



Market-Pricing Idiosyncrasies Present a Twenty-First-Century Grid Challenge

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The Federal Energy Regulatory Commission (FERC) has recently issued rules that address the difficulties of assuring reliability over complex grids.

WIND POWER NOT EXEMPTED FROM REACTIVE POWER

On November 19, 2015, FERC issued a proposed rule to eliminate the exemption for wind power plants from *reactive power* obligations. Other, more conventional generators are required to provide reactive power. The proposal is in part to maintain system reliability as more and larger-sized intermittent resources are added to the grid.

Reactive power establishes and sustains electric and magnetic fields, essential to electric system voltage control. Reactive power ensures the reliable operation of our alternating current transmission system. FERC is proposing to standardize rules for all generators in the form of reactive power requirements.

The rules would apply to newly interconnecting nonsynchronous or intermittent generators, including any new or upgraded facilities connecting to the grid. Based on its findings, FERC concluded that continuing to exempt wind generators from reactive

power requirements might be discriminatory and prejudicial. With more intermittent and distributed resources comprising our generation asset portfolio, it is time to consider the needs of a 21st-century grid.

We need one set of rules and one set of expectations governing generation asset performance. At a minimum, if different assets are going to continue to have different requirements, we need to select resources much more carefully to ensure that the “portfolio” of assets on the system has sufficient reactive power to maintain reliability. Let’s come back to this shortly.

NEW REPORTING REQUIREMENTS FACILITATE COMPARISONS

On November 20, 2015, FERC issued an order regarding price formation in energy and ancillary services markets. The reports to be filed by regional transmission organizations/independent system operators (RTOs/ISOs) have to address the pricing of fast- or black-start resources, among other pricing issues. For example, natural gas- and petroleum-fired generators can start up quickly in real time to address system needs and restore grids after blackouts.

These resources play by a different set of rules in locational marginal pricing (LMP) due to their unique characteristics and operating synergies with other resources in the LMP region. Coal and nuclear plants do not have black-start capabilities. It takes hours—or, in some cases, days—to start these units back up. With the emergence of a more distributed grid, relying less on a radial system configuration and being more networked, resources that are more homogeneous in capability are required. Assets will need to be able to substitute more easily for one another, requiring that they have somewhat similar operating characteristics and that such operating characteristics have value in the marketplace.

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With the introduction of microgrids, either stand-alone or connected to a utility grid, new resources will need to mimic the characteristics of conventional generation. If the new resources do not, we risk not being able to maintain required and expected levels of reliability. This is not to say that all resources should be the same.

Generation assets producing electricity from sunlight, wind, water, uranium, or carbon-based fuels could have different operating characteristics. However, the combination of assets has to operate in a manner consistent with and in sync with the current system in which resources are added. To some extent, as a new system (electric grid) is being built, near-term asset additions are required to meet existing system requirements.

This will be the case until the system reaches a tipping point and new assets and infrastructures overtake the existing system, perhaps with different and new operating requirements and rules.

CONSIDERATIONS MULTIPLYING WITH MORE-COMPLEX GRID

FERC is timely in its deliberations.

Wholesale electricity markets are now 15 years old and continuing to evolve and mature. It is time to address market-pricing idiosyncrasies to ensure that market rules and pricing are not so radically different among and between RTOs/ISOs. Having been a market participant in three RTO/ISO markets, I can attest to the difficulty at times of valuing assets, clearing markets, and assessing the economics of new asset additions due to differences in how prices are set and how value is determined in the different markets. FERC's initiatives are well-timed and necessary as the electric industry continues its transition toward a more distributed system with more intermittent resources. Unless FERC addresses pricing issues, the real value of new resources additions will be masked.

As FERC said:

[B]ecause these issues are complex, inter-related market features, the effects of any one change on the price formation process may not be readily apparent. By obtaining information on these five issues, the Commission, RTOs/ISOs, and stakeholders will be able to compare practices across markets. (FERC Order. Docket No. AD14-14-000. November 20, 2015.)

FERC is requiring regional and independent transmission operators to report on their price-formation practices in the energy and ancillary services markets. Reports are due within 75 days, and the public will have 30 days to comment.

NEW FERC DATA REQUIREMENTS MEET NEW REQUIREMENTS

Now back to reactive power.

The electric grid, built around large, central-station generating assets, moves power via radial transmission and distribution lines. These "central" generation resources, including hydro plants and coal, nuclear, natural gas, and oil-fired generators, provide reactive power. With costly control equipment and storage, large-scale asynchronous resources like solar and wind, which do not produce voltage in sync with the rest of the grid, can supply reactive power as well. The FERC proposal addresses the concern that as more and larger distributed resources are added, reliability will be compromised without new reactive power sources.

Whether you agree or not with FERC's direction, RTOs and ISOs, as well as vertically integrated utilities in their "look-ahead" modeling, need to consider system needs—not just customer, policy, or market participant desires. FERC's interest in look-ahead modeling is expected to optimize new resource and infrastructure additions based on key asset characteristics, including reactive power needs, ramping needs, black-start, and location on the system. Getting prices right, valuing assets based on their contributions to providing energy and capacity, and system reliability will become more important than ever. FERC's interest is in line with the changes the industry is going through, and if issues are examined thoroughly, and addressed appropriately, we can be assured of continued well-functioning markets and a reliable grid.

FERC's stated goal is to identify best practices to maintain reliability, facilitate accurate and transparent pricing, and reduce uplift, and for market participants to operate consistent with dispatch signals. FERC has stated that it will use the RTO/ISO reports to determine if further action is necessary. The studies, coupled with the interest to require large-scale distributed intermittent resources to comply with reactive power needs, will ensure a healthy and transparent dialogue and a more reliable and resilient electric grid. 