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Issues Facing the North American Power Grid and Their Technological Solutions

By

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Abstract:

The North American power grid is currently facing many challenges such as an aging transmission infrastructure, concerns about the environment, rapidly increasing electrical demand and changes to operating practices due to deregulation. The electric power industry recognizes the importance of a revitalized grid to meet these challenges and ensure reliable, cost-effective, and environmentally benign power throughout the 21st century. One area of focus is the development of real-time wide area tools for visualization and control of an entire interconnection. Recent large-scale blackouts have occurred because system operators were unaware of problems developing outside their own control areas. The phasor measurement unit (PMU), which was developed at Virginia Tech, has gained industry acceptance and is being widely deployed all over the United States. There are several ongoing research projects at Virginia Tech aimed at developing algorithms and technology to integrate phasor measurements into state estimation, contingency analysis, advanced warning systems, adaptive protection schemes, and other applications.

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