Electric Cooperative Adopts Common Platform for Monitoring Visibility

Great River Energy uses Industrial Ethernet 3000 Series switch for intelligent consolidation of multiple control networks.

EXECUTIVE SUMMARY

GREAT RIVER ENERGY

- Industry: Energy/Mining
- Location: Maple Grove, MN, USA

CHALLENGE

- Improve visibility into energy management system
- Expand intelligent monitoring capabilities at remote locations
- Gain scalability

SOLUTION

- Cisco Industrial Ethernet 3000 Series switches

RESULTS

- Increased visibility over multiple disparate control systems without adding management complexity
- Contained management and deployment costs through ease of use and common platform
- Gained flexibility to cost-effectively scale where needed

Challenge

Great River Energy is a not-for-profit electric cooperative and the second largest electric power supplier in Minnesota. The cooperative has 28 members throughout the state that serve 1.7 million people. Great River Energy offers more than 3,000 MW of generation capability that consists of a diverse mix of baseload and peaking power plants, including coal, refuse-derived fuel, natural gas and fuel oil, as well as wind generation. The company's infrastructure includes 11 power plants, more than 4500 miles of transmission line, and more than 100 transmission substations. This large, dispersed network must be monitored for faults, anomalies, and service disruptions.

To support this effort, the organization relies on an energy management system (EMS) that continually polls equipment at each site for voltage and power flow information. Real-time visibility into data and access to information are essential to improve equipment and supply chain performance, so maintaining the EMS is critical to serving Great River Energy's customers. The EMS gathers data from IP-based sensors deployed on systems and equipment. Because plants and substations often include multiple outbuildings and control rooms in addition to the main facility, dozens or hundreds of IP-based sensors may be transmitting data to the local area network at each location.

In the past, Great River Energy had connected sensors and systems with copper cabling. Because each device and sensor required a dedicated cable run, the cabling costs were high. In addition, using copper in high-voltage and electrically sensitive environments is dangerous, and the cabling demanded extraordinary levels of protection from power level fluctuations and power surges.

The Great River Energy IT team recognized that IP is an ideal foundation for its monitoring and communication networks. With a flexible IP infrastructure, Great River Energy could integrate proprietary monitoring systems and management applications into a single infrastructure to increase visibility and control.

"We wanted Ethernet connectivity to support future assets that will be Ethernet-enabled," says Scott Hughes, principal IT network engineer for Great River Energy. "We also wanted to support wireless access for technicians in the substations, as well as voice-over-IP. The most difficult challenge, however, was finding solutions that could run in the rugged substation environment."

> "With a common platform for our operations, we gain higher return on investment and greatly improve our asset utilization."
>
> **– Scott Hughes, Principal IT Network Engineer**

In recent years, the company replaced copper cabling with fiber optic connections within and between facilities. The IP network now connects substations and plants while extending the corporate network to each location for better information access. Great River Energy deployed Cisco® 3200 Series Rugged Integrated Services Routers as its routing platform in power plants and substations with wireless connectivity to its optical backhaul network.

"Since deploying the new IP network, our uses for it have continued to grow," says Hughes. "We are looking to add more sensors, devices, and capabilities to our networks at our remote locations. We needed to scale our infrastructure further and continue to add intelligence at the network edge as our needs expand."

Solution

With space at a premium and a harsh environment to contend with, Great River Energy chose Cisco Industrial Ethernet 3000 (IE 3000) Series switches to add capacity and intelligence to its plant and substation networks. Industrial intelligence enables organizations to more intelligently and responsively manage monitoring operations from a global perspective. In many energy company deployments, industrial intelligence solutions use IP networking to connect sensors and controllers, operational processes, and people. Connected plants and distribution assets enhance safety while enabling process visibility and rapid response in the event of an anomaly.

Cisco IE 3000 Series switches are ruggedized for harsh environmental conditions, such as temperature extremes, dust, and vibration inherent in power plant environments. With a flexible, modular design and the ability to use either AC or DC power, the Cisco IE 3000 Series switches work anywhere that Great River Energy deploys them without requiring electrical adaptation.

A compact footprint and DIN rail mounting option enable Great River Energy to mount switches on substation walls, conserving valuable space. Various port densities give Great River Energy the ability to add the right amount of port capacity needed in any given location. At the same time, when capacity requirements increase, an expansion module makes it fast and easy to add more. The Cisco IE 3000 switches also provide power over Ethernet (PoE) to power devices such as wireless access points and voice over IP phones. Great River Energy has deployed approximately 40 Cisco IE 3000 Series switches in its plants and substations.

PRODUCT LIST

Routing and Switching

- Cisco Industrial Ethernet 3000 Series Switches
- Cisco 3200 Rugged Integrated Services Routers

Wireless

- Cisco Wireless Control System

Security

- Cisco Security Manager

Management

- CiscoWorks LAN Management Solution
- Cisco Security Monitoring Analysis & Response System (MARS)

Results

"With a common platform for our operations, we gain higher return on investment and greatly improve our asset utilization," says Hughes.

The Cisco IE 3000 Series switches added to Great River Energy's existing Cisco infrastructure allow the company to bring together multiple disparate control networks on a common platform and gain intelligence and visibility across them. With remote access to systems and experts, technicians can easily collaborate with partners and substation or plant employees to reduce downtime in the event of a process disruption.

Having a standardized platform also simplifies management for Hughes and his team. The team already has extensive expertise with Cisco solutions and can easily reuse existing configurations and management systems. Because Hughes' team has configurations already created, it is easy to deploy a switch and integrate it with the corporate network. When coupled with Cisco 3200 Series routers, the Cisco IE 3000 Series switches allow one person to view the entire substation network infrastructure from backbone to individual device. The Cisco IE 3000 Series switch platform helps reduce deployment and operation costs by virtue of its standard network architecture.

A common platform also reduces the need to keep large parts or spares inventories. Minimal inventory reduces the demand on cramped space as well as tracking and parts management. The Cisco IE 3000 Series switches also eliminate the need for Hughes to purchase additional systems simply to add capacity. Adding an Ethernet port is as simple as plugging an expansion module into the chassis. The Cisco IE 3000 Series switches provide additional Ethernet connectivity to connect substations, buildings, or systems within the plant locations, wherever needed, while eliminating the need to purchase additional complete systems.

Great River Energy has successfully extended corporate network resources, security, wireless capabilities, and IP telephony features to plants and substations. The ability to gather and intelligently transmit high volumes of monitoring data, provides the electric cooperative with the capability to track many different processes and systems to improve asset utilization.

For More Information

To find out more about Cisco IE 3000 Series switches, visit: www.cisco.com/en/US/products/ps9703/index.html.

To learn more about Great River Energy, visit www.greatriverenergy.com.

This customer story is based on information provided by Great River Energy and describes how that particular organization benefits from the deployment of Cisco products. Many factors may have contributed to the results and benefits described; Cisco does not guarantee comparable results elsewhere.

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