IIoT Technology for Efficient Management of Commercial Solar Power Plants

Background

Commercial solar farms are typically scattered over remote sites. Solar inverters for DC-to-AC conversion, power meters for measuring power generation and quality, and sensors for weather monitoring to predict power generation capacity are some of the solar assets that operators need to manage. IIoT technology is emerging as a popular solution to efficiently monitor and manage these remotely distributed assets on a solar farm. To deploy IIoT technology on a solar farm, firstly, we need an IIoT gateway that can collect Modbus data and transmit it to a cloud-based energy management system. In some cases, a local energy management system is also needed for maintenance purposes. The IIoT gateway should also be capable of supporting the Modbus TCP server mode to simultaneously transmit data to both local and cloud-based systems. Considering the initial low return on investment (ROI) of such a system, operators are less willing to develop such a solution from scratch and are looking for a ready-to-run IIoT gateway that meets all their requirements with minimal configuration changes.

System Requirements

- Ready-to-run IIoT gateway that integrates with Azure cloud to simultaneously manage both power assets and the local energy management system
- Data preprocessing at an edge IIoT gateway
- Remote device management to optimize operations
- Reliable data transmission to ensure data completeness

Why Moxa

- An edge device which is both a Modbus TCP server and an Azure IoT device, capable of simultaneously transmitting field data to local and cloud-based energy management systems
- Provides data preprocessing functions to eliminate programming efforts
- Moxa device management service support to remotely manage the IIoT gateway
- Store and forward function to prevent data loss

Moxa Product

AIG-100 Series
2-port Modbus RTU/ASCII/TCP to MQTT/Azure/AWS cloud-ready gateways

- Built-in network traffic monitoring and diagnostic tool for easy troubleshooting
- Data buffering using store and forward function and a datalogger
- Seamless integration with Moxa ioLogik /UPort devices to easily extend I/O and serial interfaces to connect more devices
- Built-in data preprocessing functions to eliminate programming efforts

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Moxa Solution

Moxa AIG-100 Series ready-to-run IIoT gateways come with an intuitive UI to configure all the parameters required to collect and preprocess field data. The cellular capability enables transmission of data from the remotest site to the cloud. The AIG-100 IIoT gateways can act as Modbus TCP/RTU master/client to collect data from field devices and as Azure and AWS IoT devices to transmit the data to the cloud. Moreover, the gateways support the Modbus TCP server mode to enable integration with local energy management systems. To prevent data loss and ensure completeness of data in power applications, such as billing and asset management, the gateways come with store and forward function and a datalogger for buffering data and resuming transmission when the connection is restored. Built-in data preprocessing functions help quickly extract relevant data for transmitting to the cloud saving on LTE communication costs and programming efforts. Moxa Device Management service can be used to remotely access the gateways after which operators can use built-in diagnostic functions to check the connection status, monitor traffic, and capture data packets for analysis and troubleshooting. With all these built-in functions and capabilities, the AIG-100 can help you quickly set up and run an efficient IIoT system with minimum efforts to reduce operation and maintenance costs.