

Reducing OPEX: Transitioning from aging & obsolete instrumentation to satellite data

Learn how reliable and consistent SolarAnywhere® solar resource data facilitates BayWa r.e.'s ROI-based approach to O&M services

Streamlining O&M for REV Renewables

REV Renewables is an industry leader in the development, acquisition, and operation of renewables and energy storage. REV has one of the nation's largest independent portfolios of renewables and energy storage, with a 2.8 GW operating portfolio and a substantial development pipeline. Their integrated approach encompasses the entire project lifecycle, from initial feasibility studies and development to construction, operations, and ongoing maintenance. REV Renewables' employees, assets, and capabilities build upon the legacy of LS Power, a company with more than three decades of investment, innovation, and development experience in the U.S. power and energy infrastructure industries.

REV Renewables began contracting with BayWa r.e. Operation Services in April 2022.

Challenge

In order to quickly identify PV equipment failures for companies such as REV Renewables, BayWa r.e.'s remote operations control center (ROCC) maps PV system energy output from SCADA devices installed on-site against estimates of expected PV production in real time. Expected PV production represents the energy output of the system assuming no equipment failures, adjusted for the current solar irradiance and weather conditions. Expected energy values are used as a means of ruling out weather or cloud-related conditions as the reason for low system production. This expected, weather-adjusted energy is calculated in real time on a sub-hourly basis, allowing the ROCC team to identify and address equipment failures before they result in prolonged production loss events.

The comparison of actual to expected production is also crucial to BayWa's performance benchmarking procedure, which includes regular reporting on key performance indicators. Production loss events are revealed by periods of misalignment between actual and expected energy. The BayWa team then drills down on these periods to determine root cause and develop strategies to resolve any of the identified issues. Because irradiance and weather conditions are considered in the calculation of expected energy, on-site weather conditions are ruled out as a potential cause of decreased production, enabling a more efficient root cause analysis.

In performance reporting, actual and expected production values are also compared directly to the production predicted for the system during the project's development stage. The predicted energy estimates are based on Typical Meteorological Year (TMY) data.





Figure 1 – Site Dashboard, Showing Actual & Expected Generation with Setpoints and Curtailments

BayWa r.e. Operation Services calculates expected energy as a function of plane-of-array irradiance (POAI), wind speed and ambient temperature. BayWa found that collecting these inputs in the conventional way, with meteorological (MET) stations, presented accuracy and reliability challenges.

MET stations are initially designed and built during the EPC phase of the project to provide accurate measurements during the contractual performance test, which typically lasts for about a year. When a project reaches final completion, maintaining the MET stations becomes less of a priority, as it is no longer incentivized.

MET stations are expensive to deploy and require frequent maintenance to ensure measurements are consistent and reliable. Based on the 14 sites that BayWa r.e. manages for REV, the following costs were calculated:

MET Station Costs		
Cost	Description	Frequency
\$59,100	Cost to restore neglected MET stations to be accurate and reliable	Year 1
\$11,600	Laboratory calibration costs	Annual
\$13,500	Labor, shipping, and installation of the sensors for annual calibrations	Annual
\$15,000	Engineering costs to review data and gap-fill for monthly reporting	Annual

Table 1 – Costs to restore and maintain the MET stations at 14 sites

Even when MET stations are regularly maintained, they are still prone to outages and soiling between maintenance events. This results in data gaps and/or data accuracy degradations in the expected energy data feed. Tracking down the root cause of production loss events becomes far more difficult when expected energy values are unreliable and inconsistent.

Solution

BayWa clearly identified that the replacement of site-measured weather data with satellite data was the best solution for the REV Renewables solar portfolio due to the efficiency improvements and achievable cost savings. As is the case with most solar sites, the MET station instrumentation installed at the REV sites was no longer required after substantial completion of the project, meaning it could be replaced with satellite data without contractual consequences. To guarantee increased efficiency and cost savings, without sacrificing any of the accuracy afforded from on-site MET stations, BayWa r.e. implemented SolarAnywhere® SystemCheck®, a real-time satellite-based solar resource data offering from Clean Power Research®.

SystemCheck offers programmatic access to site-specific, real-time solar resource data for the calculation of expected energy. SystemCheck data fields include, but are not limited to, plane-of-array irradiance, wind speed, and temperature data. With the SolarAnywhere SystemCheck API, BayWa r.e. requests updated irradiance and weather data across 25 sites every 15 minutes. SystemCheck data is pulled directly into the ROCC by the SCADA edge device for a real-time estimate of expected energy. BayWa’s performance engineers also used the SolarAnywhere API to automate retrieval of the 1-hour resolution data for monthly performance reporting.

In addition to reliability and consistency, SystemCheck provides the accuracy required to effectively benchmark system performance. Data is offered at 1 km spatial resolution. A comparison of SystemCheck POAI data against actual POAI data across 5 locations revealed that SolarAnywhere’s accuracy is within the criteria defined by BayWa.

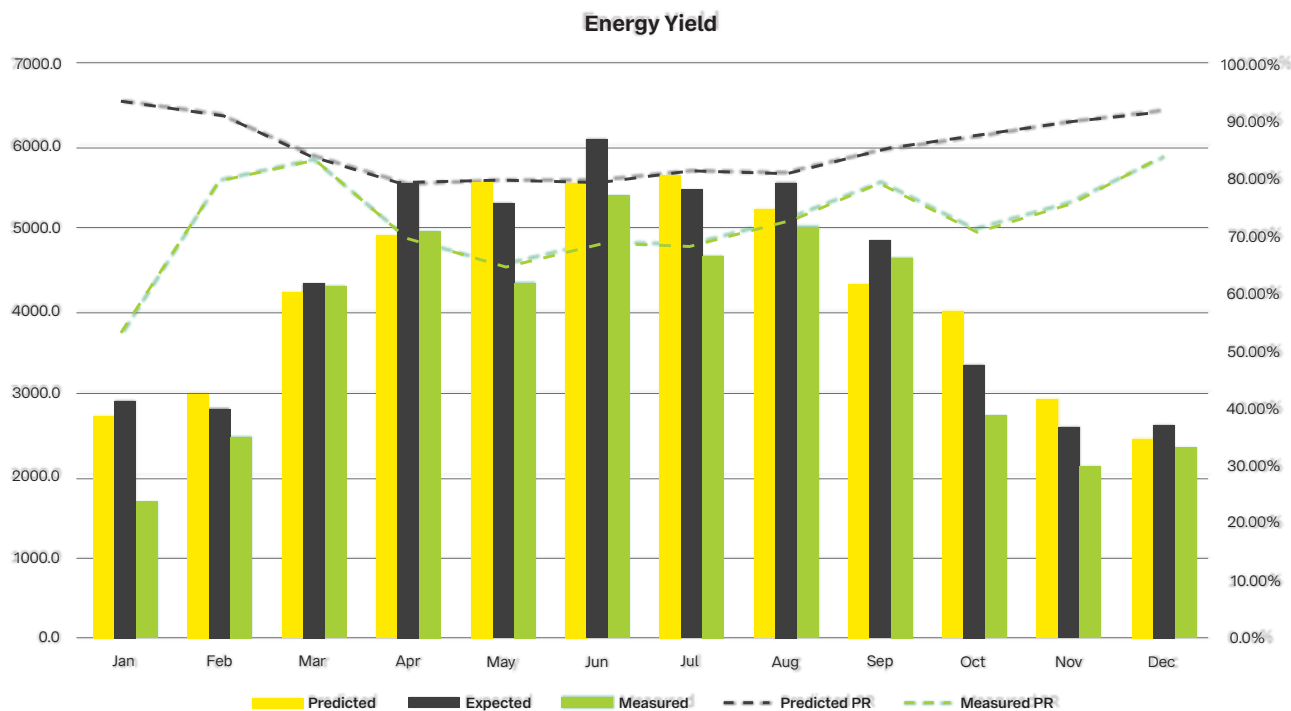


Figure 2 – Monthly Predicted (TMY), Expected (Weather-adjusted), and Actual energy and performance ratio of a typical site

Result

By integrating SolarAnywhere SystemCheck into its O&M systems, BayWa is able to provide consistent, cost-effective, and real-time PV system management and monthly performance reporting.

Not only does BayWa r.e. benefit from a reliable, gap-free data source, but customers, such as REV, avoid the expensive costs and labor required to maintain solar MET stations. Furthermore, the man-hours and field resources previously dedicated to meteorological instrumentation maintenance can be dedicated to activities that increase plant production without adding more human resources.

BayWa r.e.

BayWa r.e. brings 10+ years of experience as a renewable energy asset (Solar, Wind, BESS) owner-operator; while also offering comprehensive operation and maintenance services for 3rd-party owned assets through its services division, BayWa r.e. Operation Services LLC.

“The difference between SolarAnywhere® Data and that of a professionally installed and calibrated MET station was calculated to be equal to or less than the measurement accuracy of the weather stations. Combine this accuracy with the increased reliability that SystemCheck offers, and you have an O&M solution that costs less and saves valuable personnel resources that can instead be focused on value-added repairs and maintenance. Less time and truck rolls are dedicated to MET stations, leaving more time for the energy-generating equipment.”

David Barnes
EVP at BayWa r.e. Operation Services LLC.

This history of asset ownership facilitated the development of a two-pronged, ROI-based approach to O&M that they now offer to their clients. The two-pronged approach includes a remote operational control center (ROCC) that works around the clock (24/7/365) to resolve performance issues in real time, while a team of seasoned operations experts regularly benchmark plant performance and implement solutions that maximize long-term plant health and ROI.

BayWa r.e. Operation Services LLC

BayWa r.e. Operation Services provides O&M services for a fleet of ~ 1 GW of renewable energy assets. This portfolio consists of both BayWa r.e. IPP-owned assets and assets of other clients, including serving as the registered NERC GO & GOP.

SolarAnywhere

SolarAnywhere, a product of Clean Power Research, supports the entire solar lifecycle, from prospecting and development to asset management and production forecasting. SolarAnywhere is trusted by leading solar enterprises around the world to help reduce project risk and improve return on investment with highly accurate, accessible, and consistent data.

To learn more about data and intelligence services from Clean Power Research, visit www.solaranywhere.com.

