

Emerson Solar Photovoltaic Solutions



Real-Time, Reliable Photovoltaic Plant Control Increases Energy Production and Grid Stability

The number of photovoltaic (PV) installations around the world has increased significantly, making PV among the fastest growing renewable energy sources. With this growth comes a need for PV owners/operators to support grid stability with operational flexibility. Emerson's Ovation™ technology for PV power generation provides an integrated, scalable control solution to maximize kWh output and profitability while contributing to utility-grid and/or microgrid stability.



Accessible

Complete control scheme visibility allows for in-house maintenance and customization of PV control logic to achieve operational goals and maximize revenue potential.



Scalable

Flexible architecture accommodates small, standalone PV systems as well as integration of multiple, geographically dispersed farms of varying sizes.



Secure

Native security features enhanced by comprehensive cybersecurity services and solutions help meet compliance obligations and protect assets against cyber threats.



Integrated

Using standard communication protocols, a single platform aggregates data from field devices and enterprise-wide business systems.



Trusted

Global industry expertise and comprehensive lifecycle services are provided by a single, trusted vendor with a history of long-term customer service and support.



Reliable

Scalable solutions designed with embedded industry-specific automation strategies optimize operations while maximizing plant reliability, availability and economic performance.

Ovation: One Platform Delivering Optimized PV Power Generation

Specifically designed for the power generation industry, the Ovation automation system is expertly configured to address the numerous challenges facing PV asset managers and operators. Leveraging Emerson's broad portfolio of field-proven solutions, including its compact controller technology, an Ovation system can be economically engineered for any size PV plant or fleet.



The U.S. Department of Homeland Security has designated Ovation control solutions as Qualified Anti-Terrorism Technology. This Designation provides significant tort protection for claims arising out of acts of cyber terrorism as defined under the U.S. SAFETY Act. The Designation covers Emerson's Ovation control system, Power and Water Cybersecurity Suite and cybersecurity services. For more information, visit <https://www.safetyact.gov>.

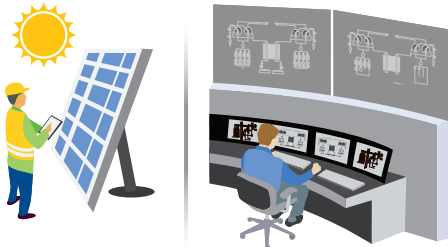


Maximize production while complying with grid interconnection agreements

Challenges	Actively curtail power output	Minimize impact of variability and intermittency	Maximize kWh output while supporting grid stability	Quickly respond to grid frequency events	Effectively manage multiple, diverse SCADA systems
Ovation Solution	Inverter setpoint control	Accurate ramp rate control	Optimized control strategies	Compliant response to frequency events	Single, integrated platform
Benefits	<ul style="list-style-type: none"> Complies with grid operator dispatch instructions Achieves accurate Point of Interconnect (POI) output target to maximize production Maximizes revenue potential Contributes to grid stability 	<ul style="list-style-type: none"> Satisfies system interconnect agreement requirements Maximizes revenue potential Contributes to grid stability 	<ul style="list-style-type: none"> Allows selection of POI operating modes including automatic voltage regulation, power factor control or reactive power flow control Maintains reactive power flow within inverters' reactive capacity limits Defaults to unity power factor when possible, maximizing kWh production 	<ul style="list-style-type: none"> Automatically and accurately reacts to out-of-bounds frequency measurement Mimics rotating generator droop control response Curtailment or coupled energy storage control enables upward response 	<ul style="list-style-type: none"> Simplifies maintenance and upgrades in a cost-effective manner Makes the Ovation SCADA network available for installation of software updates on third-party plant equipment Plant- and fleet-wide data aggregation provides actionable information for enhanced decision making

Scalable Ovation PV Architecture

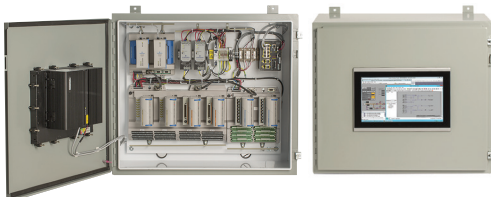
Enterprise and Remote Applications



Provides secure, remote monitoring of PV operations from mobile devices or central control room for grid operators, maintenance staff, utility or power purchase agreement (PPA) host, owners, operators and asset managers.

Measures, monitors and reports key performance indicators for increased visibility of plant or fleet operations.

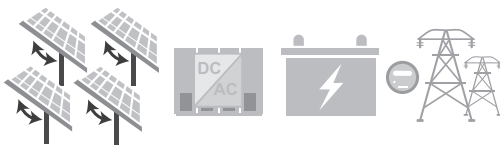
Ovation SCADA



Performs supervisory control and monitoring including data acquisition, engineering, maintenance, alarming, historical and cybersecurity functions.

Features rugged design with built-in, wide-area networking for access to aggregated plant-wide process and equipment data.

Solar Plant Equipment



Collects data from inverters, solar array trackers, combiner boxes, meteorological stations, transformers, switchgear and battery management systems/inverters.

Communicates with remote terminal units (RTUs) and other field devices via a host of standard protocols with optional redundancy for reliable data transmission.