ELECTRIC LIGHT&POWER UTILITY T&D Automation & Engineering

10 Years of Results: AmerenUE's AMR Business Case Evolves to Support AMI

By John F. Luth, Ameren

The year was 1995, and automated metering and wireless communications were still in their early development stages. Most AMR initiatives at the time were confined to handheld collection and mobile point system solutions. Only a scattering of power line carrier (PLC) solutions were deployed in rural settings.

That year Union Electric Company of St. Louis, now known as AmerenUE, made a decision to begin a project to deploy one of the world's largest wireless fixed-network AMR systems. Over the decade since then, Ameren has moved forward to expand its capabilities and is now laying a foundation for full, two-way, advanced metering infrastructure (AMI).

Ameren is currently engaged in a significant AMI project that is expanding services to more than 1.1 million additional gas and electric customers throughout Illinois. The rollout started this year and will span a four-year period. Upon conclusion, Ameren will have more than 2.5 million end points in its system across several operating subsidiaries throughout Missouri and Illinois.

Ameren's decision to expand its program with Cellnet Technology Inc. into new operating subsidiaries was based on a systematic evaluation of system-related benefits tracked over a 10-year history of success with Cellnet's wireless fixed-network.

Author's note: Because Ameren treats detailed project savings and financial model data as proprietary information, the benefits described below are depicted as percentages of impact by category. Comparative changes in actual benefits between several years of operating history are also presented in similar percentage terms.

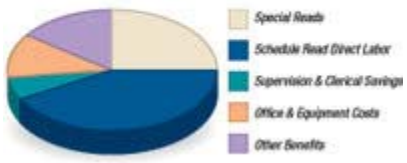
1994-1997: The UE Business Case & Initial Rollout

Union Electric Company (UE) began investigating wireless fixed-network technologies in earnest in 1994. In summer 1995, UE selected Cellnet after looking closely at all available options to automate meter reading processes. By early 1997, nearly 400,000 St. Louis area meters were on-line delivering 24x7 data available in 15-minute increments. At that time, UE had one of the earliest and largest wireless fixed-network AMR deployments in production.

As an early adopter of wireless fixed-network AMR, and given the lack of published reference and rate case materials then available, UE had to build a regulatory business case virtually from scratch. UE and the Missouri public utilities commission worked closely together to develop a successful program, while UE also consulted with neighboring utility and fellow early adopter Kansas City Power & Light, which had recently launched its own wireless fixed-network AMR program.

The initial business case was conservative. It focused largely on rapid payback, hard-dollar benefits across areas including meter reading, customer service and operations.

Figure 1
1996 Total Relative AMR Meter Reading Benefit Categories



Meter reading savings, which in early years comprised the vast majority of the overall business case, were

documented as depicted in Figure 1.

A Platform for the Future

Anticipated benefits beyond hard- dollar meter reading savings were a significant part of our decision to begin implementing a wireless fixed-network AMR system. The original sponsoring executives and the UE project team saw the implementation as a long-range strategic initiative that would ultimately help achieve the corporate goals of maintaining competitive energy costs while improving customer service. Early project charters also emphasized the longer term vision of implementing an intelligent network platform.

UE also recognized at the time that the project would provide timely, detailed customer energy usage information to help customers improve their energy efficiency. While not factored in the hard-dollar business case at the time, the 1996 UE business case review recognized the program's capability to support customized and time-of-use (TOU) pricing, load management, demand side management, network feeder optimization and distribution operations communication.

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At the beginning of 2006, Ameren Illinois launched its AMI expansion and communication programs for customers in the Champaign and Urbana service territories.

The Ameren Illinois utility company AMI project, which was launched just recently, leveraged this collective decade of experience in rapidly creating a full 2006 AMI business case.

Customer Service & Operations Benefits Take Hold

As the AMR system deployment continued at UE through the late 1990s and successfully through Y2K, the system end-point count reached 1.4 million in 2003.

Over these years, the company added benefit areas to the annual business case model. New customer service and operations benefits accrued as the data from the system, new software applications, and the network's capabilities took root across the company and across all departments.

Additional business case benefits that were added to the model included:

• Significantly reduced call center volumes with double-digit percentage decreases in high-bill complaints (after a temporary surge of calls related to system changeover during the deployment);

• Reduction in staff and systems costs to support estimated readings, which were virtually eliminated across the service territory as the rollout progressed;

• Reduction of crew dispatch for trouble calls due to customers' inside equipment problems;

• Improved cash flow benefits from more timely billing; and

• Reduced energy theft and meter tampering.

From Meter Read Savings to Advanced Distribution Applications

Figures 2 and 3 depict the change in relative percentage values across a sampling of Ameren business case benefit categories comparing the original 1996 values with relative values taken from 2003 when the system was deployed to nearly 1.4 million end points. This does not represent an exhaustive summary of Ameren's previous AMR business model or the new AMI business case, but is provided to illustrate the business case evolution we have seen over

time at Ameren.

Figure 2
Comparison of Relative Total Benefit Percentages across a Sample of AmerenUE Business Case

Selected Benefit Area	1996 Percentage	2003 Percentage
Meter Labor Savings	43	26
Vehicle & Office Savings	5	3
Move In/Move Out	31	25
High Bill Special Reads	0	1
Meter Accuracy Improvements	8	8
High Bill & Outage Calls	2	2
Estimated Bills Savings	3	1
Single Light Out	5	3
Load Analysis & Research	0	2
Energy Theft Savings	3	3
Improved Cash Flows	0	6
Load & Distribution Network Optimization	0	20

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A comparison of relative benefit percentages between years reveals significant changes across these selected categories. While the total annual ROI of the system across all categories increased consistently, even when normalized for meter counts between 1997 and 2003, several items significantly decreased as a relative percentage of overall annual system savings:

What is particularly revealing is a review of the change in relative value in the area of load management and distribution network optimization. This is now a major benefit area with many components that are summarized in the category “load and distribution network optimization” in Figures 2 and 3. This area continues to increase in value and relative overall contribution to the program. Our experience to date in this area contributed greatly to the foundation for much of our new AMI business case. We have also factored in support for potential additional market-driven benefits and real-time distribution optimization applications over time.

Figure 3
Relative Change in Percentage of Total Annual Business Case Values Between 1996-2003 for a Sample of Benefit Categories

All AMI business cases should address a 15-year time frame to fully capture the change in benefits over the lifecycle of a normal deployment. Future use cases and business process improvement possibilities were studied and mapped to new system capabilities in 2005 to ensure a flexible network platform to the degree possible and financially practical.

2006: Focus on Customer Education and Communication

At the beginning of 2006, Ameren Illinois utilities formally launched its AMI expansion and communication programs for customers in the Champaign and Urbana service territories, where installation of the new network and meter end points are now under way.

While the program's documented benefits span every department including system planning, distribution operations and customer service, the core customer benefits are as compelling for energy end-use customers today as they were a decade ago when we started.

Our communications during the January 2006 program launch reinforced key service benefits to our customers, government officials and the media including:

• Improved customer service levels through network automation, improved outage detection capabilities, and improved customer service and billing through daily access to usage information;

• Scheduled off-cycle readings for turn-ons/turn-offs;

• Near elimination of estimated bills and estimated reads;

• Reduced need for utility staff to access customer properties; and

• Reduced operating costs resulting in long term savings for customers.

"Our companies' expansion of AMR will enhance our operations and lead to higher levels of customer satisfaction," said Scott A. Cisel, Ameren president of Illinois Energy Delivery. "The Cellnet network has helped Ameren's Illinois utilities improve customer service and lower operating costs in other parts of our service area. The new system will ultimately lead to cost savings for our companies, which brings long-term benefits to customers, as well."

Ameren executive vice president and chief operating officer Thomas Voss has been involved with the program since its inception when he served on the original project team as an executive in UE distribution operations. His recent comments regarding the Illinois project launch reinforce Scott Cisel's position that meeting customers' evolving needs over the long term should be the central focus for any company deploying an AMI solution.

Thomas Voss remarked, "Our successful relationship with Cellnet over the past 10 years was a key factor in our choosing them as our partner to expand into two-way advanced metering infrastructure. The system's functionality has allowed our company to realize numerous benefits, including prompt identification of network outages."

Conclusion

The Energy Delivery subsidiary companies of Ameren Corporation are prepared today for the next waive of AMI-driven business opportunities as it moves forward to build on 10 years of investment and experience. Annual business cases will likewise evolve and, with past experience as a harbinger of the future, our ROI will continue to grow.

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