may only be the case in the short-term as FOW costs fall and shallow-water site availability decreases. Whilst strong and stable winds may be considered an advantage of deep-water sites, this factor also brings with it the risk of harsher wave action and other adverse weather conditions.

Furthermore, greater distances from the shore will inevitably affect the design, construction and installation of the power cables. In addition to the added consideration of distance, complications may also arise with connecting cables to a moving foundation[10]. Finally, the advantage of onshore assembly can only be realised if a suitable port is in close enough proximity to the site. In reality this may not be likely, due to the width and depth that would be required for the port to facilitate assembly; this will only become more relevant with the continuous growth in turbine size.

[7] Hannon, M. et al., (2019) Offshore wind, ready to float? Global and UK trends in the floating offshore wind market. University of Strathclyde, Glasgow, https://doi.org/10.17868/69501
[8] Carbon Trust (2015) Floating Offshore Wind: Market and Technology Review. Available at: http://www.carbontrust.com/media/670664/floating-offshore-wind-market-technology-review.pdf.
[9] RSPB (2016) Floating offshore wind farm given the green light from RSPB Scotland following consultation response. Available at: https://www.rspb.org.uk/our-work/rspbnews/news/stories/rspb-scotland-supports-offshore-floating-wind-project/ (Accessed: 16 January 2019).
[10] Hannon, M. et al., (2019) Offshore wind, ready to float? Global and UK trends in the floating offshore wind market. University of Strathclyde, Glasgow, https://doi.org/10.17868/69501

Figure 1 – Types of Floating Offshore Wind structure



Source: Irena, 2018

FOW project design variations

Monopile foundations are currently the most common fixed-bottom design, due to its cost-effectiveness and adaptability to a variety of seabed conditions. However, they begin to lose their economic viability past depths of 35m, where jacket foundations adapted from offshore oil and gas rigs are typically preferred. The jacket foundation is considered to be cost-ineffective in depths of over 50m, which is a major limitation on the development of large-scale offshore wind farm, with high potential markets such as Japan and the US having relatively few suitable shallow water sites[11].

Figure 1 above illustrates the three main design variations for floating platforms:

- **The Tension Leg Platform** (left) utilises anchors that are gravity-based, suction or pile driven. It is currently the least common design type of the three, with one major reason being that it can only be installed on certain types of seabed, making it fairly site specific. However, it does offer flexibility in the fact that it can be utilised at most water depths. If this design is being used for a shallow-water site, it has the benefit of being able to be assembled onshore.
- **Semi-submersible and barge designs** (centre) have the benefit of being able to be assembled onshore so are relatively easy to install; are very adaptable to seabed geologies; and can be used in a variety of water depths, meaning they offer a high degree of flexibility. However, these designs are the most affected by tidal movement and allow lateral motion of up to 50m, which may cause issues with the cabling[12], and its complex design means it is complicated to manufacture.
- **The spar design** (right) is adapted from offshore oil and gas rigs and, as a result, is the most suited design for depths of over 100m. This is due to its utilisation of a large draft, which conversely means that it is not suitable for the shallower locations, making it more site-specific. The size of the draft also means that the structure is typically transported to the site in a horizontal position and then positioned using a specialised vessel, which can lead to both an increase in cost and risk[13]. However, it benefits from the fact that it has a simple design, meaning it is less complex to manufacture than the alternatives.

[11] IRENA (2018) Renewable Energy Benefits: Leveraging Local Capacity for Offshore Wind. Abu Dahbi. Available at: www.irena.org.
[12] Carbon Trust (2015) Floating Offshore Wind: Market and Technology Review. Available at: http://www.carbontrust.com/media/670664/floating-offshore- wind-market-technology-review.pdf.
[13] Hannon, M. et al.,(2019) Offshore wind, ready to float? Global and UK trends in the floating offshore wind market. University of Strathclyde, Glasgow, https://doi.org/10.17868/69501

Conclusion: insurers to familiarise themselves with all three designs

It can be seen that each design offers its own benefits and costs, and developers are likely to choose designs on a case-by-case basis with factors such as water depth, infrastructure/port availability and the physical characteristics of the site playing a deciding role.

Market share for installed capacity in 2025 is expected to be split into 65%, 24% and 10% for Semi-Submersible, Spar and Tension Leg Platform respectively[14], so it is not expected that any single design will become market-standard. As a result, it is paramount that insurers continue to familiarise themselves with the nuances in the technologies, in the same way that the market approaches prototypical onshore turbines. There is also a responsibility on the behalf of the insured to conduct due diligence on which design is the most appropriate for their chosen site, which should be facilitated through risk management services provided by their broker.

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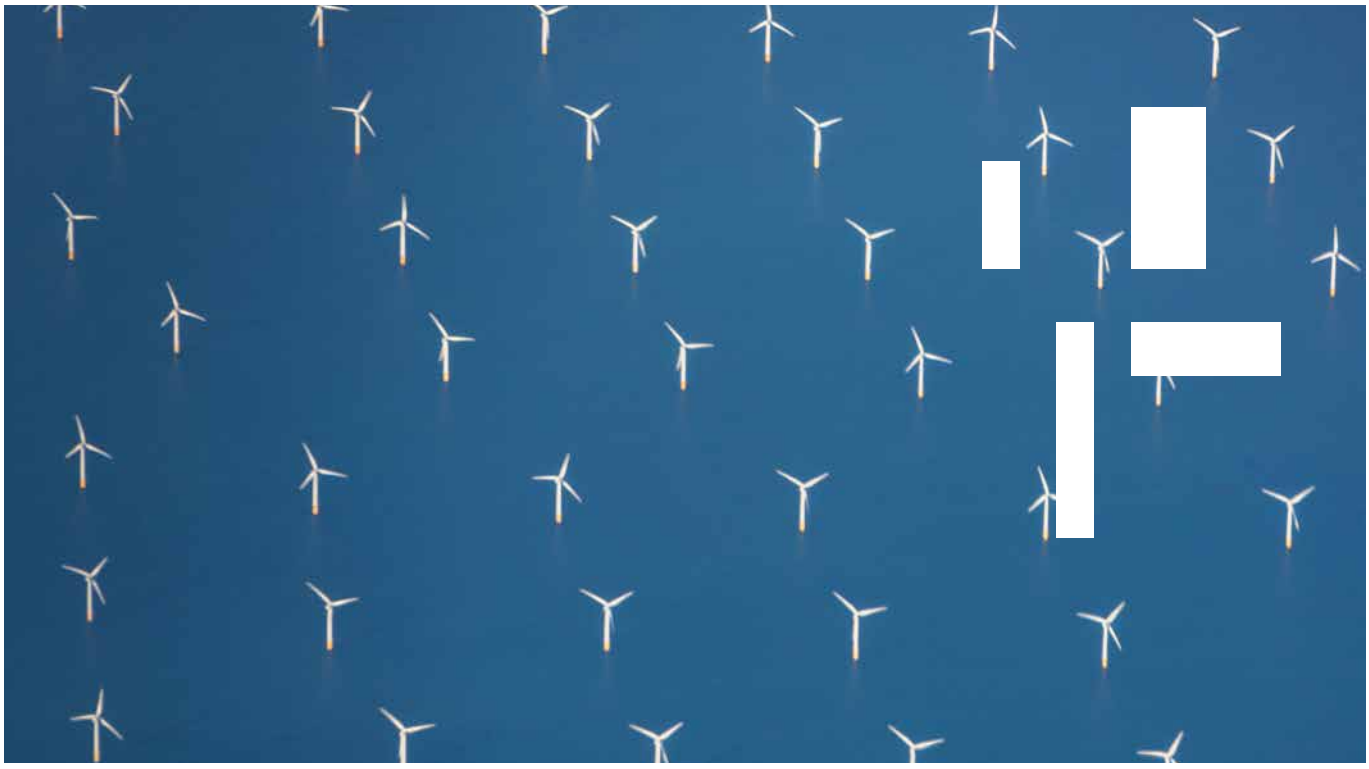
" It is paramount that insurers continue to familiarise themselves with the nuances in the technologies, in the same way that the market approaches prototypical onshore turbines."



[14] Hannon, M. et al.,(2019) Offshore wind, ready to float? Global and UK trends in the floating offshore wind market. University of Strathclyde, Glasgow, https://doi.org/10.17868/69501

Bankability redefined

Introduction: new decade, new landscape!

As a society we find ourselves at the doorstep of the 21st century's third decade. And from this precipice, we see before us a set of conditions that have never occurred in such a combination and at such epic proportions, especially for the renewable/alternative energy industry. So what is it that we see before us?

- A planet that is warming at such an alarming rate and to such a point that the National Geographic stated in its November 27 2019 publication: "irreversible changes in Earth's climate systems are underway" that could pose "an existential threat to civilization" (Tim Lenton and colleagues of Nature)[1];
- The ability to generate electricity via renewable resources at lower cost point than is available from legacy fossil fuel generation[2];
- Affordable large-scale energy storage that, for the first time in history, provides the ability to manage electricity - not just its generation and usage;
- Teams of the planet's brightest and most well-funded minds making frequent announcements about new energy-related technological breakthroughs;
- A global economy consisting of low single-digit to negative interest rate environments; and finally
- A metaphorical global tsunami, consisting of trillions of dollars searching for, and being required to find, bankable Environmental, Social, and Governance (ESG) investment opportunities with acceptable risk-adjusted return profiles.

Are there new ways to utilise insurance capacity?

While this article does not discuss the traditional utilization of insurance capacity, the reader is asked to accept the premise that the vital traditional roles of insurance capacity is not being questioned; instead, it focuses on novel and alternative applications of some of that insurance capacity. As the remainder of the article refers to insurance capacity as a capital source, it will henceforth refer to it as capital.

Energy investments are by nature capital intensive and typically deliver relatively low rates of return. This paradox presents significant financial challenges when considering investing in un-bankable technologies and/or into assets involving financial counterparties that do not possess a published investment-grade credit rating.

But what if these bankability concerns could be satisfied with insurance capital? What if we started treating insurance capital like any other component of a project's capital stack and not just as a balance sheet protection tool? While the applicability of these concepts permeates all aspects of this industry, this article will focus solely on the Commercial and Industrial (C&I) solar marketplace.

[1] https://www.nationalgeographic.com/science/2019/11/earth-tipping-point/
[2] https://www.forbes.com/sites/dominicdudley/2018/01/13/renewable-energy-cost-effective-fossil-fuels-2020/#7cf549b54ff2

The C&I conundrum: the need to resolve "Lose-Lose"

Globally there are many thousands of commercial entities, commonly referred to as Hosts, seeking to avail themselves of the vast financial benefits that are offered by renewable energy assets. Numerous studies have also found that a large majority of these entities have grave concerns regarding climate change and an innate desire to operate their businesses in an environmentally responsible manner. Regretfully for most potential Hosts, these aspirations can sometimes be eviscerated as quickly as they are formed; when these entities start searching for project financing, they can often be told that they are just not good enough.

The financial markets have been relentlessly brutal in their unwillingness to fund C&I solar projects cost-effectively for Hosts without a published investment-grade credit rating. To further exacerbate this situation, this ostracized market segment is one of the few remaining underserved segments in which developers, especially solar developers, may look to receive unlevered double-digit returns.

To clearly restate the problem: this disconnect within the traditional Renewable Energy capital markets prevents most commercial operations with very strong financial ratios from reaping the benefits of renewable energy utilization while simultaneously minimizing investment returns available to the renewable energy sector. The result: a classic "Lose–Lose"!

Isaac Newton meets Wall Street: new platform provides instant bankability

As one of its founding principles, Newtonian physics states that every action must have an equal and opposite reaction. Metaphorically, this principle may also be applied to the world of finance: accordingly, the systemic capital market disconnect and its imposition of such overwhelmingly negative financial consequences discussed above affords an opportunity of equal and opposite magnitude of financial gains for those with the drive, creativity and intestinal fortitude to develop scalable investment-grade solutions.

By the end of Q1 2020 a financial and operational platform is planned to be introduced into the US marketplace that looks to create instant bankability for the currently disqualified but financially strong C&I Hosts. As is often the case when solving such systemic problems, there are no silver bullets. The platform will involve a well-orchestrated combination of existing products and services, re-purposed capabilities/resources and newly created financial tools. The platform is being designed to insert itself in the early development stages of a potential C&I project. The automated platform will proactively manage the accumulation of new projects into asset pools which meet a pre-determined risk profile, as opposed to a traditional post-Limited Notice to Proceed (LNTP) deal featuring specific credit underwriting methodology.

Key platform features

Some of this platform's key elements are:

- **Contract certainty:** predictability has an inverse relationship with risk and is a major keystone of bankability. The contracts supporting C&I projects are inherently more intricate than other forms of solar development; as such, the need for consistent terms and conditions with these contracts cannot be overstated. By maintaining core consistency within these contracts, the risks associated with the projects are more clearly defined and understood.
- **Data, data, data:** in the era of Big Data, there are multiple widely accepted credit default data bases and forecast models available to evaluate the potential credit risks of a particular Host. These models tend to result in a shadow credit rating being developed for the Host. As is the case with most heterogeneous data bases, a varying degree of subjectivity has to be applied as the data points are not directly correlated with the credit risk associated with a particular Host's unwillingness to pay its electricity invoices. There is also typically the need to extend the forecast modelling further into the future than offered by the database provider. Most forecasts models only offer a mid-term (i.e. five-year) outlook into the future, while the investments typically need 10 years of bankable revenue to be successful.
- **Automated project screening platform:** project acquisition cost and consistent project quality is imperative to creating bankability and realizing optimal returns. A properly designed software package will allow project developers to upload project data along with the Host's financial data into a cloud-based system that, in real time, determines if the candidate is viable. The software will be programmed to manage specified asset pools to their predetermined asset-level and pool-level credit requirements and risk profiles.

- **The "Bankability Wrap":** to assure investors that this platform will surpass the scrutiny of the credit/bond rating agencies, a great deal of collaboration and input from such firms was included in the development of these tools and in the creation of the final key component: a long-term, non-cancellable, fixed-cost insurance policy with a minimal credit rating of S&P A, which secures the payment performance of the pool.

And the result – new investment opportunities!

Binary outcomes rarely exist; this vast pool of potential C&I Hosts presents a range of outcomes. With this bankability platform the financial markets see investment-grade opportunities; without it, the markets can often simply state that they are just not good enough. This bankability platform is designed to transform the C&I industry into an investment opportunity that may best be characterized as follows:

- As the pool of eligible Hosts grows exponentially, C&I project development velocity and scale will dramatically increase, thereby reducing project costs and enhancing investor returns.
- Revenue pools that are technically un-bankable are transformed into investment-grade assets, which will easily exceed the most stringent rating agency scrutiny.
- Access to the benefits derived from the utilization of solar generation will instantaneously be realized by the millions of previously ineligible commercial operations.
- Armed with superior capital costs and unparalleled operational efficiencies, these firms will deliver an unparalleled value proposition to this marketplace.
- C&I project developers will have the ability to approach institutional-level investors with a highly-rated investment opportunity; an opportunity that not only delivers superior risk-adjusted returns but also instantly starts satisfying their ESG investment objectives.
- For the purchaser of this insurance-backed solution, it provides a rare opportunity to treat insurance capital as any other capital source and to receive a positive return on the investment as opposed to a sunk cost.

Conclusion: bankability re-defined

There is a school of thought that would describe the renewable energy industry as a finance, legal, and technology sector that happens to do great things with electricity instead of lumping it into a legacy energy category.

While this article is not endorsing one thought process over the other, the solutions discussed above are only possible when one chooses to view the industry from the broader perspective. By viewing insurance as a capital source that specializes in long-term data-driven decision making, one can craft solutions that fill the voids created by traditionally-defined capital providers - thereby redefining bankability.

Danny Seagraves is a risk management and risk finance specialist working for Willis Towers Watson in Charlotte, North Carolina.

"By viewing insurance as a capital source that specializes in long-term data-driven decision making, one can craft solutions that fill the voids created by traditionally-defined capital providers."

Hybrid Renewable Energy: building the bridge to an all-renewable future?

Introduction: renewables more competitive than ever before!

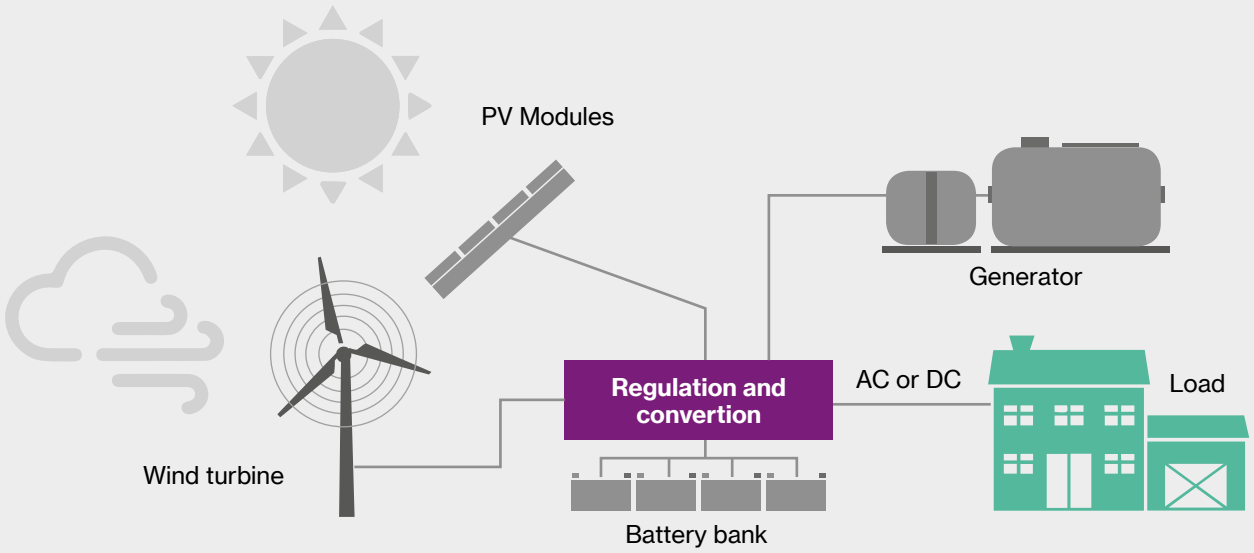
Climate change: the key challenge of the 21st century, and a rising and prominent topic of discussion in recent years worldwide. “The world cannot afford to press “pause” on the expansion of renewables and governments need to act quickly to correct this situation and enable a faster flow of new projects,” said Dr Fatih Birol, the International Energy Agency’s (IEA) Executive Director. “Thanks to rapidly declining costs, the competitiveness of renewables is no longer heavily tied to financial incentives. What they mainly need are stable policies supported by a long-term vision but also a focus on integrating renewables into power systems in a cost-effective and optimal way[1].”

But - flattening growth trend fuels concerns

According to the Global Energy & CO2 Status Report 2019, global CO2 emissions rose 1.7% to a historic high in 2018[2], mainly due to emissions from fossil fuels driven by higher energy consumption. Furthermore, emissions from the power sector accounted for nearly two thirds of emissions growth[3]. The solution seems simple; cut man-made greenhouse gas emissions, phase out fossil fuels and move to renewable energy. Renewable capacity additions need to grow by over 300 GW on average each year between 2018 and 2030 to reach the goals of the Paris Agreement, according to the IEA’s Sustainable Development Scenario (SDS)[4]. And yet, after nearly two decades of strong annual growth, renewables around the world added as much net capacity in 2018 as they did in 2017[5], an unexpected flattening of growth trends that raises concerns about meeting long-term climate goals.

[1] https://www.iea.org/news/renewable-capacity-growth-worldwide-stalled-in-2018-after-two-decades-of-strong-expansion
[2] https://www.iea.org/reports/global-energy-and-co2-status-report-2019/emissions
[3] https://www.iea.org/reports/global-energy-and-co2-status-report-2019/emissions
[4] https://www.iea.org/news/renewable-capacity-growth-worldwide-stalled-in-2018-after-two-decades-of-strong-expansion
[5] https://www.iea.org/news/renewable-capacity-growth-worldwide-stalled-in-2018-after-two-decades-of-strong-expansion

Figure 1 – How a hybrid power system combines multiple sources to deliver non-intermittent electric power



Source: https://www.energy.gov/energysaver/buying-and-making-electricity/hybrid-wind-and-solar-electric-systems

Barriers to renewable energy industry development

So why aren't we building more renewables projects? The main barriers to renewable energy industry development are:

- **Capital costs –** despite falling capital costs, the upfront expense incurred to build the technology is still considered expensive. Consequently, financial institutions tend to lend money at higher rates, making it difficult for developers or utilities to justify the initial investment.
- **Transmission –** this is building the infrastructure required to move the electricity from where it is generated to where it is consumed. This is not only costly, but also requires extensive negotiations, contracts, permits and community relations, which are extremely time-intensive.
- **An emerging industry –** the renewable energy industry is still relatively new. The technology must compete with older, well established, wealthier industries that benefit from existing infrastructure, expertise and policy.
- **Reliability/variability –** this is perhaps the biggest barrier that the renewable energy industry needs to overcome. Unlike traditional energy sources which can be ramped up and down on command, renewable energy plants produce power only when the sun is shining or the wind is blowing. This is less attractive to grid operators, who must accommodate this uncontrollable variability and who need to keep excess reserves running just in case.
- **Low capacity factor –** further to the variability problem, in 2014 the average capacity factor (i.e. production relative to potential) for utility-scale solar PV was around 28%; for wind, 34%, according to the Energy Information Administration. (By way of comparison, the average capacity factor of US nuclear power was 92%)[6]. Because of the renewable energy industry's low capacity factor, conventional plants are needed to take up the slack; however, because of the industry's high output in peak hours, conventional plants sometimes don't get to run as often as needed to recover costs.

What is HRE and why is it a potential solution?

There are many solutions proposed for these highlighted problems. However, one solution seems to stand out: Hybrid Renewable Energy (HRE). HRE projects combine two or more forms of energy generation, storage or end use technologies; for example, wind and solar technologies, coupled with an energy storage system. Wind power is typically most productive during the night and solar only produces during the day; combining both

[6] https://www.vox.com/2015/6/19/8808545/wind-solar-grid-integration

resources with energy storage allows project developers to maximize the revenue generation from a given amount of land and grid interconnection. Curtailed output will end up in the battery, which is programmed to either sell electricity into the grid when prices are high (arbitrage) or inject power to provide grid ancillary services, such as frequency regulation.

What are the advantages?

The key advantages of HRE technology can be easily identified:

- **Continuous power supply –** the HRE system provide power continuously, without any interruption, as the batteries connected to them store the energy. So when there is an electricity outage, the batteries work as an inverter to provide back-up.
- **Energy efficiency –** there is no waste of excess energy; the balance is maintained.
- **Low maintenance costs –** wind and solar farms are not expensive to operate.
- **Load management –** the HRE plant has ability to adjust energy supply according to the energy sources that it is connected to.

Barriers to deployment

On the other hand, there are some substantial obstacles to overcome before this combined approach can be deployed on a large scale. These can be summarised as follows:

- **Location suitability –** there is the need for a significant area of land to be considered a site suitable for both solar and wind technologies, with enough sun and wind to make the investment viable.
- **Technology –** Some technologies are still relatively new and considered prototypical. For example, the insurance market is particularly concerned by and adopts a cautious attitude to Battery Energy Storage Systems (BESS), which have incurred some large losses in recent years. Whilst it is true that a BESS unit attached to a wind and solar project might be viewed more favourably by underwriters than a standalone BESS project (owing to overall premium spend and general risk attractiveness) there is also a greater possibility for significant losses from a property damage and loss of revenue perspective. Losses could be further aggravated by Liability claims in the event of shared grid substations and/or multiple-owner developer involvement in the hybrid renewable plant. Careful consideration should be given to the technology chosen for these projects; a focus on proven technology with adequate fire detection and protection systems is essential.
- **An immature market –** there is still a lack of hybrid project accreditation and interconnection processes. From an insurer perspective, lack of experience and lack of loss history makes it difficult to really ascertain the most likely risk exposures relating to the construction and operation of a combined plant.
- **High initial costs – t**he cost of construction will be expensive, but developers should also consider the subsequent financial impact. For instance, it will be difficult to secure competitive/attractive financial investment; furthermore, the insurance premiums for these projects will be expensive, given the perceived increased risks to underwriters. And, of course, the hardening insurance market is hardly conducive to new and emerging technologies and solutions!

Conclusion: the next frontier in renewables?

In conclusion, HRE projects are certainly emerging as a major trend in the global transition to renewable energy, which can lead the scale-up of renewables. The real growth in these projects has occurred in the past two years, driven in part by new projects pioneered in India, with hybrid renewable energy projects developing at a larger scale now evident in Mongolia, Australia, China, Europe and even the USA. “Hybrid is the next frontier in renewables,” says Mike Bowman, chief technology officer of GE’s Renewable Hybrids business. “It’s a paradigm change driven by technology development and market development[7].” Governments, investors, insurers and grid operators should prepare for the rapid growth of these systems to ensure they do not become barriers to technology and/or market development, but facilitators to real climate change solutions.

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[7] https://www.energy-xprt.com/articles/the-rise-of-the-hybrids-new-ge-unit-blends-batteries-and-renewables-to-boost-wind-and-solar-power-ou-826315

CSPs: a tale of two technologies

Introduction: underwriters on the edge of their seats...

Two new Concentrated Solar Power (CSP) plants located in Israel reached a critical phase of their lifecycle last year –the start of their testing and commissioning phases and consequent transitions into full-time operation. This crucial stage in the projects' lifecycle, when the CSP plants were fired up to full power, had insurers of the construction phases on the edge of their seats. Those who had agreed to cover the operational phases also watched with full attention, eager to find out whether their commitment to underwrite the first year of operations was a wise decision.

Geographically, these plants - Ashalim A, a 121 MW Parabolic Trough (PT), and Ashalim B (also known as Megalim), a 121 MW Solar Tower (ST) – are situated across the road from each other. And whilst both are classified as CSP projects, their risk profiles are very different.

Parabolic Trough (PT) leads the way

Globally, PT is leading the race as the dominant technology choice in the market. Out of the top ten CSP projects by size, nine are PT and only one is a Solar Tower (ST) – the 377 MW Ivanpah Facility in the Mojave Desert, which is further made up of three individual ST's[1]. This installation had the first-ever utility scale direct steam ST's . This dominant theme continues through the top 25 CSP projects worldwide, with just two out of this group being STs[2].

In this article we will examine the tale of these two technologies: the different risk issues, how the insurance market has responded, and critically, what a project owner can do to derive optimal terms from the global renewable energy insurance market.

Technology One: Parabolic Trough (PT)

Long PT history provides insurer comfort

Large scale PTs have been in operation since the 1970s. This rich history has given many years of proven operational experience globally; subsequent operational issues, failure modes and long-term performance have become better understood as the decades have unfolded. Accordingly, this has established a strong supply chain of both developers and contractors (EPC & O&M etc.) with in-depth knowledge of the technology.

In fact, the technology was designated as being fully mature by the National Renewable Energy Laboratory (NREL)[3] in 2003. Subsequent advancements in the technology are focused on technical nuances to increase performance and efficiency rather than large leaps, in as will be evidential in the ST type.

Moreover, PT losses, such as broken concave mirrors or natural peril related losses, have given the insurance market, contractors and designers a greater understanding of the risk issues faced by this technology, given that this loss data has been fed back into improving the technology over the years.

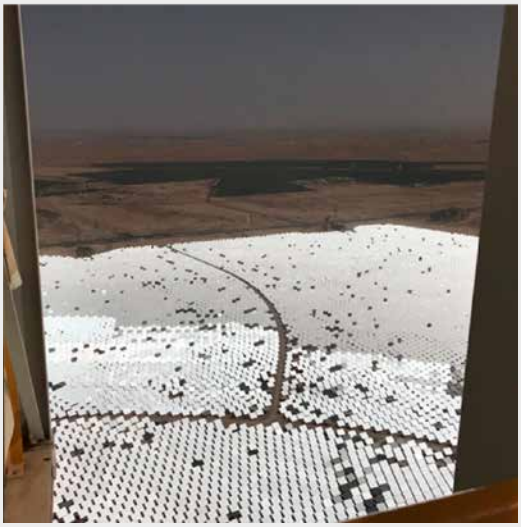
This track record, together with the insurance market's increased understanding of these risks, has released increased capacity to underwrite such projects. PT Plants regularly leverage this increased supply to obtain broader and relatively cheaper insurance cover than is currently available to plants featuring the ST technology.

"This crucial stage in the projects' lifecycle, when the CSP plants were fired up to full power, had insurers of the construction phases on the edge of their seats."

[1] https://cleantechnica.com/2016/04/27/ivanpah-raised-performance-second-year/
[2] https://en.wikipedia.org/wiki/List_of_solar_thermal_power_stations
[3] Executive Summary: Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Forecasts

Figure 1 – Megalim Solar Tower

Figure 2 – View from the Top of Megalim Solar Tower



Technology Two: Solar Tower (ST)

Insurance market apprehensive of ST technology

Being a relatively newer technology, with the first projects developed in the late 2000s, STs face greater unknown financial, technology and technical risks than PTs. Both the tower and the Solar Receiver Generator (SRSG), the standout components of a ST plant, are generally labelled as large risk by the insurance market and are notably less proven at scale.

At 250 metres, the Megalim CSP plant in Israel (Figure 1 above) boasts the highest solar tower in the world[4]. It also has the largest heliostats (reflective mirrors) by surface area, technology considerations for many underwriters – where positive risk engineering, understanding and collaboration between such projects and their insurers about these evolutions can help, in part, to understand and such developmental concerns.

The supply chain is also limited; there are only a small group of companies with the knowledge and expertise to make the unique components of the technology, such as the heliostats and the SRSG. Projects built using the same contractors continue to implement lessons learnt from their predecessors; this gives the market greater comfort, but there are still many unknowns with the uplift in project scale and advancement of technology.

ST complexities and concentrations

The SRSG is a very complex structure which is custom made for a ST project. The tower and SRSG in unison represent a single point of failure for the plant. If any of these units fail, then the entire plant is taken offline, which creates a significant DSU (Delay in Start-Up) exposure during the construction phase, or BI (Business Interruption) exposure during the operation phase. The lead replacement times for these items are generally quite long; sourcing spares to keep on site is often uneconomical.

[4] https://www.powerengineeringint.com/2017/01/10/israel-building-world-s-tallest-solar-power-tower/

Natural risk is also a concern. The tower itself must be built to survive the local atmospheric weather and earth conditions, as well as natural phenomenon such as earthquakes. Moreover, the SRSG is of considerable mass; the significant load at the top of the tower, with large volumes of high-pressure fluid flowing and quantities of energy fluxing through, add to the technical challenge. One underwriter recently described this technology type as having a "very heavy boiler on a stick" (in Megalim's case, 2,500 tons). The SRSG is a significant cost of the technology, generally around 10% of total capital expenditure[5]; should this be damaged, the cost of repair is high. Allied with this is the likely long lead time to repair or replace, which can cause a significant drop of production and financial loss to a project. All this will be factored in by a technical engineering underwriter before even considering the other single point of failure, the conventional steam turbine that is situated at the base of the tower (this is also an issue for the PT).

ST losses and insurer considerations

Given the limited number of STs in operation, most of the losses to date have occurred during the erection of the plants. History has shown contractor negligence, and the failure of auxiliary boilers and booster heaters in STs. Natural events have also led to losses; there has been flooding at a project as a result of a thunderstorm, and high winds damaging heliostats.

Common mechanical, electrical breakdown and fire risks must be addressed within the solar tower. If the focal point of the mirrors or a subset of these (and there are many) is marginally off the intended target, then the sun's rays may be focused on a section of the SRSG not designed to handle the large influx of solar energy. One fire at the Ivanpah facility[6] was the result of just this scenario[7]; the situation was only made worse by the fact that the fire occurred some 200 metres up in the air - an issue which a Parabolic Trough power plant would never have to contend with. Besides the Physical Damage element, projects can be plagued by lower than expected production; for example, the Ivanpah facility took a few years for performance to reach 97.5% of its contractual power output[8]. Prudent insurers would look to ensure that these issues are taken into consideration on future projects.

Looking ahead - a desert of power towers as the climate changes?

We are already seeing more of this power tower technology being planned globally[9], particularly in the United States where projects generating as much as 2 GW are now being planned[10]. If they come to fruition, these will comprise ten individual 200 MW power towers in the Nevada Desert, with the additional of molten salt energy storage for 24/7 operation; a similar largest scale project is being considered in Saudi Arabia[11].

In parallel, the emerging trends of climate change, geopolitical concerns and cyber risks are new considerations for developers. The insurance industry is offering new and alternative solutions in this sphere and it will be interesting to see how both existing and future projects approach these risks.

"The insurance industry is offering new and alternative solutions in this sphere and it will be interesting to see how both existing and future projects approach these risks."

[5] IMIA Working Group Paper GW 84 (14) – Solar Thermal Power
[6] Source: San Bernadino County Fire Department
[7] https://riskandinsurance.com/solars-risk-challenges/
[8] https://www.technologyreview.com/s/601083/ivanpahs-problems-could-signal-the-end-of-concentrated-solar-in-the-us/
[9] http://analysis.newenergyupdate.com/csp-today/siemens-supply-turbines-giant-dubai-csp-plant-saudi-arabia-targets-27-gw-csp
[10] https://www.solarreserve.com/en/
[11] http://analysis.newenergyupdate.com/csp-today/siemens-supply-turbines-giant-dubai-csp-plant-saudi-arabia-targets-27-gw-csp

The insurance placement process

Developing insurance market appetite

The insurance programme placement process for CSPs is complex. Capacity in the market is limited, as historic claims have led several insurers to remove CSPs from their strategic plans; only a few now possess the technical understanding to effectively underwrite these projects. However, in the case of PT technology there are decades of precedent on which insurers can base their understanding of the risk and subsequently guide their underwriting. In contrast, ST technology suffers from a limited number of predecessors; as such, delivering optimal insurance programmes can be particularly challenging.

Some segments of the wider insurance market, particularly smaller players who are comparatively "risk seeking", are keen to get closer to this technology. However, they are not positioning themselves to lead such a technical programme and overall risk appetite and line sizes remain relatively low.

"Safety first" approach

The general market approach to any novel technological development, such as the advancements to the ST type, is to constrain cover and/or charge a higher premium for the heightened risk until an operational track record is established. For some insurers, if a technology appears in their opinion to be "unproven", then even the prospect of charging additional premium is generally not enough for them to deploy their capacity. Instead, they would look to further constrain cover and/or reduce line size – and sometimes to decline the risk all together or limit to external perils only. It is often said that insurance is not an appropriate solution for prototypical technology risks, which should remain instead with the developer or the manufactures; indeed, the low carbon sector is coming to terms with this at present on several clean energy technologies.

Transitioning from construction to operation

A project owner also needs to be aware that the market views operational risks as a different risk profile to that of construction. Specialist insurers who write the construction are often not interested or able to underwrite the operational phase – it's not in their risk appetite or treaty permissions. Losses during construction will further impact underwriter interest as operational underwriters consider their position. Recently the market has seen the withdrawal of key construction markets due to losses faced across many different types of risks – sadly this has also meant many job losses; this has added uncertainty into the mix. A project owner should be aware of how the ever-changing insurance market dynamics can impact their project.

As with any power project, the underlying maintenance period provided by the construction insurers is crucial, as any issue during the initial years of the operation can be latent from the construction activities. If there is a loss event, and there is not a seamless panel of insurers on both placements, and furthermore it is unclear from the root cause analysis whether the loss is resulting from construction defects or operational issues, disputes may arise. History has shown us that those who write the construction policy - even the incumbent lead - are not necessarily going to write the new stage of the project's life.

Requirement for knowledgeable lead

As with any placement, a knowledgeable lead insurer is a crucial part of the process. An inexperienced lead market underwriting the technology may discourage follow markets by under-pricing and/or agreeing cover and terms which are simply unsupportable.

The "long walk"

For the largest and most complex of this class such as STs, the placement process is considered in the market as "a long walk"; this relates to the days of brokers walking around the market and negotiating fiercely to obtain capacity at the desired terms. Where large values must be covered, many insurers will be required to complete a placement.

Firstly, this scenario does require a reputable lead to set the terms. In special instances, the use of a lead and a co-lead underwriter to collectively pool market knowledge can help refine terms and provide greater confidence to other participants in the marketing process. Positioning both a lead and a co-lead insurer also gives a project greater insurance security should the lead decide not to renew after their policy period has expired. This can happen, in today's market, as projects transition from construction to operation and underwriting strategies change including that of the Decile 10 Lloyd's initiative. The hard market and scarcity of knowledgeable leading markets has also seen the resurgence of lead underwriter engineering fees, payment for their time and expertise in often extensive assessments of the complex risks. These also have to be factored into the ultimate risk premium to the client.

The effect of Decile 10

Equally important is the state of the insurance market which is facing significant hardship. In London the "Decile 10" initiative at Lloyd's - a historic home for unique and difficult risks, and where much of the expertise for underwriting these risks exists - has resulted in increased scrutiny of loss-making syndicates and power risks. Power in general has faced significant underwriting losses as of late, and all eyes at Lloyd's are on profitable growth.

As a result of the hardening market and apprehension to this technology, it is expected that concessions will have to be made by all by project owners, lenders, contractors and insurers to get to a point where a bankable and 100% support insurance programme is delivered - a process that typically involves significant negotiation and mediation by the placement broker.

The two technologies – how to get the best out of a hardening market

Any major placement of risk for a CSP facility requires a collective, globally coordinated marketing approach. Gone are the days of underwriters deploying plentiful capacity in the power sector; insurers are unlikely to put down large lines, even when the limits are generally quite low. The type of technology configuration, down to the finest details, will have a further bearing on their approach.

From a cost perspective, the price of insurance for CSP programmes can be twice as high as compared to conventional power classes. Moreover, ST risks are considered comparatively more expensive than PT programmes, both for the reasons already discussed but also due to the existence of the power tower and equipment at height, which further raises the risk profile (and Probable Maximum Loss) during both construction and operation phases.

The value of market roadshows

When taking a CSP risk to market, brokers are finding that underwriters who previously would have written these types of risk are now much more cautious. Close collaboration between the project and insurers, augmented by brokers in market roadshows, are an invaluable and often overlooked part of the placement process, even for a renewal. Insights into the technology types and experiences of the past are crucial, certainly for novice

STs. Although underwriting capacity is relatively limited in today's underwriting climate, there is still enough available to deliver a comprehensive programme for even the largest plants out there; London, as the home of insurance, has all the connections and routes into other global markets to make it happen.

Communicating the risk and cover

A constant and clear flow of key information from project team to insurers helps the latter to better understand the risk and will lead to the best possible results. It is a given that insurers will request a significant amount of project detail. This will include technical information, risk management plans and protocols, replacement times, financial models, plant layouts and, where possible, detailed independent risk engineering surveys. Making such documents available and responding to follow up questions in ample time is crucial to aiding the markets underwriting process.

Following the underwriters' understanding of the technical aspects of the projects, the next element to consider is the coverage that has been requested. An insurance advisor, that has as strong understanding as the underwriters of both the technical and commercial aspects of the project, is crucial to delivering a fit for purpose and cost-efficient solution. They should be engaged in the process as early as possible.

Finally, it should be noted that if lenders are involved there must also be open communication between both project and lenders insurance advisors so that the insurance requirements are not set too wide, but in a form that allows for such a streamlined solution.

Future insurability of CSP

On the whole, insurability of the PT technology has its grounding on the numerous projects already built and operating. There may be minor adaptations to the technology, improvements to some Steam Turbine Generators here and there, larger fields and some changes to the designs, but this technology is mature and insurability comes down more to the posturing of the insurance market rather than technical issues.

However, future insurability for ST is more uncertain. The technology is going to be advanced over time; the power towers may get taller, the mirrors larger and fields more extensive. As the design evolves, the price of the technology will fall, interest from developers will increase and the role of insurance to make them bankable will be even more crucial to the continued growth of this technology. Effective risk management and transfer are necessary to protect all parties' interest, which will act as a feedback loop. And as bankability grows, greater investment will go into Research & Development to further drive down the price.

The success or failure of the latest projects as they move into the operation phase will be a significant test of the insurance market's appetite to take on these risks. However, it is important to consider the difficulties that the insurance market is facing, especially in the traditional construction markets, and now we have a situation which could go either way for the insurability of this technology. If it goes well, capacity will increase, driving competition for such risks and reducing the cost of insurance. And further innovative insurance structures can be designed, or capacity accessed from non-traditional means, in order to provide these projects with the required protection.

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De-risking "known unknowns" in renewable energy

Introduction: the "known unknowns"

Former US Defence Secretary Donald Rumsfeld once famously said: "We know there are known knowns and we also know there are known unknowns; that is to say we know there are some things we do not know.'

Renewable Energy projects, regardless of technology - Wind, Solar or Battery Storage - have project lifecycles populated with dozens of known unknown risks. The job of a good risk advisor is to anticipate and tease out the known and unknown risks and avoid or reduce the risk of them occurring or mitigate the impact when they do occur. This forensic analysis and quantification will have a direct impact on both the insurability and bankability of the project.

How reliable are existing renewable energy projects?

With many countries now producing close to 50% of their electricity from renewables and therefore becoming increasingly dependent on this relatively new industry, there is quite naturally a focus on the reliability of existing renewable energy projects as well as the introduction of new projects coming onstream. On December 8, 2019, UK wind farms generated more than 16 GW of power for the first time; wind supplied 43.7% of electricity, nuclear 20,5%, gas 12.8%, biomass 7,9% while 7.4% came from imports[1]. The extra power meant the National Grid paid some households to use electricity, as it was cheaper than paying the operators of wind turbines to stop them generating. The energy mix is changing, and the current climate movement will only further encourage the renewable energy contribution to increase. Currently there at nearly 7,000 UK independent commercial-scale projects in operation[2].

As the global renewable energy industry matures, the insurance market has not unsurprisingly felt the impact of increased volume of claims, and magnitude of losses. Bigger projects, greater sums insured, larger targets for natural catastrophe perils (for example, the $80m hailstorm loss to a solar farm in West Texas in 2019) have increased the risk to projects and insurers.

How can the industry remove risks from the balance sheet?

Specialist renewable energy risk advisors guide and advise developers and contractors alike though the phases of a project, helpfully summarised in Figure 1 below. The project is challenged at each anticipated phase to consider what the known risks are, as well as the potential unknowns.

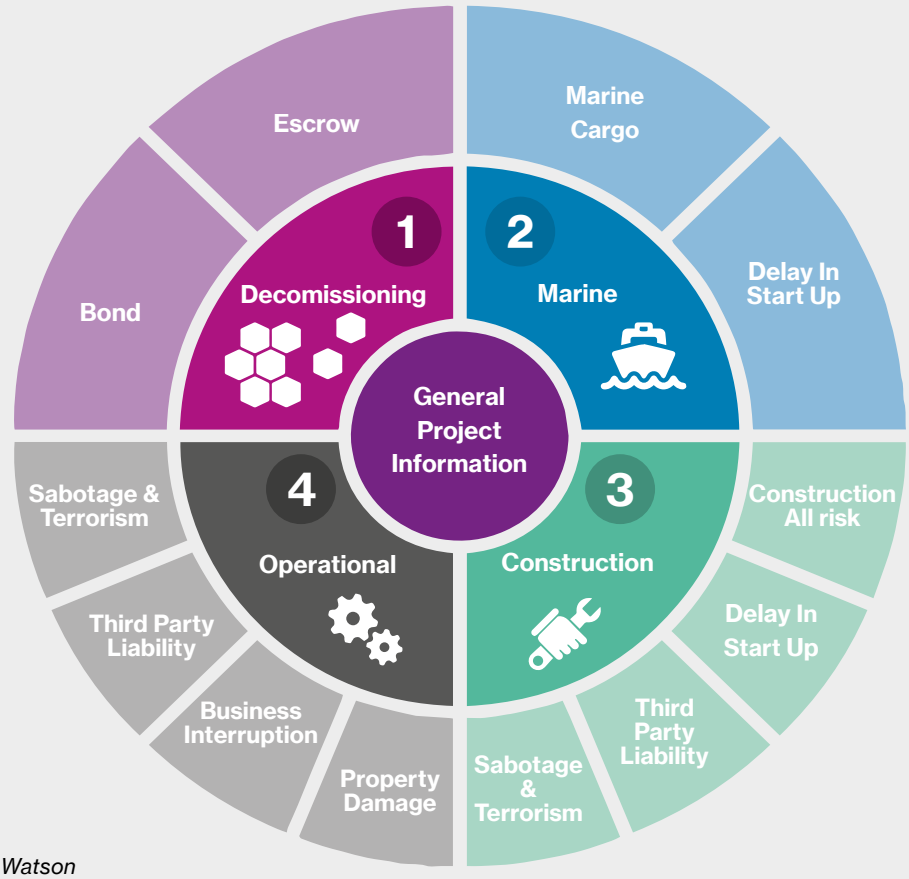
The key question

To date, there have been certain risks, such as long-term liabilities and potential legal challenges, that project owners have simply accepted, or felt obliged to accept onto their balance sheet as they were unaware of an alternative approach. However, over the last five years, experienced project owners and their legal and financial advisors have posed the question:

"Is there anything that insurance could do to avoid these types of risk and or transfer them away from the balance sheet?"

[1] https://www.energylivenews.com/2019/12/10/uk-hits-renewable-energy-record-as-wind-shatters-16gw-threshold/
[2] https://www.edie.net/news/10/In-numbers--Charting-the-rapid-growth-of-renewable-energy-in-the-UK/

Figure 1 – A typical renewable energy project lifecycle



Source: Willis Towers Watson

Banks and lenders have in fact eagerly sought to reduce these known risks on projects and begun to engage with the insurance sector. Whilst the insurance market has been dramatically hardening in the last 12 months, the Lloyd's and company insurance markets have remained incredibly receptive and innovative when it comes to developing new risk solutions for this fast maturing sector.

Increasing "known unknown" risks for Wind and Solar projects

Legal challenges, such as Judicial Reviews to planning applications/permits, have increasingly been seen in the UK, France, Germany, Sweden and Ireland as projects continue to attract divided sentiment amongst the population. For example, Sweden requires an "environmental permit" which can expire, so fresh permits must be applied for and the application processes can be lengthy. This protracted process can lead to more uncertainty over potential challenges that could be mounted, so seeking protections against future challenges would provide a level of certainty.

Third party rights and title ownership discrepancies need to be fully considered at the earliest possible stage in the project lifecycle process. Project principals and lenders need to identify who are likely to mount a challenge; recent experience shows that this can range from individual third parties and landowners to environmental groups. In certain territories, 'serial challengers' have caused considerable delays and financial loss to renewable energy projects.

Known potential losses

If there were a challenge to a wind farm or solar park project, then owners could find themselves incurring considerable legal/professional costs. The project CAPEX could be threatened, and the project might conceivably and quite likely incur a loss of asset value. These challenges and delays will inevitably cause a loss of revenue which would not be traditionally protected by Property Damage and Business Interruption insurance, as there has been no physical damage.

Mitigating the "known unknowns" – some case studies

So, to counter these known unknowns, a number of risk solutions have been tailored to protect against these increased exposure in the Renewable Energy sector. The following are some examples of just such challenges that have been posed to risk advisors and the innovative risk solutions designed to mitigate the "known unknowns".

Case study: Environmental Permit Challenge 1

Country

Sweden

Asset

Pre-construction wind farm

Insured risk

Third party legal challenge to the extension of an Environmental Permit to facilitate the construction of the wind farm.

Threat to the Developer

The team ran a downside scenario of a five-month delay to one of the projects. A five-month delay would cause 19/41 turbines to miss the permit deadline resulting in an economic loss of €50M.

Risk solution

Indemnity to protect the Operator against any delays caused by a third-party legal challenge to the Environmental Permit.

Key losses covered

- legal/professional costs
- loss in market value
- costs
- permit costs
- loss of revenue

Case study: Rotor Diameter Challenge 2

Country

Ireland

Asset

Operational wind farm

Insured risk

Blade diameter of the as built turbine is different from that for which planning permission was first granted under planning permission

Risk solution

Indemnity to protect the Operator and Lender that any court of competent jurisdiction make an Order requiring the turbines to cease operating

Key losses covered

- legal/professional costs
- costs and expenses incurred by the Lenders under the PPA Guarantee for any period during which the owner is unable to use the Property for the purposes of the Insured Use
- loss in market value
- reinstatement/demolition costs
- costs to regularise planning

"A number of risk solutions have been tailored to protect against these increased exposure in the Renewable Energy sector."

Case study: Rotor Diameter Challenge 3

Country

UK

Asset

Pre-construction wind farm

Insured risk

Long term PCG on the Balance Sheet for an Indemnity to a Statutory Provider

Insured risk

In order to carry out works to construct an access road install cable ducts, lay and use cabling in the vicinity of a gas pipeline, the Wind Farm entered into a Deed of Consent and Waiver with the Statutory Provider to an provide an indemnity with a limit of £10M should the pipeline be damaged. A Parent Company Guarantee was also required from the owner to the Project.

Risk solution

A bespoke Defective Title insurance policy to cover the Lift and Shift indemnity agreement, with a limit of £1M rising to £2m over the period of the lease.

Key losses covered

- damage or compensation awarded by an Order
- the landlord requiring the Insured to lift and shift the cable
- costs of any settlement (with the landlord)
- cost and expenses

Case study: Rotor Diameter Challenge 4

Country

UK

Asset

Operational wind farm

Insured risk

Long term PCG on the Balance Sheet for an Indemnity to a Statutory Provider

Insured risk

In order to carry out works to construct an access road install cable ducts, lay and use cabling in the vicinity of a gas pipeline, the Wind Farm entered into a Deed of Consent and Waiver with the Statutory Provider to an provide an indemnity with a limit of £10M should the pipeline be damaged. A Parent Company Guarantee was also required from the owner to the Project.

Risk solution

A bespoke policy was provided, for the term of the lease, to protect the Project against any loss following damage and a demand being made under the PCG. This enabled the investor to proceed with the purchase of the Project.

Key losses covered

- All losses including costs and expenses, as a result of a demand on the PCG
- All losses involved in any settlement with the Statutory Provider
- All other costs and expenses associated with the claim.

Conclusion: new solutions ensure bankability and viability

Donald Rumsfeld's coining of the phrase "known unknowns" has proved a useful trigger to discuss the key risks of a renewable energy project. This should be done at the earliest possible opportunity, ideally during the pre-planning phase.

Good risk intermediaries have demonstrated their ability to help de-risk many challenging projects, including using the above innovative risk solutions to ensure their bankability and long-term economic viability. What's exciting is that a number of project opportunities for developer and investors could come back into play if such long-term liabilities can be removed - whether it be through Asset Protection, Defective Title Liability, Judicial Review policies or Legal Liability Risks, all these solutions protect projects against known and unknown risk in the long term.

Adam Piper is an Account Director, Renewable Energy GB, Willis Towers Watson.

"Good risk intermediaries have demonstrated their ability to help de-risk many challenging projects, including using the above innovative risk solutions to ensure their bankability and long-term economic viability."

Cyber risk and the renewable energy industry

Introduction – a changing energy system

In a time of an ever-evolving geopolitical conflict, the integration of technology into business processes and the increased interconnectivity of our world, we are seeing a growth in both the sophistication and number of cyber incidents, both malicious and accidental. Hacks are getting easier to build and simpler to obtain, while the attack surface is growing.

The renewable energy industry is no different to any other in this regard; while it can leverage the lessons of other industries, it also must face up to the challenge in quite a different way. For as the power transition continues to ramp up and technologies evolve, the industry has large numbers of distributed assets connecting to the grid system in a way that has not been seen before; all must be protected to ensure power supply stability.

This article does not intend to give an overview of the many incidents that have occurred, nor the different types of ransomware, malicious and destructive malware, or social engineering techniques being utilized by cyber operators to gain access to IT and industrial control infrastructure. This has been written about numerous times, across many media.

Instead, this article intends to give risk managers, executives and other stakeholders in a renewable energy-focused business greater clarity over:

- how the risk may impact on them;
- how the insurance sector is currently able to address the challenge of cyber risk, be it from a malicious attack, human mistake, or a technology failure.

Our approach to this will start by giving an overview of cyber risk in the context of four different business elements of a renewable energy developer. Whilst we apply this thinking to a developer, this can be adapted to other participants in the renewable energy supply chain from as an asset manager, contractors, grid operators, and even financiers. We will then turn our attention to the global insurance market and explore how it currently is approaching this issue, both in the traditional and the specialist markets. Finally, we will look at how renewable energy companies at this moment should approach this issue so that they are cyber-resilient in an intelligent manner.

Figure 1 – Elements of a business

Source: Willis Towers Watson

Four elements of a developer

To illustrate cyber impacts on a developer, it is prudent to explore the four elements in Figure 1 above:

1. **People –** a business' greatest asset, but also its weakest link. Your employees may play a role in an incident themselves, as a large proportion of incidents can ultimately be traced back to human factors such as talent shortages, skill deficits and employee engagements. However, there is also an element of ensuring that your employees know how to react in the event of a cyber incident affecting your business, so that damage is mitigated as much as possible. Furthermore, developers need to understand how their employees interact with those of the contractor from a cyber perspective.
2. **Brand –** most (if not all) renewable energy companies across the world greatly value how their brand is being viewed. There are excellent examples of companies doing great things in terms of investing in lower-income nations, where power is at a premium. However, brand is easily damaged by cyber risk if an incident is poorly managed. It may be that, with the increased scrutiny of this risk, a company's approach may have a part to play in future developments such as an off taker agreeing a Power Purchase Agreement (PPA) or a bank giving a loan to a developer. Those entering such an agreement may wish to have a guarantee that a project is prepared to address an incident and can provide reliable power to the grid. In the same way, high cyber resiliency can be a unique selling point in a competitive tender.
3. **Property –** this comprises the tangible assets such as the towers, nacelles, solar panels and the transmission infrastructure. But it also includes the intangible assets - the software and data underpinning the operations. These can be impacted, and even damaged, by the manipulation of data and software. The insurance market approaches these risks in different ways which will be explained later.
4. **Profit –** the result of a developer's ability to provide its power or service. The growth of the cyber threat means that now more than ever a cyber incident, regardless of where it has come from and where it hits - be it the developer itself or its supply chain - can ultimately have a significant impact on a developer's operations and its profitability. The developer can lose income, face third party liabilities from downstream and upstream suppliers, or even face losses from their employees themselves.

"The growth of the cyber threat means that now more than ever a cyber incident, regardless of where it has come from and where it hits - be it the developer itself or its supply chain - can ultimately have a significant impact on a developer's operations and its profitability."

The insurance market approach

Just as cyber risk exists across many parts of a renewable energy company, it also a peril that is covered across many different lines of insurance: multiple areas such as Property, Casualty, Marine, Terrorism, and even D&O cover cyber exposures.

Lloyd's of London and large insurance companies have taken a cautious and a pragmatic approach. Much of this work has been driven internally to both understand and protect itself as the industry looks to clarify the intent of cover and allocate adequate reserve capacity should an event occur.

In the last three years there has been a significant increase in central regulatory interest in the risk. In the first half of 2019, for UK based insurers including Lloyd's, the Prudential Regulation Authority (PRA) directed that they begin formulating clear manageable and measurable action plans to address the cyber exposure in their portfolios[1]. We will see much of the effects of this taking hold in 2020; however, insurer action has been swift as they look to pre-empt the regulatory clouds above them.

Silent Cyber

Following on from the PRA directive, Lloyd's of London released a market-wide bulletin[2] focused on the issue of silent Cyber. Silent Cyber is non-affirmative Cyber, i.e. where a policy neither expressly provides nor excludes cover and is simply silent as to its existence. The bulletin laid out a timeline for this to take effect; for first-Property Damage policies, inception on or after the 1st January 2020 should either clearly affirmatively cover or exclude cyber exposure, while for Liability the requirements are to come into effect in two phases during 2020/2021.

The difficulty here is that while organisations will obtain clarity over whether an insurer covers the peril or not, Lloyd's of London has not been prescriptive in which approach they should take and whether they should cover the risk or not; they have left that decision to individual syndicates in the market.

This complexity is then compounded by the different clauses available in the market that insurers may look to apply, either to the entire risk or, depending on the numbers of insurers on a programme, in a patchwork manner. Discussions must be had with insurers where they look to apply certain clauses, to drill down into why they are taking a certain stance and whether the wording achieves what they had intended. However, as the easiest approach they would likely look to exclude Cyber in the first instance and then allow "carve back" to covers, subject to better understanding of the risk. This creates a complex minefield for both insureds and their brokers to build a consistent and harmonised insurance programme.

The clause dilemma

Recently it was made known in the market that the ever-present CL380 Cyber Attack and NMA Electronic Data 2914/15 cyber exclusions clauses (that many have become accustomed to) do not, by Lloyd's of London standards, go far enough in addressing the issue of silent Cyber and so are therefore deemed not satisfactory in respect of their requirements on this issue.

As a result, in November 2019 the Lloyd's Market Association published a set of new model clauses for Property and Marine risks[3], which come in the form of both outright exclusions and versions with provisions for buy backs such as Fire and Explosion. However, it should be noted that these are purely illustrative and can be adapted by a skilful wordings specialist to achieve different outcomes which do not conflict with the balance of the wording. We are yet to see whether the wording will differ for the Casualty sector; however, a similar approach is expected.

While Lloyd's provided their clauses recently, the International Underwriters Association (IUA) also released their own London Market model clauses in the summer of 2019. In similar fashion, the intention was to address the issue of non-affirmative silent cover[4]. As stated by the IUA, these come in the form of a "Cyber Loss Absolute Exclusion Clause" which provides market participants with an option to exclude, in the broadest possible manner, any loss arising from the use of a computer system, network or data – each of which is clearly defined. Meanwhile, a Cyber Loss Limited Exclusion Clause enables only the exclusion of losses directly caused by cyber events, rather than 'directly or indirectly'". The nomenclature of these clauses differs slightly from that of the Lloyd's clauses, adding to the difficulty.

As a tightening of approaches in the traditional markets is now apparent, we see organisations turn towards the specialist markets for solutions. This is where one will find solutions, not just to those exposures being excluded by the traditional markets, but also emerging exposures that were not covered in the first place.

[1] https://www.bankofengland.co.uk/prudential-regulation/letter/2019/cyber-underwriting-risk-follow-up-survey-results
[2] https://www.lloyds.com/~/media/files/the-market/communications/market-bulletins/2019/07/y5258.pdf
[3] https://www.lloyds.com/~/media/files/the-market/communications/market-bulletins/2019/07/y5258.pdf
[4] http://www.iua.co.uk/IUA_Member/Press/Press_Releases_2019/IUA_publishes_cyber_exclusion_clauses.aspx

Figure 2 – Cyber solution categories

Source: Willis Towers Watson

Innovation in the Cyber markets

The Cyber market has been historically grown from focusing on data related risk where organizations obtain cover for loss of data and liabilities resulting from breaches of sensitive personal information. For a general renewable energy company, be it a developer or contractor, personal data will not be primary focus; they do not hold large amounts of personal data, bar that of perhaps their own employees. They do hold operational data which may be affected, and the focus should be on ensuring operational resilience.

To deliver cyber resilience to the renewable energy and power sectors several insurers in the market offer generalised coverage wordings. However, these are complex and don't address the nuances of these sectors. As such, brokers are actively developing simpler insurance solutions that are focused on the risk issues in these sectors; these are then further tailored to the individual client.

The solutions in the market, for both on and offshore renewables, can address the categories noted in Figure 2 on a clear affirmative basis - from a malicious cyber-attack, human mistake (i.e. a negligent employee) and/or the technology failure. Affirmative being the operative word here - it actually provides certainty! A solution from this market will avoids any of the issues and disputes that have been seen on traditional policies whereby cover interacted with War and Terrorism exclusions.

There are a few interesting areas to point out here. The first party data loss is an area which the traditional Property market generally has no intention of covering, unless the loss of this data comes from a physical peril that would generally be covered, i.e. Fire or Explosion; however, losses arising from a pure cyber incident are generally only provided in the specialist market. The Third-Party Liability cover can possibly be that of bodily injury, lost data, regulatory liabilities, and property damage. Finally, the incident response type solutions being offered allows cover for the developer's responders and their external experts, who come in to mitigate loss and to get companies back on their feet quickly. It is important that this is matrixed in with the company's existing incident response and claim protocols.

Insurance capacity in the Cyber markets

It is no secret that the capacity available in the Cyber market is not even close to that provided by the traditional Property & Casualty (P&C) markets. Cyber towers are modest in relation to that created in those markets; last year it was noted that the largest capacity available, which can only come about from intensive global co-ordination of the markets, is around US$600 million. The market hasn't seen an explosion of capacity growth over the past year; indeed, as we seen the changing tide within the P&C market, the Cyber market appears to be experiencing a degree of hardening at present, despite growing in a sustainable and calculated manner. Furthermore, this top capacity level is only possible for the areas such as financial services where cyber insurers have a relatively strong foothold and experience.

For power producers, being a part of a nation's critical infrastructure, their industry risk is much less sought after by Cyber insurers and so expected capacity available is always going to be lower. While it is an interesting objective to quantify the maximum capacity that is available, there are so many different variables to consider. So perhaps the conversation should move instead towards the key exposures – specifically what a quantifiable estimated maximum loss or maximum possible loss may look like, and how best to approach both the traditional and specialist markets.

Conclusion: approaching cyber intelligently

As we move into 2020, companies involved in the renewable energy sector should expect to see greater focus on cyber clauses in their current insurances. There may be a transition over to a new form of covers, owing to the new clauses which underwriters may apply. This will clarify intent of cover but may in some instances create gaps in cover or inconsistencies across the panel of insurers. Furthermore, for a project owner where lenders are involved, the issue may be heightened as now cover may not be in alignment to any financing requirements.

So, what should a participant in the industry do?

1. Have an open conversation with your insurance advisor about the current state of your coverage and if this is expected to change at renewal.
2. Identify any gaps in exposure and cover.
3. Analyse these gaps relative to your business' vulnerabilities and quantify the potential impact of several cyber incidents.
4. If material, work with your advisor on whether these gaps can be addressed through your existing insurance providers or whether specialist solutions are required.

Taking this approach will empower any risk manager with the confidence to advise their key stakeholders how their insurances will, or will not, react to a variety of cyber incidents. As the insurance market continues to strengthen its approach to cyber, those in the renewable energy sector must know where and how their policies will respond to the different incidents that may occur and losses to which they are susceptible. Scrutiny of this element is only going to grow in the years ahead.

In traditional lines of business, cover may be excluded or covered in part, and there may be inconsistencies across insurer approaches. As a result, the Cyber market is active in developing new, clearer and simpler solutions to bridge the cyber gap where traditional markets are not able to assist.

To be sure that their risk is covered, renewable energy risk managers should be able to evidence how their company is assessing the risk, protecting its people, brand, assets, and profit, and able to recover should something go wrong. These are the building blocks to a cyber-resilient power supply.

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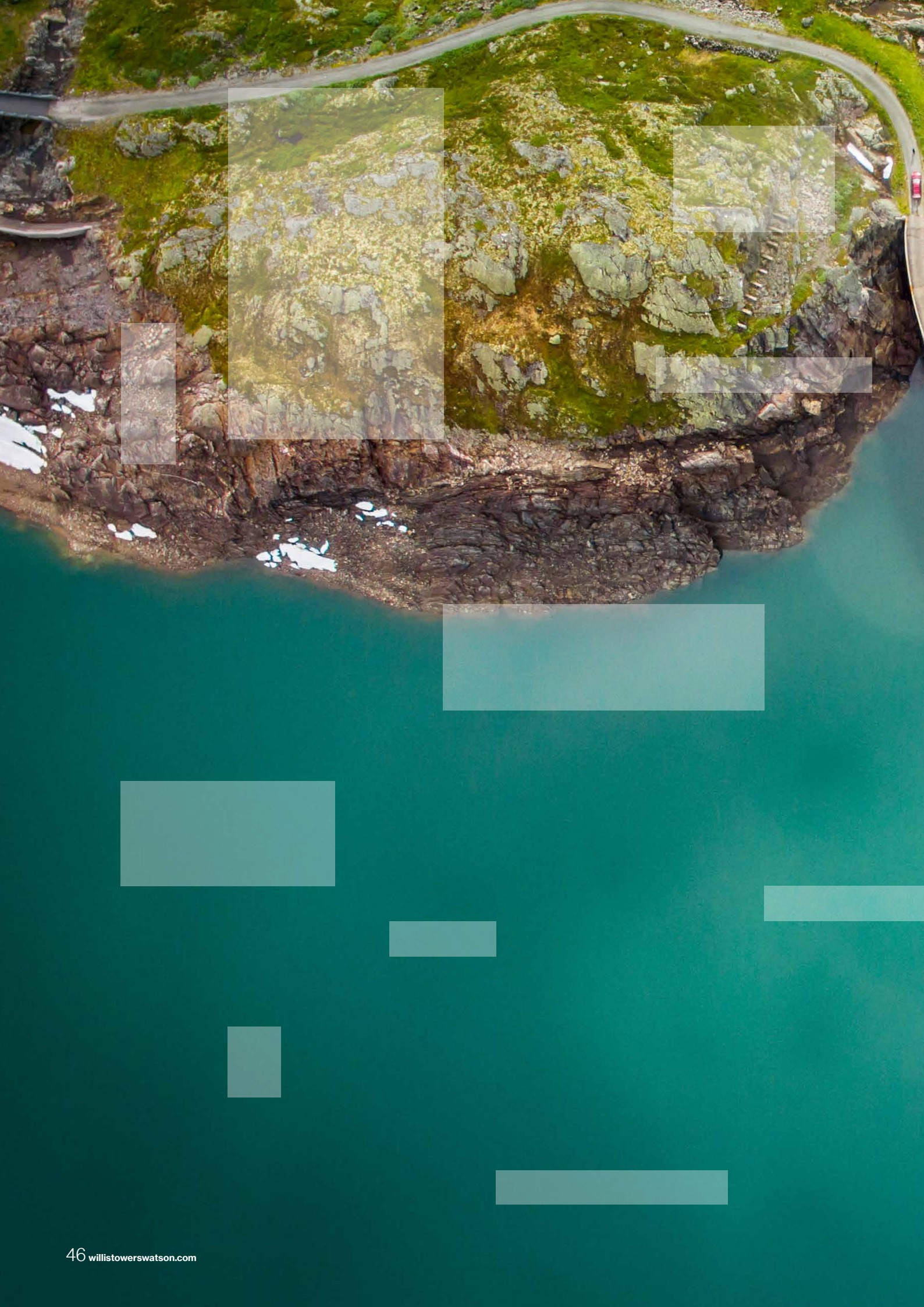


Part two - new realties in the renewable energy insurance markets

London & International market review

Introduction: a challenging year

There is no doubt that the Downstream Energy & Power, Construction and Property insurance markets lost money for their supporters in 2017 and 2018. Natural Catastrophe (Nat Cat) losses were a substantial contributor; however, there were many other market-renowned incidents. The Renewable Energy market was not immune to the general direction of the Property market and has suffered its own industry specific issues.

In summary, 2019 was an even more challenging year for the dedicated London & International Renewable Energy market teams and their colleagues in the Marine, Construction, Operational Power and Property markets seeking to either gain a foothold or build out their traction in the rapidly evolving industry sector, with a measured and profitable business model.

A market in turmoil

2019 saw a market in turmoil, capacity jostling, hesitantly trying to understand its own appetite, where its efficient frontier lies in the struggle to reduce combined loss ratios and return to a position of delivering profitability. The stringent measures placed on last year's business plans by the Lloyd's of London "Decile 10" initiative are starting to take effect - but at what cost to the premium volume and reputation of the markets?

One loss can sink an entire portfolio

Incremental underwriting improvements are helpful and seen as positive; however, these pale into insignificance if you are unlucky enough to sustain a market reportable single loss. Without the right portfolio protections in place, losing the whole year's underwriting revenue through a single loss incident is a realistic proposition.

The shift in climate change patterns and increasingly unpredictable natural catastrophe events (windstorm, earthquake, bushfires) is making several underwriters return to the drawing board to reassess their perception of maximum potential losses and accordingly the rate on line for projects which were previously considered to be marginally exposed.

Capacity shedding

This year we have experienced extensive individual capacity shedding. There are now only a few underwriters who feel confident in being the sole capacity provider for clients in all lines of business, often waving goodbye to profitable and long held sole supplier relationships to ensure their books risks are diversified and Chief Underwriting Officers appeased.

It is estimated that the key London and European dedicated Renewable Energy markets could easily deploy capacity to support single site projects with a value up to US$4 billion. The capacity is there, but at what price, at what terms, for what technology and for which location?

Diminished panel of leaders and line sizes

It is also true that whilst the technical complexity of "getting it right" has increased, this is taking more time, consideration and resources, with the diminishing panel of leaders recognizing this by often charging lead underwriter fees. This is a marked shift from wrapping renewable energy projects into a property portfolio; it's also true that, after positive conclusions from the protracted technical and engineering due diligence, leading insurers' confidence in their commitment to the portfolio is reducing. Where historically 40-60% lead lines were once available, these are now shrinking to 20-30%, creating long walks around the market and increased costs for the broking community.

It would therefore appear the days of a consummate Lloyd's broker arriving on spec with a new risk requiring binding on a Friday afternoon, without agreed leader terms, are gone. If the project risk is in a location exposed to Nat Cat risk it could take several days to run the projects through the insurers' technical Nat Cat pricing and aggregation models. Any exposure to Nat Cat will substantially diminish the available capacity and single site projects in excess of US$1 billion will be very challenged in the future, requiring a global mix of capacity.

Insurer withdrawals

Unfortunately, there have been a number of market casualties this year:

- CNA Hardy and Pioneer have both ceased writing renewable energy business, moving their accounts into run-off.
- The mighty RSA have moved to cease writing renewable energy business from their continental offices (particularly Madrid, Milan and Paris) although they continue maintain a strong discipline within London.
- Zurich has ceded its traditional renewable energy capacity globally to support GCube as a longstanding Renewable Energy MGA (Managing General Agent) where there is continued speculation following purchase of its JLT equity as part of the Marsh takeover.
- Axis maintain a prominent position in the market but has experienced an increasingly limited appetite as it battled with its own accounting demons.
- We have also seen Swiss Re withdraw from supporting Marine Cargo classes, with severe constriction in other capacity providers which, if the trend continues, could challenge the principle of an all classes lifecycle insurance product.
- The Liability market is also not without change; greater limitations on capacity aggregation, limitations on GDPR risk and modification of cyber risk coupled with increased cost of capacity pricing.

New entrants

In contrast, the prevailing conditions are ripe for new capacity entrants who are not encumbered with latent under-pricing and claims. Aviva has made a splash back into the market, Albus Underwriting (as a specialist Renewable MGA) have started converting risks and Travelers are making a steady return to leading capacity. The positive market conditions, coupled with more limited capacity, is steadily attracting renewed interest from agile syndicates and traditional company markets with a large appetite for well-managed technical and engineering risks.

Retreat from construction risk

Whilst the Construction market globally has experienced substantial constriction, the Renewable market's appetite for new construction risks with unproven technology, larger turbines (contractor negligence and technology provider oversight issues), battery energy storage, offshore wind, wave and tidal, energy from waste and concentrated solar thermal projects have been bearing the brunt of this constriction. There is also a widespread acknowledgement of the challenges of working in new or developing territories where contractors have limited experience. So choice of contractor, Original Equipment Manufacturer, length and quality of warranties and respect for the Owner's risk management philosophy are equally paramount factors contributing to the increasing focus on deductible level and quality of contract certain wordings with appropriate sub-limits.

"It would therefore appear the days of a consummate Lloyd's broker arriving on spec with a new risk requiring binding on a Friday afternoon, without agreed leader terms, are gone."

Conclusion: enough is enough!

It is noticeable that the London market's influence around the world has taken perhaps 12 months to be received as a global reality. However, their acknowledgment that "enough is enough" by drawing a line in the sand and a mandated desire to return to profitability - or be closed - is resonating through the quota share markets. The key to continued success will be in knowing their clients and distribution channels and correctly anticipating the right balance in a measured return to profitability, whilst still writing business, supporting their client partnerships and leading the industry with complex challenges as the renewable energy continues to evolve.

This will need to be achieved through better understanding of technical risks and the ability to cede capacity to developmental projects where a close learning relationship can be established with partner clients and brokers. A short-sighted approach and "get rich quick" business plans will no doubt see opportunities being strengthened and realized elsewhere with a broad devaluation of London's influential role.

Steve Munday is Head of Renewables, GB at Willis Towers Watson, London.

"Their acknowledgment that "enough is enough" by drawing a line in the sand and a mandated desire to return to profitability - or be closed - is resonating through the quota share markets."

US Renewable Energy insurance market round-up

Onshore Wind

In recent years, the Renewable Energy insurance market has developed within a softening overall Property market environment, offering clients inexpensive, broad coverage with high limits and low deductibles.

This is now changing. Market hardening in the overall Energy sector has not spared the Renewable Energy portfolio, which sustained poor underwriting results in both 2017 and 2018. After years of unsustainably soft conditions, and a slew of losses, pricing for onshore wind projects has firmed and deductibles are rising. Typical onshore wind project deductibles are now $250,000 for Physical Damage (PD) and 30 days for Business Interruption (BI). Wind rates now range from $0.20-$0.30 before Natural Catastrophe (CAT) loading. Higher deductibles protect carriers from smaller frequency losses, which clients now retain.

AXIS, G-Cube and PERse expect to be profitable in 2019, due to their disciplined approach. While higher deductibles have helped insurer responsibility in respect of gearbox/blade losses, the industry continues to be impacted by multi-million-dollar turbine fires in the $2-7 million range. The industry has also been hit by a slew of losses due to improper installation of equipment and carriers are working to better oversee contractor work to prevent this from occurring. Underwriters seek to manage their exposure to certain contractors whose projects have led to more frequent losses than others, but this is challenging as a small group of contractors dominate the space and carriers dedicated to the industry cannot afford to shy away from every opportunity where they are involved.

However, better terms and higher prices inevitably open the door to competition from other insurers who have been "waiting in the wings" for more attractive terms. Some carriers have opportunistically underwritten the Onshore Wind portfolio before but exited as market conditions deteriorated. Other carriers are strategically entering the wind sector altruistically or to replace premium lost to their withdrawal from the coal-fired generation portfolio, a shrinking sector that some carriers can no longer write at all. There is a need for this capacity, as the traditional Renewable Energy insurers seek to reduce the capacity offered to projects involving large turbines, so as to limit their exposure in the event of a large turbine event – onshore turbines can now generate as much as 4.5 MW. Additionally, Lloyd's markets backing these renewable insurers have reduced their capacity as well, reducing the line size that these insurers can now offer.

Photovoltaic (PV) Solar & Battery Storage

The PV Solar sector has seen large weather losses in recent years involving neither hurricanes nor earthquakes but including tornados occurring in unexpected areas (The Mojave Desert in 2015) and hail (West Texas in 2019).

The impact of lightning strikes is another area of concern. Developers didn't fully evaluate and design for catastrophe (CAT) exposure when capacity was abundant and cheap, and carriers now are demanding that new projects be engineered to handle these natural hazards. Some speculated that securing coverage for solar projects in CAT zones may become uninsurable; the boom in building wind projects to meet subsidy deadlines has led to timing pressures that predictably result in construction losses. Defective equipment led to a large battery storage event in Arizona, although the defect has been addressed and other measures have reportedly been taken to prevent future problems.

Renewed emphasis on claims management and engineering

Another way in which carriers are attempting to improve their bottom line has been a significantly increased emphasis on claims management, including root cause analyses and exploring subrogation possibilities where available. This ultimately can benefit both clients and carriers in that these measures can reduce losses paid, which is a component of premium calculations.

Carriers also have increased their focus on risk engineering, particularly in managing contractors and ensuring clients are doing what they originally planned. Historically, carrier involvement in loss control has varied significantly, and in some cases has been completely absent. Strong engineering information and an engagement with the client with respect to recommendations proposed are now essential to securing coverage from most carriers; they utilize engineering services to provide value in project development, providing more to the client than solely capacity.

Tightening of policy conditions

In addition to deductible and pricing changes, carriers have firmed up their historically broad policy language, adding exclusionary language typical in other property policies, including removing LEG3 defects wording in favour of the LEG2 defects wording accepted throughout most Property forms.

Banks and developers have taken advantage of abundant capacity and a market hungry for renewable energy risks to secure coverage beyond what most would consider necessary. With the ability to buy whatever they wanted cheaply, developers have not needed to think about risk and insurance in a holistic way. Instead they have focused solely on their insurance cost, expecting all other aspects of their coverage to be easily provided at their lenders' asking.

But now carriers are pushing back on the limit and deductible requirements sought by lenders and lender consultants that they feel are either unsustainable (low deductibles) or unnecessary (full CAT limits when exposure is well below these limits).

Furthermore, with respect to liability risk, some General Liability carriers are expressing concerns regarding solar Independent Power Producers (IPPs) being held liable for wildfires, particularly if the IPP owns the lines to the offsite interconnection point.

Conclusion: paradigm shift required by buyers

In summary, carriers believe that lenders and lender consultants need to make a paradigm shift in their requirements, given what is available in the marketplace with respect to deductibles and scope of coverage. In past years, the competitive insurance marketplace gave lenders everything they asked for, such as low deductibles and coverage enhancements. However, these requirements provided more coverage than clients ultimately needed, at unsustainable retention levels for insurers, and insurers no longer will support these needs. Lender agreement requirements have become obsolete and unattainable from traditional insurers; buyers are therefore being forced to either negotiate changes (or waivers) from their lenders or purchase expensive deductible buydowns and coverage enhancements from opportunistic Excess & Surplus Line insurers to meet lenders' needs.

Michael Perron is Renewable & Power Generation Leader, North America, Willis Towers Watson, New York.

Proactive or reactive? That is the claims question!

Introduction: do buyers have to wait for a loss?

The 14th century proverb "The proof of the pudding is in the eating" - and its meaning - will be well known to many readers of this Review; for many insurance policy holders this has historically been one of the criteria by which insurers' and brokers' performance following a claim made under an insurance policy has always been judged.

But is it really the case that an insurance buyer needs to suffer an actual loss to test whether the proof of the particular pudding really is in the eating – or not?

This old adage may still have some truth to it in terms of putting a value on the insurance product purchased, and we are firmly of the opinion that the way in which the policy may or may not respond in terms of an indemnity payment is driven by the cover available. However, increasing emphasis and value are now being placed on the steps taken at the outset of the policy to ensure that all parties are aware of their respective obligations in terms of the potential million-dollar question: "What happens if...?"

The value of claims workshops

Ultimately, the requirements for policy holders and lenders when purchasing an insurance policy are to provide comfort and cover when an unfortunate situation does arise. So logically, it makes sense to know what product is being purchased and how it is likely to perform.

In our experience, more and more insurance buyers appear open to the idea of participating in claims workshops designed to stress test the insurance policy with hypothetical claims scenarios designed to gain a better understanding of what is and what is not covered under their policy. Indeed, we have found that including representatives from a buyer's technical as well as insurance team in these discussions provides greater clarity over the actions and responsibilities of each party in the event of a loss.

By engaging in these discussions at the pre-placement and placement stages - and therefore pre-loss - many lessons can be learnt in terms of how the policy is constructed and the scope of cover available. Moreover, it can also assist in highlighting, where possible, limitations to cover such as sub-limits and how restrictive clauses may impact any ultimate recovery under the policy. In our experience, we have found that this helps to manage and set expectations should a claim arise.

Not just for Risk Managers

These discussions should not only be focussed on the relevant risk managers or in-house insurance specialists but also on project managers, financial controllers and other key employees of the insured such as co-insured contractor parties and wider project teams.

Of course, it is not always possible to replicate an exact loss scenario but utilizing lessons learnt from similar claims can help to gain a better understanding of what can be expected in terms of policy response. It also provides the opportunity before a loss occurs to ask the questions: What if? Why? and How? in the knowledge that preparation for a possible eventuality allows a more reasoned and coordinated response to a loss if it happens.

Claims process integral to overall insurance proposition

The claims process is where the intangible policy benefit becomes tangible; it is an integral part of the whole insurance proposition and therefore should be a key part of the overall servicing proposition during RFP submissions and presentations, continuing throughout the placement stage. Furthermore, engagement on claims with buyers during the procurement process completes the jigsaw in terms of being able to see and understand the entire risk management picture.

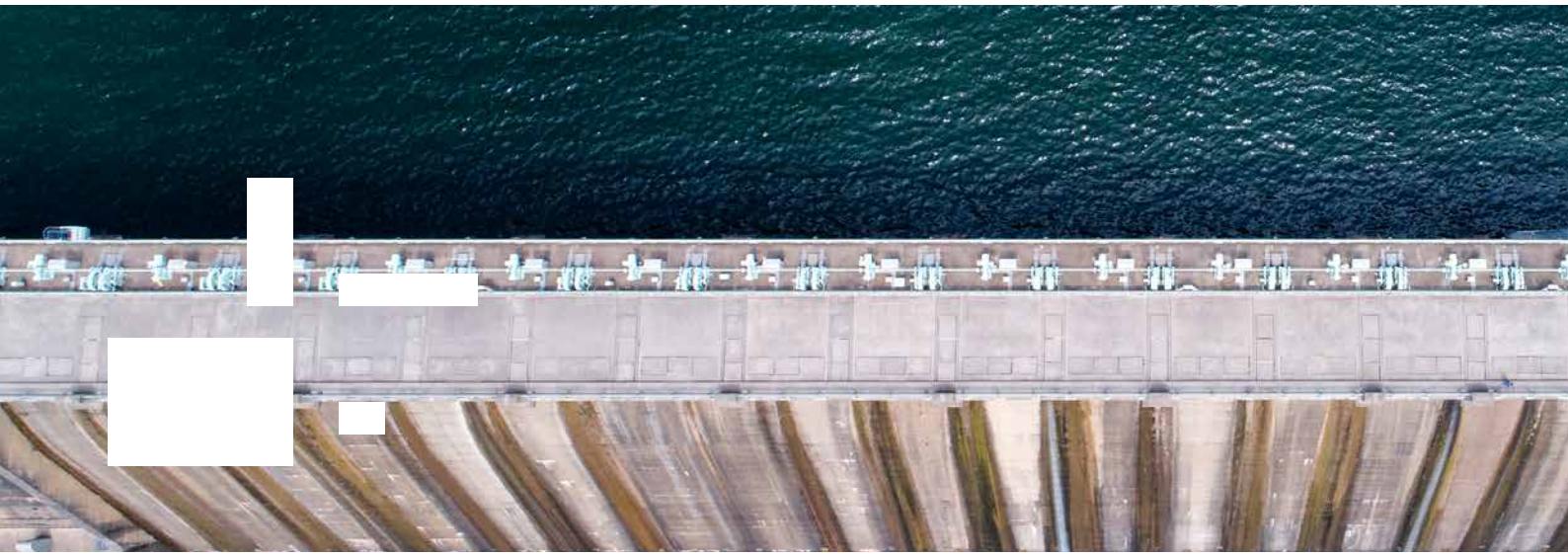
The value of a claims procedure document

Proactively engaging in the claims process at an early stage is not just advantageous to policyholders. It has become more commonplace at the inception of a policy to work with an insured and insurers to compile a practical and working claims procedure document or claims protocol which sets out a number of key points and processes so that when a loss does occur, all parties have a clear picture of the necessary steps to take and by whom.

The type of incident, circumstance, loss or damage which is considered material to the insurance cover requiring notification will be noted in the policy wording. It is important that this is correctly communicated in the claims protocol to ensure the responsible party for notifications does not invalidate a potential recovery.

There are wide and varying obligations for claims notification; some will be time bound from the date of the incident, others will require as soon as reasonably practicable after such information shall come to the knowledge of the Principal Insured.

This can include pre-agreed loss adjusters and experts that insurers stipulate are likely to be involved in the process, together with details of key contacts at the relevant stakeholders. This is becoming more pertinent in the renewable sector, where losses are increasing in terms of frequency and severity. We continue to see further investment and development of more specialised renewable energy adjusters, experienced in handling these types of claims. Whilst many renewable energy projects benefit from project finance, it is imperative that claims are quickly addressed to maintain revenue streams to support debt servicing. Expedition is also heightened when losses occur during or just before cyclical high wind or resource periods, generation is not constant and requires a different mindset to base load generation for established utilities. This can only be positive in terms not only of understanding the renewable industry sector but also in terms of the insurance product and response.

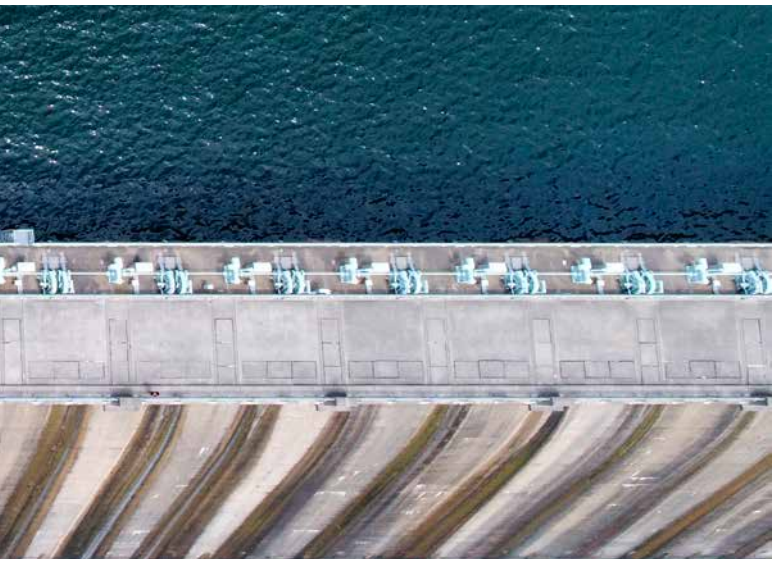


Managing pressures

In our experience, when a loss occurs there are many different internal and external pressures placed upon the insured, including customers, contractors, lenders, shareholders and internal management, each with its own demands and expectation placed upon them in terms of what happens next and in what order.

The advantage of pre-agreeing the steps to be taken by all parties following a loss allows the necessary resources to be allocated to getting back to business as normal as quickly as possible. For example, inclusion of standard loss reporting forms, how to record the loss and how to monitor costs can all assist in streamlining the information flow in the initial hours and days following a loss. In particular, we have also found that claims protocols have proved extremely valuable for clients who have global portfolios of assets spread over many locations and time zones. Being able to provide asset managers with a standard loss template to complete in event of a loss can take away any preconceived myths associated with insurance that may exist.

We have a positive experience of integrating some of our clients protocol needs and expectations within the policy wordings we execute. These would include a mandated position for insurers to make a claims payment within 14 days of its final agreement. This would appear obvious; however, the market is well known for challenging administration and some contractual planning will ensure market settlements are correctly prioritised.



Claims preparation clauses

Claims preparation clauses are regularly omitted from insurers' own wordings; however, they regularly feature in soft market-driven, bespoke broker and client wordings. As the market continues to harden, these clauses and their extent of application continue to come under scrutiny and pressure. In our experience, a separate policy response to pay for the additional clerical or professional services to correctly evaluate and present a valid claim is essential. Should an insured or insurer wish to engage the services of a third-party forensic accountant to support assertions of claims quantum, this can become an important feature of policy cover for all parties. It is probably one of most nominal of clauses, but one with the greatest impact as it can be called upon in the event of any indemnifiable claim under the policy.

Conclusion: a proactive response

Of course, a proactive response to claims continues throughout the entire claim duration and putting the right pieces of the jigsaw together at the early stage puts in place the scope for interim claim submissions and ultimately to work towards obtaining the right result in terms of final claim settlement amounts.

This can often involve a significant amount of time with the various stakeholders to understand, verify and challenge differing approaches to coverage and quantification.

We believe strongly that the insurance process is as much as partnership between the parties as it is a financial transaction and development of working guidelines and relationships with the key stakeholders is key to a more efficient claims process.

Chris Ling is Claims Director specialising in Renewable Energy, GB, Willis Towers Watson.

Facing into the wind: addressing unpredictability

Introduction: the predictability problem

The rise of wind power

In 2018 wind power installed in the countries of the European Union amounted to some 189 GW, second only to natural gas which it is likely to have exceeded in 2019. Wind power represents 18.8% of the EU's total installed generation capacity with five countries (Germany, Spain, UK, France and Italy) representing in excess of two-thirds of this production[1]

On the evening of Sunday December 8 2019 wind farms in the UK generated more than 16 GW for the first time representing 44% of the electricity produced that day[2]. The growth of wind power in the overall mix of power production in UK and the EU has been remarkable and now firmly established in a myriad of global territories.

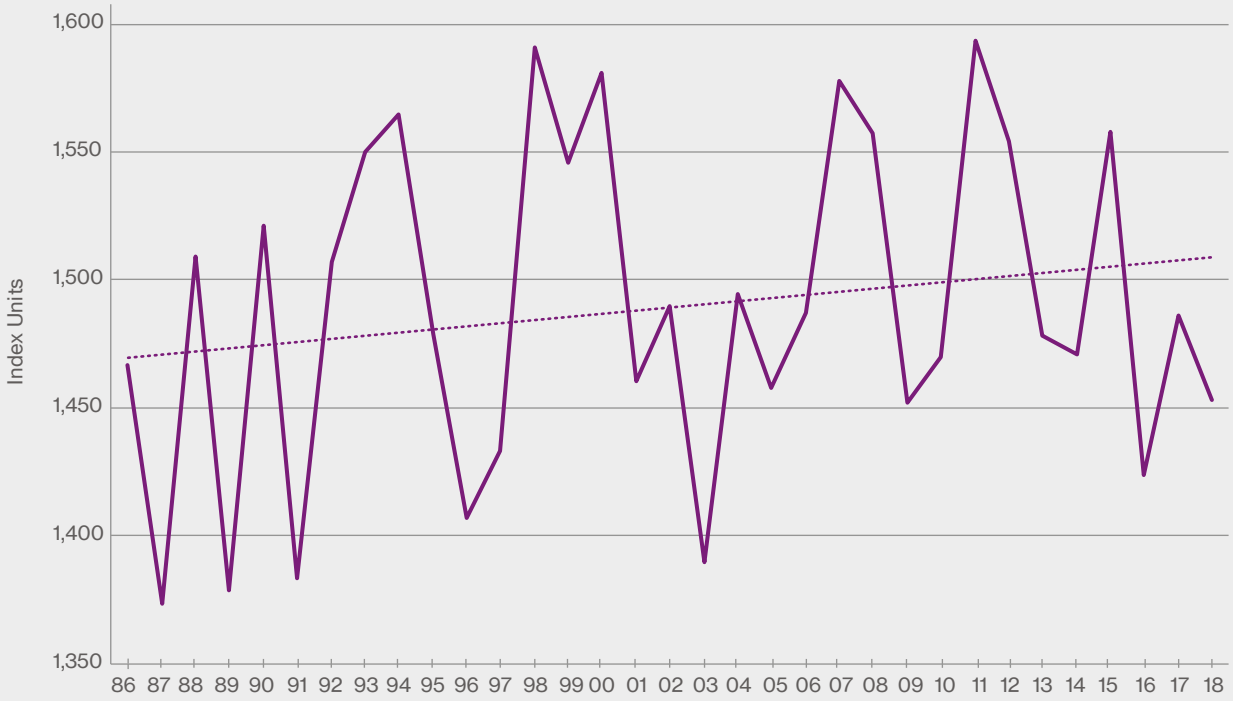
Intermittent and unpredictable

Wind, as we all know, is a free resource and entirely without emission but it is not entirely predictable: it is both intermittent and subject to diurnal and seasonal fluctuation. Yet the investment required to exploit this free resource brings with it the altogether more predictable strictures of finance: debt service, dividend payments and capital repayment, over 20-25 years.

On average, a wind farm tends to produce the average amount of power that it is designed to generate yet from hour to hour, day to day, month to month the amount of wind is seldom 'the average'. So while it is entirely obvious, the challenge arises from managing the volatility around this average. When wind is abundant, such as on that evening of Sunday December 8 2019 in the UK, there is more power in the system than it can handle - such that consumers may even be paid to help balance the system. Conversely of course, during periods of low wind production is less than planned; it further confirms that the current energy mix is still critical.

[1] Source: WindEurope
[2] https://www.dailymail.co.uk/sciencetech/article-7772499/Windy-weather-sets-new-renewable-power-record-Britain.html

Figure 1 – Flex Germany NW region Wind Index



Source: Speedwell Weather Services

An example from Germany

Figure 1 above shows a wind index for north-west Germany for the period 1985-2017[3]. During this period the Production Index fluctuated between 1,192 to 1,594, a range of almost 30% around the long-term average; 20% on the downside. Simply put, this represents a production (and therefore revenue) shortfall which is foregone in that production period.

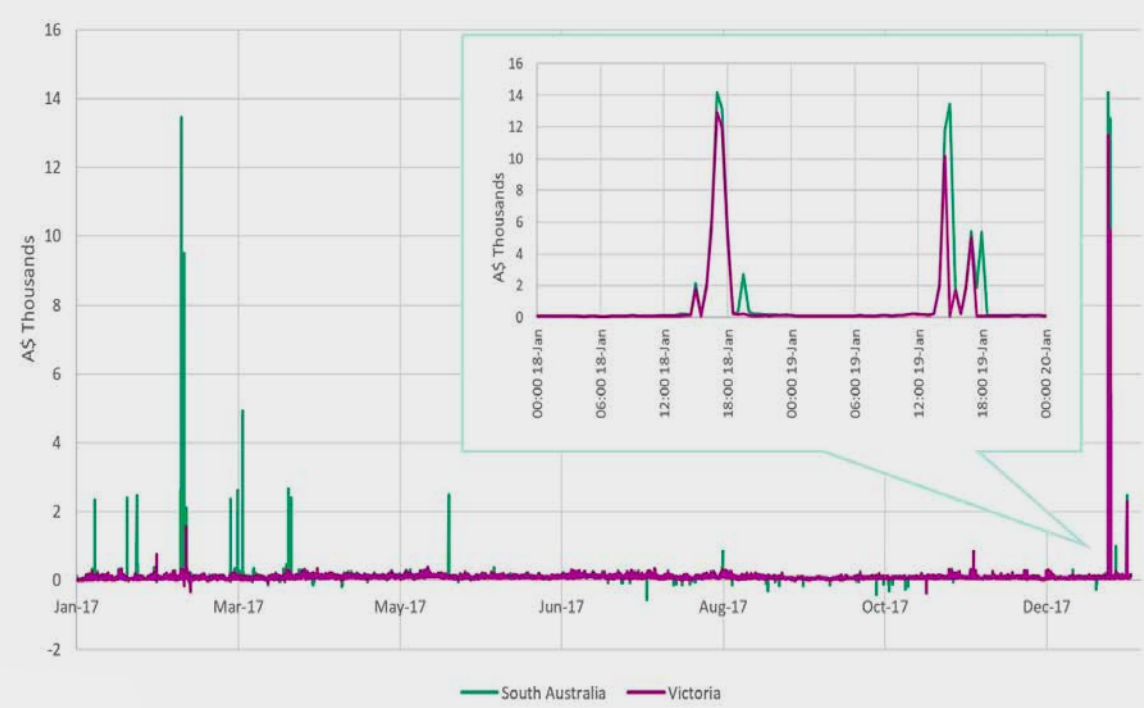
How do subsidies help manage risk?

Since renewable energy production has received some element of price support, it has been the case that wind and other renewable energy producers have benefitted from a degree of protection against low production by virtue of receiving a 'premium' price for delivery.

As wind power production operates in an unsupported, auction-based regime, no such in-built protection against the downside exists. This confers new levels of production and performance risks on new projects and those that are no longer the beneficiary of such support pricing.

[3] Source: Speedwell Weather Services

Figure 2 – Spot prices in South Australia and Victoria



Source: AEMO

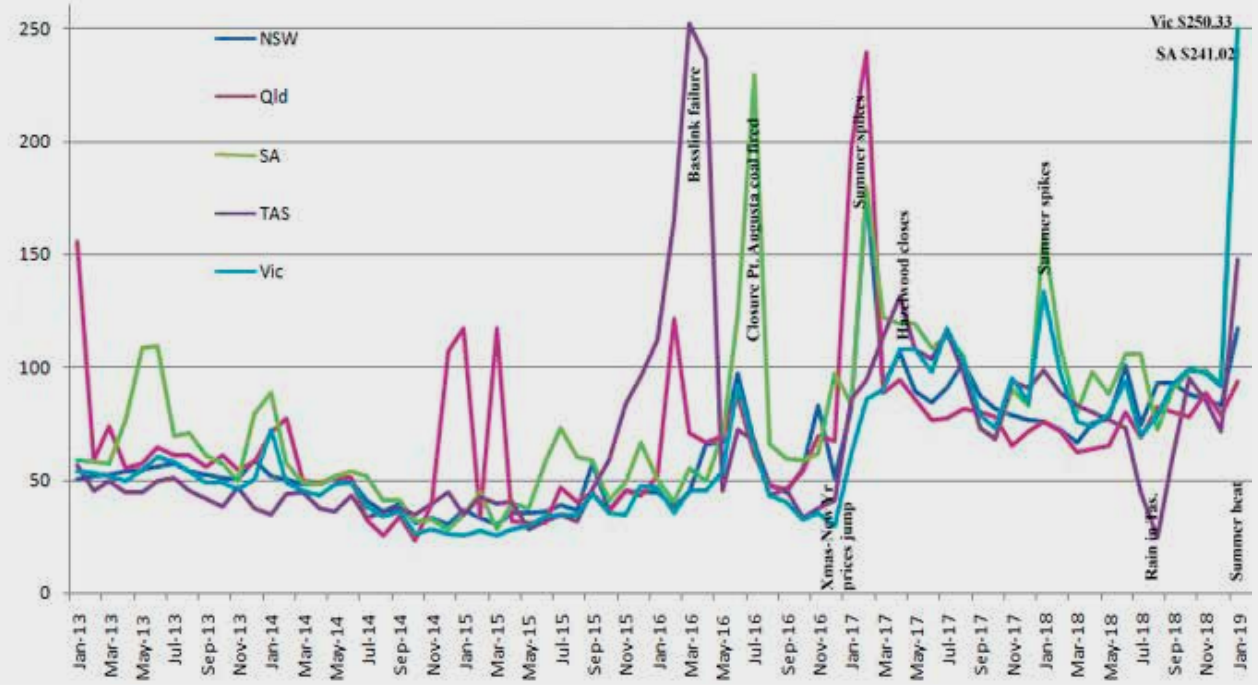
What about the price of electricity?

The wholesale price of electricity that a renewable producer receives may be fixed under the terms of a bilateral agreement with an off-taker, typically under the terms of a Power Purchase Agreement (PPA) or may be sold as 'merchant' power and subject to the vagaries of the market. The price on the day (even hour) will be dictated by the normal rules of supply and demand. For example in Australia the whole price of electricity can spike from its normal operating range of AU$50-100 to spike levels of AU$500-12,500+[4], as per Figure 2 above.

And while spot prices may spike by more than 12 times during the course of a single day, even the average monthly wholesale prices can vary by 5 times or more, as shown in Figure 3 overleaf.

[4] Source: Australia Energy Market Operator

Figure 3 – Six year 5 States AEMO average monthly wholesale prices in $s per MWh, January 2013 – 19



Source: AEMO

Clearly such volatility in electricity price – often the result of demand spikes during the summer – makes price (and hence revenue) management extremely hard to achieve. Servicing fixed commitments of supply or delivery in such a volatile price environment can leave either buyer or seller with a major shortfall or penalty.

Parametric risk transfer solutions

Is there cover for low wind risk?

Protection against low wind volume is available in a form known as parametric (or index-based) cover. This form of insurance provides an alternative way of transferring the revenue or cost impact of natural and man-made catastrophe perils, such as earthquake, windstorm, terrorism, adverse weather and pandemic. These solutions differ from traditional insurance policies in that loss payments respond solely to movement of a pre-agreed reference index rather than the normal principles of indemnity based on measured losses.

Power industry leading the way

In fact, the power sector has been the dominant buyer of weather-index programmes since the origination of these products in the late 1990s. Typically power companies use these solutions to hedge their energy demand risk, which has been shown to correlate well with temperatures. Indices based on population-weighted temperature provide a good proxy for the demand for power in certain regions. Derivatives of the indices provide an efficient hedging mechanism for companies whose revenues depend upon high power demand. Since the outset of the weather-index market, the available solutions have become more sophisticated and, in today's Alternative Risk Transfer (ART) market, index-based solutions are used to address power generation risks wind and low solar as well as power price volatility and power outages not linked to physical damage.

The availability of weather data from satellites along with synthetic and reanalysis data sets now allows weather-index solutions to be developed in territories with a limited network of ground stations as well as for offshore locations, which in the past were no-go area for these products.

Where does the data come from and how is it modelled?

Parametric solutions are driven by data. The data is needed both to:

- **price the insurance contract:** to determine the premium; and thereafter it is needed to
- **settle the contract:** to determine whether or not a payout is due, and if so, to quickly ensure payment.

Given that the index payment is published in real time, two weeks would not be an unrealistic timeframe for settlement.

There are various sources of wind data – they may be obtained from an anemometer reading from a wind mast or turbine. Operational wind farms have Supervisory Control and Data Acquisition (SCADA) systems which record all aspects of the actual wind regime at turbine hub height which is clearly most representative of the site itself. For projects which are not yet operational and therefore do not have history of recorded wind data, then various proxies or modelled (so-called re-analysis) datasets may be applicable.

Of particular concern is that data, analysis and contract performance are achieved on a like-for-like basis. In this way the buyer and seller can each have confidence that the contract will perform as anticipated and, critically, that low wind events will be faithfully captured by the process.

Prerequisites for good programme design should include the following:

- The data must be independent and needs to be measured and recorded by a third party that is trusted by both buyer and seller.
- There can be no subjectivity or lack of transparency in the way in which the data points are measured or compiled.
- The data should not be subject to historic (or indeed future) discontinuities that cannot reasonably be accounted for.
- The index data must continue to be reported in the same way (and generally by the same agency) during the foreseeable duration of the contract.

In order to structure low wind protection, the wind history most appropriate for that site is analysed and modelled to establish a distribution of expected power generation for the project. This modelling will also take into consideration the type(s) of turbines that have or will be commissioned, their associated power curve(s), numbers.

Such modelling cannot explicitly take into account non-availability of the turbines due, for example, to mechanical breakdown or failure, miniatous or other heterogeneous outage. A general availability coefficient may be applied as appropriate.

Is there a risk of mismatch between parametric loss and actual lost revenue?

The flipside of the parametric trigger is the concept of 'basis risk', that is the risk that the payments under the parametric contract do not precisely match the loss of revenue or increase in costs sustained by the insured. This arises as a result of the parametric solution responding to the occurrence of an event or movements in an index, as opposed to the losses actually sustained by the insured. It is important that this basis risk is properly considered in the design of any index-based contract. It must, wherever possible, be estimated and discussed between buyer and seller to ensure absolute transparency.

However, this potential for mismatch between actual loss and contract pay-out is certainly not confined to parametric structures. Conventional contracts of insurance and reinsurance also contain terms and conditions (exclusions, warranties, deductibles, waiting periods and the like) which can significantly limit the insurer's payment obligations. Some would argue that these conditions of non-payment are far more penal and prone to subjective interpretation than the relatively simple operation of an index.

Although basis risk is a potential disadvantage of parametric contracts, this structural approach remains a more suitable basis for the efficient participation of alternative risk investors, particularly in respect of the risks of corporate buyers. The participation of the capital markets in such structures expands the pool of capital available to support such programmes and the policy limits that can be negotiated.

Conclusion: who should manage your low wind risk?

Put simply, any party that is carrying low wind risk should manage it. This could be any one or more entities in project life cycle and the parties may indeed change during the life cycle from design and conception, funding to build, operation and maintenance. Portfolios of wind projects have increasingly been reviewing their risks for low wind.

Our weather index solutions team advises global clients in the power sector and is uniquely positioned to provide both insurance and derivative solutions for the low wind risks. For any party with interest in researching the options available to them to manage the risk associated with low wind, we would be pleased to assist and provide advice on the possibilities and solutions provided by today's expert insurers.

Julian Roberts is Managing Director, Alternative Risk Transfer Solutions, GB, Willis Towers Watson.

Claire Wilkinson is Managing Director, Structured Risk Transfer Solutions, GB, Willis Towers Watson.

"Our weather index solutions team advises global clients in the power sector and is uniquely positioned to provide both insurance and derivative solutions for the low wind risks."

Part three - new realties from around the world

Prague 2019: de-risking renewable energy projects

Over 100 delegates gathered at the Intercontinental Hotel, Prague last October for our inaugural European Renewable Energy Seminar.

Are the "winds of change" blowing through the Renewable Energy industry? At every stage of the lifecycle of a typical renewable energy project, new challenges and risks are emerging that, if not managed correctly, can threaten the very viability and long-term profitability of the project concerned.

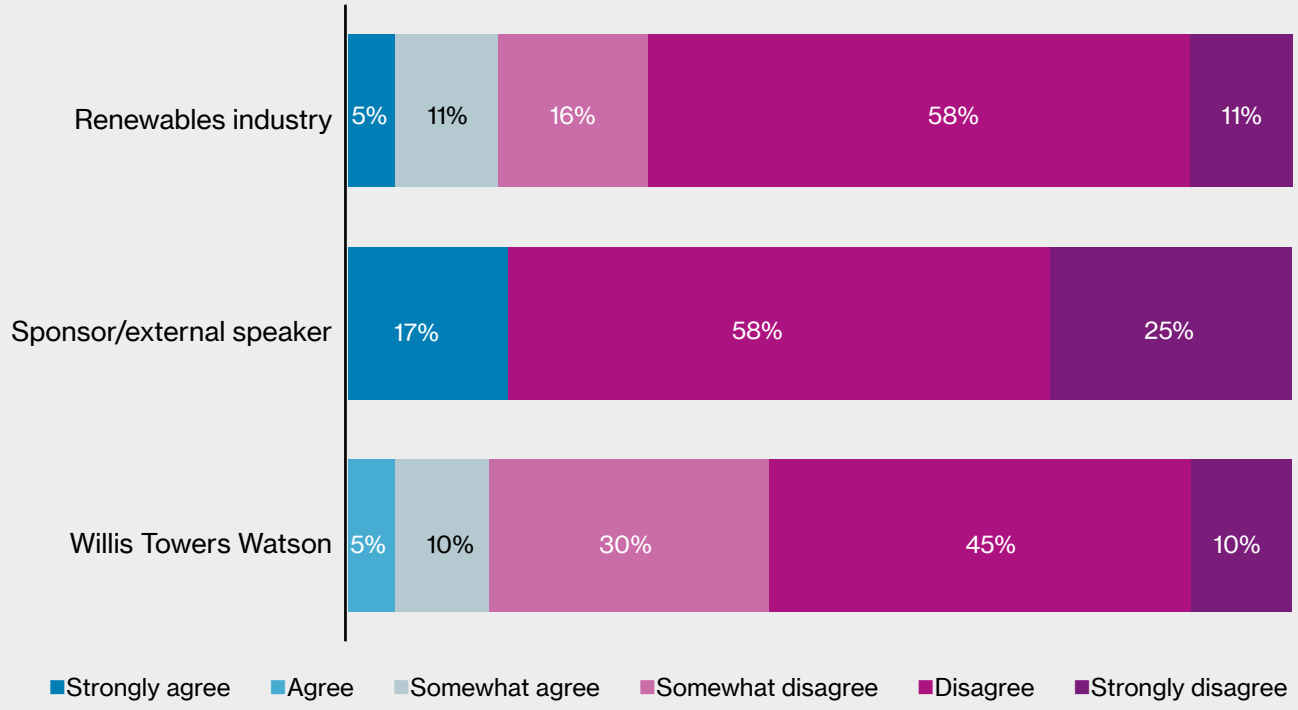
At our inaugural European Renewable Energy seminar held in Prague in October 2019, over 100 delegates gathered to hear a range of experts "de-risk" the renewable energy industry by following a project lifecycle through from project start-up to final decommissioning.

As always at our events, we used app-based interactive voting technology to find out what the delegates themselves felt about some of the key issues presented by our expert speakers. We thought that some of the results were interesting enough to reproduce within this Review.

Head of Global Natural Resources Graham Knight opens the seminar.

Head of Renewables GB Steve Munday outlines the agenda for the day - "de-risking" a typical European renewable energy project.

"The European renewable energy industry knows how to quantify and manage its exposure to cyber risk."



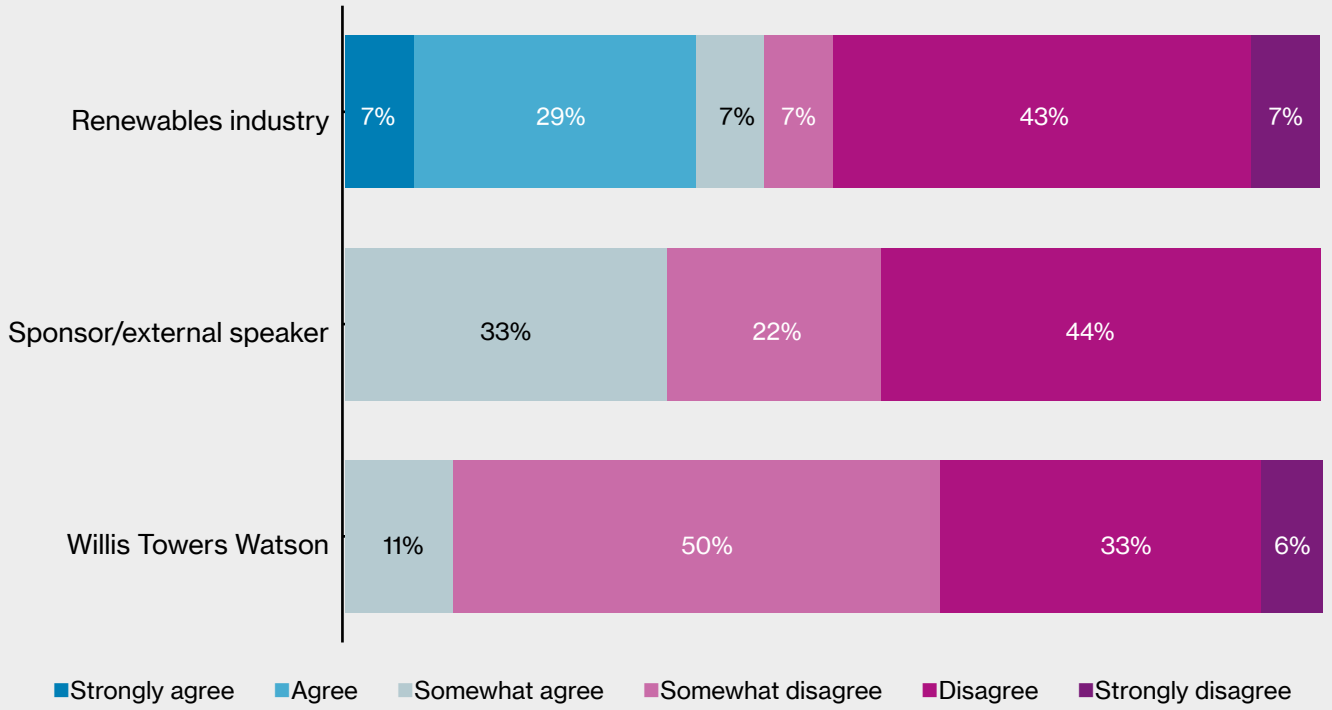
84% of the industry delegates disagreed that the industry knew how to quantify and manage its exposure to cyber risk – an opinion that was generally shared by insurers and Willis Towers Watson.

Issue one – The need to quantify and manage cyber risk

In one of the most striking results produced by our voting technology, no less than 84% of the renewable energy industry delegates disagreed with the assertion that "The European renewable energy industry knows how to quantify and manage its exposure to cyber risk." This view was shared by a similar proportion of insurer and Willis Towers Watson delegates. This question followed a presentation by Willis Towers Watson's Myles Milner in which he set out what is now considered to be the key cyber-related risks, as well as the best practice for the industry in the event of a cyber-attack - adding that achieving cyber resiliency can become a significant competitive advantage over a renewables company's peer group.

"In one of the most striking results produced by our voting technology, no less than 84% of the renewable energy industry delegates disagreed with the assertion that "The European renewable energy industry knows how to quantify and manage its exposure to cyber risk."

"Decommissioning risks for renewable energy assets are properly identified, quantified and managed by the European renewables industry."



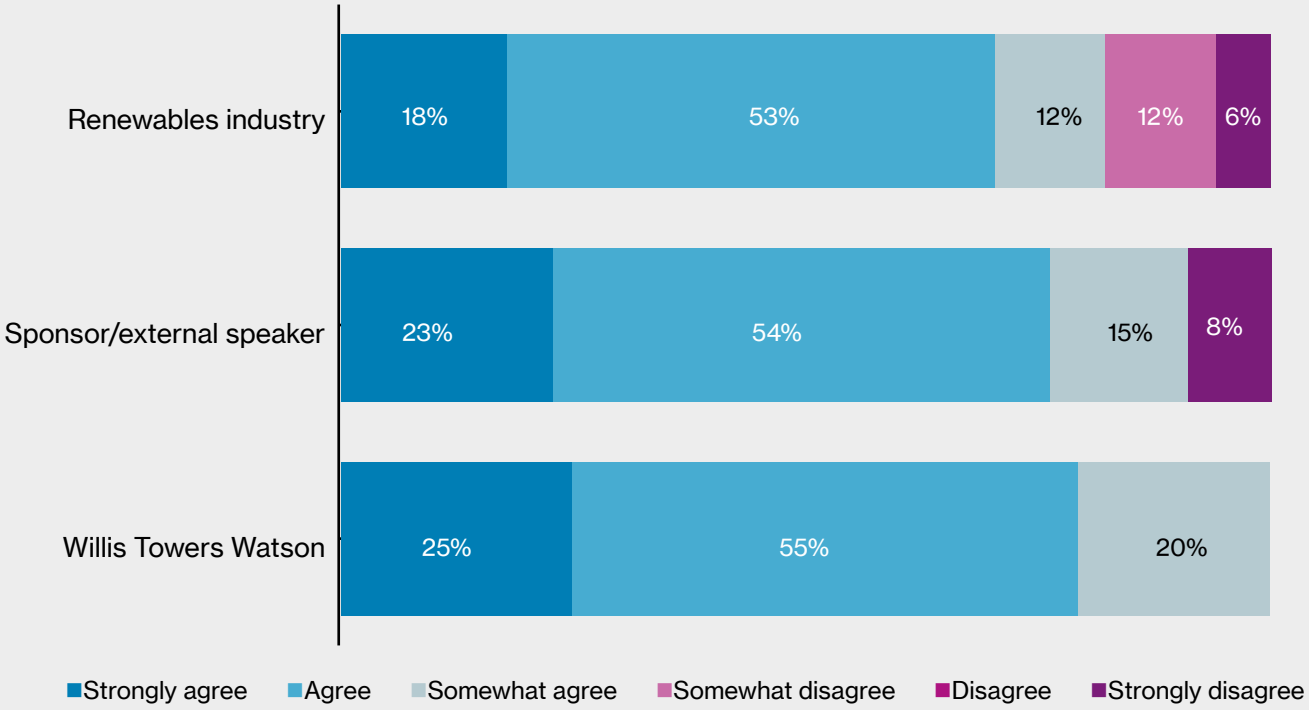
Delegates were more divided when it came to the question of decommissioning risk. However, a majority of industry delegates did not agree that the industry was managing this risk effectively.

Issue two – Decommissioning risk divides the delegates

Following a presentation by Willis Towers Watson's Adam Piper, delegates were divided when asked if decommissioning risks for renewable energy assets are currently properly identified, quantified and managed. While 43% of the industry delegates thought that they were, the majority (57%) did not - this majority increased to 66% in the case of the insurer delegates and rose to 89% in respect of the Willis Towers Watson delegates. Adam's presentation focused on the benefits arising from improving Returns on Investment via a Long Term Decommissioning Bond – an instrument that most delegates were unfamiliar with.

"Following a presentation by Willis Towers Watson's Adam Piper, delegates were divided when asked if decommissioning risks for renewable energy assets are currently properly identified, quantified and managed."

"Bigger turbines are an exciting development, but they carry with them risks that have not yet been fully quantified."



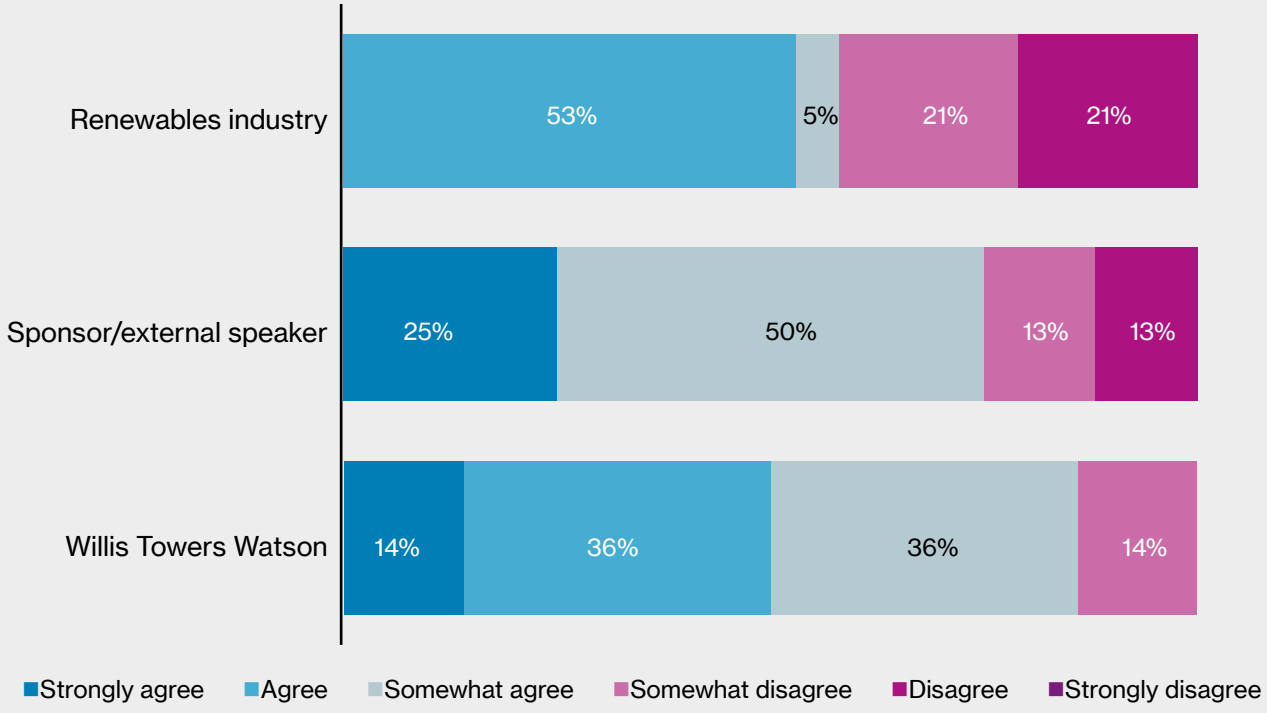
As the industry pushes new frontiers in terms of size and scale, delegates remained nervous when considering the potential additional risks involved.

Issue three – Large turbine risks have not yet been fully quantified

Another decisive vote during the seminar was recorded in advance of an excellent presentation by Manish Hatwar, Senior Product Manager for GE Wind Energy GmbH. A very large majority – virtually all the delegates with the exception of 18% of the industry delegates and 8% of the insurer delegates - agreed with the notion that bigger turbines, while an exciting development, carried with them risks that have not yet been fully quantified. As part of his presentation, Manish showed how GE is ensuring the reliability of bigger turbines by adopting processes beyond component testing to drive reliability, including highlighting blade and tip joint testing and certification, rig tests for pitch bearing and full rotor testing, machine head testing and gear box testing.

"Virtually all the delegates with the exception of 18% of the industry delegates and 8% of the insurer delegates - agreed with the notion that bigger turbines, while an exciting development, carried with them risks that have not yet been fully quantified."

"In most European renewables projects, the sponsors and lenders' interests compete with (rather than are aligned with) those of the contractor."



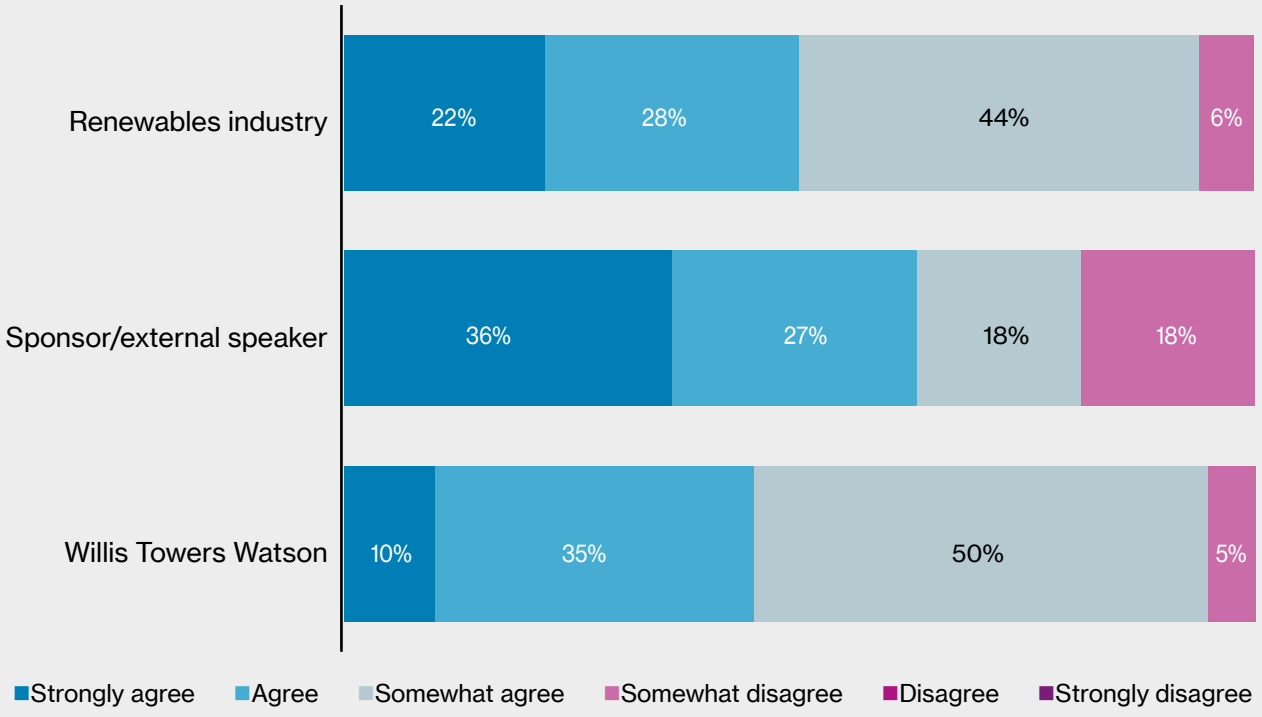
Despite a significant disagreement from some renewable energy industry delegates, most generally agreed with the proposition that lenders and contractors interests were often in conflict.

Issue four – Conflicting contractor and sponsor/lender interests?

Another issue which split delegate opinion at the seminar was whether or not sponsor and lender interests in the renewable energy industry were generally aligned with or were in conflict with those of the contractor. The industry delegates voted by a small majority (58%) that the lenders' interests generally competed with those of the contractor; however, there was substantially more agreement to this notion from the insurers (76%) and Willis Towers Watson (86%). HFW'S Ben Mellors and Joseph Botham provide their insights into the bankability of the renewable energy sector, and within their presentation highlighting the need for a proper (and early) identification and assessment of the risks involved, together with complete and adequate pre-contract studies, adequate time for all parties to assess risks and a proper evaluation of the risk itself.

HFW'S Ben Mellors and Joseph Botham provide their insights into the bankability of the renewable energy sector

"To keep insurance prices to a manageable level, the European renewables industry will respond effectively to what insurers want from it."



The demands for better data and more sophisticated underwriting information from insurers is well known –and it seems that the European renewable energy is keen to respond to the challenge.

Issue five – The buyer response to insurer data demands

For several years now the insurance industry has been at pains to put out the message that the more sophisticated the insurance market submission, the better the changes are of buyers achieving sufficient differentiation to obtain more favourable terms. Following a presentation by Nigel Spencer, Global Development Manager, RSA, a proposition was put to delegates that "to keep prices to a manageable level, the European renewables industry will respond effectively to what insurers want from it". While it might be expected that 95% of the industry and Willis Towers Watson delegates agreed, perhaps more surprising was that as many as 84% of the insurer delegates agreed as well.

What next for European renewable Energy risk? From left to right: Nick Evans (Avivia), Roger hughes (Willis Towers Watson) Matthew Radmillo (Rushtons), GuangQuan Xu (SCOR) and Chris Ling (Willis Towers Watson). Chair: Steve Munday (Willis Towers Watson).

The feedback from delegates suggested that the seminar had been very useful to the majority, as we look forward to staging another similar event in the near future.

Robin Somerville is Editor of the Renewable Energy Market Review and Facilitator of our recent Prague seminar.

Australia: meeting the challenge of a hardening insurance market

Introduction: a thriving industry beset by a new insurance challenge

Australia's renewable energy sector should be thriving in an era where consumer demand and environmental awareness is driving a boom in technology, along with heightened affordability and accessibility.

There are billions of dollars' worth of projects in the pipeline for Australia for wind, solar and hybrid technologies such as solar/hydrogen plants. These, as well as a host of established plants, already have a host of issues confronting them; now they have a new challenge, and it is coming from the insurance industry.

Renewables in Australia have long battled such problems as a lack of policy direction from the federal government, connection delays, marginal loss factors and the need for greater investment to ensure power grid security. Now, underwriters are setting them a stern test as a result of significant losses in the sector, during both construction and operations. A number of insurers have exited the Australian market and capacity is dwindling - even those underwriters who remain have markedly less appetite for providing the same amount of capacity that they have historically deployed, leading to hardening market conditions.

"Risk engineering will be particularly crucial in the proposal stage to ensure there is enough capacity and appetite from the insurance market to back these projects."

A sunny country at the forefront of solar technology

Australia is at the forefront of renewable solar technologies. Available land for projects is vast and relatively cheap, there's an abundance of sun, and geo-political risks are generally stable, notwithstanding the differing attitudes to the sector from state and federal governments.

There are some innovative approaches to energy production, such as renewable energy hubs pairing wind, solar, hydrogen and battery storage. While this is attractive to financiers and developers, it represents an aggregation of risk, stretching already compromised underwriting capacity. This is exacerbated by developers seeking opportunities further afield in regions that have natural catastrophe exposures.

Risk engineering critical as market hardens

Risk engineering will be particularly crucial in the proposal stage to ensure there is enough capacity and appetite from the insurance market to back these projects. Coverage restrictions are not only resulting in increased premiums and retentions, but they also have the potential to affect the viability of both existing and proposed projects.

Essentially, revenue models which were developed with flat insurance premium estimates - and assumptions that coverage would be consistent over the life of the project - can no longer be counted on. The market is hardening in Australia to the point of a doubling in insurance costs for 2020 and beyond, compared to what would have been budgeted for in the 2018/19 financial year.

Economically viable coverage?

On top of increased risk financing costs, the renewables sector must come to terms with the reality that coverage previously offered may no longer be available.

LEG3 Design Cover is a case in point. Up until early 2019, LEG3 was widely available; however, in response to a market push towards a holistic review of underwriting methodology, it can no longer be assumed to be a given. As part of the technical underwriting, prospective insureds must now review evidence that the increased design coverage is not taking on original equipment manufacturer (OEM) research and development risk, whether that be from evolution of technology or, in more recent times, complete prototypical technology.

This could mean that existing contractual agreements will be breached – the required level of coverage may no longer be economically possible to obtain. Insurance advisors have a crucial and early role to play here in projects to ensure that the insurance provisions within the Design & Construct (D&C) and Operation & Maintenance (O&M) contracts are available in the market.

Increased natural catastrophe losses

The hardening insurance market is also being driven by the increasing number of natural catastrophe claims, locally and globally, arising from perils such as flood, hail, bushfire and cyclone. These claims are intensified where organisations are looking to reign in project costs by using inferior equipment, or where issues arise from faulty workmanship by contractors. This is particularly an issue for Australian projects where the availability of experienced contractors is already stretched. Australian losses have already led to key insurance markets ceasing to underwrite projects here.

"The hardening insurance market is also being driven by the increasing number of natural catastrophe claims, locally and globally, arising from perils such as flood, hail, bushfire and cyclone."

Quality underwriting submissions vital

Indeed, the quality of the submission presented to the insurance market, both in Australia and globally, will have a major influence on the terms received. If companies in the renewables sector are not willing to provide the required level of information and engage with insurers, there is a real risk of projects potentially being left with sub-standard coverage that will not satisfy their financing arrangements.

This is of particular concern to projects at the proposal stage; details of the experience of all contractors and subcontractors to be used are essential, as insurers will only look to underwrite projects that are being managed by a proven team.

Contractor insolvency risks

There have been renewables projects in Australia where contractors and subcontractors have gone into liquidation or become insolvent. This has increased the risk to the project through extended build times, not only while alternative contractors are sought, but also raises a host of other issues. These include the question of pre-insolvency build quality, and issues with onboarding new contractors with the part-built projects, as well as with unviable warranties.

Technology not always a plus

Technology is also playing its part, but not necessarily in terms of improving the outlook. The push by Original Equipment Manufacturers (OEMs) for new prototypical technology, along with developer appetite to maximise project outputs, is pushing the insurance market to a place of discomfort.

Is the insurance market really the default location for the OEMs' Research & Development (R&D) risk prior to certification? Insurers do not believe so and they are pushing back hard. It is becoming difficult to get design coverage, with certain risks becoming uneconomical to transfer. The push to prototypical is also being exacerbated by question marks over the suitability of the technology for the harsh Australian conditions.

Address the detail

It's not all about projects in the pipeline. Unless the renewables sector addresses the level of detail now being required and demonstrates some common sense when agreeing Power Purchase Agreement (PPA) prices that move in line with increased insurance costs, then existing projects will fail. In the current environment, it would be difficult to see new investors prepared to invest against the backdrop of the issues that confront the sector.

Other risk financing options

Larger operators may be in a position to consider the use of other risk financing options. These could include captives, as insurers push for higher retentions, particularly for Business Interruption exposures. While fundamentally this will not alter the underlying cost of the risk transfer, it may enable operators to smooth out losses, thereby ensuring that project financiers have a greater level of comfort in consistent project returns.

Plan your strategy

There also needs to be heightened planning and strategy around the renewal process, particularly when looking to utilise global insurance markets. This must be undertaken in a co-ordinated way to ensure the best solution can be found. It's no longer possible to have a "hands off" relationship with underwriters.

Each organisation needs to set a timeline of major renewal milestones that is regularly reviewed. Importantly, they must remain flexible and be open to possible changes in direction. The insurance market's attitude to renewables is evolving at a rapid rate. Risk management remains paramount – addressing risk early and failing to demonstrate the quality of projects can only result in substandard outcomes.

Conclusion: don't blanket the market!

The temptation to blanket the market in a hope of obtaining the cheapest deal via multiple insurance brokers is not the best way forward. In the short-term, this strategy might produce some limited upside on premium outcome, but it will generate a longer-term negative insurance market sentiment. Insurers will not actively look to partner with those organisations; in a market where there is a shrinking number of insurance carriers and capacity, those that are willing to work with and build relationships with selected insurers will win out in the longer term.

Mick McKeever is National Sales Director, Willis Towers Watson, Australia.

Geoff Babbage is Director, Property and Casualty, Willis Towers Watson, Australia.

Mark Thompson is Broking Manager, Construction Risks, Willis Towers Watson, Australia.

Ireland: balancing opportunity against a challenging insurance market

Introduction: a milestone reached

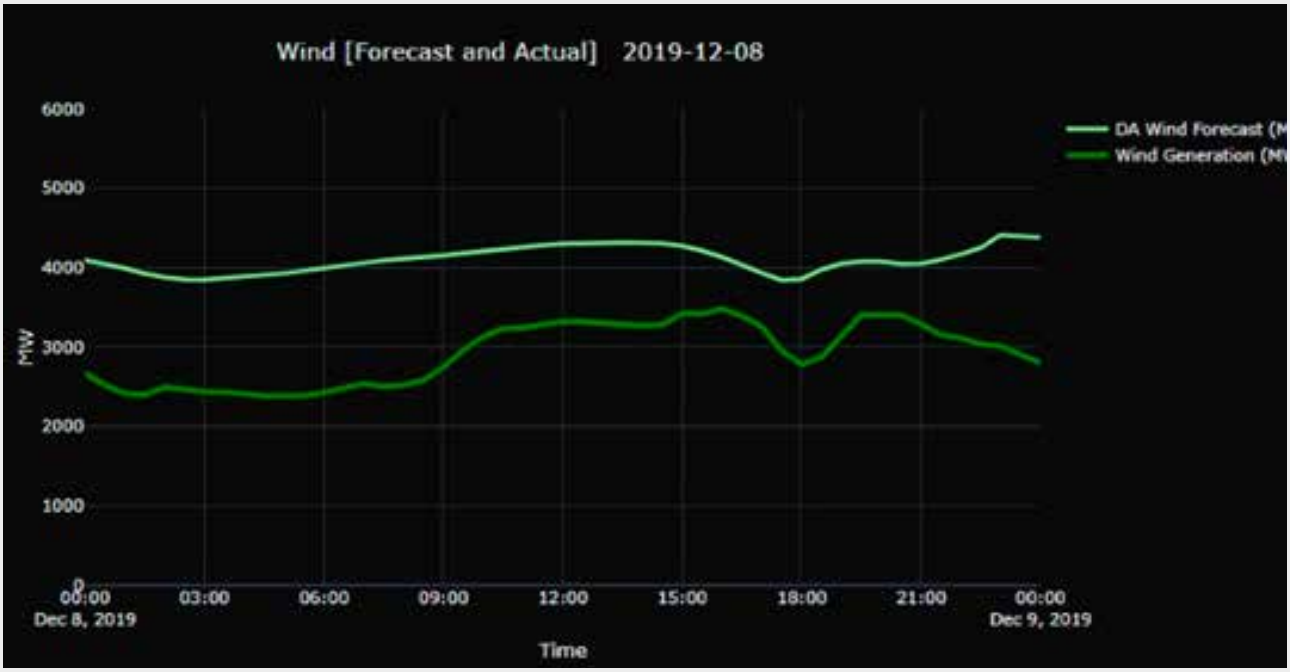
December 8 2019 was a landmark day for the Irish renewable energy sector - and more specifically the onshore wind energy industry. Storm Atiyah was tracking from the north-west of Ireland, with varying levels of wind warnings in place. As the day progressed and against a backdrop of pricing volatility, the permissible limit of 70% renewables penetration on the system was reached for the first time as the Irish system became the first in the world to achieve these levels - levels which are critical to achieving a decarbonised energy system.

Climate Action & RESS – moving to auction

This milestone came just six days after the Minister for Communications, Climate Action and Environment, Richard Bruton TD announced long awaited details of the first Renewable Electricity Support Scheme (RESS) auction. The Government has approved key features of the scheme which will give investors and developers some sense of clarity; however. a process of consultation is now underway to iron out the finer details of the new scheme. Subject to state aid approval by the EU, the first auction[1] is potentially set to open in June 2020. The announcement of a new RESS scheme came after the government had published its climate action plan which sets out its ambitious plan to tackle climate change. Wind energy is central to the plan, with a target of 3.5 GW of offshore wind energy by 2030 to more than double onshore wind capacity to 8.2 GW and to achieve the overall target of 70% of Irish electricity from renewables by 2030[2].

[1] https://merrionstreet.ie/en/News-Room/News/Government_approves_key_design_features_of_first_Renewable_Electricity_Support_Scheme_RESS_auction_30_Increase_in_Renewables_Expected_in_Round_One.html
[2] https://blogs.dnvgl.com/energy/the-irish-wind-industry-looks-forward-to-2030

Figure 1 - Wind (Forecast and Actual) Storm Atiyah, December 8 2019



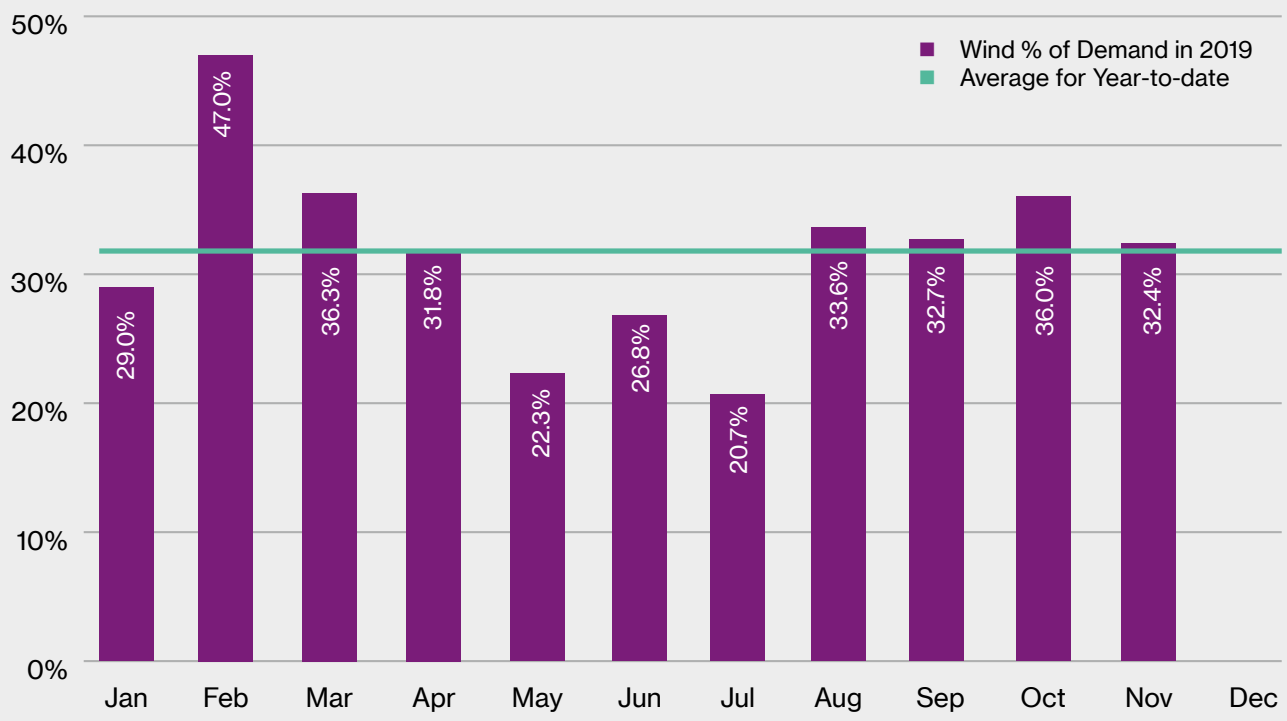
Source: https://www.electroroute.com/storm-atiyah-8th-december-2019/

The RESS scheme will be open to a range of technologies, including wind and solar, which is intended to help Ireland broaden its renewables mix. It will include a category for community–led projects, subject to state aid approval of up to 30 GWH, and developers will contribute to a fund to support communities.

However, the new scheme will come with a caution for investors, given the experience of similar regimes in territories such as the UK, Germany and India where there have been problems with profitability and low bid volumes. Investors and lenders will need to evaluate their risk transfer appetite, while the new regime presents an opportunity for the insurance market to further develop more innovative index-based solutions to offset uncertainty risk. It will also require developers and investors alike to give further thought to projected revenue figures for Business Interruption coverage (for example) and fully understand policy responses to fluctuations in pricing.

"Investors and lenders will need to evaluate their risk transfer appetite, while the new regime presents an opportunity for the insurance market to further develop more innovative index-based solutions to offset uncertainty risk."

Fig 2 - Wind in ISEM, 2019



Source: ISEM

ISEM & the Rise of CPPAs

It is now over 12 months since Integrated Single Electricity Market (ISEM) Ireland's wholesale power market commenced in October 2018. In its first year of trading, ISEM has had issues with pricing disputes as well as significant volatility, as the new format has multiple two-sided markets with the onus of balance responsibility within a capacity auction. The fuel mix has seen a steady growth of wind on the ISEM, with an average of 34% of demand in 2019[3]. Despite this growth, the challenges caused by the volatility of balancing ISEM prices has led to less value in the capacity market for many generators in ISEM compared to SEM.

The Government's Climate Action plan 2019 provided a very ambitious target for Corporate Power Purchase Agreements (CPPAs) in Ireland by 2030, with a target to ensure 15% of electricity demand is met by renewable sources contracted under CPPAs; it is estimated that this equates to approximately 2.5 MW of installed onshore wind generation capacity supported through CPPAs[4].

Considering the EU Directive 2014/95 and the current climate change momentum, the challenge will be to make this a viable effective route to market. However, there seems to be an appetite to make this happen as Ireland is home to more than 60% of the RE100 signatories[5], a climate group imitative under which the world's most influential companies commit to achieving 100% renewable power by a target date.

This is a new phenomenon in recent years and certainly one for which insurers have yet to bring innovative risk transfer solutions to market, except for a couple of US-based specialist providers. However, this is certainly an opportunity and they are keeping a close eye on working to change this position.

[3] http://www.energycork.ie/wp-content/uploads/2019/12/S.pdf
[4] https://www.lexology.com/library/detail.aspx?g=e7675995-0314-4f0a-9b1d-85312f9bad35
[5] https://www.eolasmagazine.ie/can-corporate-ppas-play-a-role-in-irelands-renewables-revolution/

Offshore opportunity - Dublin Array project

It is more than 14 years since an offshore wind project was built in Irish waters; however, there is an offshore wind energy "pipeline" of more than 12 GW at various stages of development around Ireland's coastline. It is a very exciting opportunity and presents the next step for the sector in Ireland.

The lessons learned from the onshore community in terms of planning challenges, community responsibility, regulation and environmental impact are important milestones and the industry is presented with an enormous potential from its surrounding waters. Offshore brings with it a different technology, but the associated costs have fallen significantly in recent years; as a result, the resources required to bring these projects to fruition will see new opportunities for many stakeholders.

It is very encouraging for the industry to see an indigenous Irish developer such as Saorgus Energy partner with the German energy giant Innogy to bring its Dublin Array project before the department of planning 2019. This project will potentially include 60 to 100 turbines and the capacity to generate up to 600 MW of electricity[6]. Thankfully the global insurance market has significant experience with these projects and has a track record of delivering effective risk transfer solutions for these projects in many territories; Ireland is not expected to be any different in this regard.

Insurance market challenges

The global Property & Casualty insurance market regained some stability in the early part of 2019, driven by strict underwriting and increased rating strength, following a period of significant natural catastrophe losses sustained since 2017. Lloyd's reported over £3 billion of losses in the past two years 2017 & 2018[7] and as a result undertook a remediation plan to maintain capacity levels.

As a result, the reduction in capacity has resulted in a hard market of near post 9/11 levels and the outlook for the UK insurance market remains very volatile. It is hoped that the recent general election result in the UK and the clarity it brings in terms of Brexit will allow both the reinsurance and insurance markets to have more certainty in their planning and potentially settle capacity challenges in the coming months.

Whilst the broader insurance market continues to battle these challenges, as a sub-set the Renewable Energy insurance market has faced a very difficult 24 months and is currently in the eye of the storm. The sector has suffered a series of heavy losses globally, primarily due to more frequent natural catastrophes along with construction and associated loss of revenue losses.

[6] https://www.irishtimes.com/business/energy-and-resources/joint-venture-to-build-1-5bn-wind-farm-off-dublin-coast-1.4051797
[7] https://uk.reuters.com/article/uk-lloyd-s-of-london-results/lloyds-of-london-suffers-storm-filled-losses-sees-profit-in-2019-idUKKCN1R80IF

Limited pool becomes even more restricted

The pool of insurers who provide cover for renewable energy projects was already limited and has further deteriorated in 2019, most notably with the announcement by CNA Hardy to exit Renewable Energy business due to poor market conditions and under-profitability. Their footprint in the market is estimated at US$20m-25m and they were a leading provider in the sector, with experienced underwriting teams in Copenhagen, London and Paris. In recent years, CNA had provided capacity to several Irish projects.

Other providers such as Axis Capital and GCube continue to provide capacity for Irish projects, albeit at increased rates and in most cases with significantly higher deductibles on both property and, more significantly, associated downtime losses. There have been moves by other insurers such as Travelers and Allianz Global Speciality to dip their toes in the Irish market and they are doing so on a selective basis, following a considered underwriting approach with rating strength applied. RSA's Irish operation continue to provide significant capacity for Irish projects, but they have had their own well-documented challenges in recent years; in terms of Renewable Energy underwriting, it is vital they balance a well-established portfolio with new technology projects to ensure its continuing profitability.

Conclusion: innovation coinciding with deployment of new technology

The challenges faced by the market come at a time when the industry is embracing innovation in project technology. Battery storage, increasing hub heights, design optimisation, modular components and increasing outputs are all becoming features of Irish projects; whilst much of this is welcomed by the insurance sector, it is prone to adopting a very conservative approach towards other elements until it brings itself up to speed with its capabilities.

Brian O'Dwyer is Renewable Energy Specialist Corporate Risk & Broking Account Executive at Willis Towers Watson Cork.

South Africa: the lion roars again

The publication of the Integrated Resource Plan (IRP) 2011 - 2030 paved the way for the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) in South Africa. Over the past 7-8 years we have seen a significant rollout of a number of RE projects (CSP, Solar PV, Onshore Wind, and Small Hydro & Biomass) which has resulted in the procurement of 6,327 MW of renewable energy across 92 utility-scale projects.

Critical to the REIPPPP has been developer, funder and lender support from the likes of Old Mutual (AIIM & ACED), Mainstream, Scatec Solar, Globeleq, Enel Green Energy, Abengoa, Redcap, Nedbank, ABSA Bank, Standard Bank, Investec, RMB and other local and international developers, funders & financial institutions. These include the Independent Development Corporation (IDC), the Development Bank of Southern Africa (DBSA) and, of course, the IPP Office which has played a vital role in the process. Another noteworthy feature of REIPPPP is the economic development aspects to it which require between 1.5% to 3% of top-line revenue goes towards community development projects. This has contributed to the uplift of the poorest of the poor regions in the country in a very meaningful way.

Reduced tariff pricing transforms viability

Over the past four bidding rounds the tariff pricing has reduced significantly - Solar PV by 76% and Wind by 55% - which now makes renewable energy a very viable and attractive option in the energy mix in South Africa.

The REIPPPP was unfortunately marred by a two-year delay on the Round 4 projects following the date that the preferred bidders were announced, primarily due to issues under Jacob Zuma's presidency from 9 May 2009 until 14 February 2018, which was plagued by alleged corruption and state capture of a grand scale. To exacerbate matters, the Minister of Energy posts have changed seven times since the introduction of the REIPPPP which has had an adverse impact on the REIPPPP's continuity. The green light for the Round 4 projects was finally received in 2018 and all 27 projects achieved Final Completion (FC) and are now in their construction phase.

Operating losses and new training

All the Round 1 to 3 projects are now fully operational but a considerable number of them have suffered major losses as a result of turbine fires, gearbox failures, transformer failures, switchgear fires, lightning strikes, mini tornadoes and design defects.

South Africa has now overcome many of these challenges, which included the rapid training of a new local workforce to achieve important South Africa BBB local content requirements, limitations on the available in-country craneage and the adaptation of the receiving ports to receive the increasing large turbines with longer blades. The often-demanding inland transit distances which are required to access sites have also been challenging to some of the freight forwarders, resulting in incidents where drivers have lost attention and loads have been shed.

Hardening property market

The considerable hardening of the Property insurance market globally has had a major impact on local insurance placements for large utility-scale projects in South Africa; this trend has been particularly relevant to CSP and Onshore Wind projects. Besides the upswing in insurance pricing, higher self-retention levels, coupled with restrictions in coverage, are now the order of the day. The placement process is taking substantially longer than before, and comprehensive risk assessment surveys have become essential as (re)insurers expect to see robust loss prevention and risk mitigation plans in place. This means that underwriting submissions to the market need to demonstrate a very firm commitment to reduction and mitigation of risks with stated timelines wherever feasibly possible.

"The placement process is taking substantially longer than before, and comprehensive risk assessment surveys have become essential as (re)insurers expect to see robust loss prevention and risk mitigation plans in place."

Political changes and a new IRP

A change of President took place on 15 February 2018 when Cyril Ramaphosa was elected as the new President of the Republic of South Africa. Gwede Mantashe was subsequently appointed as the Minister of Mineral Resources and Energy, replacing the former Minister of Energy, Lucas Radebe.

Following this appointment, the long awaited updated Integrated Resource Plan (IRP 2019)[1] was gazetted in October 2019 and makes an allocation of an additional:

- 6,000 MW for Solar PV;
- 14,400 MW for Wind;
- 4,000 MW for Distributed Generation, Cogen and Biomass landfill; and
- 2,088 MW towards storage.

No allocation has been made for CSP up until 2030. The IRP is welcomed at a time when South Africa is once again experiencing major load shedding due to the myriad of issues at the embattled state-owned power utility Eskom, which is a very serious concern for the economy of South Africa. There is now absolutely no doubt that renewable energy technologies can provide the solutions to alleviate the challenges Eskom are facing, particularly after the company recently implemented an unprecedented Stage 6 load-shedding operation, costing South Africa over ZAR2 billion a day[2].

Electricity crisis - latest developments

The current electricity crisis prompted President Cyril Ramaphosa to cut short an official visit to Egypt and to announce on Wednesday December 11 2019 that the Department of Mineral Resources and Energy (DMRE) would consider several emergency power supply options at a meeting scheduled for Friday 13 December 2019 to assist Eskom with their 5,000 MW deficit that has arisen as a result of the underperformance of its coal-fired power stations. It is also of interest to note that the 5,000 MW supply deficit is larger than the 2000 MW to 3,000 MW shortfall outlined in the IRP 2019.

The DMRE subsequently announced on Thursday December 17 that the much-anticipated Request for Information (RFI) for emergency supply-and demand solutions would be published soon, and also indicated that Section 34 Ministerial determinations needed to facilitate the procurement of new capacity would also be published in the near future, although no timelines were formally communicated. The DMRE subsequently set January 31 2020 as the deadline for the responses to the RFI for 3,000 MW of near term supply in accordance with the Risk Mitigation Power Purchase Programme to alleviate the country's electricity crisis.

President Cyril Ramaphosa also announced on Wednesday 18 December 2019 that government was fast-tracking applications that would allow industry and business to produce and use its own power and that government is determined to remove the bureaucratic constraints and regulations to self-generation.

[1] https://www.cliffedekkerhofmeyr.com/export/sites/cdh/en/news/publications/2019/Corporate/downloads/Energy-Alert-22-October-2019.pdf
[2] Source: Creamer Media's Engineering News

Immediate release of wind power

The South African Wind Energy Association (SAWEA) has called for an immediate release of available wind power, which is estimated to be about 5,000 MW[3]. This could be achieved by lifting the Maximum Export Capacity on all operating wind farms, which governs how much electricity is permitted to be exported by wind farm power generators. Furthermore, the South African Photovoltaic Industry Association (SAPVIA) also believes that small-scale embedded generation is key to rapidly expanding electricity generation capacity and have urged the DMRE to swiftly implement regulatory changes to the current arduous NERSA licensing process required to allow generation of less than 10 MW. This could result in an additional 2,000 MW over the next 12 months to the energy mix[4].

The situation in Cape Town - will other municipalities follow suit?

It is also of interest to note that the City of Cape Town has asked for a Section 34 Ministerial Determination that will allow it to procure 150 MW of solar energy & 280 MW of wind energy directly from IPPs. A court hearing is currently scheduled for May 2020 in this regard and this could well pave the way for other municipalities to do the same. The Mineral Council South Africa has subsequently joined the City of Cape Town in urging government to make it easier for their members to generate their own electricity without the current restraints.

Conclusion: new bidding rounds anticipated

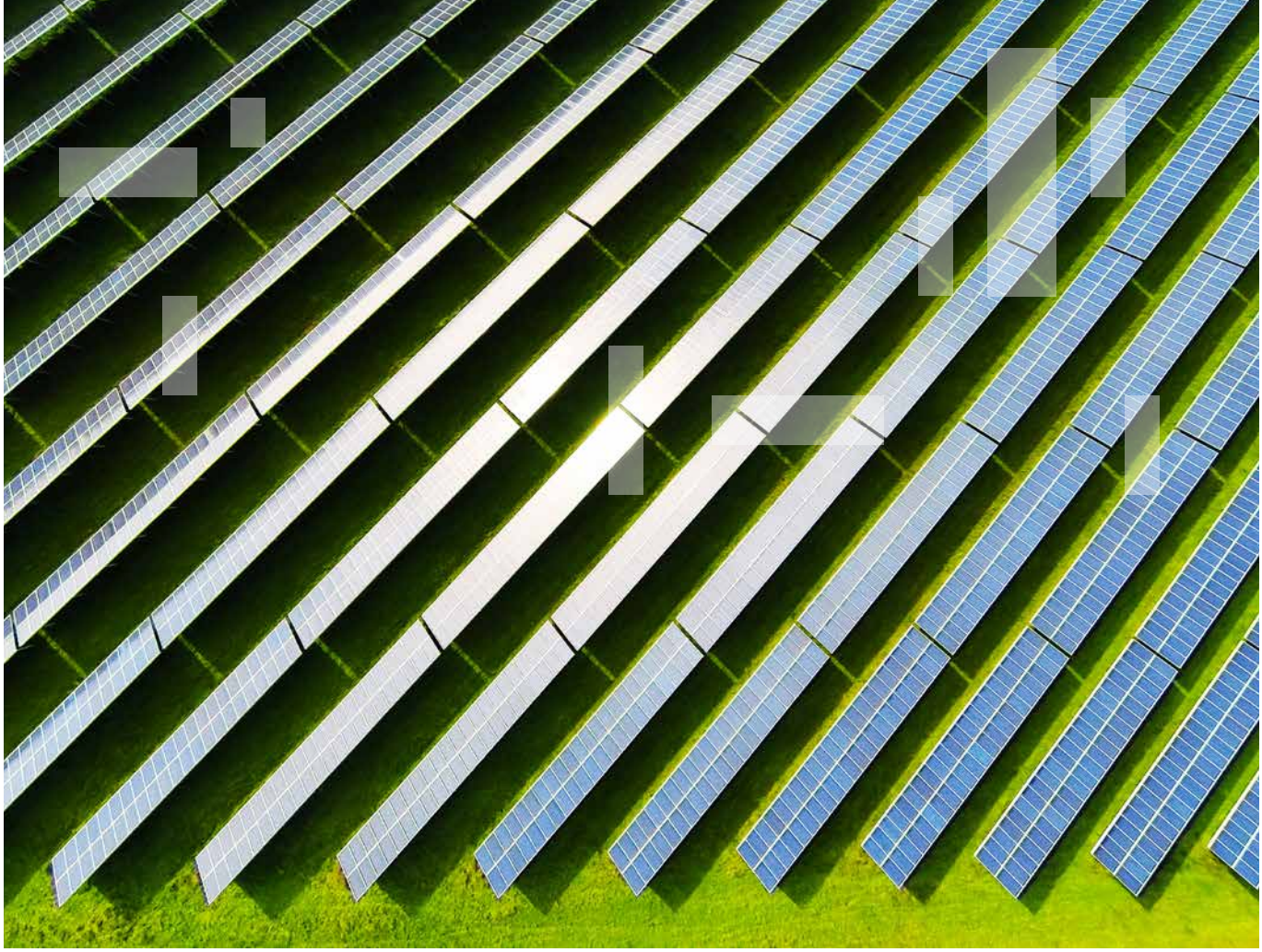
As to when the REIPPPP Bidding Round 5 will take place, a number of credible stakeholders believe that this will happen in Q2 2020 and a "massive" bidding round is anticipated due to the acute electricity crisis currently prevailing in South Africa. Major risk intermediaries are utilizing their insights gained on the previous bids and their own traction with construction and operational risks to ensure the lessons learned are considered during the bidding and subsequent delivery of Round 5.

South Africa is a shining example of new renewable energy deployment around the world. To quote Mike Peo, Head of Infrastructure Energy and Telecommunications, Nedbank Capital: "At almost every international conference on energy South Africa has been widely acknowledged as having the most successful RE programme ever undertaken".

Chris Nivison is Renewable Energy Specialist, South Africa, Willis Towers Watson.

"Major risk intermediaries are utilizing their insights gained on the previous bids and their own traction with construction and operational risks to ensure the lessons learned are considered during the bidding and subsequent delivery of Round 5."

[3] South African Wind Energy Association (SAWEA)
[4] South African Photovoltaic Industry Association (SAPVIA)



Chile: the green revolution

Introduction: the growth of the Chilean economy

Chile has surpassed an installed capacity of 5 GW of renewable energy in 2019[1]. This is set to be ramped up, with the Chilean government setting itself an objective to reduce its CO2 emmissions by 30% in 2030 by closing several of the existing coal fired power plants[2]. This would change the energy source mix to be 75% from renewables and the remaining from fossil fuels.

Indeed, Chile has been one of the fastest growing economies in Latin America for the last few decades now; one element that has helped sustain this growth is the privatisation and liberalisation of the energy sector. However, Chile has limited fossil fuel reserves and the country has sustained a several periods of challenges, most recently in 2008[3] when matters were exacerbated by the loss of natural gas imports from neighbouring countries. This was compounded by droughts in their own country – given that 50% of Chile's electricity generation comes from hydroelectric power (source: as per previous footnote), the impact can be devastating. This has led the government to rethink their current strategies and put some sustainable and long-term energy policies with measurable targets for 2035 and 2050[4] in place.

[1] Chile surpasses 5 GW of renewables capacity in June, Renewables Now - https://renewablesnow.com/news/chile-surpasses-5-gw-of-renewables-capacity-in-june-663282/ - 29 July 2019Chile surpasses 5 GW of renewables capacity in June, Renewables Now – 29 July 2019
[2] International Climate Initiative - https://www.international-climate-initiative.com/en/news/article/chile_plans_to_close_coal-fired_power_stations/ - 20 September 2018International Climate Initiative – September 2018
[3] International Energy Agency - https://webstore.iea.org/download/direct/828 - October 2009
[4] Energy Policies Beyond IEA Countries – Chile 2018 International Energy Agency - https://webstore.iea.org/download/direct/265 - October 2018

Solar panels in Chile. Source: PV Magazine 2018.

30% reduction in CO2 by 2030

The Chilean Ministry of Energy has set itself an ambitious target to reduce CO2 emissions by 30% by the year 2030[5]. To achieve this, a key milestone was the signing of agreement by four major Chilean electricity producers to end coal-fired electricity generation and oversee the shift away from coal. Chile also put a carbon tax in place in 2014 on carbon dioxide emitted by thermal power plants (in excess of 50 MW of generation capacity)[6]. There is an emphasis on sustainable energy sources such as wind and solar and the importance of integrating and guaranteeing these energy sources as a key feature in helping reform the market for energy services.

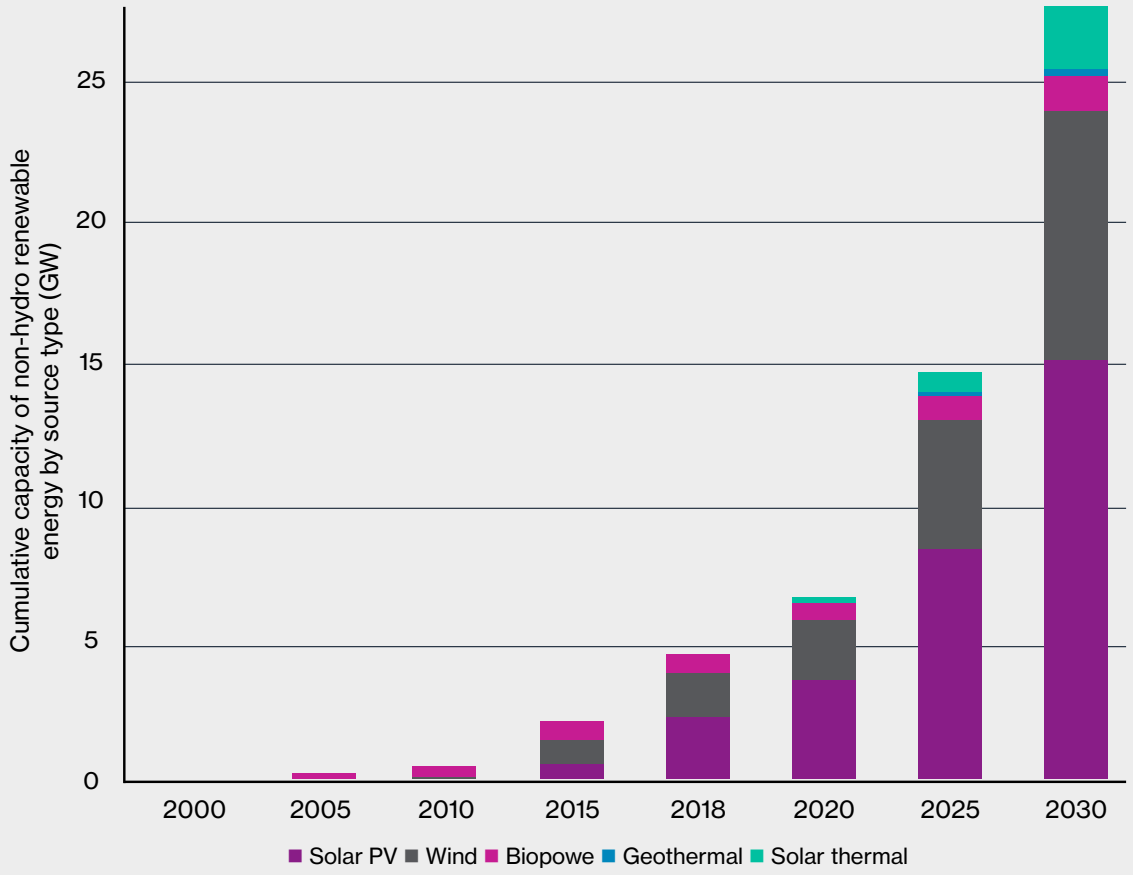
"According to Generadoras de Chile, Solar will become the primary source of electricity in the country as early as 2030, with expectations that it will cover more than 30% of demand."

Solar to become primary electricity source by 2030

Currently, coal-fired power plants are responsible for about 40% of electricity production in Chile. But according to Generadoras de Chile, Solar will become the primary source of electricity in the country as early as 2030, with expectations that it will cover more than 30% of demand. In 2018, nearly US$ 1.2 billion invested in Solar in Chile up 106% from prior year though wind projects took a massive hit as investments dropped by 96% due to concerns around curtailment and delays to the expansion of the transmission lines[7]. Thermoelectric plants will still have a quota of 25% in 2030, while the remaining 75% will be covered by renewables - out of which 29% would be covered by Hydro, while Solar Photovoltaic and Wind would add up to 42%. The remaining 4% would be Biomass, Geothermal and Concentrated Solar Power[8]. One of the possible driving factors for this is the cost of renewable energy technology was found to be cheaper than conventional power as shown in the 2016 distribution tender with Solar leading the way at US$ 29 per MWh versus US$ 31 per MWh for Wind whereas Coal was priced at US$ 57 per MWh[9].

[5] Chile: Plan for decommissioning of coal; solar to become primary energy source by 2030, PV Magazine - https://www.pv-magazine.com/2018/01/30/chile-plan-for-decommissioning-of-coal-solar-to-become-primary-energy-source-by-2030/ - 30 January 2018
[6] IReuters - https://www.reuters.com/article/carbon-chile-tax/chile-becomes-the-first-south-american-country-to-tax-carbon-idUSL6N0RR4V720140927 - September 2014
[7] Global Trends in Renewable Energy Investment 2019, https://wedocs.unep.org/bitstream/handle/20.500.11822/29752/GTR2019.pdf?sequence=1&isAllowed=y - 2019
[8] Chile: Plan for decommissioning of coal; solar to become primary energy source by 2030, PV Magazine – 30 January 2018
[9] Renewable energy in Latin America: Chile - https://www.nortonrosefulbright.com/en/knowledge/publications/a130d46e/renewable-energy-in-latin-america-chile - February 2017

Figure 2 – Growth of global non-hydro renewable energy, 2000-2030



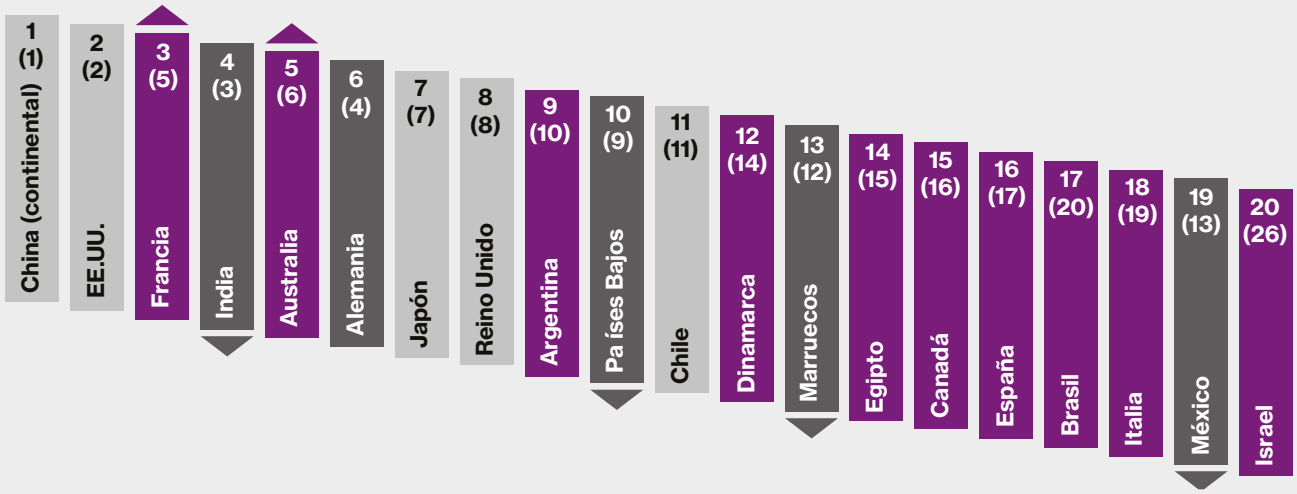
Source: GlobalData 2019

The move away from Hydro

It does feel like getting to their target of 75% overall and 42% from Solar and Wind is going to be a big step if the recent numbers are to be relied on. Chile has been one of the largest renewable energy markets in Latin America[10] and as of November 2019, in terms of installed capacity renewables accounted for 22% of the total mix (up from 6.3% in 2013 and 12.65% in 2016[11]) and in terms of total generation it accounted for 23.3%[12]. However, if we dig a bit deeper, we find that the increased production from non-conventional renewable energy was of 20.6% from prior year. What is fascinating is that for a country which has a huge historical connection to hydro related power sources, according to GlobalData[13] Chile has grown its installed non-hydro capacity from 0.03 GW in 2000 to 4.5 GW in 2018 and is in line to grow this further to 27.5 GW by 2030 - which means it is going to be a very interesting decade ahead of us.

[10] IRENA (2019), Global energy transformation: A roadmap to 2050 (2019 edition), International Renewable Energy Agency - 2019
[11] Renewable energy in Latin America: Chile - February 2017
[12] Chile grows renewables capacity, production slightly down in Nov – 23 December 2019
[13] GlobalData: Chile's non-hydro renewable energy reached 4.5GW by 2018 - https://www.power-technology.com/comment/globaldata-chile-renewable-energy/ - 31 July 2018

Figure 3 – Renewable energy country attractiveness index, 2019



Source: RECAJ – EY Publication 2019

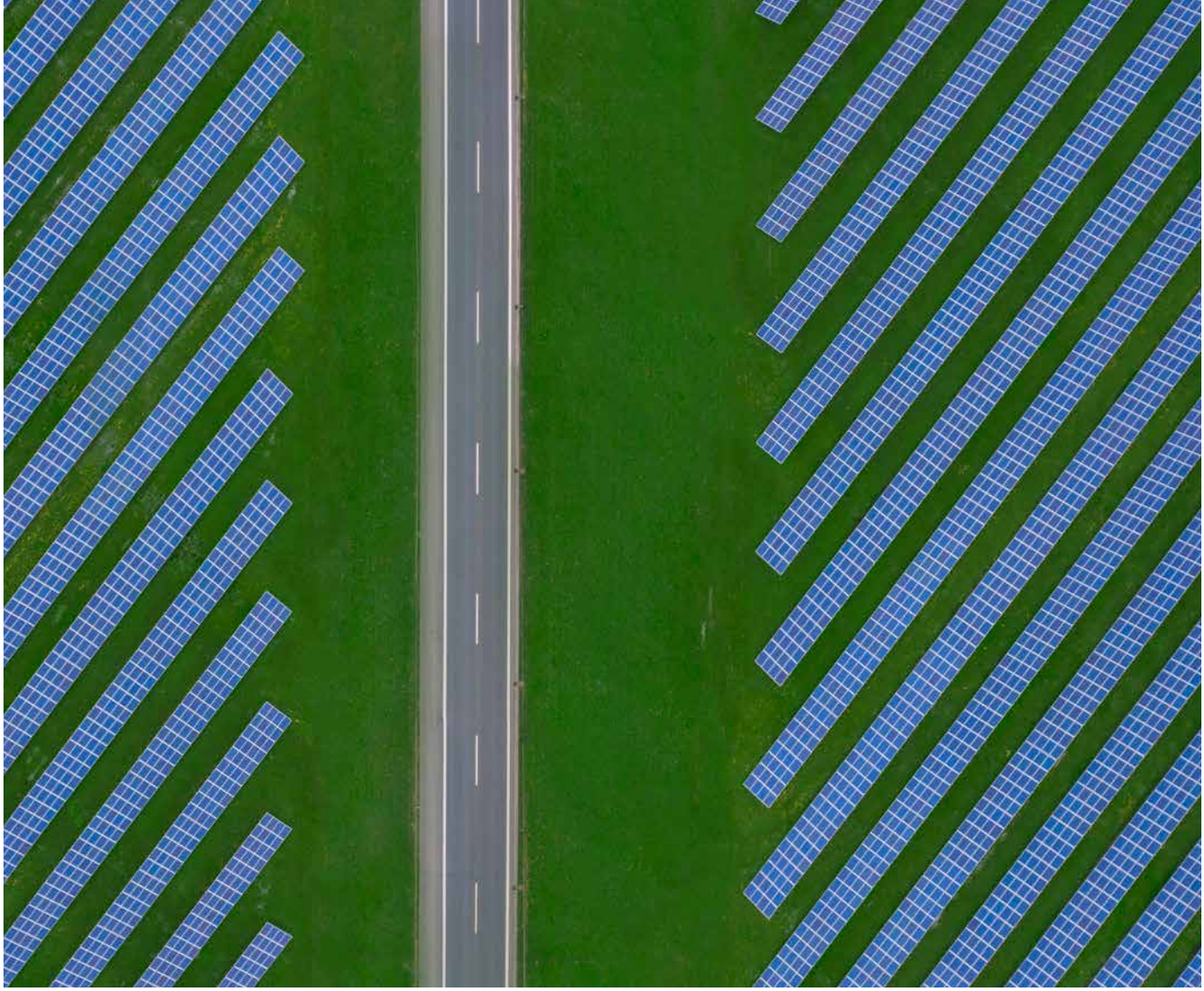
The need for regulatory change

According to Eduardo Valente, EY partner and energy and mining sector leader, Chile needs to make regulatory changes to improve green energy public policies in the medium term. "The reform of the distribution sector is an excellent opportunity to generate flexible tariffs that allow us to take advantage of solar energy in every way and to make use of unexplored resources in Chile such as residential demand management," he said. From the beginning of 2016 until the end of 2018, Chile was ranked as the 4th most attractive country to invest in renewables, according to EY's latest edition of the Renewable Energy Country Attractiveness Index (RECAI)[14] Chile is still well positioned amongst leading countries as an investment destination in the renewable energy sector. According to the EY research, despite the lack of these types, Chile is ranked at 6th for the potential to develop offshore wind and marine energy projects, 8th for Concentrated Solar Power and 12th for Onshore Wind, Geothermal and Hydro Power plants.

This is reflected in the number investments in the last 18 months in Chile, with the likes of leading Renewable Energy developers such as Mainstream, Engie, Enel, Acciona, Solar Reserve amongst others all making sizeable investment[15] in the region.

"From the beginning of 2016 until the end of 2018, Chile was ranked as the 4th most attractive country to invest in renewables, according to EY's latest edition of the Renewable Energy Country Attractiveness Index (RECAI) Chile is still well positioned amongst leading countries as an investment destination in the renewable energy sector."

[14] Chile en el Índice de Atractivo País para Energías Renovables: oportunidades y desafíos, EY – 2019
[15] Renewables Now – Chile - https://renewablesnow.com/country/chile-493/ - 18 December 2019



Conclusion: ambitious targets on track

At the rate at which projects are being developed and financed in Chile, they should be on track to achieve their ambitious targets. Despite recent events, Chile is still seen a country that has a relatively stable political environment and supports renewable energy, emphasizing the current government's work and its interest in developing this technology and the decarbonization of the energy matrix.

John Abraham is an Account Director, Renewable Energy GB, Willis Towers Watson.

"At the rate at which projects are being developed and financed in Chile, they should be on track to achieve their ambitious targets."

China: opportunities & challenges for renewable energy[1]

Introduction - overall Chinese Power market conditions

For Chinese Renewable Energy business, premium rates in 2020 are basically flat compared to 2019; as the prevailing domestic economic trend is gradually heading in a downwards direction, it is anticipated that the domestic insurance market is more likely to compete more fiercely for the more limited pool of domestic business this year than in 2019 and keenly support Chinese interests abroad. However, market combined loss ratios for Onshore Wind business are expected to exceed 120%; if 2020 turns out to be a smooth year, the Domestic Power and Renewable Energy insurance market is likely to smooth its book from the continuing activity in traditional coal fired power plants, which has been running in parallel with the growth in domestic renewable energy.

"Even with the expected reduction in technology losses through continuous lessons learned, there is no early indication to date of any obvious improvement."

Onshore Wind

On August 31 2019, wind power grid capacity reached 200 GW in China, including 11 GW of new generation capacity during the period from January 1 to August 31 2019. This was only 40 MW lower than during the same period in 2018.

For Chinese Onshore Wind, the national average abandonment rate decreased from 12% in 2017 to 9% in 2018. The main reasons were that the bidding "on grid" for onshore wind power and power generation indicator should match their coal fired and renewable energy equivalents. It is believed that average annual newly installed capacity will keep on growing, to add an additional 20 GW during the next four years. The renewable energy initiative remains a key objective for China.

However, the total combined loss ratio for Onshore Wind is still over 100% during this period. Even with the expected reduction in technology losses through continuous lessons learned, there is no early indication to date of any obvious improvement. In consideration of the above, but noting that competition among local insurers is particularly fierce, it is anticipated that premium rates for Chinese Onshore Wind will be flat in 2020 compared to 2019.

[1] All statistics for this article are from https://library.wwindea.org

Offshore Wind

For Chinese Offshore Wind, new power grid capacity reached 3.08 GW in 2019; in 2020, this is figure is estimated to reach 4.13 GW, resulting in total Offshore Wind grid capacity of 10.84 GW. Investment in new construction projects reached US$8.8 billion in 2019; this is expected to rise to US$11 billion in 2020, which means that approximately 20 projects are scheduled to begin construction every year. Most of these wind farms are located in the Jiangsu, Fujian and Guangdong provinces, with the largest wind turbine able to generate as much as 7 MW.

In 2019, with the exception of losses arising out of Typhoon Lekima, no other major Chinese Offshore Wind losses have been recorded. It is now a more common feature for Marine Warranty Surveyors to regularly be appointed to assist in risk mitigation activities for construction projects; as a Third Party, their involvement is not necessarily mandated by insurers.

In terms of rating levels, by the end of 2019 Chinese Offshore Wind construction insurance premium rates were averaging between 0.42% to 0.43% (net to insurers) excluding Delay in Start-Up (DSU). During the course of 2020, these rates may decrease by 5-10%, based on individual risk profiles. As part of the same trend, operational period insurance rates for Chinese Offshore Wind are between 0.15% to 0.17% (net to insurers), excluding Business Interruption (BI). However, during 2020 we anticipate that this premium rate may decrease to less than 0.1%. There remains a strong appetite for non-domestic Offshore Wind projects involving Chinese interests, broadly in a supportive capacity.

Hydro

Turning now to Chinese Hydro, national total installed capacity was 310 GW on August 31 2019, including 280 GW of conventional hydro power. From January 1 to August 31 2019, new hydro power generation capacity was 3.15 GW, which was less than in 2018. No large-scale hydro power projects commenced in China during 2019 and no major losses were recorded. Both buyers and sellers of insurance recorded a profitable year from Hydro business during 2019.

Solar

For Chinese Solar, national grid solar power capacity was 140 GW on August 31 2019. New added solar power generation capacity during January 1 to August 31 2019 was 18 GW less than the same period for 2018. On May 31 2018, the Chinese government issued its “Notice of Solar Power Related Matters in 2018” stating that solar farm construction projects would henceforth not benefit from government subsidies. This policy quickly caused a rapid “ebb tide” of reduced investment, reversing China’s solar power construction boom.

In 2019, the loss ratio for Chinese Solar has reached more than 150%, which is worse than for Offshore Wind. The main causes of loss have been natural hazard, machinery breakdown (inverter, etc.), and fire. However, because of the short duration of construction works, the premium rate for Construction insurance in 2020 will be at the same level as 2019. But we should be prepared to be surprised - the premium rate for Operational insurance in 2020 may be 10% less than 2019 because most operational solar farms are owned by many state-owned enterprise groups who procure blanket insurance every year.

Sources of risk

There are three main sources of risk for the Chinese renewable energy industry:

1. Equipment manufacture: for example, no enough operational data for verification;
2. Limited risk control/risk management levels; and
3. Poor power plant operation and maintenance levels.

Each party – buyers, sellers and brokers - should pay more attention to all these issues, and play their own part in driving improvements, enhancements and reinforcements to the risk mitigation efforts implemented by the industry.

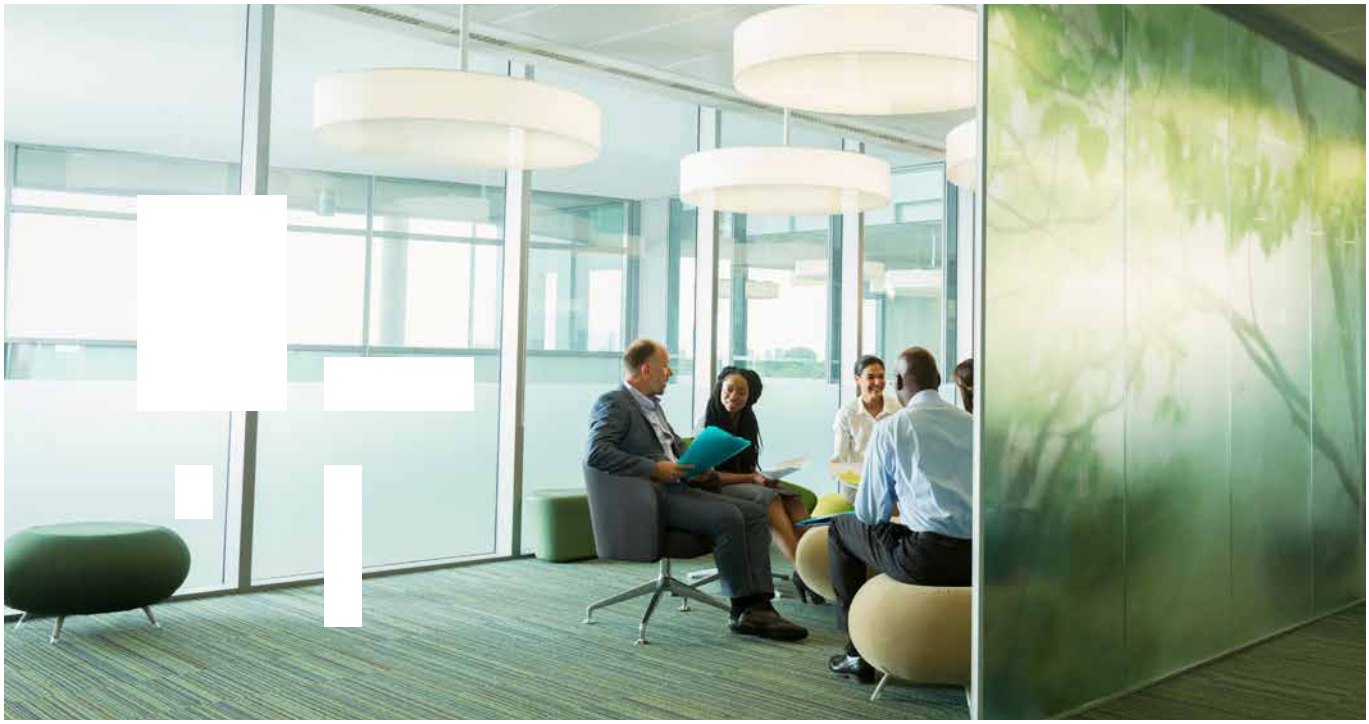
One Belt, One Road – co-operation with global insurance market

For overseas power business with Chinese interests, many state-owned enterprises are including their overseas power assets into a single 'One Belt, One Road' strategy. China insurers are providing increasingly significant capacity to support these enterprises, with competitive premium rates backed up by reinsurance; however, Chinese insurers are lacking reinsurance treaty support for DSU/BI and Terrorism. So in most cases where there is a significant BI requirement from the insured, Chinese insurers have to co-operate with the global insurance market. Then the premium rate will revert to reasonable levels.

For overseas power business without Chinese interests, no more than five China local insurers can underwrite these lines of business to comply with Chinese insurers' internal underwriting regulation policies. Because reinsurance treaty protections cannot be used for this kind of business, Chinese insurers have had to write limited lines governed by their net retentions. However, global insurance market premium rates are attractive compared to Chinese local premium rating levels.

Another reason for adopting a prudent approach is that the Chinse insurance market cannot afford to become impacted by a significant loss record, even for limited participations on known risks where related loss control (risk management) measurements for these programmes are in place.

Johnson Liu is a renewables specialist Beijing, Willis Towers Watson.

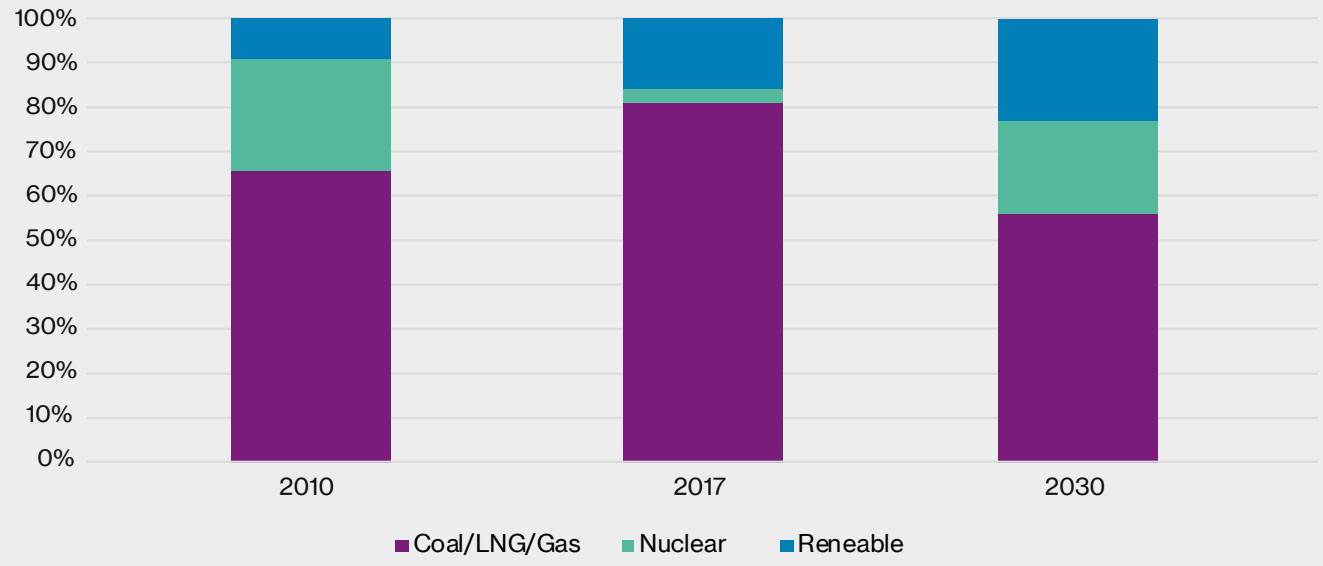


Japan: driving renewable energy in a complex marketplace[1]

The renewable energy sector in Japan is showing active growth, with currently 16-18% of domestic energy production being generated from renewable energy sources, compared to 9% in 2010. The Ministry of Energy, Trade and Industry's (METI) agency for Natural Resources and Energy forecasted as recently as September 2019 that this figure will increase to 22-24% by 2030.

Their main growth areas by 2030 are predicted to be in Solar (64 GW) and Wind Energy (10 GW) production, followed by Hydro and Biomass Energy as set out in Figure 1 below.

Figure 1 – Japan energy mix breakdown, 2010 – 2030



Source: Agency for Natural Resources and Energy

[1] All data in this article is from https://www.meti.go.jp/english/press/2019/0315_003.html

Mega Solar power shifting to rooftops

As the reduction in Feed In Tariffs (FITs) continue year-on-year in the Japanese market, developers are struggling to maintain the traditional financial model (Internal Rate of Return - IRR) for new projects as the market becomes more competitive and manufacturing costs are on the rise with the effect of the 2020 Olympic Games.

Further fuelled by the lack of large, open spaces in areas of Japan, there is a significant interest in the industry to shift its focus to smaller scale, rooftop panels for an off-grid production of energy.

Previously such movements were hindered by various risk elements such as cost, environmental and leasing contractual restrictions but the development of mass production methodologies of smaller panels have further opened up the market to developers.

There is currently strong competition from international Original Equipment Manufacturers (OEMs) in the Japanese market, with many major Japanese panel makers branching out by developing and offering products such as fuel cells and storage batteries.

Insurance market conditions

Natural Catastrophe trends have shifted, with frequent occurrences of wind-damaged solar panels in Japan, resulting in exposure reviews. Furthermore, the recent international market movement has affected the Japanese domestic insurance market, with non-loss affected programmes experiencing rate increases of 130%~300%.

The impact of Typhoon Faxai in September 2019 resulted in 934,000 households without electricity. The economic impact is estimated to be over US$8 billion and floating PVs were also affected in its course. A 13.7 MW floating project at the Yamakura dam was damaged by 120mph winds, which saw panels being torn off and stacking up causing the modules to overheat, resulting in fires. Such large-scale losses are also a factor for caution for the solar developers in Japan.

Offshore Wind: the deployment of fixed foundation turbines in Japan

On November 30 2018, *"Act of Promoting Utilization of Sea Areas in Development of Power Generation Facilities Using Maritime Renewable Energy Resources (Act No. 89 of 2018, hereinafter referred to as the "Act")"* was approved by the Japanese government and came into force as of April 1 2019[2].

The act sets uniform standards in certain sea areas designated by the authorities to be offered under public bid, with selected operators obtaining exclusive area use for a maximum of 30 years. This enables developers and operators to have certainty in land usage, driving a smoother introduction of offshore wind projects in Japan.

An additional catalyst for the offshore wind market in Japan is being driven by the development of Jack-up vessels by Japanese firms to increase availability locally. Many of the vessels are due to be completed in 2022 to prepare for the demand in Japan and the APAC territory.

There are currently over 20 offshore wind projects in the planning stage in Japan, with the projection that tenders for projects will accelerate in 2020 through to 2021.

What are the risks?

The risk profile for Offshore Wind projects in Japan varies significantly compared to the more traditional risks seen in the European sector. In Japan traditional risks are coupled with the natural element, with Japan being exposed to considerable earthquake, wind and tidal catastrophes. There are significant works carried out by turbine makers for new equipment to be developed to withstand windspeeds of up to 70m/s compared to the traditional 40m/s-50m/s as they prepare to enter into Japanese and Asian markets.

Typhoons Hagibis and Faxai were 2019's costliest natural catastrophes, costing US$10 billion and US$8 billion to the insurance market respectively. The changing trend of cyclones noted by geoscientists is the extreme precipitation associated with the traditional wind forces. Recognition of these changes can form a basis for further preventive measures to reduce losses.

There are still large elements of uncertainty for this previously unforeseen risk exposure, but currently this has not diminished the overall interest in developing offshore projects in Japan.

Willis Towers Watson has worked on the Fukushima III project, the world's largest floating wind turbine project at 344 feet, which is able to withstand 65-foot waves - and even tsunamis.

Insurance market and brokers

Japan's traditional insurance model is often carried out on a direct basis, with approximately 5% of market being placed through brokers. However, there is now a contrasting trend in the Japanese renewable energy industry, as there is a growing requirement for international expertise and market capacity to be deployed in Japan as Japanese developers/lenders start to look outwards for support.

Conclusion: interesting developments in Japan's renewable sector

In 2020 Japan's renewable energy profile will change dramatically, with new project confirmations on large scale offshore wind projects. The solar energy development will also become increasingly closer to mass-produced projects while traditional "Mega Solars" will become less prominent in Japan.

There is still some uncertainty with regard to elements of natural catastrophe and its effects on this industry, but there are no signs of any deterrence from the developers to drive this movement forward.

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"In 2020 Japan's renewable energy profile will change dramatically, with new project confirmations on large scale offshore wind projects."

[2] https://www.meti.go.jp/english/press/2019/0315_003.html

Ukraine: a country in transition

Ukraine has made clear statements about its commitment to develop a large percentage of renewables into their energy mix. According to the nation's energy strategy, the intention is to have 25% of power generated from renewable sources by 2035[1]. Whilst such lofty ambitions are often merely political rhetoric in many countries, Ukraine has seen a real push towards Solar PV, onshore Wind and other renewable energy facilities, particularly over the last year or so. Indeed, by October 1 2019 the country had an installed capacity of 4.6 GW (excluding large scale hydro) and generated 4% of the nation's power from renewable sources[2].

Geopolitical tensions

Despite having abundant wind and solar resources, it is the geopolitical landscape which has really pushed Ukraine towards renewable energy. Since Ukraine's independence from the Soviet Union, the country has relied heavily on natural gas imports from Russia, as it has limited fossil fuel reserves of its own. The more recent tensions with Russia have forced the country to reduce its reliance on imports from its neighbour and look further afield, a policy which comes with obvious increased costs. In order to help mitigate these issues, energy produced within the country (of which renewable energy is an obvious contributor, given the plentiful resources) will help increase energy security and independence.

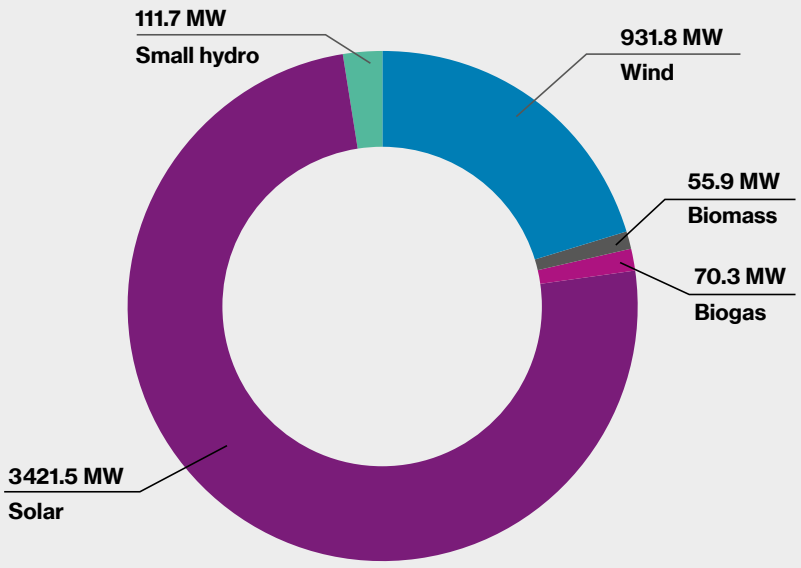
Introduction of Green Tariff

In a bid to drive investment in the renewable sector, the state introduced an extremely attractive Feed-in Tariff (Green Tariff) with guaranteed Euro-denominated rates until 2029. With the green tariff being one of the highest in Europe, there has been no shortage of interest and investment by both international and domestic developers who have noted the excellent return on capital available. Importantly, these developers have been backed by major western development banks including, but not limited to, EBRD, OPIC, IFC and EIB[3].

"Despite having abundant wind and solar resources, it is the geopolitical landscape which has really pushed Ukraine towards renewable energy."

[1] https://cms.law/en/ukr/news-information/ukraine-launches-renewable-auction-system
[2] https://balkangreenenergynews.com/ukraine-launches-renewable-auction-system/
[3] https://assets.kpmg/content/dam/kpmg/ua/pdf/2019/07/Renewables-in-Ukraine-2019.pdf

Figure 1 – RES development in Ukraine as of 1 October 2019



Source: http://sk.ua/wp-content/uploads/2019/10/Energy-0.17-THE-LAST-FINAL.pdf

Transition to an auction system

However, times are changing; the country has decided to move to an auction system, reflecting a well-trodden global trend by developing nations. The auction system will replace the Green Tariff with full effect from 1 January 2020. Not wishing to miss out on the favourable Green Tariff, investors have been hesitant to change and there has been a major rush of investment in order to remain eligible for the Green Tariff in the years to come.

The requirements are that projects must have obtained land use rights, have agreements for grid connection and construction, a Power Purchase Agreement (PPA) by 31 December 2019 and are constructed within two years for Solar PV projects and three years for Wind projects. The dash to benefit from this tariff has been evident as seen by the fact that "during the third quarter of 2019, 956 MW of capacity was commissioned which is almost 6 times more than the capacity commissioned during the third quarter of 2018[4]."

Pressure on state coffers as caution builds

However recent events, combined with the change to an auction system, have created a mood of real caution amongst investors and developers. The Green Tariff, whilst hugely beneficial for electricity producers and for the development push of renewable energy infrastructure, has created a heavy burden on state coffers. Under the tariff, the state-owned company 'Guaranteed Buyer' is obliged to purchase the electricity produced from renewable facilities at artificially high prices, which is now squeezing the state purse strings. With the tariff so high, the state is experiencing difficulties in purchasing the electricity at such generous rates and is attempting to reduce the tariff.

Furthermore, and of grave concern for developers and investors alike, is that the state is now defaulting on payments for electricity already produced and sold. This now represents a far cry from the financially advantageous as well as stable and transparent conditions anticipated by investors and reflects the concerns of the political risk insurance market when looking at non-payment perils. The presence of the major development banks mentioned earlier will undoubtedly add substantial leverage to the situation as the country can't afford to see them turn their backs on renewable projects and move their investments elsewhere. However, a worrying situation remains.

[4] http://sk.ua/wp-content/uploads/2019/10/Energy-0.17-THE-LAST-FINAL.pdf

Auction system may lead to under-subscription

The auction system, though an understandable next step for the country in terms of reducing the end cost of electricity and the ability to tailor the auctions to country specific objectives, will still cause concern for investors and developers. Investors require confidence in the system, the state rules and regulation and the off-taker. Such confidence may not be on display in the early auctions as they prefer to take watching briefs to see how the first auctions are realised before deciding whether to put their money back in. This would lead to under-subscription, meaning that there would be an insufficient number of bids to meet the volume demand, creating less competition and consequently a less than expected reduction in electricity pricing.

"Amongst the prevailing uncertainty, developers and investors benefit from risk advisors and brokers who have had similar experience with their global clients in developing territories and know how to navigate such situations."

Conclusion: seek expert advice!

Amongst the prevailing uncertainty, developers and investors benefit from risk advisors and brokers who have had similar experience with their global clients in developing territories and know how to navigate such situations. Ukraine is not the first country to have transitioned to a renewable energy auction system, with Mexico, Argentina and India already having done so. The appointment of a risk intermediary with both global renewable energy expertise and domestic knowledge, combined with the trust and ability to work with the major development finance institutions, will enable the best chance of success.

Freddie Cox is an Associate, Renewable Energy, GB, Willis Towers Watson London.

Asia: the role of the Renewables insurance market in the energy transition

Introduction: Asia's historic reliance on coal

Incited by rapid economic and population growth, Asia's rising demand for power surpasses that of any other region. To power its own developing economy, Asia has become increasingly dependent on coal - the same fuel that drove the European Industrial Revolution - due to its affordability and availability as compared to renewable energy alternatives. With a rapidly increasing population that surpasses that of Europe and the US, Asia's rising dependence on coal has the potential to have a devastating impact on the fight to prevent climate change. It is therefore now more important than ever that significant measures are taken in this region to make an effective and substantial transition to renewable energy. For this transition to be achievable, renewable energy needs to be an economical and reliable source of power.

Embracing the transition

Largely due to global pressures to reduce emissions and fight climate change, Asian governments and corporations are beginning to embrace the social transition from coal power to renewable energy. Whilst climate change may be in the hearts and minds, only with the globally falling prices of renewable energy and grid parity with fossil fuel alternatives is it possible to start considering the realization of the transition of this social conscious to an economic reality.

ASEAN Centre for Energy (ACE) executive director Dr. Nuki Agya Utama was quoted in an interview with *Asia Power* stating that "even with the persistence of coal in Southeast Asia, renewables are projected to represent 43% of the region's capacity by 2040. The deployment of renewables is supported by new government policies, primarily led by Malaysia and Vietnam with large concession tenders and associated tariff schemes[1]."

"Largely due to global pressures to reduce emissions and fight climate change, Asian governments and corporations are beginning to embrace the social transition from coal power to renewable energy."

[1] https://asian-power.com/regulation/in-focus/tariffs-and-tenders-drive-southeast-asias-renewables-boom

More government action needed

With the noticeable rise of approved solar and wind projects, we have seen this momentum kicking in in 2019, but governments need to continue to adopt even stronger renewable-friendly policies to maintain the downward momentum of renewables costs. Going into 2020, government intervention will be crucial in introducing stronger renewable policies and incentives to ensure that the Asian countries maintain on course to a more renewable future.

It is not only important to keep renewable energy costs low so that it can be economically viable; costs need to be kept low in order to allow for more investments to be made into developing the required power infrastructure.

Power grids need to be more flexible

As the "fuel" that powers renewable energy is only available as long as the sun is shining and the wind is blowing, traditional power grid designs are not flexible enough to adjust to the unpredictable peaks and troughs of the renewables power supply. Technological solutions are necessary to improve the ability of power grids to absorb the more variable generation produced from renewable power sources, providing storage solutions, and to ensure that the transmission and distribution systems are reliable and have sufficient capacity. Regardless of how cheap an alternative, Asian countries will continue to rely on coal and other sources of fossil fuels if renewable energy is not readily accessible, available and reliable.

Conclusion: role of insurance markets will be key

The growing need for Asia to transition to renewable energy will only be sustainable with a rapid increase in investment into the industry, and insurance markets and project financing banks have been key in promoting this shift. Not only are insurers leading the movement by pulling back on insuring coal, they are developing innovative solutions which are tailor made specifically to tackle issues such as the lack or shortfall of sun or wind energy. By transferring these business risks to the insurance markets, this allows for an improvement of cashflow which allows for business models to succeed and ultimately aid in the shifting of investments from coal to where they are truly needed – renewable energy.

Elizabeth Kobes is Division Director at Willis Towers Watson, Singapore.

Latin America: increasing market appetite despite hardening conditions

Shift to solar and wind

Hydro has long been the dominant source of power generation in Latin America. In recent history, the attention for development of new capacity has shifted to solar/wind projects and smaller hydro projects. The plans for further growth in these areas are vast.

Brazil, Mexico, Uruguay, Argentina and Costa Rica have been instrumental in leading this growth, backed by Colombia and Peru. Governments have been and will be organizing renewable tenders in various countries.

"In respect of the Latin American insurance market, which is concentrated in Miami and with also underwriting centrums in other Latin American countries (mainly Brazil and Colombia), there is a distinct appetite for renewables."

Hardening insurance market

In respect of the Latin American insurance market, which is concentrated in Miami and with also underwriting centrums in other Latin American countries (mainly Brazil and Colombia), there is a distinct appetite for renewables. However, market conditions are hardening with a delay effect to global markets, as is the case for the Power market in general. In particular, insurers are imposing restrictions related to testing and commissioning and machinery breakdown because of concerns regarding certain types of wind turbine technology. There are also more stringent technical requirements emerging for dams related to hydro power plants before insurers can deploy their full capacity.

In respect of minimum capacity, some important players require a minimum project value of US$250m, which means that for smaller stand-alone projects local capacity will often have to be sought to complete the placement.

Early advice essential

Insurance is always a key component for project finance and indeed project risk transfer management overall and so will continue to be instrumental in the further development of this sector. Especially during these hardening market conditions, an early involvement of an insurance advisor/broker will help dovetail all the project contracts and risk transfer/insurance requirements, with the latter to be placed into construction and operational insurance programs. This issue is equally valid all over the world but requires specific attention in Latin America, due to insurers often still using restrictive wording templates.

Contracts need to be well drafted

It has been proven on many previous financed renewables projects globally that a well drafted contract providing the optimum risk allocation amongst the contracting parties, coupled with manuscript broad form insurance policies and accurate construction and operational insurance budgets. This combination provides the most robust risk management and insurance procurement strategy, which further contributes significantly to the competitiveness of the overall project bid.

Preparation of underwriting information, together with the insurance advisor´s engineering team, will support the discussions with the markets about risks in that respect.

So there are certainly challenges ahead but with the right attitude, adequate insurance protection can be obtained to ensure the support of the growth of the renewables industry in Latin America.

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