



MARKET REPORT UPDATE

PROTECTING INVESTOR CASH FLOWS

June 2021

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CONTENTS

INTRODUCTION.....	3
THE KEY ISSUES.....	4
LENDER VS. OWNER PROJECT INSURANCES.....	5
OWNER'S INSURANCE PROTECTS INVESTOR CASH FLOWS.....	6
WHERE AND MOST IMPORTANTLY, HOW TO TRANSFER RISK	7
RISK PLANNING FROM THE EARLIEST PHASES.....	8
RISK TRANSFER GAP: CONTRACT VS. INSURANCE	9
SUBROGATION RIGHTS	10
WIND PROJECT RISKS	11
CONSTRUCTION RISKS	12
OPERATIONS RISKS	14
GAP ANALYSIS	16
ABOUT MODERN ENERGY MANAGEMENT	17
OVERVIEW OF PRICE FORBES & PARTNERS LTD	18

INTRODUCTION

This publication marks our second market report on wind risks, the first one being “Key Wind Insurance Risk Challenges for 2019”. The first market report was very well received with over seventy thousand copies in circulation via print and web downloads.

As insurance claims exceeded premiums paid in 2018, the premise of our 2019 market report was that wind insurance markets were rapidly hardening. Global reinsurers were at the time becoming increasingly selective about which projects and project risks they were willing to accept. For wind insurance as with other renewable sectors, the market was rapidly shifting from a “buyer’s market” to a “seller’s market”.

A sign of increasing cost sensitivity in project development, since our last market report, that trend has continued, and losses have continued to rise. From our perspective, the poor risk profiles of wind projects we see in the market essentially stem from a misunderstanding of wind project risks and how they impact the equity investor.

Over the past two years we have seen increasing delays in closing of project financing due to insurability issues. At this stage of the project construction contracts are typically already closed, leaving equity investors potentially critically exposed to construction and operations risks left by insurance exclusions. To put it bluntly, project insurers are no longer subsidising the financial impact of poor risk management in project development. This cost is now directly hitting investor returns.

This is no longer just a trend of insurer risk tolerance, it’s now a trend of declining financial performance of wind projects globally. In this market report we chose to focus less on specific insurance issues and more on general risk profiles, with attention to risk identification and how project equity is exposed to risk in financial returns. In the following pages you will find key insights from the perspective of not just project insurers, but investors who are active in emerging markets.

Best Regards,




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THE KEY ISSUES

Continued price sensitivity in project development has in many cases led to a “race to the bottom” in the quality of projects. With manufacturing and EPC margins squeezed, OEM’s and contractors increasingly seek to push risks away from their own balance sheets and onto developers and operators instead. This is not sustainable and is manifesting in the increasing number of uninsurable, and therefore unbankable projects stalling at financial close. This drift away from development of “investment grade” projects is the result of 2 key issues we are seeing exhibited in the industry:

- Understanding the role of project insurances in protecting equity cash flows
- Understanding of wind construction and operational risks

Insurers are like the proverbial “canary in the coal mine”; their increasing risk aversion and the resulting hardening of the global insurance market is simply a reaction to a broader issue in the wind industry. Relative to other power generation sectors, wind is still a very immature industry. Risk and quality management have not improved sufficiently; in emerging markets it is actually declining. As wind turbine technology scales, the cost of poor risk and quality management is dramatically increasing. Insurers have concern that some of the 4MW+ WTG technology now on the market has been rushed through product development to meet market demand, without sufficient prior testing. Related insurance claims are on the rise and are expected to increase in terms of both the number and quantum of the losses. This has caused insurers to become increasingly risk averse, which ultimately means investors will be forced to absorb the cost of unmanaged construction and operations risks directly.



LENDER VS. OWNER PROJECT INSURANCES

The challenge in developing investment grade projects, is in our experience, that many of the risk interfaces with insurers are typically given too little specific attention too late in the construction contracting process. Often the insurance advisor is not appointed until well after construction contracts are drafted, or even after contracts are negotiated and finalized. Worse yet, project insurances are often procured based on requirements set out by the lender, rather than by the equity investors that are most at risk.

To understand the fundamentals of project insurances and their relation to investor cash flows, we need to begin with a look at the perspective of interests in the project: debt vs. equity. If we assume a debt-to-equity ratio of 75:25, the lender has security on the project and priority over equity in payment of cash flows. Their risk exposure is lower as the equity portion is at risk first. Lender interest in insurance is in securing the (replacement) value of the asset and repaying the loan in worst case.

By definition, equity is simply the residual value in the project after the value of debt. And equity is the last to be paid from project cash flows. Given the lender's focus is on preserving the replacement value of the asset, equity's focus should be in protecting the project cash flows.

Cost conscious projects that procure insurance based on the minimum requirements set out by the lender's insurance advisor (via the facility agreement) simply aren't protecting the inherent risk position of the equity investor. And this misunderstanding of the purpose of owner insurances leads to questions over the general understanding of project risks altogether.



OWNER'S INSURANCE PROTECTS INVESTOR CASH FLOWS

In order to protect its own interests, a lender will typically require an owner-controlled insurance programme. The reasoning behind this, is that a contractor led insurance programme will mainly focus on the contractor risks and interests, rather than those of the project/project owners. Additionally, an owner led insurance programme provides control over the indemnification.

For example, consider the insurance cover interfaces in the diagram below:

1. Marine All Risk (MAR) / Construction All Risks (CAR) interface: if transport damage is discovered upon receiving equipment at site, but the cause of the damage cannot be determined to have taken place during transport (MAR) or at site (CAR), without a clear cause for the damage, both MAR and CAR may reject the claim. If procured by the owner together, in this circumstance the claim is paid out 50/50 between the investor's MAR and CAR policies.
2. MAR/CAR / Delay in Start-up (DSU) interface: in the event the completion of the project is delayed due to an insured event under the MAR or CAR policy, DSU cover pays out the investor's lost revenue for that delay.
3. Operations All Risk (OAR) / Business Interruption (BI) interface: like interface #2 above, if an event insured by the OAR policy causes a loss of revenue (for a single WTG or the wind farm), BI cover pays out the investor's lost revenue.

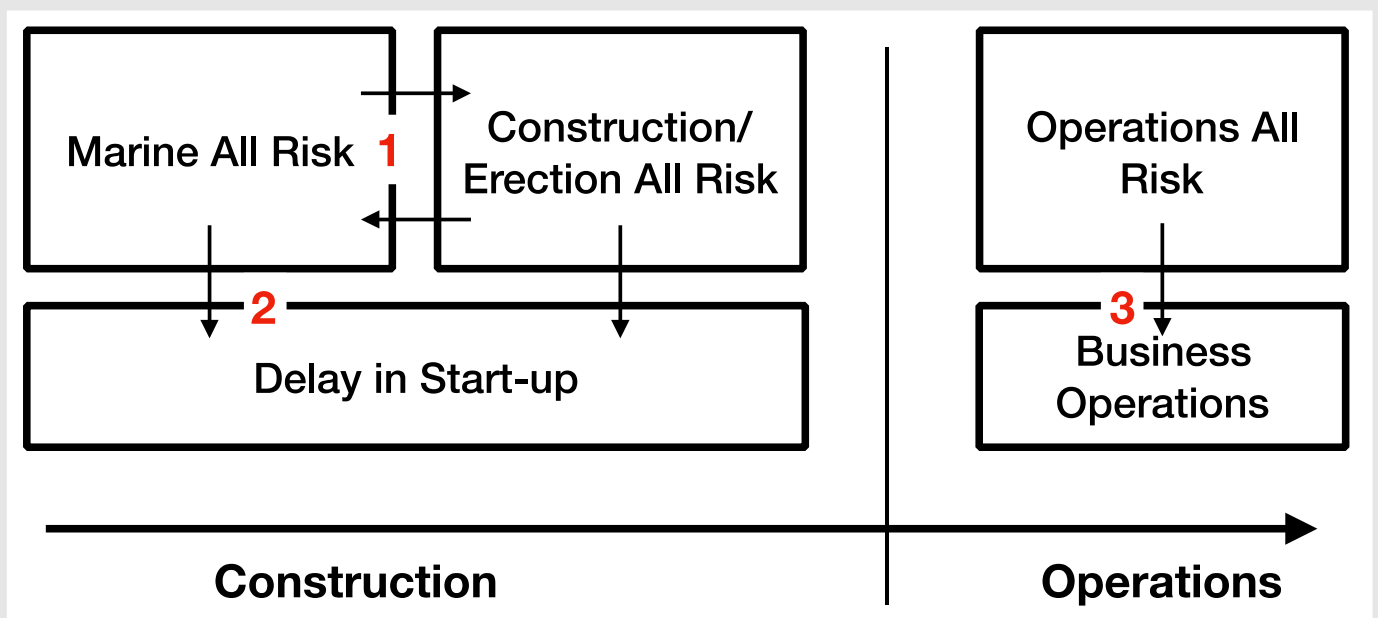


Figure 1: Owner insurance interfaces

Building on this structure of owner-led insurances, DSU and BI policies are key insurances to protect investor cash flows. However, they are dependent on MAR (Marine All Risk), CAR (Construction All Risk) and OAR (Operations All Risk) properly covering the project risks. And to ensure these policies reliably cover investor risks, they must be procured together by the project owner.

Additionally, an owner-controlled insurance programme gives the investor control over the insurance proceeds. Typically, according to the contract payment schedule the owner will already have paid for the equipment when an insurance claim is made.

WHERE AND MOST IMPORTANTLY, HOW TO TRANSFER RISK

As insurers become more risk averse, investors are increasingly exposed to the quality of project risk management. To understand risk transfer, we need to first look at how risk transfer happens. The table below reflects the Project Management Institute’s (PMI) academic view of risk analysis and risk response strategies:

Project Risk Analysis Process	Risk Response Strategies	Risk Strategy Owner	Implementation Method
1. Identify risks	1. Avoid	Project Manager	Project plan Operations plan Commercial Strategy
2. Qualitative risk analysis	2. Transfer	Project Manager, Attorney Insurance Advisor	Commercial agreements Insurance cover
3. Quantitative risk analysis	3. Mitigate	Project Manager	Project plan Operations plan
4. Plan risk response	4. Accept	Project Manager	Project plan Contingency
5. Control risks			

Figure 2: PMI risk analysis and response strategies

Obviously, the risks that cannot be avoided or mitigated should be transferred to 3rd parties. The key issue we see with poor financial performance and impact to investor cash flows is simply in identification of wind-specific risks. Often, we see lawyers drafting contracts without wind-specific technical and commercial inputs. While lawyers can speak to issues of law (i.e., contract enforceability, securities, bonds, etc.), they typically can’t address the issues that are fast becoming key hazards to investor returns, and ultimately to project insurability:

- Wind or WTG platform-specific technology risks (i.e., fire control, WTG lock out pins, blade grounding, leading edge erosion, etc.)
- Site-specific risks (i.e., turbulence, operations affected by heat, humidity or intertidal environments, etc.)
- Force Majeure risks (natural catastrophe, acts of God, sovereign risks which poor definition can be linked to site or platform-specific risks)
- Quality management risks (qualifications and management of subcontractors, quality and testing documentation, etc.)
- Operations risks (i.e., cost control and transparency in performance of out-of-scope services (fx. Insurance claims), and warranty claims interfaces issues between construction and operations contracts)

As you can see from the table above, the project manager is the consistent leader in the development of risk strategies; an experienced wind project manager is absolutely critical to properly identify wind project risks. But this project manager needs to work with an insurance broker with wind expertise, from the earliest phases of the project to understand the commercial availability (or exclusions) in insurance products. This is really the only way to properly identify risks which are uninsurable; these risks must either be included in commercial contracts, or the investor must accept these risks fully.

RISK PLANNING FROM THE EARLIEST PHASES

Many investors mistake the development process as merely a technical de-risking process. In reality it is an iterative evaluation of the “business thesis” for the project and a business plan for 20+ years of cash flows. The project must be developed, designed and contracted to support the business plan of construction and operations.

Particularly in emerging markets we have seen projects that have conducted significant development work (and expense), missing a potentially fatal flaw that, if identified earlier could have saved precious development capital. In emerging markets, often “shovel ready” means the project is ready to be buried because it is dead.

MEM employs a proprietary risk gating process to continually assess the “investability” of projects in development, evaluating continued spend based on the ever-evolving risk profile of the project in development. A key element of our risk gating process is incorporating a project insurance broker, such as Price Forbes, at the earliest phase of the project development (site evaluation) to understand not just potential fatal flaws, but construction and operations requirement which may need to be contemplated in project design, contracting and financial modeling. These could include:

- Natural catastrophe risks – insurer flood design requirements, seismic requirements, etc.
- Technology risks – site or environmental concerns related to WTG performance, and specific WTG platform claims histories related to defects
- Construction risks – Due diligence on the EPC contractor and proposed sub-contractors based on past experience and insurance market feedback
- Operations risks – potential constraints and indicative costs for unplanned or out of scope maintenance

Working with an experienced wind insurance broker, such as Price Forbes, can also identify potential opportunities that help improve the project financial performance. Last year MEM advised 2 clients on wind project design on sites with typhoon risk. In both cases, working with global reinsurers we optimized the design of the project while maintaining insurers would accept risk for losses related to typhoons. The net effect was >20% increase in energy yield.

Project development is an iterative process of risk management, and a wind-experienced “risk team” of project manager and insurance broker is absolutely critical throughout.

RISK TRANSFER GAP: CONTRACT VS. INSURANCE

Projects that fail to both properly identify and transfer project risks expose the equity investor to “risk gaps”, which can result in additional costs during the operational lifespan of the project.

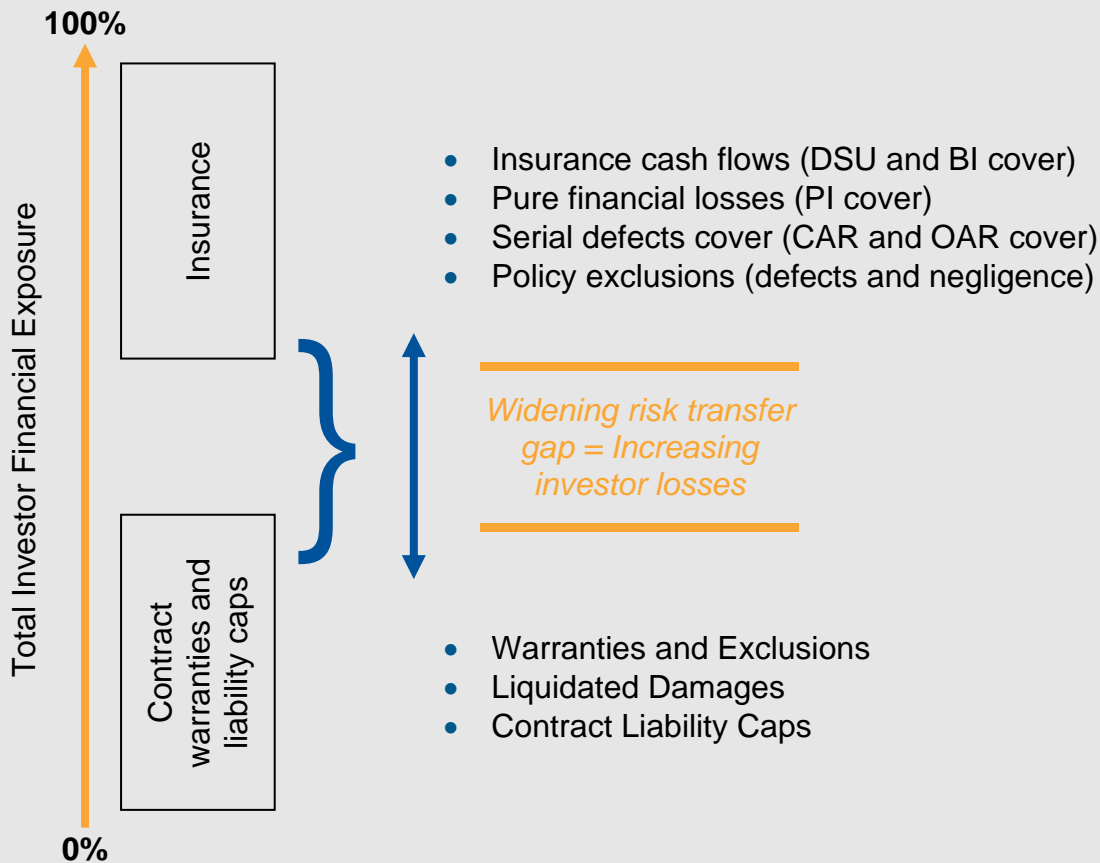


Figure 3: Risk transfer gap

As global insurance markets continue to harden, insurers are making more exclusions in their cover. The net result is that this risk gap widening, exposing equity investors to more potential risks. As we've seen in the past couple of years, in some cases the risk gap is so big that project insurers are now refusing to underwrite the project altogether.

SUBROGATION RIGHTS

A key issue regarding risk transfer gaps between contracting and insurance is in contractor subrogation rights. Subrogation is the act of one party standing in place of another party; in the context of project insurances, subrogation means that where the contractor is named as an additional insured in the contract, they enjoy the same rights as the owner as policy holder.

Standard construction contract terms typically specify the contractor is named as an *additional insured* to the owner's insurances. This is sensible during construction as the timeline to file claims is critical to ensuring timely completion of a project. If an insurance claim is related to a force majeure event, for instance, the interest of the owner, contractor and project insurers are completely aligned. However, if the claim is caused by a failure in the contractor's performance, there is a massive misalignment of interests. And due to the concept of subrogation, the insurer's inability to seek damages from the contractor in these instances is a significant point in the continuing hardening of project insurance markets.

Subrogation in this case creates a "hidden" risk gap. Historically, insurers have paid these claims. However, with the scaling of technology, and quite frankly with the increasingly egregious lack of design, manufacturing and construction quality management we are seeing in the market, insurers are now beginning to decline to insure projects where there is a potential for such claims related to the contractor's failure to perform.

WIND PROJECT RISKS

Wind projects have complex technical and commercial interfaces. When there is a problem with a wind project, it usually goes spectacularly wrong, with equally impressive cost implications. Wind project investors with any real experience have scars from past projects. The following are the key risk gaps we are seeing repeated in the market. While this list is not exhaustive, we intend it to be illustrative of the critical nature of proper project risk management.



CONSTRUCTION RISKS

Subrogation



- **Issue:** As an additional insured, the contractor generally enjoys indemnification related to negligence and failures in performance obligations. As the insurance market hardens, instances of contractor negligence are often an exclusion to owner insurance, potentially leaving the project exposed to these losses.
- **Risk:** Some of the single biggest claims insurers are paying are for contractor related losses, mostly during construction. This is not just an issue with the less experienced contractors; in many instances some of the most experienced and reputable OEM's & EPC's are leading losses, then seeking indemnity under the owner's insurance. Examples include incorrect use of cranes and other lifting vessels, incorrect handling of blades, dropping equipment, incorrect storage of equipment, fires, ignoring method statements and other user error type losses that can happen occasionally, but should not occur multiple times across many projects. In a number of cases this has led to catastrophic losses, up to the full replacement value of WTGs and even substations.
- **Mitigation:** Contracts must reinforce the expectation that the contractor is required to deliver quality within the expected time and budget. Contractual scope of owner insurances should exclude defects (in design, engineering, manufacturing or Contractor performance), resultant damage caused by the defect, as well as contractor negligence.

First loss provisions

- **Issue:** Insurers are frequently requiring a "first loss" provision wherein claims related to transport and construction of main components are made first to the OEM insurances. This is fast becoming a basis for owner insurance premiums, deviations to this requirement coming as an additional cost to the owner.
- **Risk/opportunity:** WTG manufacturers carry their own marine transport and construction insurances. In fact, from an accounting perspective, these OEM insurances must be booked to projects (i.e., prorated to the projects in their order book) to be allocated as a business cost. The contract price actually already includes the cost of these insurances.
- **Mitigation:** It's important to note that an owner-led insurance programme is of critical importance (to include MAR and CAR insurances), contractor insurances should be expanded to also include marine transport and construction all risks, with first loss provisions and related liability caps to protect owner interests (and reduction of premiums).

Force Majeure

- **Issue:** Typical force majeure language is often drafted so broadly that it includes risks that ; (i). May be well within the WTG's standard specifications and/or (ii). Given the nature of wind projects, are risks that should be contemplated in project planning and costing by the contractor.
- **Risk:** While it is an HSE risk, WTGs are actually designed to absorb lightning discharge (IEC 61400-24 lightning protection of wind turbines). However, we note that contractor force majeure claims for lightning are not typically in the context of construction delays, but in lightning damage related to blade damage in operations. Likewise, the term "windstorms" or "gusts" is a highly subjective term, prone for abuse if the contractor is behind schedule and looking for cost or schedule relief.
- **Mitigation:** These broad force majeure concepts should be qualified in the contract by the project manager so as to clearly differentiate between manageable risks (i.e., within the specifications of the equipment or the project requirements), and legitimate force majeure events. In markets where there are pronounced, seasonal weather risks such as monsoon seasons in SE Asia, precise schedule management must be monitored by the owner in cases where contractor delays increase exposure to this type of risk.

Design and manufacturing

- **Issue:** In addition to EPC design and construction risks, there is increasing concern (and claims) related to defects in design. As WTGs scale in size, the cost of defects includes not only repair or replacement, but specialized equipment for repairs. Additionally, loss of revenue on a per/WTG basis is increasing as turbine MW size increases. Blades in particular have seen several issues manifest in recent years, whether this be edgewise vibrations, delamination or design defects with the lightning protection system.
- **Risk:** In the case of design defects, there is likely an associated cost to determine the course of action to correct the defect. Additionally, if the defect manifests after the defect notification period, the revenue losses incurred to repair the defect may impact investor cash flows. Increasingly we are seeing insurers “back stop” their OAR (Operations All Risk) and BI (Business Interruption) risk exposure throughout the contract warranty period via contractor securities (which in the case of latent defect warranties may be a pure financial loss PI policy lasting as long as 10 years).
- **Mitigation:** Professional Indemnity (PI) insurance can cover pure financial losses due to contractor defects in design, engineering or breach of professional services, and is an ideal insurance product to satisfy insurer concerns related to potential design defects.

Continuity of owner insurances

- **Issue:** Another example of the continued hardening of insurance markets is insurer’s strict compliance requirements during construction. Insurers will require a Marine Warranty Survey (MWS) to monitor contractor compliance to transport work instructions and safety protocols. Additionally, the contractor will be required to submit specific deliverables (i.e., work instructions, recover plans, incident reports, claims documentation, etc.).
- **Risk:** A recurring problem we see in construction is the contractor’s failure to provide sufficient transparency and documentation to satisfy the owner’s stakeholders (particularly project insurers). We are now seeing project insurers cancel or limit owner insurance during transport due to the contractor either not following their own work instructions, or failure to follow industry standard safety protocol related to tests and inspections. In every case, limitations to owner insurance came about as a result of multiple observations and warnings from project insurers.
- **Mitigation:** Critical insurance process steps, documentation and submittals must be specifically outlined in construction contracts. To align interests between the owner, insurers and the contractor, linking compliance to contractor cash flows is essential.

Resultant damage

- **Issue:** Contractors typically limit their warranties to repair or replacement of a defective part, but not the resulting damage.
- **Risk:** The breakdown of a defective part often has knock-on effects. For example, a defective generator can cause a fire in the nacelle, resulting in the total loss of a WTG. Historically, these consequential losses have been covered by the owner’s insurance. However, due to insurer’s sensitivity to the subrogation issue mentioned above, these are now being excluded from owner insurances. The resulting risk transfer gap could expose the investor up to the cost of full replacement value for a WTG (plus lost production).
- **Mitigation:** Resultant damage should be included in contractor warranties, with explicit waivers of subrogation under the investors insurance policy. Additionally, the contractor’s insurance should be specified as primary for claims related to their liabilities.

OPERATIONS RISKS

O&M cost transparency



- **Issue:** The scope and cost of O&M services are typically contracted as a “lump sum” annual amount. However, baseline costing for parts, labor and equipment are not detailed.
- **Risk:** Without granularity in contractor pricing, it is difficult to manage costs related to work out of scope (i.e., insurance claims or any out-of-scope work billed to the project). Typically, we see costs related to lightning damage, grid issues, retrofits and upgrades being inflated relative to market via 3rd party service providers. This lack of cost certainty leads to increased OPEX and insurance premiums.
- **Mitigation:** Labor, parts and equipment costing should be included and the broken down within the O&M contract, with annual updates.

Provision of local services

- **Issue:** At the beginning of the service period O&M focus is on mobilization, closing any outstanding construction quality issues, WTG “cutting in” issues, and stabilizing power quality onto the grid. Contracting of local support services such as transport and crane contractors, test laboratories, etc. are typically not contemplated until well into the first or even the second year of operations. Depending on the location of the project, there can often be a lack of local expertise, meaning major components being sent back to OEM manufacturing bases in Europe for repair. This is particularly relevant for the larger (i.e., 4MW+) WTGs now in the market.
- **Risk:** Availability losses associated for mobilization of cranes and specialty equipment is typically allocated to the owner. If a main component fails before local support services can be established, the additional time for contracting and mobilization of equipment (i.e., specialized transport equipment and cranes) increases investor revenue losses. Additionally, the urgency for provision of such local support services typically comes at a premium compared to cost if it was established as part of a framework agreement ahead of time
- **Mitigation:** O&M staffing should be in place at commissioning in order to provide on the job training for the locally sourced technicians. With early mobilization to site, O&M subcontracting for local services should be mandated by the owner prior to start of commercial operations. Guaranteed mobilization times for cranes provided by the OEM’s should be sought in O&M contracts.

Provision of spare parts

- **Issue:** As OEMs and owners optimize project cost, inventory of spare parts physically held at site is being reduced. Additionally, as WTG technology evolves, parts for more mature platforms may be discontinued from OEM inventory.
- **Risk:** Availability warranties typically exclude lead time for delivery of parts not in inventory. For older WTG platforms, spare parts procured from secondary markets may not meet quality standards of the original OEM parts.
- **Mitigation:** Cost decisions related to procurement of spare parts should be considered in context of availability losses related to lead time for delivery. For example, if lead time for delivery of a gear box is 4 months, this amount of potential lost revenue for a single WTG should be weighed against the cost to procure and maintain this part in inventory. Long term agreements for procurement of spares are advised, particularly for older WTG platforms.

Allocation of down time

- **Issue:** OEM SCADA systems make no considerations for either commercial terms in the O&M contract or underlying technical issues related to a WTG fault or service time.
- **Risk:** Loss of availability related to an owner risk may be overstated (or incorrect) in the SCADA system. For example, if a WTG goes offline due to a grid fault, the SCADA system would allocate down time to the owner, but if the O&M contractor exceeds their warranted response time, this should then be re-allocated to the contractor. Additionally, concurrent events such as an owner allocated event (i.e., a grid fault) that happens after a mechanical defect may skew commercial availability and potentially have knock on effects to bonus calculations paid to the contractor. In circumstances where insurance cover is involved (i.e., claims against the owner's Business Interruption insurance), this may also overstate claims made to the owner's insurance which should in fact be claimed against O&M availability warranties.
- **Mitigation:** SCADA functionality which allows reallocation of WTG down time should be specified in procurement. Daily review of WTG downtime should be agreed as a part of the daily plant management process to ensure timely documentation to support warranty claims.

GAP ANALYSIS

To effectively transfer risks, a thorough understanding of the current risk appetite of insurers is absolutely vital. Imprecise risk transfer and poor contracting are no longer acceptable. As insurers become more risk averse, risk transfer gaps are widening, exposing project investors to more uncertainty in the financial performance of their projects.



With this hardening of the insurance market, thorough and complete identification of risks that could impact the project's financial performance requires precise identification of wind project risks. This level of expertise requires experience in the sector. A "risk team" consisting of that wind project manager and experienced insurance broker is critical in developing a proper risk transfer plan.

Prudent investors seeking stable and predictable returns should continually perform a gap analysis based on the latest insurance market risk appetite.

ABOUT MODERN ENERGY MANAGEMENT

Modern Energy Management (MEM) is a renewable energy development services provider, delivering project lifecycle certainty to renewable energy investors with focus in rapidly expanding emerging markets. Its expertise is in creating “investment grade” projects through technical and commercial de-risking coupled with financial optimization.

The firm’s team enable project investors to successfully develop, construct and deliver complex, profitable projects in remote, rapidly expanding emerging markets.

MEM established its corporate offices in Thailand in 2013, and has since expanded to Singapore, Vietnam and Philippines to accommodate its growing regional project pipeline. MEM is now the market leader for development and wind project advisory services in SE Asia.



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OVERVIEW OF PRICE FORBES & PARTNERS LTD

Price Forbes & Partners Limited is an independent global specialty insurance broker with offices in Hong Kong, Bermuda, Brussels, Chile, Dubai, London, South Africa and Malaysia.

The Renewables team at Price Forbes is commercially minded and technically skilled, with direct experience in renewable energy project development, OEM supply, equity and debt funding, in addition to transactional insurance. We work globally with clients, helping to agree practical solutions and design the risk strategies. We deal with the local and international insurance markets to negotiate and deliver the best possible terms and pricing.

Price Forbes clients range from small-scale solar and wind developers through to large-scale national utilities. Our team of experts works closely with clients ensuring they are aligned with the best markets, people and products available to achieve the right solution. Our proprietary wordings are client- focussed and tailored per risk.



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