# Case Study Alternative Energy





#### Customer

Azure Power www.azurepower.com

## System Integrator

Arc Auto-Tech Pvt, Ltd. www.arcautomation.com

#### Location

India

#### Challenges

- > Accurately monitor weather details
- Log and send data from remote devices
- Streamline legacy multi-device solution

# **Products**

Industrial Automation Modular Controller Additional PID Modules

#### Results

- > Data logging and I/O with one device
- Rugged product design is optimal for extreme environments
- Easy to use programming software cuts down on installation time in the field



## **Project Scope**

Azure Power, a solar power generation company located in India, generates and sells cost-efficient solar power to both the Indian government as well as independent industrial and commercial customers. They needed to support a weather station tool for solar power sites and be able to efficiently analyze the installed systems for energy consumption based on the ambient conditions. To do this, Azure Power needed to monitor weather details from the following remotely located field devices:

- **Pyranometer:** a type of actinometer with 4 to 20mA output that is used for measuring solar irradiance on the surface of the solar panel and designed to measure the solar radiation flux density from the hemisphere above
- Wind vane: a 4-20mA output instrument that shows the direction of the wind
- **Solar inverter:** converts the variable direct current of a solar panel into a utility frequency alternating current that can be used by commercial electrical grids or other off-grid electrical networks
- **PV module temperature sensor:** measures the temperature of PV modules and provides RTD output

Weather stations with solar pyranometers and temperature sensors enable the calculation of efficiency and power production vs. consumption. In addition, SCADA connectivity to environmental monitoring systems is used to provide automated feedback. Azure Power wanted to accurately monitor and log data from each remote device to meet application requirements. They also wanted the ability to easily send all of the logged data to their head office.

Azure Power's original data-gathering system was connected to two webBOX devices; one located in the field and one in the control room. They used the field device to connect the solar inverter, pyranometer, wind vane, PV module temperature sensor and ambient temperature sensor. This device used RS-485 output which was then sent to the control room. There it was connected to a Modbus serial to Modbus TCP device which then connected to a router to send data to the cloud. This solution did not satisfy the customer, as they still had to use two devices (one in the field and another in the control room) to connect to the Ethernet network. The RS-485 cabling was not ideal either, as it had to be run for a length of approximately 1.5 kilometers from the field to the head office. This opened up many problems in the field as the cable could be easily damaged, and field techs were often called out for repairs.

# Solution

Arc Auto-Tech Pvt. Ltd implemented a full solution for Azure Power by creating a cabinet that housed the solar inverter, pyranometer, wind vane, and temperature sensors, and then added Red Lion's Modular Controller (CSMSTRSX) with two PID

modules, an N-Tron<sup>®</sup> Ethernet switch, and a commercial cellular router. The addition of the Modular Controller allowed for protocol conversion, data logging and web server functions within one piece of hardware. The serial to Ethernet protocol conversion capabilities enabled the Modular Controller to be easily connected to Azure Power's Ethernet network. This meant that data could be stored in the cloud, and the RS-485 cabling was no longer necessary as a means of data transmission. The built-in web server feature was used to monitor data locally and remotely.

## **Benefits**

Red Lion's Modular Controller features —including integration of varied devices, ability to tolerate harsh environmental conditions, data logging and the potential for future growth— made it the ideal solution for Azure Power's needs.



Many different solar inverters are used to convert solar energy into usable power, which means that protocol conversion is essential. The Modular Controller can convert up to 12 protocols simultaneously, and enables these different inverters to communicate seamlessly with one another. Having one device that can do the work of many means less hardware is needed, and therefore there are fewer possible points of failure.

Temperatures in Northern India's solar panel fields can reach extreme highs, so the rugged, reliable design and operating temperature range of 0 to 50 °C means that service will continue even in the most sweltering of environments.

Data logging with the Modular Controller can be displayed and stored on CompactFlash and a remote FTP server in CSV format which can be viewed using common commercial applications such as Microsoft Excel. The web server function allows for remote access to data files as well as the ability to create intuitive user interface screens as if an HMI were connected. No additional SCADA software is required. This remote monitoring and control eliminates the need for multiple site visits which reduces operating costs. Red Lion Crimson 3.0 software is so easy to use and configure that installation takes field techs much less time than with the previous devices being used.

Finally, as demand increases, if Azure Power wants to connect more field devices, all that would be needed are additional PID modules; the main Modular Controller would not need to be changed or replaced.

# Products

Model	Description
CSMSTRSX	Modular Controller Master with multiple protocol converter, data logger, web server with Virtual HMI up to QVGA (320 x 240) size and expansion slot





Connect. Monitor. Control.

Americas sales@redlion.net

Asia-Pacific asia@redlion.net

Europe Middle East Africa

europe@redlion.net

+1 (717) 767-6511

As the global experts in communication, monitoring and control for industrial automation and networking, Red Lion has been delivering innovative solutions for over forty years. Our automation, Ethernet and cellular M2M technology enables companies worldwide to gain real-time data visibility that drives productivity. Product brands include Red Lion, N-Tron and Sixnet. With headquarters in York, Pennsylvania, the company has offices across the Americas, Asia-Pacific and Europe. Red Lion is part of Spectris plc, the productivity-enhancing instrumentation and controls company. For more information, please visit www.redlion.net.

ADLD0474 050917 © 2017 Red Lion Controls, Inc. All rights reserved. Red Lion, the Red Lion logo, N-Tron and Sixnet are registered trademarks of Red Lion Controls, Inc. All other company and product names are trademarks of their respective owners.