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Solar PV Resiliency During Severe Weather Events

With the increasing frequency and severity of severe weather events (hurricanes, blizzards, dust storms, etc.), the importance of ensuring our solar PV arrays withstand these storm related events will become increasingly evident. However, in the 2018 hurricane seasons, many large scale utility PV arrays experienced catastrophic damage resulting in major financial loss. Significant life-safety issues arose as a result of these major array losses. Unfortunately, these losses were, and will not, be endemic to just the Caribbean.

There are major deficiencies in the codes and standards on the design, engineering, and construction of PV arrays. A PV array designed and constructed in Florida will experience much different severe weather related events than a PV array in Minnesota. However, both of these arrays are designed and constructed under the same codes and standards, creating too much and uncertainty that the PV arrays will withstand severe weather events.

Given that there are thousands of utility scale PV arrays on the horizon to be built, there exists a major need for better codes and standards for PV arrays built in severe weather prone areas. A more robust design and sturdier equipment is necessary for PV arrays to be able to endure these events. The benefits that PV arrays can provide power to areas devastated by severe weather events will not be realized if the PV arrays themselves are destroyed because of poor design and sub-par construction practices.

Force-majeur events like earthquakes, wildfires, and 500-year floods will almost certainly cause major damage to PV arrays that in many cases cannot be avoided. However, this is where important tools like insurance can come into play. The opportunity to build microgrids powered by PV arrays and batteries in wildfire prone regions is increasing as major utilities look towards de-energizing their lines leading to these areas. Creating guidance for utility scale PV arrays to be able to not only prevent the cause of wildfires but also be able to survive and be protected from wildfires is extremely critical.

In addition, the thousands of existing utility-scale PV arrays need to be assessed for major vulnerabilities that will be exploited during severe weather events and cause major financial and possibly life losses.

The importance of finding cost-effective solutions to increase the resiliency of PV arrays in severe weather prone regions will only increase as the effects of climate change continue to worsen.