



# Kootenai Electric Cooperative

AMR and GIS Combine to Close Outage Tickets

## CASE STUDY



### CHALLENGE

Utility needed to be able to respond quickly and effectively to outages.

### RESULTS

- Within minutes of an outage call, affected customers and phases are identified, an outage ticket is created, and a crew is dispatched.
- Operators know whether a meter has power and which phase each transformer is connected to without the need to physically trace the distribution system.

*"Integrating the systems gave us the ability to dispatch crews directly to problem spots or to eliminate trips altogether. The solution has been a real savings in money and time."*

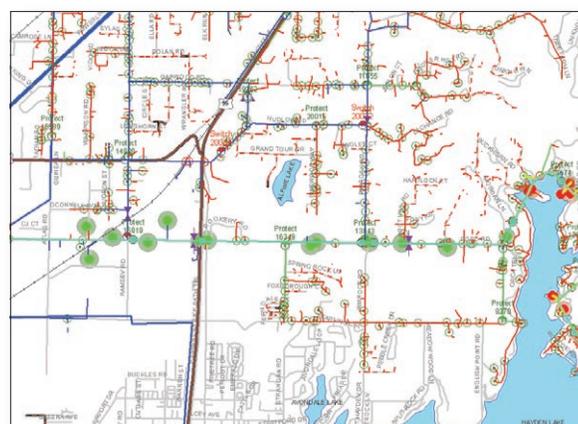
*Keith Brooks*

*Kootenai Electric Cooperative GIS Analyst*

Kootenai Electric Cooperative serves 22,000 homes around Coeur d'Alene, Idaho, and grows by about 1,000 homes each year. Since the 1990s, Kootenai has used ESRI's ArcGIS® technology to link its customer information in the billing system with the outage management system (OMS). In 2002, the utility implemented a high-speed automated meter reading (AMR) and advanced metering infrastructure (AMI) system.

### The Challenge

Kootenai Electric was looking to save time and money by optimizing its OMS, linking AMR/AMI to a geographic information system (GIS). Through ArcGIS Desktop and ArcGIS Server, the utility would also have fast, reliable access to customer information. With ArcGIS capabilities linked to AMR/AMI, Kootenai would be able to dispatch crews directly to outage areas and avoid unnecessary trips.



*An upstream trace selects key meters from an outage call back to the substation. It then queries (pings) each selected meter and returns a value of green (has power) or red (does not have power).*

### The Solution

The AMR/AMI system allows meters to be queried and checked in real time, a process called pinging. The system allows active pinging of individual or groups of meters to quickly determine the extent of an outage. It then gives accurate counts and locations of affected customers.

When a call comes in to the outage hotline, an automated system matches the customer information with a location in ArcGIS Desktop. The dispatcher is notified of the outage via e-mail and cell phone page. The dispatcher can then consult Kootenai's GIS to view the location of the outage call.

Through ArcGIS Server, a ping is sent to the meter using the AMR/AMI system. Within seconds, the meter responds by showing the dispatcher whether or not the meter has power. If the meter response indicates that it has an active power connection, the dispatcher will call the cooperative member with the information. In such a case, there may be a problem with the member's service equipment. If the meter response indicates a disconnection of power, the dispatcher initiates an upstream ping, which selects a meter from each phase on each side of every protective device all the way back to the substation. The AMR/AMI system also allows the utility to display which phase each transformer is connected to without physically tracing out the distribution system.

Learn more at [www.esri.com/electric](http://www.esri.com/electric).

## Kootenai Electric Cooperative

### ESRI SOFTWARE USED

ArcGIS Desktop  
ArcGIS Server  
ArcPad®

### OTHER SOFTWARE USED

Professional Computer Systems  
StakeOut  
National Information Solutions  
Cooperative  
Microsoft® Outlook®  
Aclara™

### DATA USED

Field data  
County parcel and road data

### HARDWARE

Panasonic® Toughbook®  
Trimble® GeoXH

### FOR MORE INFORMATION



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The results of the ping are shown in the GIS, with the problem fuse or recloser identified. Within moments of the initial outage call, the number of members and phases affected are known, an outage ticket is created, and a crew is dispatched. After the crew has made repairs and notifies the dispatcher that power has been restored, a downstream ping is initiated to test meters on each side of every protective device within the outage section to ensure all power is restored.

If all meters ping green to indicate the power is on, the dispatcher informs the crew and closes the outage ticket. Affected members and phases, as well as outage times, are recorded for later reporting and system analysis.

If a meter pings red to indicate that the power is still off for those areas, the GIS identifies the common protective device that is still open. The crew is notified that an outage still exists. At this point, the dispatcher can close the outage in stages. Once power is restored to all members, a customer service representative will close the outage ticket.

### The Results

The addition of AMR/AMI to its GIS has dramatically improved the utility's response time to outages. Staff members at Kootenai are pleased with the system's easy-to-use menu and large choice of output report formats.

When residents of northern Idaho recently experienced a severe, debilitating windstorm that flattened the distribution system, Kootenai Electric was prepared for the outages. With a sturdy GIS and AMR/AMI system in place, the cooperative was able to restore power to affected areas within a couple of days. Without this technology, the job would have taken two to three weeks.

"It's hard to quantify what the GIS, combined with the AMR/AMI, has saved Kootenai Electric," said Keith Brooks, a GIS analyst at the company. "We have relied on GIS since 1996 and installed our AMR/AMI system in 2003. Integrating the systems gave us the ability to dispatch crews directly to problem spots or to eliminate trips altogether. The solution has been a real savings in money and time."



*Ping results are analyzed, and a common open device is automatically selected.*

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