

Clearing Obstacles to a National Transmission Superhighway and Smart Grid



The transmission system is the backbone of the electric system. It has suffered from underinvestment for decades, and antiquated components are causing severe economic losses to the economy. For example, it is estimated that the cost of the power blackout in the Northeast in August of 2003 was \$6-10 billion dollars.¹ Enabling and constructing a national transmission superhighway will improve reliability and significantly reduce line losses.

Build It Fast and Smart

The Council Recommends that:

- Congress set national criteria for transmission siting by creating independent regional planning authorities overseen by the Federal Energy Regulatory Commission (FERC).
- FERC require regional planning authorities to allocate costs to construct and upgrade transmission regionally, spreading costs across all jurisdictions served by the new lines.

A new transmission system is needed to enable large amounts of new renewable resources to be brought online. Because renewable power is intermittent, new transmission is required to balance the power produced by these resources with other power supplies. Additionally, renewable energy production is often best sited far from demand centers. New transmission will be needed to move power easily and with minimum losses from where and when it is produced to where it is consumed.

“Transmission is so important because, whether you are talking about nuclear or clean coal, renewables or prioritizing efficiency, ultimately there has to be a shift in the country to greater electron liquidity—delivering clean electrons where and when we want them to fuel industry and homes, and even portions of our vehicle sector.”

Alexander A. Karsner

Former Assistant Secretary for Energy and Energy Efficiency and Renewable Energy, U.S. Department of Energy, and Distinguished Fellow, Council on Competitiveness, in July 2008.

Unlike the federal highway system, the U.S. electric power system was not designed from the top down. It is a mosaic that has been stitched together year over year, from one community to the next and one transmission tower to another. It is a system comprised of large for-profit corporations with billion dollar revenues to small, non-profit rural electrical cooperatives servicing a community of less than one hundred. The electric power system is disaggregated, balkanized and governed by a veritable patchwork of regulation and legislation. As such, the siting of transmission lines has been delayed by continuing disputes over jurisdictional authority, environmental impact and the allocation of construction costs.

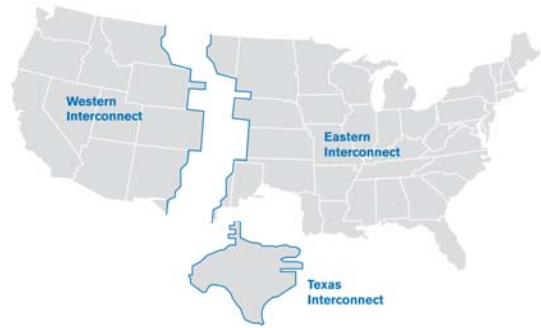
The development of a transmission superhighway should be done in parallel with the design and implementation of a smart grid so that power dispatch and use can be managed with 21st century technology. This will result in more reliable and secure power and maximize energy efficiency and demand response by empowering all types of consumers with the ability to closely monitor and adjust their energy use.

Transmission Line Locations

Transmission lines are not sited in convenient locations to move abundant renewable energy to population centers. Investor owned utilities invest, on average, about 6.5 percent of their transmission budget on transmission to and from power sources. The American Wind Energy Association estimates that there are 300,000 MW of wind projects stalled because there is inadequate electric transmission capacity. That represents 20 percent of U.S. electricity consumption.²

Snapshot—The U.S. Electricity Transmission System

The U.S. has three different electricity transmission interconnections with 273,564 miles of high voltage transmission lines. Electricity is distributed by 3,139 utilities, with 50 public utility commissions, either publicly elected or governor-appointed, providing regulatory oversight. A hundred and forty separate “balancing authorities” manage the electricity load, making interjurisdictional transport very difficult.³



The market is beginning to demand tools and options to better manage energy at the point of consumption. Standards need to be developed so that devices are compatible and capable of being used by all consumers and any grid operator; security needs to be ensured so that hackers or others cannot access the devices or grid control points; and the design should incorporate an ability to be self-healing and adaptive so brownouts and blackouts are minimized.

Excitement has been building over the past several years about the prospects of plug-in hybrid electrical vehicles (PHEVs) as a means to reduce U.S. dependence on petroleum-based fuels, along with their CO₂ emissions. A smart grid will be essential to help manage the power flow between vehicles, charging stations and utilities. Experts believe that PHEVs represent an integral part of the nation’s future power delivery system to help manage peak loads.⁴

In Drive: A Comprehensive Roadmap to Achieve Energy Security, Sustainability and Competitiveness (September 2009) and ***Prioritize: A 100-Day Energy Action Plan for the 44th President of the United States*** (September 2008), the Council detailed actions to be taken by the federal government in six critical “pillars” as necessary for true breakthroughs in U.S. energy production and use to be achieved. Below are additional recommendations from Pillar 4: Clearing Obstacles to a National Superhighway and Smart Grid.

Additional Recommendation:

- FERC develop interoperability standards so that energy management devices can be operated on any smart grid and so that the grid architecture will be adaptive and secure.
- FERC set interconnection standards that permit multiple new energy sources and devices to be connected to the system.
- The President’s Science Advisor establish the “High-Performance Computing Transmission Initiative”—a consortium of national laboratories, universities, industry and organized labor to model and simulate the design, construction and operation of an intelligent, self-healing, electrical grid.

For More Information: Visit our website at Compete.org to find the full reports or contact Susan Rochford, Senior Vice President, at 202 969 3384 or SRochford@compete.org.

¹ ICF Consulting, “The Economic Costs of the Blackout: An issue paper on the Northeastern Blackout, August 14, 2003.”

² Wood, P., Church, R., *Building the 21st Century Transmission Super Grid; Technical and Political Challenges for Large Scale Renewable Electricity Production in the U.S.*, Washington, D.C.; American Council on Renewable Energy, April 2009; American Wind Energy Association, *2009 Report Card*, Washington, D.C.; American Wind Energy Association, July 2009.

³ “The Changing Structure of the Electric Power Industry 2000; an Update,” U.S. Energy Information Administration, 2000; Wood, P., Church, R., *Building the 21st Century Transmission Super Grid; Technical and Political Challenges for Large Scale Renewable Electricity Production in the U.S.*, Washington, D.C.; American Council on Renewable Energy, April 2009.

⁴ Office of Energy Efficiency & Renewable Energy, *Alternative & Advanced Vehicles, Plug-in Hybrid Electric Vehicle Benefits*. Washington, D.C.: U.S. Department of Energy. 11 September 2009.