WIRELESS MAKES SCADA AND AMR MORE EFFICIENT AND LESS COSTLY

Headquartered in Green Bay, Wisconsin Public Service Corporation is an electric and natural gas utility serving northeastern Wisconsin and an adjacent portion of Upper Michigan. The company serves more than 433,000 electric customers and over 314,000 natural gas customers, supporting in excess of 700,000 electric and natural gas meters spread across 10,000 square miles.

CHALLENGE

Find a cost-effective connectivity option to support Automated Meter Reading (AMR) and Supervisory Control and Data Acquisition (SCADA) applications.

A few years ago, Wisconsin Public Service Corporation began exploring using alternate communications to support SCADA and AMR applications. The company was paying in excess of $100,000 per year in the city of Green Bay alone to lease four-wire circuits to connect its AMR head-end to its substations. In addition, the company was using a low bandwidth fixed radio system for SCADA operations for many of the same substations and it soon realized that the 2400-baud connection that the low bandwidth fixed radio system offered would not be enough to support long-term SCADA applications.

To meet the long-term SCADA needs, which included process control applications such as remotely checking power flows and status of the breakers in real-time, the company required additional circuits which would have put its leased line costs in the city of Green Bay alone at more than $200,000 per year.

Wisconsin Public Service immediately began looking for another solution to meet its connectivity needs. Company engineers explored many options. They considered using fiber, but soon discovered that even though the utility already had an extensive fiber network in place, running fiber to its substations in Green Bay would cost upwards of $1 million. The company also looked at options such as frame relay, cellular and satellite links and quickly rejected them, given their low throughput and high ongoing costs.

SOLUTION

A high-speed wireless communications link that provided the right bandwidth for the right cost — and put Wisconsin Public Service in control.

After careful consideration, Wisconsin Public Service took a look at unlicensed wireless solutions. The appeal of these services included ease-of-deployment, low maintenance needs, reasonable cost, high capacity and proven reliability. The opportunity to own and control its own communications network also appealed to the utility.

Wisconsin Public Service reviewed many different unlicensed alternatives and selected Cambium's Fixed Point-to-Multipoint platform. Company engineers chose the Cambium solution based on its low cost, wide coverage, ability to support IP and its superior security. Two other big pluses: The throughput of the Cambium system is not affected by distance and is extremely resistant to interference. Wisconsin Public Service executives considered these characteristics an essential requirement for an unlicensed network. Another very important consideration was the ability to securely implement the solution. This was accomplished through a combination of Cambium security and external third-party tools and products.

Today, Wisconsin Public Service has 26 circuits in the Green Bay area and a total of 11 circuits in the city of Oshkosh, Wisconsin. Subscriber modules are located in the distribution substations, and they communicate with access points located at the company's service centers and power plants.

Wisconsin Public Service also transmits some data across power lines and some data via the utility's existing fiber network. When necessary, the transferred data is changed from an IP to a serial format using a simple converter. This communications network supports the company's AMR and SCADA applications well. Company engineers are now exploring the use of the same Cambium links to support video surveillance security and other distribution automation applications in its substations.

BENEFITS

Cambium's solution offers a low total cost of ownership, fast return on investment, high throughput, superior security and enhanced interference resistance.

When they first decided to install an unlicensed wireless network, company engineers had a few concerns about its ability to resist interference — and whether an unlicensed network would offer the required security for communications. With the Cambium solution, those concerns were soon put to rest. The system's powerful modulation scheme was designed specifically to improve the quality of data and to effectively mitigate interference from other systems. It also avoids self-interference through precise GPS synchronization.

And according to Craig Maternoski, manager of IT infrastructure for Wisconsin Public Service, the Cambium approach works — and works well.

Security has not presented a problem, either, given Cambium's layered approach to security, which involves

COMPANY ENGINEERS CHOSE THE CAMBIUM SOLUTION BASED ON ITS LOW COST, WIDE COVERAGE, ABILITY TO SUPPORT IP AND ITS SUPERIOR SECURITY.

successive layers of hardware, software, interfaces, encryption, signal synchronization and user authentication. Where necessary, the company has also implemented external security tools and products to add another security layer to the solution.

And the operational efficiencies Wisconsin Public Service has received from installing the Cambium platform are impressive. Thanks to the enhanced AMR applications supported by the platform, Wisconsin Public Service has reassigned more than 100-meter readers to other positions in the company or offered them other options, such as voluntary separation.

Wisconsin Public Service achieved its return on investment within two years of installing the Cambium system. This return was based on its savings on the AMR backhaul application alone, including the elimination of the leased line costs. The two-year payback doesn't include the efficiencies that Wisconsin Public Service has gained from its SCADA applications, which monitor the entire health of the substation by checking measurements such as power flows, status of the breakers and other factors.

Wisconsin Public Service was also able to reduce the number of personnel needed to support its SCADA applications. Prior to installing the network, technicians had to call an operator at the head office to get the results of any specific SCADA substation tests they would run because they couldn't access the main server while at the substation. These operators, located in the main office, would log on to the main server and report the results to the technician as the testing was taking place.

In sharp contrast, today when running specific diagnostic SCADA applications, the company's technicians remotely connect to the main network using their laptops and the Cambium network at the substation. This allows them to see the SCADA data on their computers as it is being reported — and eliminates the need to tie up operator resources. Wisconsin Public Service is now reaping the benefits of a connected utility — their real-time network enables the seamless flow of information that delivers tangible operational efficiencies.

Cambium Networks™   www.cambiumnetworks.com