

Extreme Weather Conditions and O&M of Solar PV Plants



Background

As a result of the ongoing global climate crisis, extreme weather events have increased again this year. Heavy rainfall bringing with it more damaging flooding in many regions of the world with extreme flooding seen across Asia and Europe during July. These extreme conditions not only impact on our lives but can also have devastating effects on solar PV systems.

For investors, reassurance of ongoing financial security of their solar system is critical to securing initial investment. PV plants are installed outdoors and whilst generating electricity, they also endure the test of nature and all her elements. How can the losses from a solar PV plant be minimized from events such as extreme rainfall? This Solis seminar will share some useful points to bear in mind regarding specifically, heavy rainfall.





Action to Take when Heavy Rainfall and/or High Winds are Forecast

The system should be powered off, inspected and if necessary, reinforced.

Always keep a close eye on weather forecasts and before the arrival of heavy rainfall you must take the necessary precautions such as, shutting down the PV plant (cutting off the inverter DC switch and the AC switch of the distribution box). The second most important thing is to check the fixed condition of the PV array and strengthen it if necessary. This could include:

1. Reinforcing the mounting of PV module array and increasing counterweight/ballast



Install ropes or tie rods for fastening to help reduce any damage to the PV module mounting caused by strong winds or floods. In addition to this, for power stations with cement foundations, sandbags can be used to increase the counterweight/ballast.

2. The pressure block and screws of the PV module mounting equipment should be checked and tightened.

Before extreme weather occurs, you should conduct a comprehensive and detailed inspection of the whole installation paying particular attention to mounting equipment. Check whether the screws, PV panel clamps and fasteners are tightened fully and whether the welding joints are secure.

3. Check the drainage system around the solar PV plant

For any ground mounted solar PV plant, you should check whether its drainage system is clear. If it is blocked, clear it to prevent localized flooding around the PV plant. Again, pay attention to the long-range weather forecast, allowing you to prepare any necessary emergency drainage plans in advance, and add temporary drainage facilities before the onset of heavy rain.



4. Deal with foreign objects and roof furniture around the PV array and pay attention to lightning protection

There are sundries and roof furniture around most rooftop solar PV systems, including satellite dishes, solar thermal water heaters etc. These need to be removed or reinforced in good time to prevent them from being blown down by high winds and potentially damaging the PV panels. Lightning strikes will also damage the PV system and other electrical equipment when it strikes so surge protection measures should be taken into consideration.



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5. In extreme situations, it is recommended to temporarily remove the PV panels and inverters before the onset of a forecast storm

If the local weather forecast predicts that there will be heavy rainfall and lightning, for any ground mounted PV plant, it is recommended to disconnect the inverter and solar panels. These should be stored in a higher level, indoor location to prevent them from being damaged by strong winds, or flooding. When disassembling the equipment, follow the relevant safe operation guidelines and use protective measures to ensure personnel safety. If complete disassembly is not possible it is recommended to disconnect the DC switch and AC breaker. The go about carefully checking the tightness of the connecting parts of the system to prevent damage and water ingress.



Action to Take After Heavy Rainfall

1. Take appropriate measures to prevent electric shock and ensure safety.

When the PV plant is submerged or immersed in water, it is possible to get an electric shock when approaching or touching the connecting parts of the inverter, solar panels, and power supply cable. **DO NOT APPROACH OR TOUCH IT.**

Solar panels damaged by floods may have faults, and any direct contact may cause electric shock. When assessing the site for safe return to operation you must take precautions to prevent electric shocks (using rubber gloves and rubber boots, etc.).

Multiple solar panels connected to PV strings, damaged by strong winds or floods, may generate high voltages under sunlight. The site should be fenced off completely to ensure the safety of site personnel and public.

If the inverter has been submerged in water, its DC circuit may short-circuit and generate heat. In this situation, contact the construction operator for safe countermeasures.

2. The restoration of the solar power station needs to be entrusted to professionals

For maintenance of any solar PV plant, especially following extreme weather events, only qualified electrical professionals should be entrusted to carry out repair work.

3. Check your PV power plant insurance type, and make an application for compensation

Any type of solar PV installation should carry insurance and depending on where the system is in the world will depend on the type of insurance offered. If you are installing a system in an area where flooding or other extreme weather conditions are common, ensure the system is insured fully.



Conclusion

Heavy rains and floods are threatening many parts of the world, where they once did not. Solar PV equipment is expensive, and care should be taken to insure the system against any natural disaster or extreme weather event.

When planning and preparing for forecasted storms which could result in flooding, extreme care and attention should be paid to the health and safety of all on site personnel as well as the public.

For more details or support on the protection measures available on Solis solar installations contact your local Solis service engineers
<https://www.solisinverters.com/uk/service.html>