



SunWave™ Communications System

Communications System Overview

The Petra Solar SunWave™ family of products offers an advanced architecture providing two-way communications to each AC Module (Solar Panel + SunWave Smart Energy Module - SEM) for individual monitor and control. This system enables remote management of a large, geographically dispersed AC Module population from a centralized location. The SunWave™ Communications System delivers the following capabilities on an individual AC Module basis:

- Energy generation metering
- Health, status and diagnostics data
- Command capability for VAR output configuration

The SunWave™ family consists of the SunWave™ AC Module, SunWave Communicator™, and the SunWave Energy Portal™.

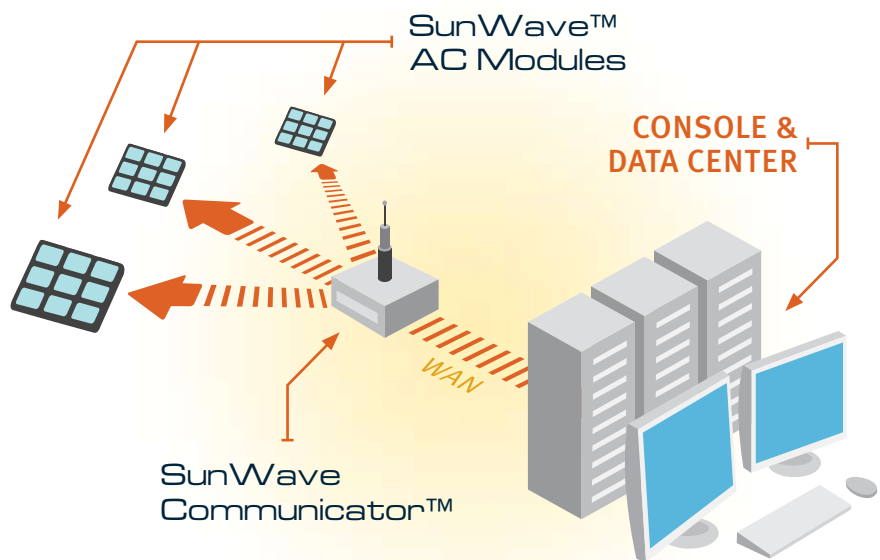
Telemetry

Each SunWave™ AC Module (Solar Panel + SunWave Smart Energy Module - SEM) gathers key system performance parameters and reports out a telemetry packet at a specified interval. The telemetry packet contains critical operating parameters such as Total Energy Generation, DC voltage and current, AC voltage and current, SEM Temperature, Instantaneous/Real Power (kW), and Reactive Power (VAR). The system will report a discrete telemetry packet for every installed AC Module at a specified interval.

Commands

The SunWave™ AC Modules can be remotely configured by command over the two-way communications link. The resulting state of the AC Module can be viewed in the telemetry data.

The command path is also capable of executing firmware upgrades to both the SunWave Communicator™ and SunWave™ AC Modules. Through this upgrade path and standard compliant networking technology, the system is forward expandable for providing additional Smart Grid functions with alternative smart devices.



Communication System Diagram

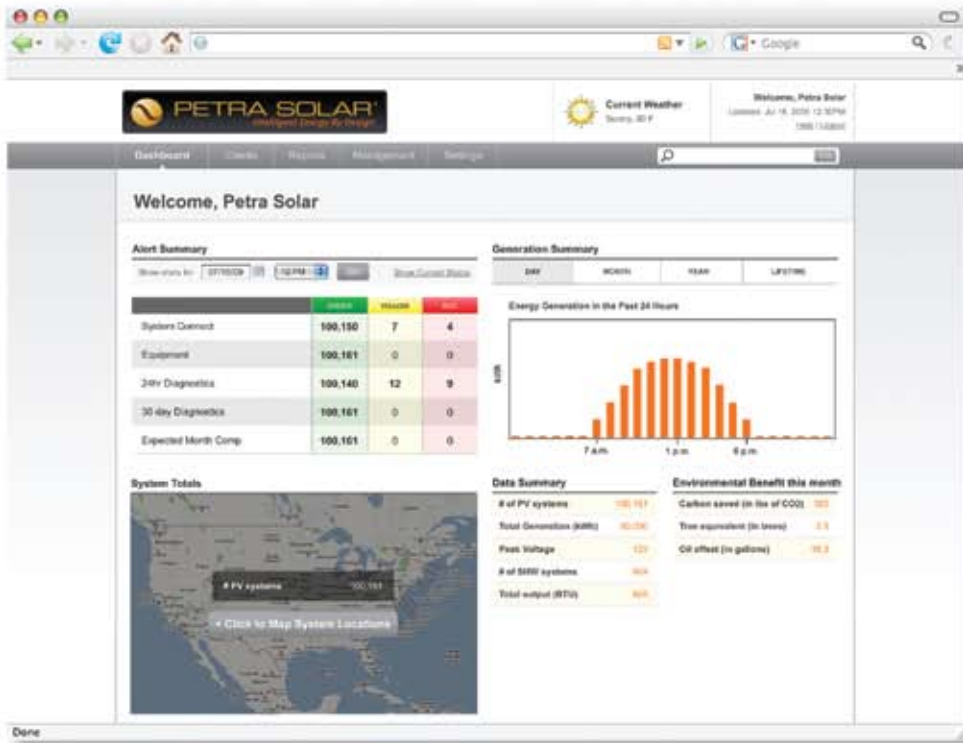
SunWave Energy Portal™

Monitoring of the AC Modules is achieved via the SunWave Energy Portal™ which is accessed via a secure web browser in the system owner's central monitoring and control center. The SunWave Energy Portal™ calibrates and stores the AC Module telemetry and enables access by authorized

personnel from a web-based Graphical User Interface (GUI). In addition, the system provides the command console used for transmitting configuration commands to the SunWave™ AC Modules and SunWave Communicator™.

Dashboard

The dashboard enables management of a large distributed AC Module deployment through alarm and alert thresholds.



This consolidated deployment analysis enables quick viewing of the properly functioning AC Modules as well as alerts regarding the number that may require maintenance. The number to the right of the color alert on the dashboard indicates the number of AC Modules that are functioning at that specified alert level. Clicking on the number will bring the user to the detail page for each AC Module at that alert level.

A combined daily and monthly aggregate PV generation for all AC Modules is displayed on the right of the page. In addition, the total CO2 emissions eliminated is calculated and displayed.

Dashboard Display



PETRA SOLAR
Intelligent Energy By Design

300-G Corporate Court South Plainfield, NJ 07080
Telephone: +1.732.379.5566 Fax: +1.908.755.0369 utilities@petrasolar.com www.petrasolar.com