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Fixing the Power Grid

Executive Summary

- The August 14 electrical power outage that left 50 million people in the eastern United States and large parts of Ontario, Canada in the dark dramatically portrayed what government and industry insiders long have known: the nation's electricity grid is clearly inadequate to meet the current demands placed on it.
- Even though the exact causes of that historic outage still are being pinpointed, no one doubts the need to improve and expand the existing grid. Investment is what is needed to increase capacity and improve reliability.
- In recent years, investment in the electricity grid has failed to keep up with the demand for transmission services. In the last four years, the volume of transmission transactions has increased by 400 percent, and uncompleted transactions due to grid congestion have increased five-fold. By 2020, electricity demand is expected to increase by 50 percent, and industry insiders estimate that an investment of some \$56 billion during the present decade is needed *merely to maintain transmission adequacy at current levels.*
- A solution proposed by the Federal Energy Regulatory Commission (FERC), known as Standard Market Design (SMD), is too blunt a policy instrument to achieve appropriate, cost-effective investment in the grid. The plan would mandate participation in regional transmission organizations (RTOs) to centrally manage the power grid and investments on a regional basis. This regulatory approach is inferior to allowing market forces to show where and how investment should be directed (subject to appropriate reliability standards).
- H.R. 6, the Energy Policy Act of 2003 (now pending in conference), provides alternative means to increase investment in the grid: repeal of the Public Utility Holding Company Act (PUHCA) of 1935, which will eliminate barriers to investment from outside investors; and imposition of electric reliability standards, which would provide rules to discipline market participants and prevent them from destabilizing the grid. Additionally, transmission line owners should be allowed to charge market rates, instead of a fixed FERC-approved tariff, for their services. Those provisions will begin the long process of improving the capacity and reliability of the grid.

Introduction

The August 14 electrical power outage that left 50 million people in the eastern United States and large parts of Ontario, Canada in the dark dramatically portrayed what government and industry insiders long have known: much of the nation's electricity grid is clearly inadequate to meet the current demands placed on it. Even though the exact causes of this outage still are being pinpointed, no one doubts the need to improve and expand the existing grid.

For some time now, public- and private-sector experts have realized that much more investment is what is needed to increase capacity and improve reliability of the grid. What policymakers must agree on is the best way to encourage that investment. At one end of the spectrum, the Federal Energy Regulatory Commission's Standard Market Design proposal would mandate participation in regional transmission organizations (RTOs), which would centrally manage the national grid and plan investments on a regional basis. At the other end is the encouragement of competition in electricity transmission and market pricing in transmission services. The latter plan would reinstate a profit incentive to invest in transmission infrastructure and avoid the pitfalls of government control.

While the question of more regulation versus less has not been resolved, one issue likely has been resolved – repeal of the Public Utility Holding Company Act of 1935. That repeal was agreed to by both the House and Senate in their respective versions of the Energy Policy Act of 2003 (H.R. 6), which is now in a House-Senate conference. It would remove substantial barriers to investment in the grid by allowing outside investors to invest in the electricity industry without becoming subject to onerous rules. Additionally, the final version of H.R. 6 likely will include electric-reliability standards, which will provide rules to discipline market participants and prevent them from destabilizing the grid.

This paper will define the problem through a review of the regulatory history with respect to the nation's power grid, and then address what can be done to increase investment in the grid in an efficient, cost-effective manner.

Government and the Grid: Where We Are Now

As noted, much of the nation's electricity grid is inadequate to meet current demands. A report produced two years ago by the Edison Electric Institute, the investor-owned electric companies' trade association, helped to quantify the need:

Between 1979 and 1989, transmission capacity increased slightly faster than did summer peak demand. However, during the subsequent decade, utilities added transmission capacity at a much lower rate than loads grew. The trends established during this second decade are expected to persist through the next decade. Maintaining transmission adequacy at its current level would

require an investment of about \$56 billion during the present decade. This transmission investment is roughly half that needed for new generation during the same period.¹

In testimony before the House Committee on Energy and Commerce earlier this month, David K. Owens, on behalf of the Edison Electric Institute, noted that demand for transmission services is outstripping supply:

According to NERC [North American Electric Reliability Council], the volume and actual transmission transactions has increased by 400 percent in the last four years. Transactions that could not be completed because of congestion on transmission lines increased five-fold to almost 1,500 in 2002, compared with 300 uncompleted transactions in 1998.²

Owens also noted that, according to the U.S. Department of Energy's Energy Information Administration, consumer demand for electricity by 2020 is projected to increase by 50 percent. "To meet this increase in demand, capital investments in upgrades and new transmission lines must increase from the current level of \$3 billion annually to roughly \$5.5 billion annually over the next 10 years," said Owens.³

There are several reasons why grid investment has not kept up with demand for transmission services that will be addressed in this paper. But to understand those reasons, a brief review of the history of electricity regulation is in order.

How We Arrived Here

The nation's electricity transmission system is an extensive, interconnected network of high-voltage power lines that move large amounts of electricity from where it is generated to where it is consumed. This network has to be sufficiently flexible to simultaneously balance the amount of electricity entering the network with the amount leaving the network every second of every day.⁴

For much of its history, the U.S. electricity industry consisted mainly of vertically integrated utilities that generated, transmitted, and distributed electricity within exclusive state-granted monopoly franchises for specific service territories. This initially led to a highly fragmented electricity grid with few

¹Eric Hirst and Brendan Kirby, "Transmission Planning For A Restructuring U.S. Electricity Industry," prepared for the Edison Electric Institute, June 2001.

²David K. Owens, testimony before the House Committee on Energy and Commerce, September 4, 2003.

³Owens, September 4, 2003.

⁴The East Coast power outage originated from a power imbalance, which overloaded the system and shut down generators. The mystery is why automatic safeguards that are supposed to quarantine imbalances failed to work, thereby allowing the outage to spread over such a large area.

interconnections between service areas. A major power outage in New York City in 1965 induced utilities to add interconnections between service areas so that power could be moved more easily to increase reliability.⁵

The Energy Policy Act of 1992 introduced competition to the wholesale electricity market by giving non-utility power producers open access to the nation's transmission networks on an equal footing with the utility generators. In other words, everyone who wished to use the grid to transport electricity could do so at a FERC-approved fixed rate, called a tariff.

The effect of opening up competition on generation through open access rules was a boom in the demand for long-distance transmission of electricity as the number of generators increased; so, too, did the need for transmission to get the power to buyers. But the transmission system was not designed to accommodate such a large volume of transactions. A Department of Energy study on the nation's electricity grid issued a year ago pointed to the "urgent need" for modernization of the transmission system:

The [U.S. transmission] system has become congested because growth in electricity demand and investment in new generation facilities have not been matched by investment in new transmission facilities. Transmission problems have been compounded by the incomplete transition to fair and efficient competitive wholesale electricity markets. Because the existing transmission system was not designed to meet present demand, daily transmission constraints or "bottlenecks" increase electricity costs to consumers and increase the risk of blackouts.⁶

Several factors have interfered with effective and efficient transmission investment. One is regulation at the state level. States regulate the rates of return on transmission investment, and many regulate retail prices as well. Both of these types of regulation can make it difficult for potential investors to make appropriate investments in electricity transmission. Controls on the rates of return and on retail prices can deprive potential investors of the information on demand that they need to determine when, where, and how much to invest. As noted by energy experts Jerry Taylor and Peter VanDoren, "Accurate price signals are crucial if we want to identify where investment might do the most good and ensure that problems are quickly and efficiently addressed."⁷ These are issues for the states.⁸

⁵Peter VanDoren, "The Deregulation of the Electricity Industry: A Primer," The Cato Institute, October 6, 1999.

⁶U.S. Department of Energy, "National Transmission Grid Study," May 2002, pg. xi.

⁷Jerry Taylor and Peter VanDoren, "Outside the Grid," *Wall Street Journal*, August 18, 2003. Also see Vernon L. Smith and Lynne Kiesling, "Demand Not Supply," *Wall Street Journal*, August 20, 2003.

⁸One of the impediments to deregulation of transmission is the widespread belief that transmission is a natural monopoly in need of regulation. Both theoretical and empirical economic studies have called into question the validity of the natural-monopoly justification for transmission regulation. See James A. Damask, "A power(ful) myth," The Buckeye Institute,

Finally, open access to the grid has created a classic “public goods” problem. As noted by Taylor and VanDoren, “Transmission projects are considered, approved and paid for at the state level – but the benefits cross state lines. And state-level decision-makers understandably resist using ratepayer dollars to pay for investments that will mainly help out-of-staters.”⁹

A similar problem has to do with what is known among economists as the “tragedy of the commons.” In other words, open access to a common resource (in this case the transmission grid) leads to overuse and eventual destruction of the resource. When FERC mandated open access to the transmission grid, it gave sellers of power an incentive to load up the grid. As noted in *Fortune* magazine, “New watt vendors don’t own wires and actually stand to gain from heavily loading the grid – they can reap huge profits when peak-time line congestion pushes wholesale power prices sky-high.”¹⁰ The vendors enjoy the full benefits of higher wholesale prices, while incurring only a tiny fraction of the cost of line congestion. The result is an overburdened transmission system.¹¹

A Flawed Solution: FERC’s Standard Market Design Proposal

Several proposals have been offered to address the shortfall in transmission capacity and the needed upgrades to the grid. At the forefront has been FERC’s Standard Market Design (SMD) proposal. *This proposal would force all utilities to relinquish ownership of their transmission systems to regional transmission organizations, which would be responsible for planning and managing transmission investment and for providing nondiscriminatory transmission services.*

FERC’s plan does not provide the kind of incentives that would stimulate efficient, economically rational investment in the transmission system, but instead relies on government fiat to determine when, where, and how much to invest. As explained by Taylor and VanDoren,

The solution now in vogue to solve these problems is to give the Federal Energy Regulatory Commission more authority over transmission investment. State regulation of transmission is, after all, an archaic relic of another era; and all who use the transmission system are vulnerable to the weakest links in it.

http://www.buckeyeinstitute.org/perspect/1999_2.HTM. Damask summarizes some of this literature.

⁹Jerry Taylor and Peter VanDoren, “The Right Way to Fix the Grid,” *New York Post*, August 19, 2003; and Lisa Shapiro, “Transmission Systems in Transition,” *Energy User News*, September 27, 2002.

¹⁰*Fortune*, “The Real Threat to America’s Power,” March 5, 2001.

¹¹This is why some analysts have suggested that owners of transmission lines be allowed to charge market rates for their services, rather than the FERC-approved fixed tariffs. See Taylor and VanDoren, August 19, 2003. Under market pricing, rates would go up as lines become more congested, which would discourage power sellers from overloading the grid.

But forcing utilities to invest in transmission upgrades through increased federal regulation is too crude and blunt a policy hammer. It may get the job done to some degree, but running industries by federal dictate is less efficient than ensuring that proper incentives exist for the industry to operate efficiently on its own.¹²

FERC's plan includes various instruments that are meant to mimic the incentives that would exist in competitive markets and market pricing; but these fail to produce the true market conditions.¹³ Without the information provided through market rates for transmission services, it will be difficult for FERC to determine when, where, and how much investment is needed. In other words, the same disincentives that currently inhibit transmission investment would continue to exist under SMD. The main difference is that FERC would mandate investment in lieu of market-driven investment. Although investment would certainly occur under this plan, centrally-directed investment is bound to lead to overinvestment in some areas and underinvestment in others.

An Alternative: Incentives for Investment Through Competitive Markets

Instead of Washington further centralizing control over the nation's grid, Congress should promote greater competition into the electricity transmission market. The first step in promoting greater competition is to urge FERC to allow transmission line owners to charge market rates for their services, instead of being forced to provide services to all comers at a fixed FERC-approved tariff (known as open access). Second, Congress should reduce barriers to entry into the transmission market by repealing PUHCA. And finally, Congress should pass reliability standards to require all market participants to follow the same rules when using transmission services.

Market Pricing of Transmission Services

Open access to transmission services – which requires regulated, nondiscriminatory rates for all users – prevents potential investors from getting the demand-side information they need to make appropriate investments in a timely manner. That information can only be generated through market pricing. It also eliminates the profit incentive to invest. Thus, transmission line owners should be allowed to charge market-determined rates for their services.¹⁴

¹²Taylor and VanDoren, August 19, 2003.

¹³For example, the SMD proposal would use “locational marginal pricing,” which substitutes computer-generated prices for real prices. See ELCON, “Locational Marginal Pricing: A Computer Program Pretending to Be a Market,” February 12, 2002.
<http://www.elcon.org/Documents/Publications/lmp.pdf>

¹⁴Taylor and VanDoren, August 18, 2003; and Clyde Wayne Crews, Jr., “Rethinking Electricity Deregulation: Does Open Access Have It Wired – Or Tangled?”, testimony before the House Subcommittee on Water and Power Resources, June 24, 1999.

Moreover, open access cripples innovation. The seizure of electric transmission services by FERC – either through the current system of regulated mandatory open access, or by assuming ownership of the transmission grid, as FERC proposes through Standard Market Design – on behalf of rivals means that neither the rivals nor the incumbents will have the incentive to develop the next-generation technologies they will need to compete in the transmission marketplace.¹⁵

Repeal of PUHCA

Both the House and Senate versions of the energy bill now in conference repeal the Public Utilities Holding Company Act of 1935 (PUHCA). The Bush Administration has also endorsed its repeal.¹⁶ The law is widely seen as a major impediment to investment in transmission capacity. PUHCA prevents new investment in the energy industry because any entity that owns a 10- percent or more voting position in a utility can be classified as a public utility holding company and forced by the Securities and Exchange Commission to sell off all of its non-utility interest.¹⁷ This all but eliminates outside investors from investing in the electricity industry. “With few exceptions, mergers and acquisitions of utilities subject to PUHCA have been by other domestic and foreign utilities,” according to David Sokol, president and CEO of MidAmerican Energy Holdings Company. “Investment by entities outside the industry has been virtually nonexistent, as they avoid the burdens imposed by the Act.” He also noted that multibillionaire investor Warren Buffett “has publicly announced his intention to spend as much as \$10 billion to \$15 billion on the industry after the law is repealed.”¹⁸

Reliability Standards

Both House- and Senate-passed energy bills also provide procedures for FERC to create an electric reliability organization that sets mandatory, enforceable reliability rules for the interstate transmission grid. The Bush Administration has also endorsed this provision. Currently, electric reliability organizations exist, but compliance with their standards is voluntary. Entities that don’t comply with the

¹⁵Clyde Wayne Crews, Jr. and Fred L. Smith, Jr. “Electricity Restructuring Is No License For Central Planning,” *Public Utilities Fortnightly*, June 1, 2002; and Adam Thierer and Clyde Wayne Crews, Jr., “What’s Yours Is Mine: Open Access and the Rise of Infrastructure Socialism,” Cato Institute, April 2003.

¹⁶Letter from the Secretary of Energy to Senator Pete Domenici, Chairman of the Senate Energy and Natural Resources Committee, September 10, 2003.

¹⁷*Rudden Energy Strategies*, June 2, 2003.
<http://www.rjrudden.com/rudden/resources/EnergyStrategies.pdf>

¹⁸Davik Sokol, “Discarding PUHCA,” *Electric Perspectives*, March/April 2000. Also see, Lynne Kiesling and Brian Mannix, “Standard Market Design in Wholesale Electricity Markets: Can FERC’s Proposed Structure Adapt to the Unknown?” *The Electricity Journal*, March 2003.

standards can act in ways that may destabilize the transmission grid. In lieu of market discipline, mandatory reliability standards are probably the best way to avoid future power outages.¹⁹

Conclusion

Increased investment in the nation's electricity grid is needed in order to increase its capacity and improve its reliability. FERC's SMD regulatory proposal fails to allow market incentives and discipline to stimulate the needed investments in transmission. Removing barriers to entry into the transmission market, as well as allowing market pricing of transmission services, would provide both the incentive and discipline necessary to create a robust transmission grid. Repeal of PUHCA and the provision of electric reliability standards provide steps in the right direction.

¹⁹For a good explanation on the justification for mandatory reliability standards, see North American Electric Reliability Council, "Legislative Action Needed to Maintain Electric System Reliability," August 2003. <http://www.nerc.com/about/legislation.html>.