PERSPECTIVES

Builder's Risk Claims & Renewable Energy: Wind & Solar

Our perspectives feature the viewpoints of our subject matter experts on current topics and emerging trends.

INTRODUCTION

Over the course of the last two decades renewable energy has been a subject that has found its way into discussion from the family dinner table to the top of global political initiatives and policies. It can at times be a polarizing topic; however, its relevance in the current geopolitical and geo-economic landscape is undeniable. According to World Resources Institute (WRI) Explaining the Exponential Growth of Renewable Energy:

> *"Wind energy first took off in the early 2000s, while solar energy took off about a decade later but has been growing even faster than wind. The factors driving the growth in renewable energy have been systemic, but certain key moments have reflected the larger trends or acted as turning points in renewable energy adoption."*

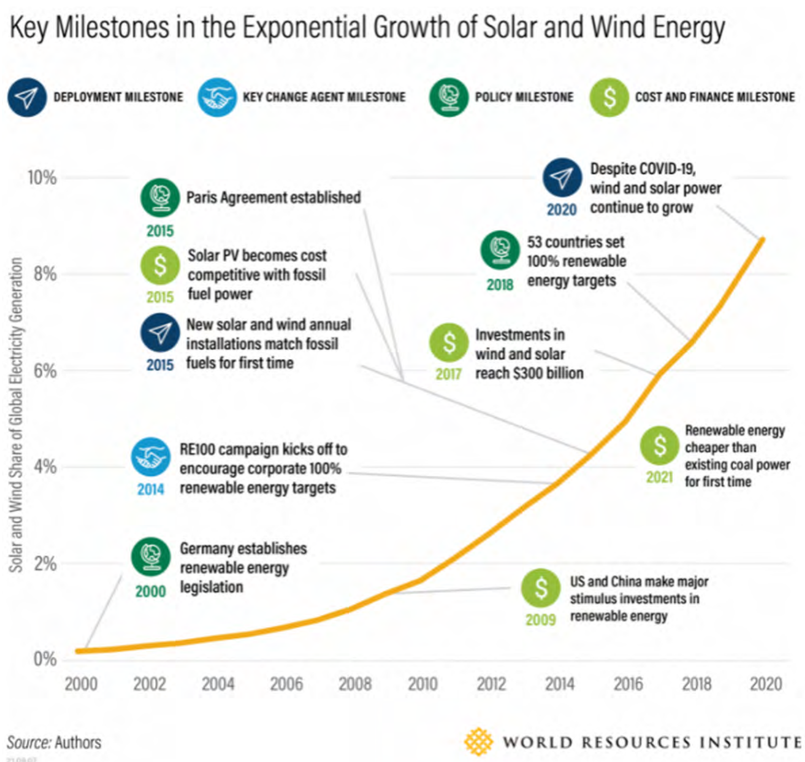

Figure 1 *- Key milestones in the growth of solar and wind energy (World Resources Institute).*

Within the same article WRI outlines the following:

> *"The market share of solar and wind in global electricity generation grew at a compound average annual growth rate of 15% from 2015-2020. If exponential growth continued at this rate, solar and wind would reach 45% of electricity generation by 2030 and 100% by 2033."*

Separately, according to the Deloitte 2022 Renewable Energy Industry Outlook:

> *"In 2021, the renewable energy industry remained remarkably resilient. Rapid technology improvements and decreasing costs of renewable energy resources, along with the increased competitiveness of battery storage, have made renewables one of the most competitive energy sources in many areas. Despite*

suffering from supply chain constraints, increased shipping costs, and rising prices for key commodities, capacity installations remained at an all-time high. Wind and solar capacity additions of 13.8 GW in the first eight months of 2021 were up 28% over the same period in 2020. Many cities, states, and utilities set ambitious clean energy goals, increasing renewable portfolio standards and enacting energy storage procurement mandates.

Renewable energy growth is poised to accelerate in 2022, as concern for climate change and support for environmental, social, and governance (ESG) considerations grow and demand for cleaner energy sources from most market segments accelerates."

With the above context in mind, investment in—and construction of—new projects in the renewable energy sector will continue to grow and thereby increase the number of builder's risk policies being underwritten. The aim of this paper is to review some of the unique circumstances surrounding renewable energy construction projects and how those circumstances can impact builder's risk claims.

NOTABLE PERIL EXAMPLES

Damage to Components

Avoiding damage to components during the construction process is a top priority for every contractor and owner. However, even when the best care is taken, unavoidable circumstances arise, accidents occur, and components can be damaged. For example, on wind turbine projects some of the typical components that can be damaged are nacelles, hubs, rotors, and, most commonly, blades (as shown in Figure 2).

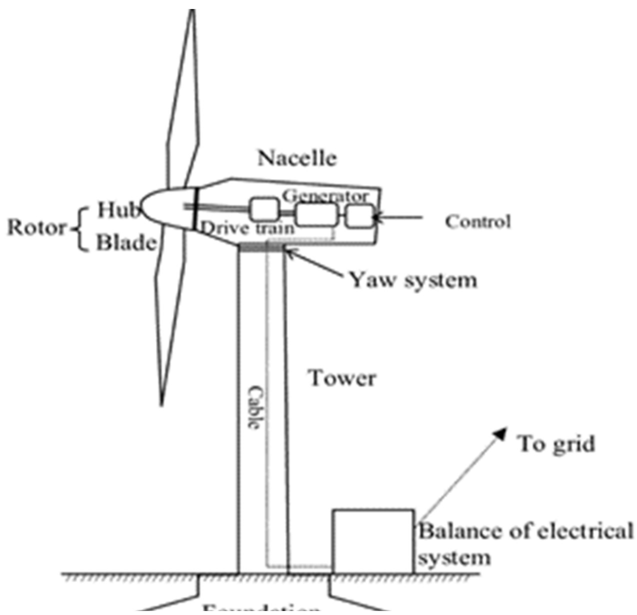

Figure 2 *- Basic layout of a typical wind turbine's major components.*

Some common causes of damage include weather events, transportation, delivery, and erection activities. When faced with turbine component damage, it is important that the parties involved weigh all the available options for repair or replacement and associated ramifications. Are the damages to affected components repairable, and is repair or replacement the most mitigative approach?

Key factors to review when considering whether to repair or replace damaged components include:

- Direct cost of material and labor for a repair vs. replacement.
- Timeline for performing repairs to existing components vs. timeline to receive replacement components, and whether there are any readily available.
- Based on current weather conditions, is it feasible to perform a repair? Can temporary measures be established to allow for the appropriate environment required to perform repairs?
- Other impacts to the construction project, including equipment and crew resequencing, schedule delays, etc.

Weather Related Impacts

Extreme weather is a common peril faced at wind and solar energy construction projects. Some of the more common types of extreme weather events experienced are heavy rain, high wind, hurricanes, and hail. Each of these perils carries their own unique set of circumstances.

Flooding from heavy rains can result in impacts to construction progress, particularly when heavy equipment and large components are involved, as in the case of a wind turbine project.

Figure 3 *- Flooding at a project site.*

When faced with this type of event, it is important that all involved clearly understand the options available. For example:

- Is it better for the contractor to halt work for a short period of time to allow for possible site recovery, and/or when is the right time to start mitigation efforts?
- What are the potential impacts for reconstruction of specific site access items?
- What are the specific soil conditions at the site, and what are the impacts from potential subsequent rain events?
- What is the current stage of the project, and what are the potential impacts to the critical path of the construction schedule?

Each of these circumstances should be addressed and weighed against the specific site conditions and project circumstances.

High winds and hail can significantly impact wind and solar energy projects. As with all projects, it is critical that there is good initial documentation of the visible damages to the impacted components. This documentation should include:

- Photo documentation (both aerial and ground level).
- Site mapping outlining saturation zones and boundaries.
- Infrared imaging for solar sites (if available).

The accuracy of the visible damage inspection data is important as it typically plays a significant role in developing testing strategies to address any potential unknown damages.

Fire

Wildfires and brush fires are another notable peril faced by solar energy projects. It is important to get to the impacted site quickly to ensure the most accurate site documentation. Some important initial questions to answer and document are:

- How and from where did the fire originate?
- What are the boundaries (if any)?
    - » Access roads, inverter pads, etc. can act as fire break areas.
    - » Aerial imaging can be particularly useful in determining boundaries.
- If a tracking system is in place, what was the approximate physical position of the Photovoltaic (PV) modules at the time of the fire event?

  - The position of the PV modules relative to the ground can assist in estimating how close modules were to the flames and elevated heat.

- What types of impacts/damages did various equipment sustain, i.e., scorching/melting of equipment vs. soot/ash impacts?

The accuracy of this initial data is important as it typically plays a significant role in developing testing strategies to address any potential unknown damages.

UNIQUE SOLAR TESTING REQUIREMENTS

The following are some unique types of testing for solar projects:

- **Current and voltage characteristic curve (IV curve).** The IV curve provides a quick and effective means of accessing the performance of solar PV modules or strings. This can be used to determine if modules within an "impacted" area are showing lower performance when compared to control modules.

- **Electroluminescence (EL).** EL testing uses specialist imaging equipment and specified current flows to create images of the panel that can detect hidden defects in the structure of PV cells. It is typically utilized to evaluate potential non-visible defects and damages such as:
  - Micro-fractures
  - Cell cracks
  - Soldering defects
  - Dead cells
  - Back-sheet scratches

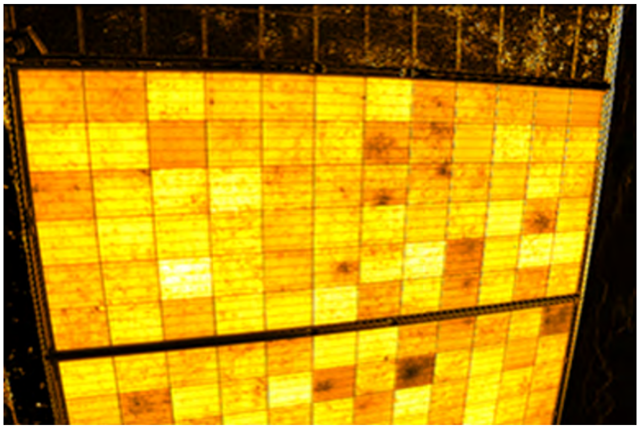

Figure 4 *- Electroluminescence testing on solar panels.*

As is important with all testing methods, it is vital that a good baseline is established to ensure that data collected within the potentially impacted areas can be evaluated against real time field PV modules. This is vital as many factors can contribute to variations in performance and hidden defects aside from any loss being evaluated, including shipping, installation, and/or thermal expansion and contraction.

BUILDER'S RISK PROCEDURES

Initial Damage Assessments

As with any loss it is critical in renewable energy builder's risk losses to accurately identify and document the scope of damages related to the claim event. This is typically achieved through:

- Detailed field notes and photo documentation of visible site conditions.

- Site diagramming and impact mapping.

- Detailed discussion with the onsite construction and project management team.

As part of this scope identification, it is also important to document and discuss any potential exposures that are not immediately obvious. At solar energy sites these can come in the form of:

- Potential non-visible micro-fractures to PV modules.
- Underground cable impacts.
- Equipment shorts.

At wind sites these exposures can come in the form of:

- Collateral circumstances from the damaged event, like additional proof rolls for equipment delivery or turbine construction activities.
- Resequencing of contract scope.
- Additional crane breakdowns, etc.

In addition to documenting the scope of the impacted portions of the project, it is important to document the overall general status of the project, including areas not directly impacted by the event. The importance of this exercise is to ensure a good understanding of the status of construction progression at or near the time of the event. This information is valuable when analyzing potential impacts to the construction schedule and delays.

Figure 5 *- In-progress construction of wind turbines at a project site.*

It is also prudent to have discussions surrounding the need for site monitoring or additional testing. Documentation gathered from site monitoring can be valuable if claim related repairs are progressing on a time and expense basis and if there are concerns that there are relevant chances of additional delays to the construction schedule. Additional testing can commonly come in the form of EL and power testing for solar sites and material and soil sampling in the case of wind sites.

Request for Information (RFI)

Due to the complexity of many renewable energy claims—especially if delay, lost productivity, or acceleration are being claimed—the RFI is critical to be able to properly review the claim. The RFI will include information related to evaluation of the claimed repair costs as well as documents which allow insight into the project status such as construction schedules, meeting minutes, daily reports, etc. The items below, although not all inclusive, represent typical critical information to allow a claim to be reviewed:

- **Cost support including invoices, time and material tickets, payroll records, and change orders.** A claim review is assisted if the insured has also designated a specific cost code where all costs related to the loss can be tracked.
- **Project meeting minutes, plan of the day (PODs), and monthly reporting.** These documents provide an understanding of the activity being executed on a day-by-day basis as well as a general overview of any project issues.
- **Contract documents.** The executed contract agreements between the Owner and General Contractor as well as the General Contractor and Subcontractors provide an understanding of contract terms as well as any allowable timeframes, markups, and unit pricing.
- **Site specific drawings and specifications.**
- **Construction schedules in native software format.** If delay or acceleration is to be evaluated the construction schedules in their native format are critical to any assessment. If the native format is not provided, many details necessary to evaluate delay, such as the critical path, logic, and constraints, are not able to be viewed and assessed.

DELAY IN COMPLETION ISSUES

Solar and wind energy projects are often constructed in remote locations, and, in the case of wind farms, with equipment of significant size as compared to a more traditional commercial building construction. As a result, when delay is claimed on a solar or wind energy project there are some unique considerations when analyzing delay and acceleration/mitigation claims.

Component Availability

Availability of replacement components can be impacted by several factors:

- Lead times for replacement components can be extended.
    - Manufacturing locations are typically not domestic and have to account for re- procurement coordination and transport.
    - The current inventory of components may already be slated for another upcoming project.
    - Transportation and shipping timelines may be extended.
- Component obsolescence.
    - Particularly a possibility for PV modules as the technology changes rapidly.
    - Potential re-engineering may be required due to component obsolescence.

The availability of replacement components can have collateral impacts on project schedule, crew and equipment sequencing, and site commissioning. It is important for contractors to consider all the collaterally impacted factors and potential mitigating options when deciding on a plan for replacement or repair.

Availability of Personnel and Equipment

Large scale wind and solar energy projects are typically located in remote and/or difficult to access areas. As a result, the industry primarily utilizes non-local resources for construction personnel. In addition, much of the equipment, especially erection cranes for wind farms, are of limited availability and are shipped from other locations, often booked well in advance.

When a delay occurs on a project, the following impacts and costs could be experienced but are not limited to the following:

- Additional transportation and expediting costs for material and components.
- Limitations on availability of qualified labor or labor that has been slated to shift to a different project by a specific timeframe, and which now must be retained on site.
- Travel/per diem related costs to secure and/or retain (standby) qualified labor.
- Limited access to or additional transportation costs for required heavy equipment.

Wind turbine projects are often constructed on leased land which typically requires construction of specific access roads, turning radii, delivery laydown areas, and crane pads for component delivery and erection activities. Depending on the specific project schedule and location of impacted turbines, site-specific access, delivery, and/or laydown areas may need to be reconstructed in part or in full which equates to additional repair time over and above the specific damage repairs.

Change in Season of Work

Delays to the project as a result of a loss can also push repairs and follow-on work into a different season. Examples of related seasonal impacts include:

- **Temperature requirements for construction.** A delay could push various construction elements into a season which is not ideal for that element of work. Examples would include trenching for electrical cables in frozen ground, erection of blades in cold temperatures, or excessive heat and the impact on the ability of the crews to efficiently work.

- **Wind speeds.** Locations typically experience different average wind speeds in different seasons. This is especially critical for wind farms, as the wind speed tolerance for crane erection is tight. A change in season could mean additional downtime days or the requirement of a larger crane with higher wind tolerances.

- **Environmental considerations.** Due to the location of the construction sites, there are often environmental issues to consider depending on the season. Requirements to be considered can range from additional safety measures (due to exposure to snakes and insects) to local protection restrictions for nesting wildlife, which may change by season.

Other Considerations

In addition to the items discussed above, the following may also be issues that should be considered when evaluating the delay on the project:

- **Restrictions by civil authority.** This would include any limitation applied to the project by the local civil authorities. An example of this situation would be the civil authority closing an area due to a wildfire, thereby restricting access to allow construction to continue.

- **Resequencing of work.** If only a limited area of the site is affected by the loss event, the contractor and owner should consider if the contract project work can be re-sequenced to mitigate potential delay.

- **Duration of testing/assessment of damages.** As discussed above, certain projects such as solar may require extensive, time-consuming testing to determine the full extent of the damages. The testing process and timeline need to be understood and discussed with the project team.

- **Commencing energy production before the project achieved Substantial Completion.** Often, energy production may commence prior to the overall project reaching Substantial Completion. This situation requires coordination with the adjuster and insurer to understand the implications of this situation and ensure that delay is being evaluated appropriately.

- **Tax credits.** Renewable energy projects often have a portion of the cost of construction tied to expected tax credits. If a project is delayed these tax credits may change or not be available once the project has completed.

LOSS OF INCOME PROVISIONS IN BUILDER'S RISK POLICIES

Policy Considerations

Typically, builder's risk coverage provides an optional coverage for loss of business Income, often referred to as Delay-in-Start-Up (DSU) or Advance Loss of Profits (ALOP). Most often this coverage will be subject to a waiting period between 10 and 45 days. However, one of the notable differences between DSU/ALOP and traditional business interruption coverage in property insurance policies is that loss events for DSU/ALOP are often aggregated, and only a single waiting period will apply, whereas for most property policies each loss event is subject to a separate waiting period.

The valuation of the DSU/ALOP with respect to business income losses can vary significantly from policy to policy, often dependent on the insurer. It is essential for claims professionals to work closely with underwriters at the outset of the claim to understand the intent of the policy and coverage are in this regard.

Projecting Normal Operations

One of the most challenging aspects of evaluating DSU/ALOP claims is determining what revenues and expenses would have been earned/incurred but for the loss absent a historical record of performance. These challenges are no different when it comes to renewable energy claims, but there are options available to assist. Most renewable energy projects are required (as part of financing) to engage an independent engineer (IE) to prepare a report detailing the expected monthly performance of site which considers the following elements:

- H**istorical climate data.** Temperature, humidity, cloud cover, precipitation, and other weather conditions are considered as they can have a material impact on generation.
- **Available resource.** For wind farms this would be the seasonal wind speeds; for solar, the seasonal irradiance/insolation.
- **Size or rating of the asset.** The generation capacity of the WTG (Wind) or panels (Solar).
- **Tracking.** Some solar projects utilize tracking systems which allow the panels to follow the sun throughout the course of the day to maximize the generation capacity.

Ideally, the IE report will be taken into consideration with more traditional documentation sources to substantiate the accuracy. Examples of this documentation include but are not limited to pro-formas/budgets, operational portions of the site, and post-loss generation performance.

Notable Considerations

Two business income aspects that are unique to renewable energy claims, including builder's risk claims, are tax credits and nuanced power purchase agreements.

Federal Renewable Energy Tax Credits

In the United States in particular, federal tax credits have been a driving force behind renewable energy development. Large-scale wind farms can earn 10 years' worth of production tax credits (PTC) following achievement of Commercial Operations Date (COD). The PTC are extremely valuable and, in some cases, can even exceed the value of the sold generation.

Solar projects are eligible for investment tax credits (ITC) which are based on a prescribed percentage of qualified investment costs. Understanding PTC and ITC qualification is of particular importance when addressing builder's risk claims because the delay itself can threaten the mileposts necessary to fully qualify.

Power Purchase Agreements

Traditional (non-renewable) power generation facilities have historically been developed and operated under power purchase agreements (PPA) which are contracts between a seller and buyer of electricity. These agreements provide the terms of the sale of the electricity (e.g., pricing, volumes, penalties, etc.). Having a PPA in place can be essential to securing financing to build-out utility-scale gas or coal fired power plants, as an example.

Renewable energy projects are typically operated on a much smaller scale compared to traditional power generation facilities, and, as a result, securing a PPA with a utility off-taker is much more unlikely. However, the necessity for a guaranteed off-taker for renewable generation remains. As a result, there have been some creative workarounds put in place. First is a corporate PPA, which is a contract between the renewable asset and a strong corporate partner who is likely looking to reduce their carbon emissions as part of regulatory obligations or eco-initiatives. The second is a virtual or synthetic PPA, in which no power is actually traded; rather, these agreements essentially serve as a financial hedge agreement often calling for requirements to purchase/sell another form of energy to/from a financial partner.

Understanding how these PPA alternatives work is essential for both insurers and claims professionals to understand when evaluating loss of income claims, including DSU/ALOP.

CONCLUSION

Considering the current market projections for growth within the renewable energy sector, investment in and construction of renewable energy projects is likely to continue to increase; as will the associated builder's risk policies. This paper has reviewed some unique circumstances associated with renewable energy construction projects and how they can impact builder's risk claims, including:

- Notable peril examples and types of damage to components, i.e., weather, fire.
- Unique testing requirements in solar (IV curve and electroluminescence testing).
- Builder's risk best practices such as initial damage assessments, documenting non-impacted areas, and the RFI.
- Delay in completion issues, i.e., availability of components, equipment, and qualified personnel; change in season of work; and other considerations.
- Loss of income provisions, i.e., policy considerations, projecting normal operations, federal renewable energy tax credits, and power purchase agreements.

While not every situation can be covered in one paper it is the hope of the authors that this discussion provides some general insight into the unique characteristics of handling potential losses associated with builder's risk claims on renewable energy construction projects.

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