

The Blackout of 2003 Viewpoints from ICF Consulting

The North American blackout on August 14, 2003, affected 50 million people in seven U.S. states and Canada. Since that event, questions about causes and possible solutions have reignited fundamental debates about the state of electric transmission systems and the path of deregulation.

What were the root causes of the problem?

While inquiry findings will shed light on specific factors, the signs of substantial stress on the power grid have been building for years. For example:

- The cost of transmission congestion in the most developed market in the United States (PJM, a power pool serving the mid-Atlantic region) has grown nearly eight-fold in the past three years, reaching \$401 million in 2002. Across the United States, the figure is in the billions.

Northeastern United States Before and During the Blackout



Satellite photos show the dramatic difference. The photo on the left was taken the evening of August 13. The photo on the right shows the same area during the blackout on August 14, 2003. (Photos courtesy of NOAA/DMSP)

In the days following the Blackout, ICF Consulting released a series of issue papers. We continue to work with clients and other interested parties to inform the debates and the paths forward.

Highlights from three of these papers are provided here. Please visit the special Blackout section on our Web site at www.icfconsulting.com/blackout for full text, additional papers, and updates.

- According to the North American Electric Reliability Council (NERC), power deals that could not be fulfilled due to transmission constraints increased five-fold to nearly 1,500 instances in 2002 compared to 300 in 1998.
- According to the Edison Electric Institute (EEI), transmission investment has fallen \$115 million per year for 25 years, from about \$5 billion in 1975 to \$2 billion in 2000 (in 1997 dollars).

The current transmission system is being used in a way not intended by its design due to the evolving operation of wholesale electric power markets. Transmission system operators have for years been balancing competing pressures to accommodate increasing wholesale power transactions while still attempting to ensure grid reliability.

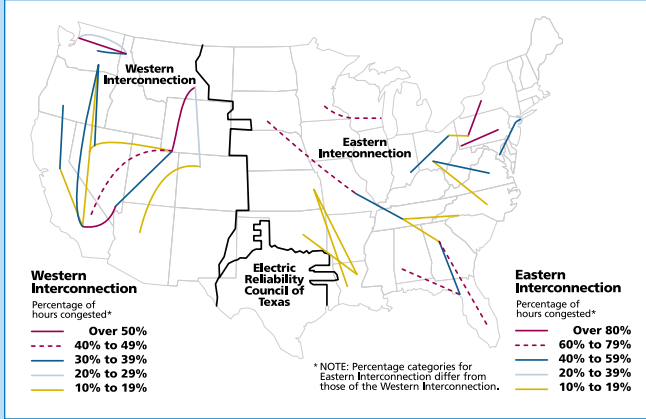
Why has the system volume grown so rapidly ahead of investment?

In 1996, the Federal Energy Regulatory Commission (FERC) issued Order 888 that provided for “open access” to the transmission grid. This meant that any generator could apply for non-discriminatory access to use the grid to transmit power to a customer, often in another state or region. Thus, grid operators now must, in addition to accounting for their own company’s service to its customers, balance the needs and financial implications of third-party users of the grid with overall grid reliability.

The maintenance of reliability levels in this new environment requires increased investment in transmission. In the United States, the need for new transmission investment is estimated to be in the range of \$30-60 billion in this decade. Yet this need comes at a time when many transmission-owning utilities have seen their stock prices battered and their credit ratings lowered; regulatory

Transmission Congestion

Source: U.S. Department of Energy
National Transmission Grid Study, May 2002



uncertainty over transmission continues. Many transmission-owning companies therefore are reluctant to invest scarce capital in transmission.

Could this happen again?

Government and industry recognize that transmission congestion is a real issue and they know where the biggest problems lie. Congestion is a serious problem in both the Eastern and Western Interconnection regions.

To examine the “where else?” question, ICF Consulting carried out a detailed, forward-looking analysis for 2004 of where the grid appears to be most congested. The table below summarizes the major areas where electric demand creates grid congestion and the approximate number of hours of such congestion. The existence of significant amounts of congestion on the transmission grid *can* be an important precondition for blackouts.

Future Recommendations

Policymakers may wish to consider multiple options for addressing the transmission issue. The options could include the following actions:

- Consider Federal funding to build or upgrade transmission capacity or otherwise alleviate congestion in the most congested corridors.

- Set and enforce transmission reliability standards (such as reserve margins are determined for generation) that NERC or a similar body should enforce.
- Implement new approaches to transmission planning under market uncertainty.
- Assess the need for new transmission regionally (beyond the state level) and establish greater regulatory certainty.
- Create Federal legislation to provide “backstop” authority to build lines if states or regional organizations defer lines that FERC or the U.S. Department of Energy believes are necessary.
- Establish incentives for performance for transmission-owning utilities.
- Exploit new technologies, such as FACTS (Flexible Alternating Current Transmission System) and superconductivity, to push more electricity through existing lines and corridors.
- Incentivize private investment to supplement the funds that utilities have available.

ICF Consulting’s Forecast of Regional Demand Resulting in Congestion in 2004

Region/ State	Hours of Future Congestion Caused*	% of Total Hours
	ICF 2004 Forecast	
California	8,271	94%
New York State	7,474	85%
Florida	5,416	62%
South Central (AK, LA)	4,668	53%
Central (OK, KS)	4,206	48%
Tennessee Region (TVA)	3,872	44%
South (MS, AL, GA, SC)	3,774	43%
South Atlantic (VA, NC)	3,726	42%
New England	3,094	35%
Mid-Atlantic (PA, NJ, DE, MD)	3,074	35%
Upper Midwest (WI, IL, MO)	2,028	23%
Midwest (WV, KY, IN, MI, OH)	1,966	22%
Northern Midwest (ND, SD, NE, MN, IA)	1,654	19%

* The actual congestion may occur in the indicated region or in other “upstream” regions.

For more information about ICF Consulting’s energy capabilities, please visit www.icfconsulting.com/energy.