



Solar Energy Providers Should Protect Their Investments with Advanced DC Monitoring

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As the scale of solar energy projects grows, the incorporation of advanced direct current (DC) monitoring into solar power systems becomes increasingly more important. Due to the increased capacity of individual projects, fewer projects are coming online than in past years.

Therefore, bidding for these projects has become much more competitive. In this competitive environment with greater energy produced by each project, resulting in ostensibly higher margin per KWh produced, the economic benefit of advanced DC monitoring has never been greater.

The typical Power Purchase Agreement (PPA) requires the power plant operator (the “Seller”) to specify how many MWhs the plant is expected to produce annually. This output estimate is generally used as the basis for contractual performance incentives and/or guarantees. For example, the Seller may be paid less than the contract rate for each MWh of energy produced in excess of 110 percent of the estimated annual output. On the other hand, Sellers are also generally bound by an output guarantee, which requires the Seller to pay the Buyer (usually the utility), if the project’s output over a specified period fails to meet a defined level.

Advanced DC monitoring permits more accurate modeling of future projects and production levels permitting more accurate output estimates. Moreover, if the plant produces less energy than expected, advanced monitoring substantially reduces the time and cost needed to detect the reason for the failure. Advanced monitoring also provides greater assurances to a new owner in the event that the plant is being sold. In addition to monitoring for production purposes, advanced DC monitoring can also aid the original equipment manufacturer and installer in determining initial output to address construction problems and equipment failures.

DC monitors are generally integrated into modern DC to AC (alternating current) inverters. However, inverter-integrated measurements, while useful in identifying relative changes over time, typically lack the level of precision necessary to address the problems discussed above on a module, panel, or array basis. Therefore, monitoring should register the DC production prior to inversion, at the junction box level. The junction box is usually pre-installed on the backside of a solar module and houses bypass diodes that keep power flowing in one direction and prevent it from feeding back to the panels. By monitoring at this level, the operator can determine power loss at a granular level.

Solar power plants should use energy meters or true-rms power meters for DC yield measurements at the junction box level. Monitoring data should be available 99% of the time. The International Energy Agency recommends that data be sampled at least every second and average values should be stored every 5–15 minutes. Longer averages may be detrimental to the analysis of the plant while shorter intervals may overload the database.

The solar power industry is growing quickly, and power producers should take advanced DC monitoring seriously to protect their investments in an evolving marketplace.

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Sources

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