

Telemetric Solutions for the Electric Utility Industry

Kansas City Power & Light, Kansas City, Mo.



Customer Profile:

Kansas City Power & Light Company (KCP&L), a wholly owned subsidiary of Great Plains Energy Incorporated, is a leading regulated provider of energy-related products and services for homes, businesses, industries, municipalities and other utilities in the Kansas City metropolitan area. The company was founded in 1882 and has become one of the Midwest's most affordable energy suppliers because of its leadership in fuel procurement, plant technology and efficient power production and distribution.

Application:

KCP&L was looking for a way to expand its world-class capacitor automation program. With a two-way communications system in place in its metro service territory area, KCP&L wanted to monitor automated capacitor banks in the remote service territory. In addition, KCP&L wanted to monitor fixed capacitor banks cost effectively throughout the service territory. In the past, two-way communications for either of these applications was either cost prohibitive or just not available. These two requirements: low-cost and wide area coverage, led KCP&L to Telemetric.

Switched Capacitor Banks:

Approximately two-thirds of KCP&L's capacitor banks are automatically switched, operating with EnergyLine 1000 Series and Energyline Intellicap Plus capacitor controls. These controls are DNP3 compliant, so KCP&L selected the Telemetric DNP-RTM (Remote Telemetry Module) for wireless communications. Using an RS-232 or RJ-45 connection with the EnergyLine controls, the DNP-RTM allows KCP&L to monitor and control the capacitor banks. The DNP RTM is seamlessly integrated with both of the controls and uses the same wiring harness as their existing radios.

The purposes of switched capacitor banks are to correct power factor and enhance service quality by improving voltage regulation. KCP&L also wanted to eliminate periodic capacitor patrols and field inspections.



Since KCP&L's capacitor controls are set up to automatically switch in and out based on true electrical needs, the Telemetric RTM allows KCP&L to monitor the installation for maintenance needs and ensure the capacitor is switching appropriately as planned. When necessary, KCP&L can also manually open or close the capacitor bank by remote control without a site visit.

In operation, Telemetric's DNP-RTM serves as a master, polling the EnergyLine controls for digital and analog values. Whenever the DNP-RTM receives a reportable value, (e.g., a digital input state change), it immediately reports this to the Telemetric Network Operations Center (NOC).

Fixed Capacitor Banks:

The other one-third of KCP&L's capacitor banks are fixed. In the past, these fixed banks were monitored by someone driving by and physically inspect them. This was time consuming and expensive. Now KCP&L uses the Telemetric TC012 MicroRTU to monitor the capacitor banks in its outlying districts. The TC012 detects operating anomalies such as blown fuses, stuck switches or damaged control cables by measuring and reporting any significant changes in the state of the neutral current. The TC012 also monitors for outages and voltage variances and reports these disturbances into the

Telemetric NOC. Based on alarm calls, e-mails or electronic pager messages are generated, notifying the appropriate personnel automatically. Control actions can also be set up to automatically switch a capacitor through the web site due to a high or low voltage or neutral current imbalance. Status reports can also be time scheduled in advance or requested at any time.

The analog input sensor converts the 0-100 amp capacitor bank neutral current to a 0-10 volt AC signal. A neutral current of zero indicates that the installation is switched out of service. Normal neutral current (a nominal value above zero) when the bank is closed indicates the bank is switched in service and the installation is operating as expected. A neutral current that is higher than average but below a predefined limit indicates the presence of high harmonic current or resonant conditions, which may indicate a partial pack failure. A higher, pre-defined level of current indicates a blown fuse or other serious problem.

As an added convenience, many TC012 operating parameters can be remotely changed from the Telemetric web site, including the alarm set points for the analog input sensor and the line input voltage.

The TC012 also includes easily accessible switches for local control. The local/remote switch physically disables remote operation, and the status of the switch is reported when changed. A local control delay gives operators time to move a safe distance from the equipment before the output change is made.

Unexpected Project Results:

Based on the success of the capacitor automation project and other automation projects with Telemetric, KCP&L was awarded the Utility Automation and Engineering magazine 2003 T&D Automation Project of the Year Award. The award was presented to KCP&L at the DistribuTECH 2004 Conference in January in Orlando, Florida. This award honors the most innovative transmission and distribution automation technology implementation undertaken by an electric utility for the year 2003. The award also recognizes KCP&L's efforts in collaborating with Telemetric to develop cost-

effective field devices, remote telemetry modules, and web-based applications using Telemetric's wireless remote monitoring and control solution.

Future Plans:

While completing the fixed capacitor bank rollout in its remote service territory, KCP&L is investigating project deployments for other distribution automation applications, particularly in those outlying areas. KCP&L has worked with Telemetric to develop automation solutions for switches, regulators, reclosers, remote voltage monitoring and fault detectors. In addition, KCP&L is a beta site for Telemetric's enhanced digital communication device and will test that device for fixed capacitor banks in its metro service territory.



How the Telemetric System Works:

The Telemetric MicroRTU communicates wirelessly over the cellular phone systems's digital control channel. The control channel offers many significant benefits including low monthly fees, significant coverage throughout North America (98% of population), and a robust and reliable communication mechanism. These factors greatly reduce the barriers to expanding automation. Telemetric integrates this communication method into a usable application for downline automation. For more information, please see www.telemetric.net/pdfs/communications_overview.pdf