
Duquesne Light Company

Large US Utility Uses AirLink® Gateways for 24/7 Monitoring and Control of its Distribution Operations Center (DOC)



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For more than 125 years, Duquesne Light has been in the forefront of the electric energy market, with a history rooted in superior customer service. Today, the company continues in its role as a leader in the transmission and distribution of electric energy, providing a secure supply of reliable power to more than 585,000 customers in southwestern Pennsylvania. Duquesne Light uses more than 45,000 miles of overhead lines, 250,000 utility poles and 103,000 transformers to bring power to homes and businesses throughout the region.

BUSINESS CHALLENGE

Previously, Duquesne Light had relied on its own communications infrastructure for all its critical applications. The company's distribution system was centrally operated from the Distribution Operations Center (DOC), which needed to be manned 24 hours a day, 7 days a week. The DOC supervisors were responsible for monitoring and managing the 700 sectionalizers and reclosers within the company's distribution system.

The company's main protection scheme uses pole-mounted sectionalizers and reclosers on feeders to divide circuits into distinct load blocks of about 1,000 customers. Varying load growth constantly affects the distribution system, forcing DOC supervisors to add or relocate the devices. These devices, however, cannot be fully utilized until they are remotely controllable from the DOC, a process that would take three to 12 months to install using a conventional wired backhaul solution.

Because protection devices were not being fully utilized, Duquesne Light found that when a problem occurred, such as a vehicle hitting a pole and downing wires, the protection devices locked up near the problem and shutdown the electricity distribution to all customers in the surrounding load block areas. This created a disruption that was more far-reaching than those customers in the immediate surrounding area. Although its existing field equipment was

performing within design standards and met all government regulations, Duquesne Light also found an increase in failure rates as its core infrastructure aged, impacting distribution reliability and overall customer satisfaction. Duquesne needed a solution that would immediately improve its ability to monitor and control its vast network and infrastructure equipment.

SIERRA WIRELESS AIRLINK® SOLUTION

Duquesne Light started researching a wireless communications solution that would be cost-effective while improving their distribution system reliability. It believed that distribution automation would benefit greatly if a wireless technology was available to supplement or replace existing hardwired communications. Also, a wireless solution would enable additional devices and substations to be remotely automated at locations where it was previously cost prohibitive.

A wireless solution powered by Sierra Wireless' AirLink® gateway was the most efficient, capable and cost-effective answer.

The Sierra Wireless AirLink gateways were installed into pole-mounted sectionalizer control cabinets. The gateway contains its own built-in TCP/IP stack and supports UDP/TCP PAD functionality. Therefore, there was no need for special provisions or to add anything to the control cabinets. In addition, the gateway self-regulates its own transmit power level based on received signal conditions and has built-in diagnostics and comprehensive tools and utilities to easily monitor and control the remote devices.

Once the Sierra Wireless solution was deployed, DOC supervisors found that they were able to address problems in near real-time and better contain the outage. For example, they were able to remotely control the sectionalizer just beyond the problem area, thus isolating the actual problem within one load block, which enabled quick resolution while minimizing the number of customers actually affected. The ruggedness and quality of the gateway made it intrinsically safe and suitable for the harsh weather and varying temperatures of southwestern Pennsylvania.

RESULTS

The initial cost to install and automate the Sierra Wireless AirLink gateway was approximately \$640 per location. This is significantly less than Duquesne Light's existing wireline communications installation costs, which are typically \$10,000 per location. The company has initiated progressive installation of 50 AirLink gateways per year to extend direct communication to all field automation equipment. Duquesne Light estimates the need for 1000 modems over a 20-year period and, during this rollout period, can anticipate an estimated annual savings of \$468,000 per year.

The solution deployment using Sierra Wireless' AirLink gateway resulted in:

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- Immediate functionality – gateways integrated with existing hardware
 - Real-time solutions – enabled DOC supervisors to instantly review data and decide how best to correct the situation
 - Better performance – enhanced network management allowed containment of network outages
 - Cost-effective deployment solution – wireless saved Duquesne Light \$9,360 per location
 - Reduced infrastructure expenses – a progressive annual saving of \$468,000 per year
 - Sustained competitive lead – a concrete long-term program to ensure that Duquesne Light continues to lead the industry in the distribution automation field, expand its service area and maintain unparalleled customer service

APPLICATION: REMOTE ENERGY MANAGEMENT

CUSTOMER CRITICAL CHALLENGE:

- Monitoring and control of remote infrastructure

SOLUTION:

- AirLink® gateways integrated with existing hardware and installed into pole-mounted sectionalizer control cabinets

BENEFITS:

- Duquesne supervisors able to address problems in near realtime to better contain outages
- Huge savings in depolying wireless versus wired