Grid Reliability
Consumers expect electricity to be available whenever they plug in an appliance, flip a switch, or open a refrigerator. Meeting these instantaneous demands requires utilities and grid operators to constantly balance a vast array of generation resources with ever changing demand.

The challenge is made even greater in light of America’s aging power infrastructure while power outages around the world have fed concerns about the reliability of power transmission systems. Following the August 2003 Northeast blackout, the utility industry implemented a range of procedural and technical improvements, but the nation’s aging grid is still at risk and the potential for another massive blackout remains.

But solutions exist. ABB’s technologies and expertise in blackout prevention and power transmission systems put the company on the cutting edge of grid reliability solutions. Today, the need for clean, sustainable energy is placing even more importance on the power grid and ABB plays a key role in enabling wind, solar and other renewable energy sources to serve a larger portion of our energy needs.
Did you know...?

- ABB is the world leader both in power and distribution transformers. **Over two-thirds** of the power transformers on the North American grid were supplied by ABB.

- ABB can trace its roots in power cables back to Sweden in 1870 when it supplied fuses for Alfred Nobel’s new explosive known as dynamite. Today, ABB cables are used to connect power grids, deliver reliable power to offshore facilities, and bring power from offshore wind farms to customers on shore.

- ABB will connect the world’s largest offshore wind farm — E.on’s massive Borkum 2 project — to the German grid this year using ABB’s HVDC Light®. The technology **improves control over intermittent wind supplies**, has lower losses than conventional power transmission systems, and uses oil-free cables. ABB developed the technology in the early 90s and remains the world leader in HVDC transmission.

- ABB is the worldwide market leader in Flexible AC Transmission Systems with around half of all installations worldwide. FACTS devices **increase the capacity of existing transmission lines by up to 50%** while also enhancing their operational stability. ABB recently installed the world’s largest static VAr compensator (one type of FACTS device) on a major transmission line serving the Baltimore/Washington, DC area.

- The Massachusetts Institute of Technology recognized ABB’s Wide Area Monitoring System as one of the “top ten emerging technologies that can change the world.” The WAMS system significantly improves visibility and controllability of power system dynamics, allowing **potential disturbances to be addressed before they occur**. ABB’s WAMS technology was employed to reunify two European grids in the aftermath of the Bosnia – Kosovo conflicts, and is being tested in the U.S. to provide utilities with a clearer picture of ongoing grid conditions.

- ABB led development of the first “open source” communication protocol for substations (IEC 61850) and established the **world’s first test facility** to certify equipment compliance with the standard. IEC 61850 allows various types of equipment to communicate using a non-proprietary protocol, advancing the adoption of smart grid technologies.
ABB in Action

Undersea power transmission: NorNed Cable is world’s longest undersea link

At 360 miles, the NorNed cable is the world’s longest undersea power link. It carries up to 750 MW of power between the Dutch and Norwegian grids. ABB completed installation of the HVDC Light system in 2007, and commercial operation began in May of 2008. Commenting in August on its recent spike in earnings, Norwegian grid operator Statnett credited much of the gain to the NorNed line, which enables Norway to export more of its cheap power to neighboring grids. As of August 28, 2008 Statnett had exported 1.6 TWh of electricity via NorNed.

Blackout recovery: Cross-Sound Cable gets Long Island back online

In the immediate aftermath of the 2003 Northeast blackout that left 50 million people without power, there was one bright spot. Soon after the initial event, Long Island began receiving an infusion of power from the New England grid via the Cross-Sound Cable, a 330 MW HVDC Light power line delivered by ABB. The previously dormant line was energized under emergency order from New York Governor George Pataki, and remains in service today. The controllability of HVDC allowed power to start flowing to Long Island much sooner than would otherwise have been possible using traditional AC systems.

FACTS: Austin Energy replaces old generator with power electronics

FACTS devices provide voltage support to allow more power to flow on existing transmission lines, but that same function has another application. Today, many urban power plants no longer produce power used in electric devices, but rather generate the reactive power needed to maintain voltage levels. These plants are often inefficient, noisy and dirty. Austin Energy replaced one such plant — an oil-fired generator at its Holly substation — with a FACTS device known as a static VAr compensator (SVC). The utility now enjoys the same voltage support but without the maintenance costs and environmental concerns of the plant.
Safety First: ABB pioneers arc-resistant switchgear

Today’s electric power systems are safer and more reliable than they’ve ever been. But electrical faults still occur, and when they do the impact to the system and the people charged with maintaining it can be devastating. ABB was the first manufacturer to design a line of switchgear from the ground up to resist the damaging effects of an arc flash associated with an electrical fault. These units, which are used in a wide range of utility and industrial settings, use a combination of high technology and simple design to mitigate the effects of an arc flash.

For example, all of the electronic controls necessary to stop the flow of power are isolated from the main conductors that carry power. If a fault occurs, these instruments are protected from the heat and force of an arc flash and are thus able to trip the power and correct the fault sooner. The main compartments are also constructed with channels to vent hot gases and debris out the top of the unit, a critical feature given the tremendous energy released during an arc flash incident.

Today there is a growing emphasis on safety, not to mention the reliability that accompanies it. Since the introduction of its SafeGear line more than a decade ago, ABB has been the world leader in arc-resistant switchgear, and now sells more of this type than it does traditional units.
Greg was appointed head of ABB’s Power Products division for North America in February 2008. He has been a member of the company’s Executive Committee in North America since 2002.

Prior to this appointment, Greg served as the president of ABB’s Automation Products division in North America. He previously served as Global Senior Vice President of eBusiness for ABB Ltd at the company’s global headquarters in Zurich.

Prior to joining ABB, Greg held positions at Westinghouse Electric Corporation, Rockwell Automation, and Source Alliance LLC, an electrical and automation channel for internet based supply of equipment.

Greg earned a bachelor’s degree in electrical engineering from the University of Delaware. He serves on the Industrial Control board of the National Electrical Manufacturers Association and on the board of North Carolina State University’s BTE Center.

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