

## Transmission - The need for new rules and advanced technology

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As Congress takes on the challenge of negotiating a new national energy policy, attention is being focused on the portion of the bill dealing with electric power. Parties on all sides agree that decisive legislation is needed to ensure grid reliability, for example by imposing mandatory reliability standards on utilities. However, there is much more that needs to be done, from the legislative, regulatory and investment standpoints.

Over the last twenty years, the power system has often been pushed to its limit while delivering the energy needs of a growing economy. Meanwhile, investment in the transmission infrastructure has not kept pace with the demands being placed on it. Recent increases notwithstanding, more resources must be devoted to bringing the North American transmission system into balance with current and future requirements.

We make the following observations regarding the transmission and distribution grid:

- Investment in the transmission grid has not kept up with the growth in demand and increase in energy trading. According to the Edison Electric Institute (EEI), transmission investment dropped from \$5 billion in 1975 to \$2 billion in 2000 (in 1997 dollars).
- Significant levels of investment are needed in the nation's transmission and distribution grid. Recent increases notwithstanding, estimates for the investments required to restore the needed integrity to the grid are more than double today's spending levels.
- Regulatory uncertainty has delayed and provided a disincentive for investments in the grid. Neither the FERC's 2000 NOPR, SMD proposal nor the latest Wholesale Market Platform (WMP) establishes a clear mechanism for how transmission upgrades can be recovered by regulated or merchant transmission companies. The overlapping jurisdiction of FERC, state PUCs and RTOs on issues of regional coordination has caused tremendous hurdles to be placed in the path of any transmission upgrade project.
- Transmission issues are inter-regional. Transmission is an inter-connected entity and cannot be looked at within state or regional boundaries. The four main grid systems in the US and Canada are the Eastern Interconnection, Western Interconnection, and the smaller Texas and Quebec systems.

Based on the observations above, ABB in our role as a premier technology provider to the nation's transmission and distribution infrastructure, would offer the following recommendations:

- Establish clear rules for Transmission Upgrades. In the ensuing dialogue between Federal, State and Regional authorities we urge the parties to formulate a set of clear mechanisms whereby regulated as well as merchant entities can and will invest in transmission upgrades. Give special incentives to solutions that offer fast implementation and increase the robustness of the transmission grid (e.g., those that improve voltage stability and provide "black start" capability).
- Strengthen NERC's role in setting and enforcing operating and reliability guidelines. The structure of the energy industry has become significantly more complicated since NERC's inception in 1965. Its powers and responsibilities must be strengthened to ensure reliability in



today's complex energy markets. NERC's readiness audits following the August 2003 blackout and its recently approved reliability standards are a good first step towards a stronger reliability regimen.

- Apply new technologies to improve the performance of the nation's grid. The performance and reliability of the nation's transmission grid can be enhanced speedily with the application of proven technologies which have significantly lower environmental impact, have smaller footprints and are extremely flexible in their operation compared to conventional ways of upgrading the grid with overhead lines. Such proven technologies include:
  - o Real-Time Wide Area Monitoring and Control of Power Systems: Advances in control technology now allow grid-wide monitoring and control of the power flows, transmission limit calculations and power plant operation. Advanced control systems, system protection, communication and automation applications can significantly improve the capacity and reliability of the existing system.
  - o HVDC Transmission: High Voltage Direct Current power electronic systems allow power flow across regions without troublesome "loop flows" while providing support and performance enhancement for the surrounding AC (Alternating Current) Grid. HVDC links also have built-in overload control and can be loaded fully without increasing the risk for cascaded line tripping.
  - o HVDC Light: In addition to the benefits of traditional HVDC, this latest technology offers enhanced voltage control and black start capability.
  - o FACTS Devices: These Flexible AC Transmission devices, such as Static VAR Compensators (SVC) and Series Capacitors, can enable more power to flow on existing power lines and also improve voltage stability. They make the system more resilient to "system swings" and disturbances. The most recent developments include devices with the same proven technology base and performance as HVDC Light.
  - o GIS (Gas Insulated Sub-stations) and Underground Cables: Enhancements in conventional technologies have allowed large amounts of power to be transmitted and distributed in a compact and un-obtrusive way. Examples of such devices are gas-insulated substations, which can enhance the reliability of an urban network in a minimum of space.
  - o Life Extension. Modern materials and design analytics often allow manufacturers to economically upgrade the capacity of existing equipment, to improve its reliability and to increase its useful life.

At ABB we believe that the US has the world's most complex and demanding power system. This system must keep up with increases in demand and the emergence of competitive power markets. The technology exists to bring the nation's grid up to the desired level of reliability and performance. We have the experts and tools to help get the most out of these technologies. We are able and willing to help any entity, government or private, in their quest to improve and enhance the nation's transmission and distribution system.

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