‘Integration’ of renewable energy: what it means and why some transmission providers are beginning to charge for this service

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A new buzzword is striking fear and excitement in the hearts and minds of renewable energy developers and transmission providers: integration. The term can get stakeholders from all sides of the energy industry shouting across the table. It is also a sign of how far the renewable energy industry has come in making resources such as wind and solar energy a larger part of our domestic energy portfolio. So what does integration mean and how should we in the industry be feeling about it?

In the context of renewable energy, ‘integration’ refers to a transmission provider’s use of balancing reserves to accommodate the natural variability of renewable resources. Balancing reserves are needed for those instances when wind or solar energy projects generate more or less electricity than forecasted. In the case of wind energy, this ‘wind integration’ or ‘wind balancing’ requires the transmission provider to either dispatch energy from its own hydro or thermal resources if the wind blows less than was expected or reduce the output of its hydro or thermal generation if the wind blows more than was expected at the time that the wind generator submitted its energy schedule to the transmission provider. Although ‘integration’ is commonly confused with energy storage and shaping, these are different concepts (and services) with different implications (and charges) for renewable energy developers.

Historically, when the percentage of renewable energy being fed into the grid was relatively small, the variability of renewable energy was masked by the variability of energy demand, and transmission providers did not charge for these balancing services. However, as the percentage of energy generated from renewable resources has increased, so have the number of voices calling for charging renewable energy generators for the ‘costs’ of providing integration or balancing services.

To place this issue in context, we offer highlights from the recently concluded Bonneville Power Administration (‘BPA’) rate case, which set BPA’s transmission rates for the 2010-2011 rate period. Because the Pacific Northwest is at the forefront of the deployment of renewable energy on a large scale, the BPA experience is instructive for renewable energy developers across the country.

Currently, BPA has a higher concentration of wind energy on its system than any other balancing authority in the country. BPA forecasts nearly doubling this amount over the next two years. The ratio of wind on BPA's system has prompted it to literally lead the charge on wind integration pricing.

BPA's Wind Integration Rate

BPA, in its role as the Pacific Northwest's largest transmission provider, is responsible for maintaining reliability of its transmission system. To do so, it must balance both loads (the electrical power consumed by customers) and resources (generation from hydro, thermal, and wind power plants) on its system. BPA must hold reserves it can deploy to keep the grid in balance when generation does not meet the moment-to-moment demand for electricity. BPA sets aside a portion of its hydro resources to provide balancing services for both wind and load.

BPA's effort to charge wind generators for wind balancing services first emerged in the 2009 Wind Integration (WI) Rate Case. Pursuant to a settlement agreement, BPA's wind generator customers agreed to pay a WI Rate in exchange for BPA's commitment to implement operational advances that would bring down the cost of providing wind integration services in the future.

In the 2010 BPA Rate Case, BPA initially proposed a WI Rate of $2.72/kilowatt-month, or roughly $12/megawatt hour (MWh)—a 300% increase from the 2009 WI Rate. [The rate is based on nameplate capacity and therefore varies somewhat depending on a project's capacity factor.] BPA maintained that the charges were necessary, in part because the rapid growth of the wind fleet and the scheduling inaccuracies by the wind generators required BPA to hold more reserves in order to provide wind balancing services. BPA's wind generator customers strongly objected to BPA's proposed rate, arguing that the amount of reserves BPA estimated as being required were inflated, and that BPA had included excessive and duplicative charges for providing wind balancing services.

BPA ultimately adopted a significantly lower rate of approximately $5.70/MWh. The lower rate was based in part on BPA's acknowledgment that wind generators had improved the accuracy of their generation schedules. It was also partly based on an agreement between BPA and its wind generator customers to limit the use of BPA's balancing reserves through certain protocols. Under these protocols, when BPA is close to exhausting the reserves it has set aside to provide wind balancing services, it can direct wind generators to lower their output if they are generating more than their schedules or reduce their transmission delivery schedules if they are generating less than their schedules. BPA also committed to working with the wind community on the implementation of certain operational improvements that will lower the cost of balancing wind energy. These improvements include enabling wind generators to self-supply balancing reserves, allowing wind generators to update their schedules more frequently in order to improve scheduling accuracy, and giving other balancing authorities the ability to provide wind balancing services for wind generated in BPA's balancing authority area. BPA pledged to implement these operational improvements before the next rate case. Despite the concerns that remain about BPA's cost methodology and other aspects of the rate calculation, BPA's wind generator customers remain engaged with BPA in the efforts to improve its internal protocols and are waiting to see if BPA makes good on its promises to facilitate the addition of more wind on its system.

Implications for future integration of renewables

There were many lessons learned from BPA's most recent transmission rate case. One insight that renewable energy developers outside the Pacific Northwest should take from this is that as renewables begin to make up a higher proportion of energy generated in a given balancing authority, transmission providers are likely to begin charging renewable energy generators for the cost of integrating larger quantities of renewables into the grid. Indeed, the Midwest Independent System Operator and Westar have also been exploring the integration of renewables.

Another cautionary note: this is not simply an issue for wind generators. Xcel Energy recently attempted to impose a 'connectivity fee' for its net-metered solar customers in Colorado. The proposal was quickly withdrawn due to strong – and highly vocal – public opposition. Had it succeeded, Xcel would have been the first utility in the United States to charge net-metered solar customers for the ability to access the grid when needed, via a proposed monthly fee that would have paid Xcel for setting aside electricity capacity for solar customers. Because the proposed charge was capacity-based, it would have applied even if the net-metered customers did not actually use any of the capacity in a given month. Although the proposal was ultimately withdrawn, it is safe to expect that the issue of charging fees for solar energy integration will reemerge.

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As projects are planned, renewable energy generators should be prepared to address integration issues and costs and the additional uncertainty they create. Although the integration of renewables poses new challenges in the planning of projects, requiring creative thinking in the drafting of agreements and advanced planning to avoid hiccups with financing, it is also an indication of the progress that the renewable energy industry has made in reshaping the electricity sector. In order for the renewable energy industry to continue to thrive, the integration of renewables must happen in a way that does not place the entire burden on developers, but that prompts transmission providers to reexamine their own practices and policies to ensure they are creating an environment that is conducive to the continued growth of renewable energy in the United States.

Stoel Rives attorneys Stephen Hall and Dina Dubson represented the Northwest Wind Group, a coalition of wind energy developers, in the 2010 BPA Rate Case.