

Bringing Commercial Solar Performance Monitoring Down to Earth

Inverter-integrated solutions are going mainstream

by Tucker Ruberti

It is currently more likely that a new commercial solar PV installation will be owned by investors rather than a building or land owner. This shift in ownership is driving an important transition in how system owners think about performance. Rather than building a system strictly around installed cost, solar system owners are increasingly focused on lifetime energy production and long term operation and maintenance costs. These performance metrics have an outsized impact on what truly matters — maximizing return on investment.

This change in industry priorities has been largely responsible for an increased use in performance monitoring of commercial PV systems. Monitoring systems provide a range of information that can be used to reduce system downtime, optimize system performance and intelligently schedule system maintenance and module cleaning.

Specific data includes detailed real-time power and historic energy production, performance and efficiency diagnostics at the PV sub-array and string level, correlated weather data, and alerts or alarms that can be customized based on a project's specific needs.

Additionally, the increased focus on performance monitoring is resulting in

significant increases in energy production when compared to similar unmonitored systems.

However, performance monitoring is still not standard for many commercial PV systems. One of the main reasons is that the design, installation and commissioning of a monitoring system typically involves many players who supply hardware and software that is not always designed to be compatible out of the box. Installers, integrators, PPA's, inverter companies, and pure-play data monitoring companies continue to develop innovative solutions, but there are no common standards that enable plug-and-play interoperability. All too often the result is unexpected delays, increased installation costs, and frustration.

A unique approach

PV Powered has chosen a unique approach to commercial data monitoring. The company has recognized that many PV system owners and integrators have already standardized on a preferred data monitoring provider. So instead of developing another custom commercial monitoring solution, they chose to partner with several companies who are focused on data monitoring technology.



▲ A UL508A panel with integrated monitoring hardware.

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PV Powered's commercial inverters can be ordered and shipped with integrated performance monitoring solutions from Draker Laboratories, Energy Commerce, Inc. and Fat Spaniel. The company also offers both integrated revenue-grade metering and subcombiner monitoring, which can be used by integrators and owners that do not want to use one of the three integrated solutions providers, but still want to enjoy the benefits of integrated monitoring hardware. Data can either be exported from the inverter to an external device, or for larger volume projects, the new hardware can be custom-integrated inside the inverter.

PV Powered's integrated monitoring hardware, including the data monitoring gateway, power supply and data acquisition modules, have been engineered onto a UL 508A industrial panel, which means a higher level of testing and reliability than stand-alone hardware solutions. Completed solutions are pre-wired and tested at the factory, and the streamlined solution is designed to simplify the entire process from configuration to ordering and commissioning. The result is a tightly integrated commercial monitoring system that is ready to start reporting critical data performance and revenue statistics right out of the box.

"Performance monitoring systems offer long-term benefit to our customers, and PV Powered's solution goes a long way towards taking the headaches out of data monitoring for developers," said Luke Soule of Solar Monkey, a solar integration company out of Irvine, California.

Gregg Patterson, CEO of PV Powered comments; "Working with the leading PV data monitoring partners to elegantly integrate their monitoring solutions into our inverters has resulted in a highly reliable solution that virtually eliminates the installation time and configuration challenges for installers in the field. We believe that

bringing plug-and-play simplicity to data monitoring will be a fundamental catalyst for industry growth."

A range of benefits

There are also other valuable benefits to an inverter-integrated data monitoring solution. In a typical commercial PV monitoring installation there is an enclosure for the subcombiner monitoring system, another enclosure for the revenue grade meter, and a third enclosure for the data monitoring system. All of the enclosures, conduit, wiring and labor are eliminated in an inverter-integrated performance monitoring package. This saves valuable space at the installation site, reduces potential installation errors and improves the overall aesthetics of the installation. Devices that are typically wired back to the data monitoring enclosure, including a weather station, string combiner monitoring, and demand metering, are simply wired back to the inverter.

In addition, instead of purchasing and installing separate CT's and other sensors to capture inverter performance data, the integrated solution leverages the inverter's resident data acquisition capabilities. A direct modbus connection from the inverter communications board feeds real-time performance data and fault codes to the partner's data monitoring gateway.

Inverter-integrated monitoring is an important step in controlling the number of touch-points and potential failures in commercial data monitoring. By providing commercial PV integrators and end users with choice and convenience, the adoption of performance monitoring beyond large investor-owned PV systems is now a viable option, and is making a high level of sophisticated system care accessible to a much broader segment of the solar industry.

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▲ A PVP100kW with the new integrated revenue grade meter.