

Thinking anew about electricity infrastructure



By James J. Hoecker

All the innovation happening in the ways we produce, use and even store electricity in the decades ahead poses a big question: Do we still need to build traditional electric delivery infrastructure — i.e., electric transmission?

The special benefits derived from the transmission system as a shared network that we all rely upon are diverse. The grid facilitates the rise of distributed generation, the deployment of digital technologies, demand responsiveness, energy efficiency programs, and other advances like storage and microgrids, all of which hold promise for a bright energy-intensive future where customers can realize their full energy potential. Transmission is a tide that will raise all boats but, like trade or the highway system or the Internet, its benefits are broad, and individuals or groups may not always be able to identify with certainty its immediate benefits. Yet, without a robust transmission system, we will forfeit many future least-cost solutions and be less able to adapt to changing conditions as technology and economic forces transform how we produce, deliver and use energy.

Make no mistake about it. The electrical infrastructure we have today is not yet equal to the challenges of the changing 21st century energy landscape. Worse yet, there exist common misconceptions — I'll call them "myths" — about electric transmission that are getting in the way of smart and timely investment in our nation's backbone transmission infrastructure, which will remain the most efficient means of delivering customer savings and integrating new technology and fuel resources.

For a more detailed examination of transmission mythologies, let me direct you to the new study by London Economics posted at www.wiresgroup.com, which provides the data that diffuses the myths identified below and a dozen others.

Myth 1: Energy efficiency and the flattening of demand for electricity in various

regions automatically results in diminished need for transmission infrastructure. Despite low electric load growth, transmission development is being driven by the need to upgrade aging infrastructure, address reliability mandates and plant retirements, and connect new resources in remote locations. We also need to ensure the electric grid can keep pace with technological innovation and the modern demand for power to sustain its critical role. This myth ignores long-term trends that will prevail over the 50-year life of transmission assets, the fact that our existing grid and its electro-mechanical components are now a generation or two old or older, and the ongoing need to integrate and expand the system to reach important new resources located where the grid is weak and the customer base quite limited.

Myth 2: The integrated wires network is obsolete in light of the decentralization of electric generation and the rise of digital technologies, rooftop solar installations, and distributed resources like energy storage and microgrids. While grid-edge technologies offer enormous benefits to consumers and locales, the grid is the enabler, integrator and facilitator of these developments — so it will never be a simple either/or proposition. Life lived entirely "off the grid" may be possible in certain cases, but virtually all uses of electricity lean on the central grid.

A modernized high-voltage grid must be empowered to integrate and dispatch new resources and technologies on demand and provide a degree of efficiency and market access beyond anything the grid was originally designed to provide and beyond anything that distributed resources can provide alone.

Myth 3: Transmission is expensive and should always be an option of last resort when it comes to investing valuable company or ratepayer dollars. Considering the benefits that a transmission project, and the grid as a whole, deliver to a wide constituency and the leverage it provides to so many innovations, transmission's upfront costs are more than justified. Unfortunately, the immediate reward of cutting costs and delaying infrastructure investment is always more enticing to policymakers than the uncertain reward of anticipating future needs. In any event, the benefits of well-planned transmission will always exceed the costs, and that investment will remain the smallest portion

of retail electric bills.

Myth 4: We have a functioning grid now, and any additional investment will be excessive and an invitation to "gold-plating." The industry has made significant investments over the past decade, benefiting customers significantly. But, given the many new demands being placed on the grid and the need for resilience in the face of extreme weather events and new security threats, now is a critical time to support continued investment in preparation for the years ahead. Historic underinvestment in transmission systems and the resulting age of the grid, grid reliability and security concerns, and modern power market dynamics are all driving the need for increased transmission investment.

regional boundaries — and the costs can be equitably shared on the basis of the benefits to an array of energy consumers.

The integrated alternating current (AC) transmission grid is like the highway system with on-and-off ramps. Its users and beneficiaries are geographically and demographically dispersed and economically diverse. While direct current (DC) projects represent contracted-for power that is delivered as if it were in a pipeline, the benefits on both the generation and power-consuming ends of such a system are powerful contributions to often-distant state and local economies with regional impacts.

Fortunately, a national conversation is underway about strengthening our nation's infrastructure and it involves

Services Provided by New Technologies Compared to Transmission

		Transmission	Energy Efficiency	Demand Response	Utility-scale Generation	Distributed Generation	Energy Storage	Smart Grid - Distribution
What	Energy	●	◐	◐	●	◐	●	●
	Capacity	●	◐	◐	●	◐	◐	○
	Ancillary Services	●	○	◐	●	◐	●	◐
	Reduce system losses	●	◐	◐	○	◐	◐	◐
When	Long lifespan	●	◐	○	◐	●	●	●
	Continuous basis	●	◐	○	◐	○	●	●
Where	Regional	●	◐	◐	●	◐	◐	○
	Local	●	●	●	●	●	●	●
	Micro	●	●	●	○	●	●	●
How	System/Wholesale	●	○	○	●	○	●	○
	Customer/Retail	○	●	●	○	●	○	●
TOTAL		●	◐	◐	◐	◐	◐	◐

● Provided ○ Not provided

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Our nation currently relies on an aging transmission grid that was not designed to accommodate either the demands placed on it today or those looming tomorrow. Electric transmission is already more systematically planned and regulated than any other kind of basic infrastructure, including natural gas pipelines, railroads, the Internet or even the highway system. New transmission facilities never go to waste. The benefits are not only widespread, even national, but also intergenerational. In my view, the most unsupportable fear of regulators is that transmission will be overbuilt.

Myth 5: The benefits of any transmission investment go to only those utilities and customers taking service at the "receiving end" of the line. Transmission investment benefits everyone by improving service reliability, decreasing generation costs, and supporting competitive wholesale energy markets across state and

perhaps the most vital infrastructure of all: the electric grid. Because the lights always come on, the truths about the need to invest in the grid are not always self-evident. The grid is aging, congested in places, fails to reach some of our most abundant resources, and will soon be called upon to support a more highly electrified, digital, and power-hungry 21st century economy. Let's work together to make sure our grid is prepared to meet the challenge.

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