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ADDRESSING THE CHALLENGES OF AGING INFRASTRUCTURE

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In an April 9, 2015, Reuters press release, Tom Willie, CEO of Blue Pillar, a company that manages backup energy systems, stated, "If Thomas Edison came back and saw the electric grid, he would still recognize it."
A recent Utility Dive survey of utility executives reported that their most significant challenge was Old Infrastructure (47%), followed by Aging Workforce (39%), and the Current Regulatory Model (38%).

"These days, to meet the requirements of providing dependable energy, we are relying on plants and other equipment that are 60 and 70 years old," said Phil Carroll, P.E., vice president, Power Group, for Finley Engineering. "We can't continue to ignore this."

The aging infrastructure leaves the electric grid, and the nation as a whole, exposed to a number of problems. The American Society of Civil Engineers (ASCE), which routinely "grades" various types of infrastructure in the U.S., recently gave energy infrastructure a grade of D+, noting that it "has resulted in an increasing number of intermittent power disruptions, as well as vulnerability to cyber attacks."

In specific:

1 - The grid is experiencing more outages, especially in light of the increasing number of "superstorms" that are being blamed on climate change.

2 - The reduced reliability and increasing costs of power are encouraging more customers to "leave the grid" and set up their own distributed generation systems.

3 - While smart grid technologies can offer so much in the way of improving the reliability and cost-effectiveness of the grid, the aging infrastructure as a whole makes it challenging for utilities to actually introduce many of these smart grid advances, including the integration of distributed generation technologies.

4 - Finally, as noted by the ASCE, the aging infrastructure leaves the grid and the nation as a whole more exposed to cyber-attacks.

Modernizing the grid will not be easy, though. "The major challenge, of course, is financial," said Carroll. Another challenge is the often complex permitting processes that are in place from the various federal and local governing bodies. "There is also some uncertainty about what utilities should be replacing," said Carroll. "For example, if we continue to move away from centralized generation to more distributed generation, we may not end up wanting to rebuild the grid in the exact same way that it looks today."

What are the solutions at this point? There are several.

First, utilities should not focus on automatically replacing the oldest equipment first. Rather, they should look at replacing the equipment that is the most problematic, either in terms of causing current problems, or the most likely to fail in the event of new "strains" on the system. Utilities that opt for this strategy can use software to track equipment performance and thus identify patterns that highlight potential problems before they occur, and then focus their efforts on those.

Second, in some cases, it may be possible to refurbish existing equipment, rather than having to completely replace it.

Third, utilities should look for various sources of funding. One option for co-ops is the U.S. Department of Agriculture, which, in April 2015, for example, announced $72 million to support six new rural electric infrastructure projects, including repairs to outdated transmission lines. In July 2015, the same department announced $349 million more for rural electric infrastructure projects. For municipal utilities and IOUs, other options exist, such as funding programs through the U.S. Department of Energy. Utilities can also consider innovative funding such as creating new in-house sources of income. One example of this is what the Fort Collins (Colorado) Utilities is doing. (See the recently-posted white paper titled, "Profiting from the Energy Efficiency and Distributed Generation Trends.")

Finally, become familiar with all of the technologies that are available, and see which of them can provide the most benefits to your utility. The advances in technology and the efficiencies with which systems can be run will be very important in providing solutions. "The technologies today are really exciting," said Carroll. Things that couldn't have even been imagined as recently as ten years ago are actually a reality today, and can be implemented as soon as a utility is ready to do so.