



## POWER CRISIS: THE OMISSION OF TRANSMISSION

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The recent massive power outage, affecting 50 million people in seven states and Canada, stems from the way in which the transmission system has been planned and developed over the past 20-30 years. Transmission has been a second-class citizen in the array of facilities required to bring power reliably to consumers, with scant attention paid to it until recently. Hopefully, this event will be a wake-up call.

**What are the root causes of the problem?** While the specific cause of the outage is still being determined, the signs of substantial deterioration in the power grid have been building for years. For example:

- The cost of transmission congestion in the most developed market in the US, the PJM serving the mid-Atlantic region, has grown nearly eight-fold in the past three years, reaching \$401 million in 2002. Nationwide, the figure is in the billions. Thus, the wholesale cost of power in 2002 was several percentage points higher than it would have been without congestion. Importantly, this trend points to the increasing stress and loading of the transmission system that leads eventually to a breakdown.
- 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.
- Major utilities have been seeing transmission problems grow substantially. For example, the ability to move power out of Entergy has deteriorated significantly in recent years. Southern Company has estimated the near-term need for \$2-3 billion in transmission investments, nearly doubling their current asset base.
- According to the Electric Power Research Institute (EPRI), roughly 2 million businesses have been losing \$46 billion per year in lost production due to power outages and another \$6.7 billion annually due to power quality issues.
- 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 Midwest Independent System Operator recently released its first Transmission Expansion Plan, identifying the need for at least \$1.3 billion in transmission upgrades and additions by 2007. Nationwide, we estimate the need for new transmission investment in the range of \$30-60 billion in this decade.

What this all shows is that transmission system operators have for years been pushing the transmission system to its limits. These lines have very real constraints in terms of their thermal capacity, stability (voltage limits), and overall capacity to carry power. Operators have frequently been pushing the more congested lines to carry power right up to these limits in recent years, as the system volume has grown sharply. Eventually, something has to give.

### Why has this situation been allowed to develop?

It's been a combination of factors. One reason is that transmission has been planned and approved largely on a utility- and state-specific basis, without sufficient regional coordination. Where there has been regional coordination, such as in the PJM, the regional entities have not had the authority to require lines to be built, since the right to approve and site power lines remains with the states, even when the lines and the power they carry cross state lines. At the state level, "not-in-my-backyard" (NIMBY) concerns and its cousin, "build-absolutely-nothing-anywhere-near-anything" (BANANA) have stymied construction. It's almost like having a separate Federal Aviation Administration for each state.

A second reason is that utilities and independent power producers in many parts of the country have been dueling over who will build new transmission. Except for a few regions such as the PJM, each utility has had its own procedure. When new plants are built, there is often a need for new transmission to accommodate the power from those plants. However, the challenge is often to distinguish between the need for transmission to improve overall reliability versus the need for transmission to accept power from these plants. The Federal Energy Regulatory Commission recently issued a ruling on generator interconnection that would help resolve this question, but it has not yet been implemented.

Finally, there is no accepted standard for transmission reliability. With power generation, we use the concept of "reserve margin" to identify the extra capacity to generate power that utilities should have, over and above their expected demand for power. When generation is projected to be short, utilities must build plants or buy power to ensure that supply will be sufficient. In transmission, however, there are a patchwork of "best practices", but nothing that requires transmission to be built when the system reaches a critical level. The operators are just left to fend for themselves until the regulatory or political logjam allows a new line to be built.

### What should happen next? We recommend the following:

1. Consider federal funding to build or upgrade transmission capacity in the most congested corridors in the country. The argument is at least as strong for doing this as it was for the Federal Highway System.
2. Federal legislation to provide for "backstop" authority to build new lines if states or regional organizations defer in building lines that the FERC or DOE believes are necessary.
3. Greater regulatory certainty and regional responsibility to assess the need for new transmission. Power flows do not respect state boundaries, so state regulators on their own cannot guarantee the reliability of the grid. To balance state and regional/federal authority, state regulators could be required to jointly consider new transmission lines under the auspices of a regional transmission organization (RTO) or other entity.
4. There should be incentives for performance. In the United Kingdom, National Grid was able to retain millions of pounds in exchange for reducing transmission congestion by hundreds of millions. We should make a similar bargain with our utilities.
5. Greater use of new technologies such as FACTS (Flexible Alternating Current Transmission System) and superconductivity, so that we can push more "juice" through the existing lines and corridors.
6. Greater use of private investment to supplement the funds that utilities have available. Many utilities are in difficult financial straits, and may wish to leverage outside investment to maintain their credit ratings. Pension funds, equity investors, and others should be attracted to the fixed rates and attractive returns that transmission offers.

In the process, we should expect the cost of transmission to rise, leading to slightly higher rates for consumers. But this would be a cheap insurance policy to buy. Isn't this a small price to pay to avoid blackouts of the type that happened recently and to lower the costs of congestion? Now more than ever, the answer is yes.

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