Powder River Energy Corporation

Powder River Innovation in Energy Delivery Project

Scope of Work

Powder River Energy Corporation's (PRECorp's) Innovation in Energy Delivery project involved the installation of communications infrastructure for the distribution grid throughout the entire service territory in northeastern Wyoming and southeastern Montana. Three sets of upgrades included 1) the addition of new microwave terminals and antennas to the backhaul network between operators and the distribution grid, 2) upgrades that allow key substations to establish radio monitoring linkages with grid operators, and 3) supervisory control and data acquisition (SCADA) equipment upgrades that enable improved integration with the new communications infrastructure.

Objectives

By increasing the ability of operators to remotely monitor and respond to grid disturbances, PRECorp has improved electric power reliability and reduced operating costs and emissions from truck rolls for field visits.

Deployed Smart Grid Technologies

The project deployed three sets of new equipment for upgrading the communications network across the entire distribution system:

- **Backhaul communications network:** This system provides the communication link between distribution circuit monitors and the grid operations center and consists of new microwave terminals, antennas, and protective equipment. PRECorp acquired proprietary right of way on these microwave channels to enhance ability to monitor and respond to power disturbances.
- **Radio upgrades:** New radios, connection equipment, and backup power supplies were installed at 30 key distribution substations to enhance the communications infrastructure. This equipment provides significant new capabilities to monitor and more rapidly respond to outages.
- **SCADA system**: New servers, workstations, and remote terminal units are used in PRECorp's control center and communications infrastructure. The SCADA upgrades improve integration and management of data from the new radio and microwave communications networks. Together these features improve grid operator ability to identify and respond to grid disturbances and improve the overall reliability of electric power delivery.

Benefits Realized

- **Reduced operating and maintenance costs:** Remote monitoring and diagnostic tools have resulted in significant costs savings thanks to avoided investigative and maintenance field visits. Once an event presents itself, PRECorp staff quickly reviews the data provided via the SCADA system and then proceeds to thoroughly review, analyze, document, and resolve the event. In some cases, the resolution can be achieved remotely via SCADA; in other cases,

At-A-Glance

Recipient: Powder River Energy Corporation

States: Wyoming, Montana

NERC Region: Western Electricity Coordination Council

Total Project Cost: $5,553,228

Total Federal Share: $2,554,807

Project Type: Electric Distribution Systems

Equipment

- **Substation Automation Equipment for 30 out of 53 substations**
  - **SCADA Communications Network**

Key Benefits

- **Reduced Operating and Maintenance Costs**
- **Improved Electric Service Reliability**
- **Reduced Truck Fleet Fuel Usage**
- **Reduced Greenhouse Gas and Pollutant Emissions**

a work crew is dispatched directly to the source of the event. Resolving an event has become a much more of an efficient operation.

- **Improved electric service reliability:** Like other utilities, PRECorp experiences planned and unplanned outages. The new SCADA capabilities support a reduction in call-out time (crew assignment and fault location / restoration) resulting from the outages. Reducing the response time decreases the duration of power interruptions for PRECorp members. PRECorp has realized year-to-year reductions in the System Average Interruption Duration Index (SAIDI), a portion of which is attributable to the Smart Grid Investment Grant (SGIG) project.
- **Reduced truck fleet fuel usage:** The utility communications infrastructure reduces the need for truck visits to monitor and maintain the grid. As described above, headquarters personnel can identify the area affected by and scope of an outage event, allowing PRECorp dispatch staff to send work crews directly to the event's source. Before the SGIG project, PRECorp had to send a work crew out to find and investigate the outage location and then address the problem.

Lessons Learned

Early in the project planning stages, PRECorp decided to hire an experienced project manager to support the execution of the SCADA project. This allowed for a disciplined approach to managing the work activities, schedule, cost, and quality of the project. This individual managed the project staff, reported regularly to stakeholders, and was the primary interface with the U.S. Department of Energy. Hiring an experienced project manager and dedicating the individual's time to the project helped ensure that the desired results were achieved.

PRECorp also identified specific project members with expertise in communications and SCADA technology. Having that expertise readily available throughout the project life cycle allowed for quick and accurate decision making. Furthermore, experienced staff members with expertise in grid technology deployments were able to effectively identify, manage, and mitigate risks with minimal delay.

Future Plans

After the SGIG project, PRECorp leveraged the communications infrastructure to add additional SCADA equipment to new and previously existing substations. During the next few years, PRECorp plans to add SCADA technology to all remaining substations.

In 2013, PRECorp executed a pilot advanced metering infrastructure (AMI) deployment project, capitalizing on the new communications infrastructure and SCADA technology that support communication between PRECorp's central office and the newly installed automated meters. Future AMI deployments will depend on the pilot project's success and on available funding.

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