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Recent Blade Failures Underscore Importance Of Risk Mitigation

When catastrophe strikes, will your project and financial agreements work for or against you?

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Technology risks are not new to energy projects. Improvements in structural engineering, materials science and computer-aided design have allowed manufacturers of wind turbine generators to make ever-larger and more-efficient machines. In turn, wind energy now competes more effectively with other power sources and attracts a steady stream of debt and equity capital despite uncertainty about future public policy incentives. Reliability, on the whole, has vastly improved over the past decade. As with other energy sources, though, cutting-edge technology can bring growing pains.

This past year, the wind power industry has experienced several high-profile blade failures, including from leading turbine manufacturers Siemens and GE. The underlying causes of such incidents require further investigation and analysis within the industry.

Despite the dramatic photos of blades slicing the earth after cracking off really big wind turbines, it is not clear whether these incidents are, in fact, more common. The higher number of blade failures may be a statistically expected result of the substantial increase in installed wind capacity over the last five years.

Whatever the causes, the sheer nature of turbine blade failures is resulting in heightened adverse publicity. How are manufacturers, owners and lenders reacting to these blade failures and related perceptions of risk?

When a wind turbine fails by throwing a blade, the first response is to cease operations of that turbine and determine the cause of the failure. Other wind turbine generators (WTGs) from that manufacturer at that project or other projects should be inspected to see if they are at heightened risk from serial defects or part of a suspect batch of units.

The recent incidents of blade failures – though unwelcome events for all parties involved – present an opportunity for developers and project lenders and investors to re-examine the adequacy of the protections built into their project and financing agreements. Several threshold issues should be part of this examination, including the following:

- Does the manufacturer have both the financial strength and reputation to stand behind the technology and address potential reliability issues proactively?
- Is the contractual allocation of risk clear and fair to speed remediation and prevent disputes?
- Is the technology inherently reliable, and if not, can it be fixed within forecasted budgets and schedules?
- Is sufficient liquidity available to cover both remedial costs and lost revenues?

Because of slower rates of growth for the wind industry, combined with recent reliability issues, project developers have somewhat more leverage to demand favorable contract terms from equipment manufacturers. In particular, warranty scope and duration has returned as a fundamental issue in the negotiation of supply contracts, though not without cost.

Similarly, commissioning tests, installation schedules and procedures, and availability guaranties are all receiving heightened attention. Lenders and their independent engineers are assessing technology risks (or perceived risks) with greater scrutiny in new project financings, both as to contract terms and credit enhancement to address technical faults that may occur. The suitability of the type and size of a WTG for a specific project site should always be checked thoroughly, and better wind resource data may be appropriate to make that judgment. In response, turbine manufacturers have taken extra steps to ascertain the causes of any defects and prevent or remediate future failures demonstrably so that the risks of failure can be reduced and, as importantly, perceived risks are credibly reduced. To the extent manufacturers are seen as standing behind their

products within existing contractual frameworks, they can resist calls to strengthen contract terms going forward.

Traditionally, the turbine supply agreement between a developer and turbine manufacturer allocates the general manufacturing and commissioning risk to the manufacturer, with a certain measure of the construction and installation risk shifted to the balance-of-plant contractor and developer.

From a project financing perspective, a crucial consideration in the finalization of a turbine supply agreement is to provide potential financing parties or investors (and, importantly, such parties' independent engineer) with a meaningful opportunity to review and understand the turbine arrangements, including with respect to the construction schedule and contractual allocation of obligations and risks in connection with the turbine supply, installation and warranty terms. The risks should be allocated to the parties best able to handle them. This practice allows developers and their financing parties and investors to perform effective due diligence and avoid surprises for the turbine manufacturer and developer in connection with the project financing and/or investment transaction.

One of the clear risks associated with blade failure during the construction and commissioning period is the delay in completion caused by remedial work and equipment replacement. When a blade failure event occurs, the manufacturer customarily performs a root-cause analysis to determine the cause of the failure and then repairs or replaces the defective blades.

In the case of the recent Siemens blade failures, for instance, Siemens curtailed the use of all turbines of its affected model globally so that it could adequately perform a root-cause analysis (which determined that only a certain batch of blades was affected due to an adhesive failure). While this process usually addresses the underlying equipment defect, the delay arising from the need to stop construction while such analysis is performed can often lead to a domino effect of consequences. Contractors wait with cranes and labor on standby, unable to complete construction, while developers are relegated to watching the calendar as construction milestones and scheduled completion dates approach or pass, with deadlines under other project contracts (namely power off-take agreements and financial agreements) drawing near.

Traditionally, the remedy for losses caused by construction delays are covered by a negotiated amount of liquidated damages payable by the manufacturer, which customarily are capped at a certain percentage of the total contract price. Developers and their financing and investment parties are well served, as part of the due diligence process, to ensure that the construction and completion schedules and regime of delay liquidated damages across all project agreements are properly aligned so as not to expose developers to risk on matters over which they will have very little direct control.

During the operational period, a blade failure can raise a different set of concerns, such as the ability of the project to fulfill ongoing delivery obligations under a power purchase agreement. If revenues are interrupted (and not offset by liquidated damages or business interruption insurance), then debt service may be impaired. At the outset of the operational period, manufacturers customarily provide a defect warranty for approximately one to two years and performance-related guaranties that extend for up to five years. The defect warranty generally will cover the replacement or repair of turbines and related equipment, but the extent that such repairs will affect the project can depend on the nature of the defect. Losses incurred by a project during the downtime when turbines are curtailed for a root-cause analysis, or otherwise unavailable during replacement or repairs, are typically covered by a performance or availability guaranty. This guaranty provides that the manufacturer will be responsible for losses incurred if turbine performance or availability falls below specified levels (usually up to a certain percentage of the total contract price).

From a project financing perspective, if turbine output will be permanently reduced, financing parties may require that the damages payable by the manufacturer be applied to prepay a portion of the project debt or otherwise set aside as a reserve for any future major maintenance events.

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Within the context of these protections, turbine manufacturers have responded to recent blade failures in different ways. In one highly publicized incident, the manufacturer agreed with the developer (after litigation) to provide extended 15-year warranty and maintenance agreements on its turbines in exchange for the developer making additional payments to the manufacturer if turbine performance exceeds specified levels. In other instances, manufacturers have agreed to pay for all of the developer's lost profits during the period of turbine curtailment and investigation. Some manufacturers, such as Siemens and GE, have been able to resist enhancing warranty coverage or extending warranty periods but only by taking proactive (and costly) steps to inspect and, if needed, repair machines across their affected fleets before waiting for additional blade

failures to occur or further warranty claims to arise.

Of course, the actions taken by turbine manufacturers in recent examples to remedy blade failures are highly influential for developers and their investors as the industry moves forward in the current environment in the development of future wind projects and selection of manufacturers for such projects.

In the event of heightened concern over the increasing risk of blade failure, developers and investors may explore other forms of risk mitigation, such as broader protections or indemnities from manufacturers or the imposition of additional cash reserves (which hurts distributions to equity investors). While such measures may be appropriate in certain circumstances, experience continues to demonstrate that solid and prudent contractual protections in connection with turbine failures and defects – including with respect to the manufacturer's root-cause analysis, liquidated damages, defect protections and performance guaranties – remain the first line of defense and planning for all project parties.

The recent instances of turbine failures serve as a reminder that successful wind project developers do not just plan for the best outcome, but also work to adequately and proactively prepare for unlikely failure events. At the end of the day, it is reassuring that the contractual mechanisms in place for most projects are working as intended: to resolve and remedy technical problems quickly without costly disputes in order to restore operational reliability and confidence in the technology. WP

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