Intelligent Remote Monitoring Solution for Distributed Solar Generation

Based on Advantech WebAccess , our Solar Power Management System (SPMS)which is specifically designed for solar applications is an ideal solution.

Project Introduction:

In order to lower the use of fossil fuel consumption and improve the quality of the environment, a number of governments have issued a series of policies to encourage the use of distributed photovoltaic systems as one of the options to offset peak electricity demand and stabilize the local grid. In comparison to traditional electric power systems, distributed solar generation is a relatively smallsystem that can be mounted on residential and commercial rooftops or ground racks to produce electricity at or near the site where it is used. Along with its installation, its growth, data collection integrity, operational stability, convenience of maintenance and inspection are the main concerns for power grid management. Advantech?s intelligent remote monitoring solution realizes unified scientific management by leveraging front-end data acquisition and back-end data analysis as well as providing comprehensive features to ensure reliable and stable operation.

System Requirements:

A solar technology company that specializes in the integration and operation of photovoltaic and solar thermal systems constructs rooftop power photovoltaic generationprojects for domestic and industrial applications. A project in Beijing with more than ten photovoltaic power stations installed throughout the city, was seeking a Supervisory Control and Data Acquisition (SCADA) solution which could not only quickly gather data but also offer a centralized supervision model to manage numerous solar power stations. A prerequisite of the system was convenience, fast access and control of the database. The new system also had to support many communication protocols to communicate with various automation devices, synchronous data storage replication to protect critical data, visual data display to understand information quickly and easily, an open platform for further development and flexible expansion. For the related hardware products, they must offer a variety of I/O ports, low power consumption, wide temperature range, and ease installation and maintenance so as to meet the client?s requirements.

System Description:

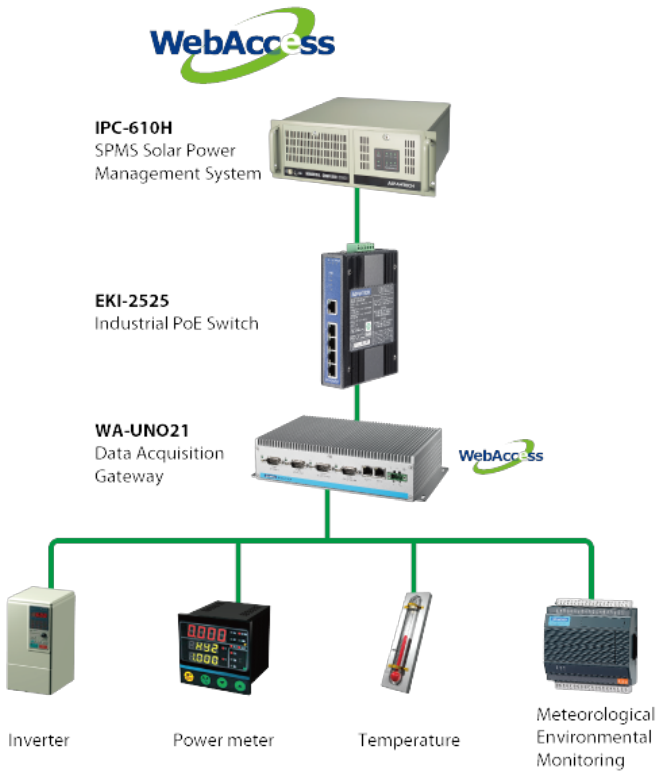
Based on Advantech WebAccess (web browser-based SCADA software), our Solar Power Management System (SPMS)which is specifically designed for solar applications is an ideal solution for helping users to implement an efficient management platform with remote monitoring and control abilities. By using a standard web browser, users can remotely view, control and configure the system over an intranet or the Internet. Through multiple built-in drivers, SPMS is able to communicate with different types of devices at the bottom layer such as photovoltaic array, electric meter, inverter, thermometer and meteorological module so that on-site data can bedelivered to control center in real time. In addition to providing animated graphical displays, instant data, trends, alarms, logs andreports, its web GIS (geographicinformation systems) service enables users to query spatial data through a user friendly interface. Since WebAccess is a powerful platform which supports a wide range of open sources devices, users or developers can add additional features tosatisfy specific application needs. Having a database backup mechanism also ensures customers can establish redundant management system at veryhigh quality and very low latency. In terms ofhardware, Advantech provided a DMU-3010 module to collect meteorological parameters and a WA-UNO2174-C30HXPE as a data acquisition controller to transfer information to the IPC-610 server via an EKI-2525Ethernet switch. By pre-installing WebAccess andpre-configuring a Windows Operating System and Internet Information Services (IIS) environment, the plug and play WA-UNO2174-C30HXPE allowed users to effortlessly build a SCADA system without worrying about compatibility and interoperability problems. Local storage on the main system can guarantee data accuracy and

completeness when disconnecting it. With the multiple I/O interfaces and expansion options, users can integrate versatile peripheraldevices for different purposes. The low power consumption, fanless design, spindle-free storage, wide operating temperature environment and IP40 ingress protectionalso ensures that it?s a durable and reliable automation computer.

Project Implementation:

Advantech WebAccess	Browser-based HMI/SCADA Software
SPMS	Solar Power Management System (Browser/Server Software)
IPC-610	4U Rackmount Chassis with Visual Alarm Notification
EKI-2525	5-port Unmanaged Industrial Ethernet Switch
WA-UNO2174-C30HXPE	Intel® Celeron® Automation Computer with 4 x GbE, 2 x Mini PCIe, DVI/DP/HDMI and WebAccess
DMU-3010	8-ch AI, 8-ch DI, 4-ch DO Ethernet I/O Module

System Diagram



Conclusion:

Although the installation ofdistributed solar generation is much smaller than concentrated solar farm, it still requires a comprehensive and automated system to monitor widely scattered power stations to enhance management performance. By using a browser / server structure and open management framework, Advantech?s solution, solar-dedicated system (SPMS) and industrial computer bundled with WebAccess (WA-UNO2174-C30HXPE), is a friendly and remotely centralized management with easy maintenance and expansion, thereby delivering maximum efficiency and simplicity and saving users? management time and resources.