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Solving the Renewable Integration Puzzle

In November, California voters overwhelmingly rejected an initiative that would have put the brakes on AB 32, the state's ambitious greenhouse gas (GHG) emissions reduction law. Given the role that California has played in climate change policy, that such a vote took place only four years into the law's implementation process and 10 years before the emissions reduction targets were to be met was a reality check on climate change policy for those on both sides of the issue.

Had the initiative passed, the effects would likely have reverberated across the country, undermining ongoing intraregional efforts to encourage and coordinate the development of new renewable resources and strengthening the case against comprehensive national legislation. While the results of the election evidence a continuing commitment in the West to move forward with climate change policy (notwithstanding the economy), questions regarding how policy objectives will be met and at what cost loom larger than ever.

A Massive Build-out

Thirty-four states and the District of Columbia have either mandatory renewable portfolio standard (RPS) requirements or have adopted renewable energy goals. Many have also passed or are considering additional GHG emissions reduction measures, which could create a need for even more renewable resources. Meeting these goals will require significant investments in new generation and transmission across the country.

In 2008, the North American Electric Reliability Corp. projected that more than 145,000 MW of new variable renewable generation would be added to the North American bulk power system over the next decade—a 700% increase in the amount of variable resources existing at that time. Connecting these resources to the grid will require significant additions to the transmission system.

For example, in the Western Interconnection, renewable developers with an eye on the California market have been active developing wind projects in Montana and Wyoming. The economic viability of many of these projects, however, hinges on new interstate transmission infrastructure, such as the proposed Zephyr and TransWest Express transmission projects—each of which carries a $3 billion price tag. Costs for new in-state transmission lines can be significantly higher. In California, the cost for new transmission infrastructure required to meet a 33% RPS target by 2020 is estimated to be $12 billion, exclusive of the cost of the underlying generation.

Transmission Is Only One Piece

In addressing the challenges of integrating new renewable generation, the focus for many regulators to date has been on the transmission lines needed to connect these resources to the grid. The Federal Energy Regulatory Commission's (FERC's) current rulemaking to consider changes to the transmission planning process is the most recent attempt to break through the transmission siting logjam that has had state regulators, generators, and utilities banging their heads against the wall for years (see "FERC Proposes an Improved Path for New Transmission," *POWER,* August 2010).

Although fixing the transmission planning process remains an immediate need, regulators such as the California Public Utilities Commission have recently turned their attention to the other piece of the integration puzzle: identifying the operational requirements and resource options necessary to reliably operate the grid in an RPS world.

To ensure reliability, dispatchable resources with specific load-following capabilities, ramp rates, and regulation capacity will be necessary to successfully integrate the variable renewable resources needed to satisfy RPS and GHG emissions reduction targets. Identifying the right mix of resources to meet these needs poses a significant challenge for regulators and has major cost implications for ratepayers.

Maximizing Value from the Existing Fleet

The projected costs associated with the amount of new renewable generation expected to come online over the next decade, and the number of transmission lines needed to connect this generation to the grid, are enormous. Add in the cost of new dispatchable resources needed to reliably integrate this renewable generation and it becomes clear that steps must be taken to reduce integration costs.

Smart grid technologies, demand response, and more energy efficiency measures are important tools but cannot be expected to fully address renewable integration issues absent dispatchable generation. Leveraging the capabilities of the nation's existing generation fleet will be one way to ensure that the needed operational flexibility is procured in the most cost-effective manner. The first step, however, is figuring out what we have.

In California, parties are trying to identify what, if any, untapped operational flexibility can be obtained from the existing fleet through modest capital investments. One straightforward way of doing so is to allow existing generation to participate in long-term resource solicitations. Allowing competition between new and existing generation resources should identify the ability of the existing fleet to meet integration requirements. Current utility procurement practices, however, often preclude existing generation from participating in such solicitations, making it more difficult to compare the relative value of new and existing dispatchable resources and identify the least-cost procurement options. These practices need to change.

As the nation continues its march toward lower GHG emissions over the next decade and beyond, we will see significant energy infrastructure investment. Given the magnitude of this investment, it is critical that steps be taken to encourage the most cost-effective ways to integrate renewable generation resources. Maximizing the value of the existing fleet should be an important first step in this process. ■

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