



Roadblock for Renewable Energy North America's transmission challenge

By Ed Feo and Cynthia Koploy

Soaring energy prices and concern over global warming have helped accelerate demand for renewable energy. The majority of US states have set renewable portfolio standards for increasing the percentage of energy they derive from renewable resources. However, efforts to generate much-needed alternative energy are being frustrated without concurrent creation of the infrastructure necessary to transmit energy to consumers.

Due to the nature of North America's geography, most wind, geothermal, and solar generation facilities are and will continue to be located in remote areas far from population centers. This problem is compounded by the high cost of building transmission infrastructure, as well as legal, regulatory, and environmental hurdles that can delay transmission projects. Fortunately, states such as Texas and California have created initiatives to help fund, site, and build transmission projects. If the political will behind these initiatives sustains them, funding to build transmission capacity will follow, and the infrastructure needed to take advantage

of alternative energy projects will continue to develop, leading to a new era in energy generation and transmission.

The US transmission system was originally built to support limited transactions between monopoly utilities, which were each responsible for building their own infrastructure locally. A combination of factors led to a chronic under-investment in transmission. An Edison Electric Institute study titled, *Transmission Crisis Looming?* concluded that transmission investments have been declining for 25 years, at an average rate of \$155 million per year. Partial blame is due to increasing costs and difficulty assuring an adequate return on investment. Partial blame can also be placed on time and the difficulty of permitting transmission lines. Approval of transmission construction has historically been a domain of the states, and in many cases local interests or, in the case of transmission lines across state borders, inter-state disputes resulted in delayed or cancelled projects.

Until the Energy Policy Act of 2005, there was no clear federal authority for licensing



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of transmission lines. EPACT 2005 at least introduced a concept of national interest electric transmission corridors, where the federal government can play a backstop role in permitting, but only after there had been demonstrated gridlock at the state level. Meanwhile, a growing mandate for renewable energy made expediting the process of building new transmission lines critical. To comply with the renewable portfolio standards adopted by (at this point) twenty-six states, a number of states are implementing transmission initiatives to allow new renewable power to reach population centers.

In Texas, Senate Bill 20, passed in 2005, directed the Public Utility Commission of Texas (PUCT) to designate competitive renewable energy zones (CREZ), and to develop a plan to construct transmission capacity to deliver renewable energy from those zones. Senate Bill 20 permitted the recovery in a utility's rate base of transmission costs for which a certificate of convenience and necessity was issued, regardless of the level of actual use of transmission facilities. SB 20 changed a previously applicable rule

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that transmission facilities had to be demonstrated to be used at an adequate level to be included in rate base. It also meant transmission line owners could recover their costs even if projects expected to use the transmission line did not reach operation.

Need for transmission line development has reached a critical stage in Texas. West Texas wind farms have been unable to deliver power at times of peak production (or have been reliant on an over-supplied local market with low or negative prices) because of insufficient transmission capacity. Forecasts of periods of curtailment for some areas of West Texas have grown from under 4% to 10% of available hours.

The CREZ process developed three scenarios for new transmission ranging from Scenario 1, with estimated new capacity of 5,150 MW and an estimated cost of new transmission of \$3.8 billion, to a more aggressive Scenario 3, with a capacity of 17,956 MW and a cost of \$6.4 billion. On July 17th, 2008, the PUCT opted for a middle ground or Scenario 2, with proposed additional capacity of 11,553 MW, 2,300 miles of new 345 kv transmission lines and an estimated cost of \$4.9 billion. The PUCT is currently holding settlement conferences to determine which transmission line proponents will build the new transmission.

Proposals have been submitted by utilities, including a joint venture of American Electric Power and MidAmerican Energy Holdings, as well as independent transmission companies such as ITC Holdings, TransElect and Babcock & Brown. Within a few years, under the PUCT program, approximately 2,400 miles of new 345 kV transmission lines will be available to serve 18,456 MW of existing and projected wind power projects in Texas. The PUCT is expected to decide which parties will construct the Scenario 2 transmission by the end of 2009.

California's SB 1078 and SB 107 set a renewable portfolio standard of 20% by 2010,

and the state's Energy Action Plan includes a goal of 33% by 2020. These aggressive benchmarks mandate significant increases in renewable generation, but development of new renewable generation has been impaired by transmission constraints. Today, there are 16,000 MW of wind projects and 22,000 MW of solar projects in the queue for interconnection at the California Independent System Operator (CAISO), and virtually all will require transmission network upgrades.

To address the transmission challenge, SB 1078 also mandated certification of new transmission facilities necessary to achieve the RPS goals. California's Renewable Energy Transmission Initiative (RETI) is a statewide initiative bringing together stakeholders from utilities, generators, and transmission interests, as well as others in an effort to identify generation and transmission projects needed to achieve renewable energy benchmarks, by locating competitive renewable energy zones that can be developed in cost-effective and environmentally sensitive manners. The RETI process is proceeding in three phases: Phase 1 is designed to provide project level screening and ranking of potential renewable resource zones in California and neighboring states, and to broadly identify the transmission requirements for those zones; Phase 2 will be a more in-depth examination, and will develop conceptual transmission plans to the highest ranking zones; Phase 3 will develop detailed plans of service for commercially viable transmission projects.

To date, development of an assessment methodology has been completed as the first part of Phase 1, and the RETI working group is now utilizing this methodology to aggregate identified renewable resources into competitive renewable energy zones. Given that access to transmission will be the difference between success and failure in project development, the process is highly debated among stakeholders.

As initiatives such as those in California and Texas proceed, funding needed to build essential transmission infrastructure will follow, eventually integrating renewable energy into the grid. With each California and Texas, cost of transmission projects will be rolled into rate base allowing generation to be built without being overburdened by network upgrades. In the case of California, FERC approved a CAISO request last year for a new category of "multi-user resource trunks" – essentially gen-tie transmission lines used to connect multiple location constrained generation sources – in FERC approved transmission rates. Tariffs will provide a basis for predictable cash flow for the transmission owner to support project financing. Owners of the new transmission will either be load-serving utilities or independent transmission companies. Regardless, all will be relying on their tariffs for recovery of construction costs. Southern California Edison alone is looking to spend upwards of \$5.5 billion on transmission projects, to add up to 7,000 MW of new generation to its system.

Transmission is a roadblock to success of the expansion of renewable energy projects. Fortunately, state initiatives such as those in Texas and California are facilitating new transmission from the renewable energy zones to load centers, and have begun to create the pipeline of investment and political will needed to overhaul a system long overdue for renovation.

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