Private LTE broadband changes the game for utilities.

The electric utility business is fundamentally more complex today than it was even five years ago: once primarily the supplier of centrally-produced power, the utility is now the master orchestrator of a multitude of distributed energy resources. Enabling the modern grid requires a solid foundation of certain strategic technologies, including private wireless broadband communications.

Utilities rely upon data from devices throughout their systems to maintain reliable customer service and ensure the security and efficiency of operations. According to Navigant Research, electric utilities will increase the number of connected data-creating devices by a factor of eight in the next decade, and the amount of data each device generates will also grow. Though much of the focus in grid modernization efforts is on the sensors and intelligent devices that create the data (like smart meters, line sensors or smart inverters) and applications that analyze the data, present it visually, and/or cause a specific automated action on the grid (like emergency load transfer to avoid a customer outage), underlying all of it is the communications network that carries that data.

THE MODERNIZED GRID REQUIRES WIRELESS BROADBAND COMMUNICATIONS.

The electric utility industry is changing, evolving from centralized generation and distribution to a more efficient and resilient distributed model. Data connectivity is the nerve system that makes this coordinated, interactive approach possible, but today's amalgam of narrowband and limited-application wireless networks—many of which are nearing end of life—is too inefficient, complex, and capacity-constrained to support tomorrow's modernized grid.

Navigant Research explains that though utilities have deployed a variety of wireless networks to support specific applications, "the economics of maintaining dozens of limited purpose networks—and the staff to support them—will become impossible to justify," and "reliance upon a vast array of incompatible networks … is inefficient and will ultimately become unmanageable." To modernize, a utility will need an efficient, secure, scalable, broadband communications platform that it controls, allowing it to phase out the complex collection of limited-purpose networks upon which it currently relies. Fiber connectivity is a critical component of utility communications systems, providing both robust backhaul for wireless systems as well as secure transport for data that never touches a wireless system at all. They are complementary broadband systems, each bringing important strengths: private wireless provides a scalable, flexible, cost-effective way to securely connect tens of thousands of devices; fiber provides robust, secure, high-capacity connectivity for critical data.

UTILITY-GRADE BROADBAND REQUIRES PRIVATE NETWORKS.

Wireless broadband service is readily available from commercial carriers, and that service may be appropriate for certain non-critical applications, or in cases where the utility has not yet had time to build a utility-grade system. But mission-critical applications require greater security, reliability, and guaranteed speed (lower latency) than commercial carriers provide. Commercial networks offer "best efforts" service; utility networks must be hardened to prevent compromise by human actors and natural disasters, reliable so they work even under emergency conditions, and resilient to quickly recover from setbacks and support power restoration efforts. On commercial networks, traffic competes for limited bandwidth; utilities require dedicated bandwidth so that critical grid communications can get through every time, even when traffic from millions of consumers clogs commercial networks.

Utilities are constantly on the lookout for ways to reduce their vulnerabilities to cyberattack, and a private network can help limit that exposure. By implementing a closed, purpose-built network separated from the public Internet and by phasing out diverse, hard-to-manage deployments of outdated network technologies in favor of a consolidated, modern broadband system, utilities can reduce the attack surface and improve their cyber security posture.

WIRELESS BROADBAND NETWORKS REQUIRE SPECTRUM, INFRASTRUCTURE, AND TECHNOLOGY.

Perhaps the most visible part of the infrastructure of a wireless broadband network is the cell tower with its familiar panel antennae. In addition to other infrastructure elements, including backhaul transport (both fiber and microwave), the physical equipment that comprises the core network, and end-point devices (including connected sensors), wireless broadband networks also require spectrum: a critical input that is rarer and less tangible than infrastructure but equally essential. Without access to spectrum (radio channels) for the use of the infrastructure, there is no wireless broadband service.

SPECTRUM IN THE 900 MHZ BAND IS PERFECT FOR UTILITY BROADBAND.

Not all spectrum is the same, however: the characteristics of the radio wave itself can affect the amount of infrastructure the network needs (tower density), and the usage requirements imposed by regulators (whether it is licensed only to the network operator or available to any/all users, like most WiFi systems) can determine its availability for critical communications during an emergency. Networks using spectrum below 1 GHz require fewer towers than those using higher-band spectrum because low-band signals can better travel long distances and penetrate walls and foliage. Additionally, exclusive licensed spectrum provides legal access to the spectrum's full capacity, free from competing uses. The 900 MHz band possesses both attributes—and the federal government will soon make it available for broadband nationwide.

The network's ability to meet a utility's performance requirements is determined by the technology embedded in the network infrastructure that makes use of the spectrum. For example, the time required for sensor data to reach a control system on the grid (latency) can make the difference between successful mitigation and a catastrophic event. Among mature mobile wireless broadband technologies, the most advanced—and the one that supports the lowest latency—is LTE, the same technology already proven in critical infrastructure deployments worldwide. LTE brings with it a range of other important benefits, including a vast ecosystem of products already available for use in the 900 MHz band, scalability, and a roadmap for ongoing technical evolution. Choice of spectrum will affect a utility's ability to take advantage of these many benefits of LTE.

UTILITIES MUST PRIORITIZE THE COMMUNICATIONS PLATFORM AS THE CRITICAL STRATEGIC ASSET IT HAS BECOME.

In the past, utilities treated communications networks as a necessary cost of doing business. Those days are gone. The inexorable march of utility modernization necessitates a communications network that is a foundational element in providing safe and reliable service to customers, today and in the future. As an increasingly complex grid relies ever more upon data, the communications network becomes one of the utility's primary strategic assets.

PDVWIRELESS, INC.

Delivers game-changing connectivity for critical infrastructure, including next-generation communications platforms to support utilities' grid modernization and cybersecurity strategies. We partner with utilities and ecosystem vendors to build secure, reliable, cost effective, and customized LTE solutions on our 900 MHz licensed nationwide spectrum.

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*Richelle Elberg, Navigant Research, "The Urgent Need for a Licensed Broadband Spectrum Allocation for Critical Infrastructure," (2018) at 5.

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