Wireless Broadband Delivers Robust, Secure Connectivity for Smart Grid Systems

The intelligent automation of the electrical grid has been heralded as a revolution comparable to the Internet. Today, it is still being defined and the critical technologies continue to evolve. While use cases in the utility and municipal arena dominate early deployment success stories, industrial applications are rapidly proving that wireless broadband, including mesh technology, can effectively deliver reliable coverage, meet load balancing challenges, and drive significant operational efficiencies in even the harshest plant environments.

A Powerful Connection

Today, the U.S. electricity and distribution infrastructure includes more than 9,200 electric generating units with a combined generating capacity of more than 1 million megawatts connected to more than 300,000 miles of transmission lines.

A Balancing Act

A common challenge in power distribution management involves load balancing. Ensuring power constraints are effectively managed across the entire power grid is critical to the efficient operation of high voltage load centers. One chemical plant operation in the Midwestern part of the U.S. utilized 36 high voltage electric load centers to provide power to its chemical processing production equipment. Monitoring, metering and balancing these loads had long been a manual process. Every two hours, a dozen personnel had to walk around with clipboards and manually record load data. If one or more load centers were found to be working harder than others, the electricity load and flow was balanced to improve operations. Less than efficient, the plant evaluated options to automate load balancing intelligently.

The Smart Grid: Defined

According to the U.S. Department of Energy, Smart Grid is the application of technologies that provide intelligent monitoring and control of the electric grid that delivers electricity from points of generation to consumers. The electricity delivery network functions via two primary systems: the transmission system and the distribution system. The transmission system delivers electricity from power plants to distribution substations, while the distribution system delivers electricity from distribution substations to consumers. The grid also encompasses myriads of local area networks that use distributed energy resources to serve local loads and/or to meet specific application requirements for remote power, village or district power, premium power, and critical loads protection.

To support the monitoring and control technology required to automate this process, the plant selected Motorola's Mesh Wide Area Network (MWAN) 4300 series wireless infrastructure to provide redundant, resilient broadband coverage throughout the plant's half-mile, harsh RF environment. Harsh RF conditions are characteristic of industrial plants, where heavy machinery and high-voltage load centers define operations and pose significant interference challenges. Motorola mesh technology has the ability to intelligently re-route signals to ensure continuous, reliable coverage, making them an ideal solution for industrial environments.

The new wireless mesh backbone consists of 11 dual radio access points providing the bandwidth and scalability to effectively integrate its disparate process control systems and extensive sensor network. In addition, the infrastructure allows the plant to implement additional applications, such as video surveillance to improve plant security and other voice and data-intensive programs to further enhance operational efficiencies.

Part of Motorola's extensive MWAN solutions, the 4300 series of products use standards-based WiFi technology and include a 2.4 GHz WiFi radio supporting 802.11b/g for client access for handheld devices, as well as a 5.8, 5.4 or 4.9 GHz radio (802.11a) for node-to-node mesh traffic. The 802.11a radio aggregates client traffic and transmits it over the mesh backhaul. Motorola's exclusive MeshConnex™ routing engine dynamically re-routes data traffic around identified interference, ensuring business-critical connectivity of the network at all times.

Smart Savings

According to the U.S. Department of Energy One U.S. Department of Energy study calculated internal modernization of U.S. grids with Smart Grid technologies would save between $46 and $117 billion over the next 20 years just due to reduced transmission losses.

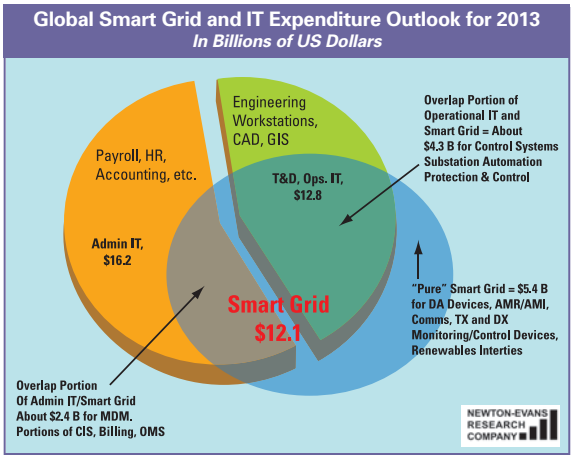
Smarter Wireless Solutions

The ability to monitor and control key elements of the wireless network and the devices it supports in real-time is critical for optimizing multi-use networks. Motorola's powerful One Point Wireless Suite features three of the most powerful network planning and management solutions in the industry. By leveraging these robust applications, plant network operators can control every detail of the company's integrated wireless networks. The solution's sophisticated visualization capabilities streamline network planning and management by providing easy-to-understand graphical representations of the most important connectivity and performance data.

Industrial Grid Gains

Wireless technologies are projected to play a defining role in the evolution of the U.S. Smart Grid. Wireless connectivity will enable industrial processing plants, municipal agencies and utilities to leverage the Smart Grid to implement intelligent monitoring and metering applications that measure, collect and control energy usage on request or on a pre-defined schedule. Industrial environments demand wireless solutions that provide reliable, secure coverage in hostile RF environments. Today's advanced wireless mesh technology meets this need, providing the scalable bandwidth network operators need to effectively automate key load balancing processes, as well as support advanced voice, data and video applications that leverage the Smart Grid and drive additional operational efficiencies and cost savings.

According to the Newton-Evans Research Company, by 2013 the total value of the various pie segments shown below are expected to increase substantially, with Smart Grid spending possibly exceeding $12 billion.



About Motorola Wireless Network Solutions

Motorola delivers seamless connectivity that puts real-time information in the hands of users, giving customers the agility they need to grow their business or better protect and serve the public. Working seamlessly together with its world-class devices, Motorola's unrivaled wireless network solutions include indoor WLAN, outdoor wireless mesh, point-to-multipoint, point-to-point networks and voice over WLAN solutions. Combined with powerful software for wireless network design, security, management and troubleshooting, Motorola's solutions deliver trusted networking and anywhere access to organizations across the globe.

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