

## **Creating a Smart Electric Grid**

Society has entered into a new era of economics and social experience driven by digitally based technologies. Our world is more interconnected than at any time in history, utterly dependent on the integrity of complex networks, including the internet, telecommunications and electric power systems. In many ways, the electricity network is the foundation of this interconnection. However, the electricity system - generation, transmission, distribution and end-use – is in serious need of modernization to an appropriate 21<sup>st</sup> century architecture if the benefits of interconnection are to be fully realized at both commercial and individual consumer levels.

Modernizing the grid will involve coupling electric power, communication and distributed computing to create a “smart” system. It is recognized that computing and communication technologies – particularly with the increased utilization of the Internet – pose not only a great opportunity to optimize and enhance the performance of the power system, but also a tremendous challenge. Concerns about securing the grid from cyber attacks, computer viruses and software deficiencies arise with any discussion on incorporating computers with power systems.

Public and private sector efforts are currently underway to lay the groundwork for the next generation power grid. These efforts focus on the definition, specification, demonstration and implementation of a design that can either replace the existing grid or overlay on top of it. The concept of an industry-wide architecture is being widely utilized because of the massive scope and scale of what is necessary to realize a “smart” power grid capable of fixing itself. Indeed, the potential for the supporting data communications and computing technologies is as extensive as the existing power system. The number of intelligent devices supporting a smart grid could easily be in the millions, thus an architecture-level approach enables a view from a height that facilitates data and applications sharing among the various stakeholder groups that operate, oversee or receive energy from the power system. Such architecture also holds the potential for adoption by multiple vendors. This will also help identify system or enterprise-level management and security issues that might not be noticed until after the smart grid is implemented.