RESOURCES FOR THE FUTURE

Comments on PJM's proposed changes to its Open Access Transmission Tariff

Prepared for the Federal Energy Regulatory Commission

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On behalf of Resources for the Future (RFF), I am pleased to share the accompanying comments to the Federal Energy Regulatory Commission (FERC) on PJM's proposed changes to its Open Access Transmission Tariff submitted to FERC on October 2, 2018.

RFF is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement. RFF is committed to being the most widely trusted source of research insights and policy solutions leading to a healthy environment and a thriving economy.

While RFF researchers are encouraged to offer their expertise to inform policy decisions, the views expressed here are those of the individual authors and may differ from those of other RFF experts, its officers, or its directors. RFF does not take positions on specific legislative proposals.

For the past several decades, RFF experts have helped decision makers better understand the implications of policy decisions on the economy and the environment. RFF has an extensive history of expertise in this area, and RFF experts are uniquely positioned to provide unbiased information based on rigorous research and policy analysis.

As always, the goal at RFF is to identify the most cost-effective and net-beneficial ways, from an economic perspective, to meet energy policy objectives through regulation, policy, or market mechanisms. To that end, researchers at RFF have been actively analyzing the proposed changes to the PJM Tariff.

Two RFF experts have provided comments on the issues listed below, which are drawn from recent RFF blog posts available at www.rff.org. All authors' comments are their own and submitted as independent authors.

1) Comparison to CASPR: Kathryne Cleary and Karen Palmer
2) Integrating Subsidized Resources: Kathryne Cleary and Karen Palmer
3) The Future of Capacity Markets: Kathryne Cleary and Karen Palmer

Sincerely,

Karen Palmer
Senior Fellow and Director of the Future of Power Initiative

Comparison to CASPR

PJM's latest proposal submitted to FERC on October 2, 2018 is in contrast with efforts of ISO-NE to address the same issue of integrating subsidized resources into the capacity market.

ISO-NE's solution, the Competitive Auctions with Sponsored Resources Project (CASPR) set to launch in February 2019, is preferable to PJM's approach in a few key ways. ISO-NE's method still preserves a functioning market where the intersection of supply and demand dictates both price and quantity. By separating these in the two-stage auction, PJM essentially removes the market part of the capacity market. In contrast, by allowing the market to determine price and quantity when subsidized resources are taken out, ISO-NE's CASPR allows quantity demanded to readjust downward in response to the higher price. This consequently could lead to lower costs under CSAPR than we see with the PJM approach that keeps the high quantity demanded from stage one and the higher price from stage two.

By allowing new subsidized resources to directly replace retiring resources, ISO-NE's CASPR finds a way to integrate and still appropriately compensate these new subsidized resources while also reducing the potential for oversupply. PJM's proposed market does not compensate subsidized resources that compete even though they are still subject to capacity obligations. Moreover, the payment to the additional resources in the second part of the proposed auction encourages oversupply by giving these resources an incentive to stay online even though their capacity is not needed.

ISO-NE's approach is able to accomplish the same goals PJM is shooting for: accommodating new subsidized resources and ensuring that capacity prices do not dip too low. CASPR is able to do so at a conceivably lower cost than PJM's proposal while simultaneously attempting to support resource reliability and addressing the oversupply issue.

Notably, between the two regions, oversupply is a much larger issue in PJM. PJM's Summer 2018 Reliability Assessment reported that the 2018 forecasted reserve margin was 28.7% despite a required reserve margin of only 16.1%. Also, ISO-NE is heavily dependent on natural gas for both heating and electricity generation and could potentially benefit from some alternative forms of excess capacity for use during extreme weather events (as seen during the Bomb Cyclone of 2018). It is worth noting that ISO-NE still recognized oversupply as an issue worth addressing while PJM's proposal did not.

FERC approved CASPR in March of 2018, long before PJM submitted its updated filing on Oct 2. Additionally, FERC already rejected PJM's original proposal that used capacity repricing—claiming that "it is unjust and unreasonable to separate the determination of price and quantity for the sole purpose of facilitating the market participation of resources that receive out-of-market support". Especially with that context, we find it very surprising that PJM chose to keep capacity repricing in its new filing instead of adopting an approach similar to CASPR that FERC would be more likely to approve.

The methods from each RTO differ notably in two key areas: treatment of plant retirements and compensation to subsidized resources. ISO-NE, under CASPR, encourages replacement of older plants with newer subsidized resources by rewarding older plants that choose to retire. PJM, by contrast, would reward arguably unnecessary plants to be on standby in order to raise capacity prices, while at the same time not providing any compensation for subsidized resources that do provide valuable capacity. Because new subsidized resources tend to be renewables and retiring resources tend to be older coal plants, PJM's proposal may be strongly influenced by the interests of incumbent generators and the Trump Administration's efforts to keep coal plants online.

Neither approach is good for ratepayers, to be clear—both will likely raise costs of capacity. But of the two, PJM's approach is likely costlier. Beyond that, PJM's proposal also does not address the oversupply issue and discourages the deployment of cleaner renewable energy.

PJM's proposal raises the question of whether its latest attempt to protect the integrity of the market ends up, in fact, dismantling the market by creating a fundamental disconnect between supply and demand. The decision lies with the Commission.

Integrating Subsidized Resources

FERC claims that out-of-market subsidies threaten the "integrity" of the competition of the capacity market. Yet most of the state policies behind these out-of-market incentives are used to correct for environmental externalities and encourage carbon-free electricity generation, either through Renewable Portfolio Standards (RPS) or Zero Emission Credit (ZEC) programs keeping nuclear plants online. Arguably, in the absence of federal or state carbon pricing, these policies are an attempt to partially internalize the environmental costs associated with certain types of generation and are thus addressing an important market shortcoming. Although they are certainly not a perfect substitute for pricing carbon, these efforts theoretically help move the market toward a more economically efficient outcome.

The issue PJM faces may therefore not be that out-of-market subsidies are distorting the market, but that the capacity market as it currently exists is not designed to properly accommodate intermittent generation units that have low marginal cost. Capacity markets used to be comprised of nearly identical products (non-intermittent resources like coal, nuclear, gas, and hydro) competing to provide the same service. Today, the units competing in the capacity market are not identical. Renewables offer value in different ways, including environmental benefits and in some instances modularity that allows generation to be located close to load. But they do not offer the same level of reliability assurance that fossil-fueled plants do, and their variable nature poses challenges for determining their capacity value (which can vary with the season and level of penetration in the market). Solar technologies especially have a tendency to become less valuable as penetration increases because their peak production occurs only during certain hours with diminishing marginal value.[1] [2]

These concerns typically lead to a highly conservative approach to valuing existing renewable capacity, especially for wind. PJM currently calculates the effective load carrying capability (ELCC) of wind energy on off-season production (i.e., summer production for wind)—a practice that can vastly underestimate its value. The RTO also recently reduced its ELCC for wind from 13% to 8%. This means that only 8% of the region's nameplate wind capacity is counted in the auction, even though the actual capacity provided is much higher. For example, in 2017 PJM accounted for only a little over 1100 MW[3] of wind capacity in the auction even though wind power actually contributed 3100 MW[4] during the "Bomb Cyclone," an extremely powerful winter storm.

Seasonal capacity markets are one way to improve the accounting of renewable capacity by accommodating their strong seasonal fluctuations in production and availability. The Commission approved PJM's Seasonal Capacity Performance product as of the 2020/2021 delivery year in Docket No. ER17-367. This revision will allow summer-only resources to pair with winter-only resources and

[1] Katz, J., & Denholm, P. (2015). *Using Wind and Solar to Reliably Meet Electricity Demand, Greening the Grid; NREL (National Renewable Energy Laboratory)* (No. NREL/FS-6A20-63038). National Renewable Energy Lab.(NREL), Golden, CO (United States).
[2] Bushnell, J., & Novan, K. (2018). Setting with the Sun: The impacts of renewable energy on wholesale power markets.
[3] https://www.pjm.com/-/media/markets-ops/ops-analysis/capacity-by-fuel-type-2017.ashx?la=en
[4] https://www.pjm.com/markets-and-operations/ops-analysis.aspx

collectively bid into the capacity market. A recent report by the Brattle Group analyzing this option, however, claims that PJM undervalues and excludes a high percentage of the seasonal resources available (such as solar, wind, energy efficiency, and demand response) by requiring resource matching in both seasons despite the summer peak being far greater than winter.

Under this construct, solar capacity that produces more in the summer cannot provide summer seasonal capacity unless bidding with a corresponding amount of winter capacity. Consequently, the Brattle Group report suggests that many available resources do not bid or will only bid into the annual markets where they are valued according to their off-season availability at peak hours, paradoxically leading to undervaluation of resources in a market that is still attempting to prop up existing, uneconomic generators in the name of supposed capacity needs. Taking full advantage of these existing capacity resources could also reduce ratepayer costs for procuring capacity.

Even if the value of renewables is accurately represented, however, their presence in capacity markets as currently structured presents a disconnect between the short- and long-run market incentives. In the short run, low marginal cost renewables supported by state RPS policies competing in the capacity market drive down capacity prices. These low prices will discourage capacity build-out, which is beneficial in the short-term since the region is already flooded with capacity. But looking far into the future, we will likely still need long-term investments to maintain a reliable grid. In the long term, these low capacity prices could potentially retire too many plants and ultimately deter long-term investment because—unless capacity prices rise sufficiently to reflect increased scarcity—potential merchant plant investors will not have incentives to build. PJM, like all RTOs, will face the challenge of maintaining a sufficient level of long-term investment and resource reliability in a flawed capacity market, and the solution may be to find alternative ways of doing so.

The Future of Capacity Markets

These issues reveal ways wholesale markets might evolve in order to capture the value of state-sponsored resources and still maintain a reliable grid. A clear distinction exists between capacity needed to meet regional energy needs reliably and resource flexibility. Existing renewable energy generators do contribute significantly to the capacity needs of the region and are underrepresented in this value, especially on a seasonal basis. These resources are typically unable to provide ramping service, however (the ability to instantaneously adjust electricity output when called upon). As penetration of intermittent sources grows in capacity markets, ramping could become an increasingly important ancillary service. Rewarding that service could be an effective method of maintaining system reliability and could help encourage long-term investment.

In California, the state's grid operator has attempted to do just that by creating the Flexible Ramping Product (FRP) in 2016. The FRP procures and compensates units that can ramp up or down on a "5-minute Real Time Dispatch" market for being available to do so. California notably does not have a capacity market and uses this product along with resource adequacy requirements for load-serving utilities as methods of managing their very high penetration of intermittent capacity and encouraging reliability.

The evolving US electric grid will require changes in market design to best account for the value that new resources offer. The US Energy Information Administration's Annual Energy Outlook predicts that solar and wind will grow collectively by 147 GW between 2020 and 2050 in the reference case (notably without a carbon policy), a two- to three-fold increase, and markets will need to find a way to accommodate these and other resources.