

View from the Top

› Smart Decisions Today Determine Global Grid Reliability and Resilience Tomorrow

John H. Mueller, Chairman, CEO, and Principal Owner of G&W Electric Company



Both residents and businesses want uninterrupted electrical power. This desire is one motivator for the use of distribution automation (DA) technology, which

can help utilities shrink outage times dramatically. However, utility managers often face significant challenges in funding grid reliability improvements. They typically must be able to ensure an adequate return on investment to justify increases to their rate base.

Because of this difficulty, DA-related projects tend to be implemented only on the worst performing feeders, rather than throughout the utility's territory. Industry and government must find ways to overcome this limitation if we want to achieve a truly smart electrical grid.

The Electric Power Research Institute (EPRI) estimated the cost of implementing the smart grid fully will range from \$338 billion to \$476 billion over a 20-year period that began in 2011; \$16 billion has already been spent, half of which came from the *American Recovery and Reinvestment Act* in 2009. In a January 2013 report titled "Enhancing Distribution Resiliency: Opportunities for Applying Innovative Technologies," EPRI describes the three elements of a distribution system's resilience as its ability to prevent (through grid hardening), recover from (through DA), and survive (through distributed generation) any type of system outage.

One way utilities are hardening their power systems is by converting overhead lines to underground lines. Although initial costs are high, the benefits of preventing downed lines, avoiding repairs, and reducing outages provide a good return on this investment. Given

the work still to do in implementing the smart grid nationwide, managers of critical loads like hospitals, manufacturing, and data centers are increasingly installing distributed generation equipment to ensure 24/7 power availability. Microgrids represent the fastest growing distributed generation segment, most of which are automated.

Severe weather events (like Superstorm Sandy in 2012) and aging infrastructure (like that which triggered the Northeast blackout of 2003) make system resilience just as critical as system reliability. In recognition of this, utilities are using DA as the glue to achieve system-wide resilience in terms of protection, control, monitoring, data collection, and communication. For example, circuit auto-reconfiguring allows for restoring portions of a damaged system to minimize the spread of an outage.

Overseas, distribution reliability and resiliency is even more important, and our industry must help provide solutions.

Performance-based ratemaking (PBR) represents a good compromise between public utilities commissions (PUCs) and investor owned utilities (IOUs) in solving the return on investment challenge for DA and other applications. Today, more than half of the U.S. has some form of PBR.

G&W Electric has supported efforts by Commonwealth Edison (ComEd) and Ameren that encouraged the passage of the *Energy Infrastructure and Modernization Act* by the Illinois General Assembly. The act enables rate increases in exchange for achieving agreed-upon reliability indices and resiliency improvements (i.e., PBR).

Both utilities have made substantial progress in increasing their resilience. ComEd avoided more than half a million customer interruptions in 2012–2013. It has also seen a 15 percent drop in outage frequency and a 27 percent drop in outage duration since 2012. Its resilience-building efforts supported 2,800 full-time equivalent jobs in 2013 and pumped \$1.5 billion into the Illinois economy in 2012–2013.

Ameren is implementing a five-year, \$3.5 billion plan to improve the efficiency and reliability of its natural gas and electric energy delivery systems throughout its 43,700 square-mile territory. Since 2012, system reliability has improved by 20 percent and customers have saved an estimated \$57 million annually. Ameren added 250 employees and 1,000 contract workers, helping to boost the economy of central and southern Illinois.

Overseas, distribution reliability and resiliency is even more important, and our industry must help provide solutions. By supporting programs that expand electrification and by helping to establish channels and relationships in developing countries, NEMA has been an excellent business ambassador for its members. These efforts have included sponsoring a reverse trade mission training event with the U.S. Trade and Development Agency for Nigerian distribution companies, working with the State Department in Africa, establishing meetings between NEMA members and Chinese officials, providing technical training seminars in China, and creating the Market Development Cooperator Program Smart Grid Brazil program.

In countries around the world, making the smart grid a reality depends on PUCs and IOUs working together with governmental organizations to make the investments in technology necessary to ensure reliability and resilience. ☪