

American Transmission Company LLC (I)

Enhanced SCADA and PMU Communications Backbone Project

Scope of Work

American Transmission Company LLC's (ATC's) Enhanced Supervisory Control and Data Acquisition (SCADA) and Phasor Measurement Unit (PMU) Communications Backbone project deployed new fiber optic transmission communications infrastructure across the company's Wisconsin footprint. The interconnection of the new fiber segments integrated a total of 149 substations within ATC's data communications and collection networks and expanded ATC's data transfer capability. ATC enhanced the fiber optic network with satellite communication links to boost reliability across key segments of the system.

Objectives

With the successful implementation of the new fiber optic and satellite networks, ATC now has an enhanced communications network that is easier to maintain and control. The new infrastructure facilitates improved network reliability, bandwidth, and cyber security. The project enabled robust electronic data exchange with critical substations throughout Wisconsin and Michigan's Upper Peninsula.

Deployed Smart Grid Technologies

- **Communications infrastructure:** ATC interconnected new substation fiber optic segments with pre-existing leased fiber optic cable or cable capacity for a more integrated and reliable communications system. The leased fiber is also connected with pre-existing, ATC-owned optical fiber ground wire (OPGW). The project deployed new OPGW to complete the fiber optic backbone network. ATC has enhanced these capabilities by installing satellite communication links that transmit electric transmission system operating data to the communications satellites and back to ATC's system control centers.

Benefits Realized

- **Reduced operating and maintenance costs:** The newly deployed technologies allow for future growth without an impact on the operations and maintenance (O&M) budget, resulting in the ability to increase throughput for future projects as technologies evolve. Further, the in-house communications network reduces the need for circuits from third-party telecommunications providers. Circuit maintenance time is also reduced, resulting in fewer dollars spent in dispatching field personnel to the site and in troubleshooting.
- **Improved communications network reliability and increased bandwidth:** The ATC-owned fiber backbone increases communications reliability for SCADA, PMUs, relays, security, and operations. The results are fewer unplanned outages, increased ability to maintain visibility of the grid's behavior in near-real time, better physical security at substations, and the ability to remotely monitor and control. Substations can be independent of local and regional

At-A-Glance

Recipient: American Transmission Company LLC

State: Wisconsin

NERC Region: Midwest Reliability Organization

Total Project Cost: \$21,780,311

Total Federal Share: \$10,890,156

Project Type: Electric Transmission Systems

Equipment

- Synchrophasor Communications Network

Key Benefits

- Improved Communications Network Reliability
- Reduced Operating and Maintenance Costs

American Transmission Company LLC (I) *(continued)*

telecommunications companies' networks, which also leads to more reliable operations. The improved communications network allows for installation of emerging technologies, such as PMUs and video surveillance, in substations. Enhancement of data throughput (speed in data transmission) also allows for more of these devices, enabling better visibility, security, and reliability of the transmission system.

Lessons Learned

The initial cost estimates for OPGW stand-alone projects came in higher than the actuals. Going forward, ATC's project control office has actual costs for stand-alone OPGW projects to provide more accurate cost estimates.

Future Plans

ATC will continue the Communications Reliability Program (CRP), which encompassed the Smart Grid Investment Grant project. The program will strategically expand the use of the fiber network; the aim is to support data communications reliability as defined by EMS and System Protection between ATC's transmission substations and its system operations control centers. The CRP enhances ATC's control over essential communication of operating data, supports risk management through system diversity, and provides improved data security.

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