

Improving Market Design to Align with Public Policy

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Key Takeaways

- Small changes to proposals being developed by PJM and commenters in response to the June 29 Federal Energy Regulatory Commission (FERC) order can improve their cost-effectiveness and workability without impacting reliability. These improvements seek to avoid imposing new constraints on newly carved-out resources, recognizing that the main difference between the carved-out resources and capacity-market resources is how they are compensated.
- Requirements and constraints pertaining to location and seasonal resources are particularly relevant to state policies promoting renewable and demand-side resources. Many of these resources are stronger in the summer or winter. Not accurately counting the capacity these resources provide will lead to capacity over-procurement at the expense of customers. Locational requirements and constraints are also important to renewable resources, particularly when they are not generated in the same state as the customers who have sponsored them.
- As wholesale buyers gain more capacity resources in their portfolios, FERC could reassess how performance incentives are applied to maximize efficiency. Generally, penalties should be imposed on the entities best able to manage the risks, and rewards should be granted to those most able to maximize them. This could mean applying incentives to portfolios instead of individual carved-out resources. Appropriate design of incentives would enable resources like energy storage and other limited duration resources to contribute as part of a portfolio.

Summary

In a sense, the wholesale capacity markets have been working too well—procuring abundant megawatts and providing price signals for the least efficient resources to retire. But these markets don't value anything other than generic megawatts of capacity, which is at odds with state policies promoting emissions-free generation like wind and solar, or seeking to preserve the local economic and jobs benefits of power plants at risk of retiring.

The Federal Energy Regulatory Commission (FERC), which regulates these markets, is looking to reconcile market design with state, and potentially federal, policy preferences. In an effort to mitigate this apparent tension in the gas- and coal-heavy Mid-Atlantic and Midwest, FERC proposed a framework for carving out those policy-sponsored resources from PJM's capacity market.

How this proposal takes shape will affect the costs of implementing public policies in PJM states and how much consumers will have to pay. The June 29 FERC order poses many questions and leaves open many details for stakeholders to resolve. FERC has invited public comments and the initial round of input is due October 2.

This policy brief offers recommendations to improve the efficiency of the developing proposals and help those responding to the FERC order understand the implications of different design choices related to the FERC proposal.

INTRODUCTION

Context and Timing

Falling demand, low natural gas prices, and surplus capacity have led to relatively low prices in wholesale electricity markets. Facing steep competition, some generators participating in the capacity markets believe that public-policy favored resources, such as renewable and nuclear generation, hold an unfair advantage.¹ They are also concerned that old, uneconomic power plants may seek subsidies to delay retirement, sparking a fierce political competition for out-of-market payments that would drive market prices further down and put more resources at risk of retirement.

Other market participants point out that wholesale capacity markets transact only in generic megawatts and are not designed to value or compensate attributes like emissions-free generation or price externalities. They note that some of these “subsidies” are actually payments for attributes that the capacity market doesn’t value.² Further, all resources benefit from some amount of preferential policy treatment or subsidy. No one has performed a comprehensive analysis of who has an unfair advantage as a result of subsidies or demonstrated market prices are significantly affected due to subsidies, especially compared to other drivers of low market prices.

FERC is trying to reconcile these positions, and is accepting initial and reply comments on or before October 2 and November 3, respectively. PJM and stakeholders are currently developing proposals and parties will be filing comments with FERC on what PJM currently calls the Resource-Specific Carve Out (ReCO), a mechanism that enables subsidized resources and their buyers to opt out of the capacity market for compensation purposes. Ensuring that the ReCO is workable and results in efficient capacity procurement is important because it would impact the cost of implementing public policies.

In its June 29 order, FERC anticipated issuing a final order by January 4, 2019, with PJM implementing the new rules in its May 2019 auction for the delivery year beginning mid 2022.³ PJM has asked that its May auction be delayed.

PJM’s mandatory capacity market and FERC’s proposed framework

PJM requires that wholesale buyers purchase a certain amount of year-long commitments from power plants and other capacity resources to deliver energy in the future and satisfy resource adequacy targets. Exceptions to this purchase obligation are difficult to obtain.⁴ As a workaround, state programs provide a means to pay for certain attributes—like Zero Emissions Credits (for nuclear generators) or [Renewable Energy Certificates](#). Resources receiving payments for these attributes currently can also sell capacity to PJM’s market and may be able to bid at lower prices in the auctions. When these resources offer at lower prices, they are more likely to win capacity commitments through the competitive auction.

When a resource clears the capacity market, it is compensated through the market and counted toward resource adequacy targets in PJM. FERC’s [June 29 order](#) proposed a framework to broaden PJM’s ability to impose a minimum offer price on auction bids from resources deemed subsidized. This restriction would work against state or even federal programs by making it more difficult for their preferred resources to win capacity commitments.⁵

¹ [Sellers offer](#) resources into the capacity market that provide power supply or reduce demand. These resources include power generation, demand response (consumers reducing electricity use in exchange for payment), and transmission upgrades. When a participant offers these resources into the market, that participant is committed to increase supply or reduce demand by the amount offered in the future.

² In other contexts, FERC has recognized that “environmental attributes” can be sold separately from energy and capacity, and that contracts for energy and capacity do not convey renewable energy credits or certificates unless specified in the contract or determined by applicable state law. *Am. Ref-Fuel Co., Covanta Energy Grp., Montenay Power Corp., & Wheelabrator Technologies, Inc.*, 107 FERC ¶ 61016 (Apr. 15, 2004), <http://www.ferc.gov/whats-new/comm-meet/041404/E-28.pdf>.

³ Some of the mechanisms enabling resources and customers to transact capacity outside of the capacity market may require action from state legislatures and utility commissions. FERC approval may also be needed for sales between wholesale sellers and buyers.

⁴ This is known as the Fixed Resources Requirement or FRR. Under the FRR, the entire utility footprint must exit the market and stay out for at least 5 years. These features render it unworkable for most capacity market buyers, and thus it is infrequently used.

⁵ For instance, in anticipation of potential federal action to bail out uneconomic coal and nuclear plants, PJM is proposing to include new federal subsidies within the scope of the new framework unless Congress specifies otherwise.

These resources may still be needed to satisfy public policies and thus may provide capacity and energy even if not formally counted through PJM's capacity market. Customers in the states sponsoring public policy resources would therefore have to purchase duplicate capacity from the market, leading to overcharges and distorting PJM's market by systematically inflating capacity procured.

To address these problems, FERC proposed that policy-sponsored resources subject to the new Minimum Offer Price Rule (MOPR) be able to opt out of PJM's capacity market.⁶ Buyers of those resources would get a reduced obligation to purchase the corresponding megawatts of capacity from the market.⁷

Multiple parties have requested FERC to reconsider its order, pointing out that all resources receive some amount of preferential policy treatment and there is no principled approach to distinguish between them, and that many of the new, apparently targeted subsidies pay for attributes rather than for generic megawatts of capacity such as environmental externalities.

PJM's Current Proposal

PJM and other parties are filing comments on the scope of the resources the proposed rule would cover, how the MOPR should be determined for these resources, and how the ReCO would work.

As presented in its [August 2](#) and [August 15](#) meetings, PJM proposes that resources subject to the new MOPR and that do not fall into a proposed exception are eligible to use ReCO.⁸ These resources are 20 megawatts or greater and receive certain out-of-market revenues that are greater than 1% of actual or anticipated market revenues.

PJM proposes to conduct its capacity auction as usual except that the ReCO resources would automatically win bids in the auction.⁹ However, ReCO resources would not be paid with capacity market revenues and the sponsoring customers would not be charged for that capacity through the capacity market.¹⁰ Instead, payments between sellers and buyers would be arranged outside of the market.¹¹ PJM also proposes that ReCO resources be subject to Capacity Performance requirements, and bear the risk of non-performance charges and be eligible for bonus payments.

Potential Price Impacts

PJM's proposal so far is to allow ReCO resources to "self schedule" and offer at \$0 so that they automatically clear PJM's capacity auction, but the resources would not be compensated through the capacity market. Whether ReCO election will affect the capacity market price depends on whether the ReCO resource offer is more or less than the market clearing price.¹² ReCO offers that are less than the market clearing price do not affect the price because the ReCO resource would not displace any resources that would have competitively earned capacity commitments through the market (see figure 1 on page 4).

It may be easiest to treat these resources as capacity market resources because they have no impact on prices. These resources may also decide against electing ReCO if they think they won't do better than the capacity clearing price or gain other benefits in negotiating directly with wholesale buyers.

⁶ This policy brief is not recommending an expansion of the MOPR, but instead focuses on improving the opt-out mechanism.

⁷ This would be like an expansion of the existing FRR, but for specific resources. FERC referred to this mechanism as a resource-specific FRR.

⁸ A [video](#) of the August 2 meeting is also available.

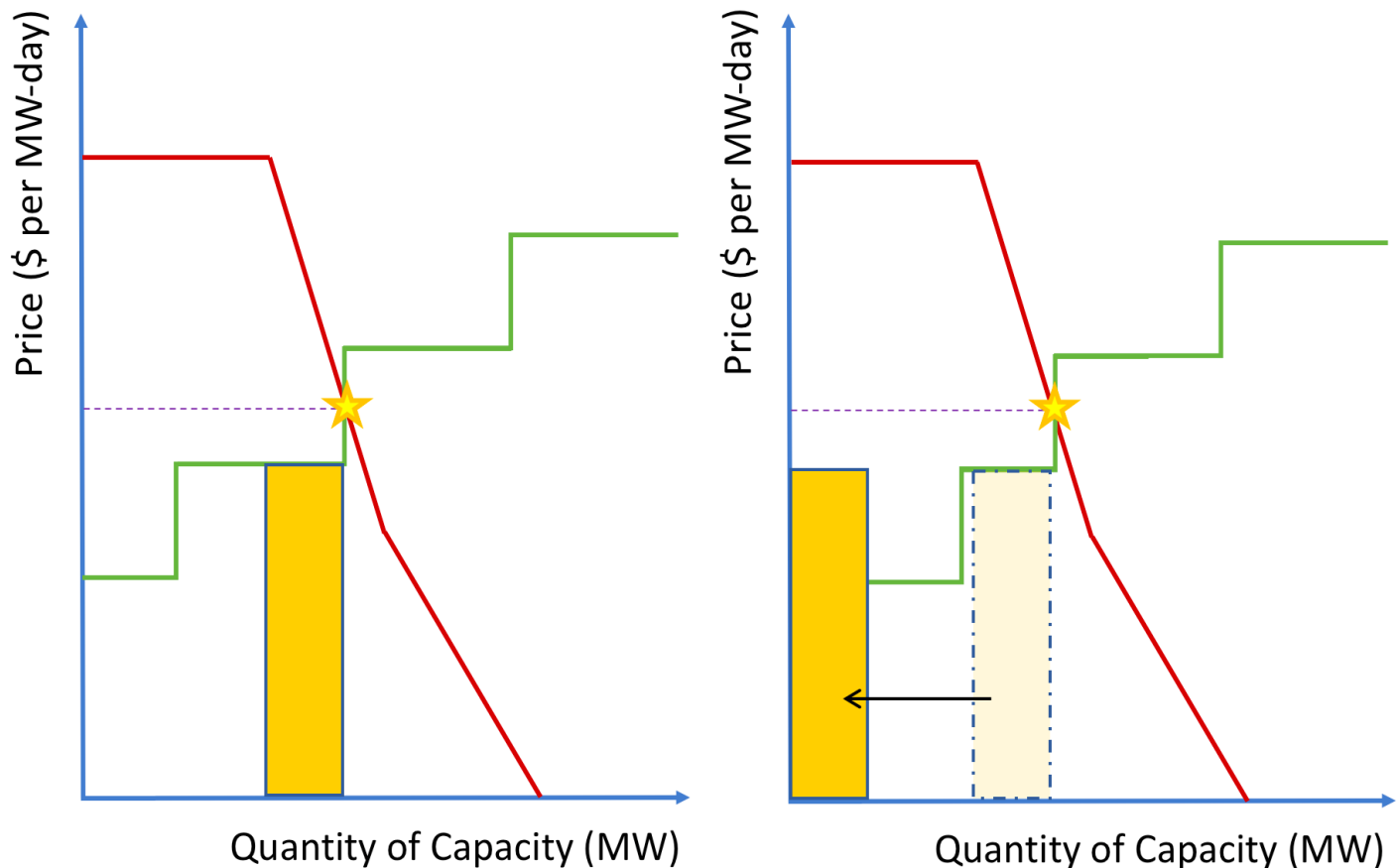
⁹ They would be "self-scheduled" and moved to the front of the supply stack.

¹⁰ PJM proposes a pro-rata credit back to all PJM load in the state subsidizing the ReCO resources.

¹¹ These could be through bilateral contracts, which could be long term. They would likely need to be approved by FERC.

¹² While the capacity supply curve is made up of resources offering to sell certain amount of capacity at certain prices, the demand curve is administratively determined by PJM and is known as the Variable Resources Requirement or VRR curve.

Figure 1. Market price impacts if ReCO resource is less expensive than capacity market clearing price



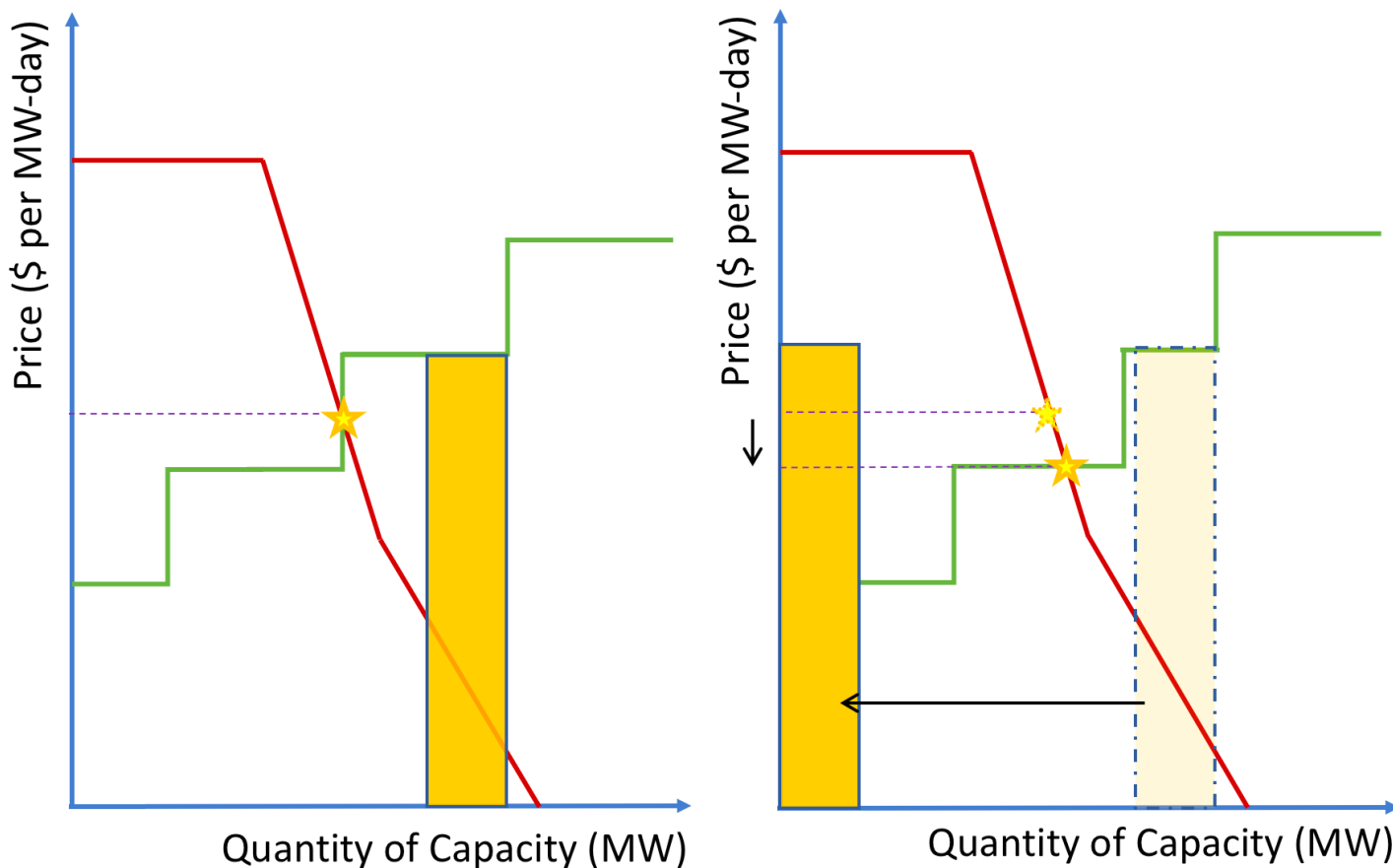
Note: No market price impacts if ReCO resource is less expensive than capacity market clearing price. The green capacity market supply curve is made up of resource offers, and the red demand curve is administratively set by PJM. The intersection of the two results in the market clearing price and quantity (depicted with a star). The left graph represents the situation prior to ReCO election. The gold box represents the policy-sponsored resource offer, which is moved to the front of the supply stack when it elects ReCO (right graph).

By contrast, if the ReCO resource is more expensive than the capacity market clearing price, then the ReCO resource would displace competitive resources from the market that wholesale buyers would otherwise have bought. This is assuming that wholesale buyers voluntarily choose or are required to purchase the more expensive ReCO resource over cheaper capacity from the market.¹³ (If they do not, there would be no price impact.) The market clearing price would decrease because there is now less demand for the same pool of resources that could potentially clear the market (see figure 2 on page 5). The resulting decrease in the market price signals that there are excess megawatts of capacity offering into the market, driving prices downward and pushing the less economic resources relying on the market to retire.

Some classes of generation would be less costly to support through ReCO than others. According to the [market monitor's](#) analysis, if all wind and solar generation in PJM elected ReCO, there would be little if any impact on capacity market prices. This suggests that these resources tend to be cost-effective compared with capacity market resources and/or they are too small to significantly affect market prices by participating in ReCO. Electing ReCO for coal and nuclear plants and/or plants at risk of retirement would impact market prices much more, indicating that they are either more expensive than capacity resources clearing the market and/or they are heftier in size and have more market share.

¹³ Wholesale capacity buyers making purely rational economic decisions may not choose to purchase the more expensive policy-selected resources over less expensive capacity from the market. They may need a government directive to make the purchase in that case, but it would be up to the state governments to weigh the benefits and make the policy decision whether to impose higher electricity costs on their constituents.

Figure 2. Market price impacts if ReCO resource is more expensive than capacity market clearing price



Note: Market price decreases if ReCO resource is more expensive than capacity market clearing price. If the resource receiving a public policy preference costs more than the market clearing price, moving that resource to the front of the supply stack under ReCO would displace less expensive capacity offers, shift part of the green supply curve to the right, and lower the capacity clearing price as indicated by the vertical arrow.

POLICY OPTIONS

Improving the cost-effectiveness and workability of ReCO while ensuring reliability

There are at least four ways to clarify or expand upon the proposals currently being developed to improve the flexibility, efficiency, and workability of the ReCO mechanism without sacrificing reliability.¹⁴

Seasonal capacity aggregation

Currently, PJM helps to match up [seasonal resources](#) (such as excess winter wind with summer solar generation) throughout its footprint, including across different [Locational Deliverability Areas](#), to form annual resources. PJM's proposal to keep ReCO resources in the same auction as capacity market resources preserves the ability to take advantage of its [in-auction matching mechanism](#) for seasonal ReCO resources. However, some proposals do not allow these seasonal resources to aggregate in-auction under ReCO. The new mechanism could afford these resources the same matching opportunities as they enjoy in the PJM capacity market.

¹⁴ See PJM's [August 2](#) meeting materials for some early thinking from stakeholders.

The difference for ReCO resources would be how they're compensated and by whom, which is not a reason to treat ReCO resources differently in terms of how they contribute toward resource adequacy. Seasonal ReCO resources could combine with other seasonal ReCO resources or capacity market resources through the market as before without changing the level of reliability. Allowing them to flexibly aggregate into annual resources would better account for seasonal resources as capacity and help customers avoid having to procure duplicate capacity.

Locational flexibility

FERC suggests and PJM proposes to have the resources receiving public policy benefits elect the ReCO (not the states or wholesale capacity buyers). A ReCO resource would then have to identify the customers who sponsored it through public policies and who would pay its capacity revenues. State programs that do not restrict out-of-state resources like many renewable portfolio standards may sponsor resources that are located in different PJM-defined zones or Locational Deliverability Areas. But because the ReCO is a means of associating resources with sponsoring customers for compensation purposes, FERC could allow associations across these zones and Locational Deliverability Areas because doing so would not threaten reliability. (Potential cost-shifting issues like customers in a higher-priced capacity zone paying for a resource located in a lower-priced capacity zone could be addressed with adjustments made in the settlement process.)

Seasonal Resources

States with policies promoting renewable and certain demand-side resources should take note of requirements and constraints imposed on seasonal resources because many of these resources are stronger in the summer or winter. Not accurately counting the capacity these resources provide will lead to capacity over-procurement at the expense of customers. Locational requirements and constraints are also important to renewable resources, particularly when they are not generated in the same state as the customers who have sponsored them (e.g., through renewable energy certificates).

Matching ReCO resources to sponsoring customers

Some states might mandate that their utilities or other wholesale buyers contract with their state-sponsored resources. Other resources may not easily be able to identify their specific sponsoring customers. It will be important that the matching not require a burdensome level of precision. As long as the amount of capacity obligation removed corresponds to the pool of ReCO resources exiting the market, matching customers to resources matters for payment and accounting purposes is an issue of fairness, not reliability. If identifiable, the customers who sponsored a resource could have a right of first refusal to contract with that resource. Having a central pool of ReCO resources and sponsoring customers could facilitate this matching. To avoid stranded ReCO resources, there should not be undue restrictions on the parties who can negotiate a contract with a ReCO resource.

Guaranteeing reliability at least cost with the appropriate application of performance incentives

Capacity Performance applies risk and reward incentives to the resources selling into the capacity market, penalizing under-performance and offering bonuses for overperformance. Underperformance by a particular resource may be [substituted or replaced](#) by other resources in a company's portfolio. Seasonal capacity resources can aggregate across multiple PJM-defined zones or Locational Deliverability Areas to form Capacity Performance resources.

One of the questions FERC posed for public comment was whether a different Capacity Performance construct needs to be developed for ReCO units. After all, these resources are not getting payments from the capacity market, and their compensation would be handled separately (this could include their performance incentives). Further, imposing performance requirements on smaller, individual ReCO units may result in less efficient outcomes compared to constructs guaranteeing performance on a portfolio level.

To maximize efficiency and procure reliable capacity at least cost, the risks of penalties for underperformance and rewards of bonuses for overperformance should be applied to the entity best situated to manage these risks and rewards, and in some cases, this could be the wholesale purchaser of capacity with a portfolio of capacity resources.

Seasonal capacity aggregates and other resources may be carved into smaller ReCO resources as they are allocated to different wholesale capacity buyers. Applying the same Capacity Performance construct to these smaller, individual resources might incur more penalties for the same level of performance overall.

For example, a 100 megawatt nameplate solar resource consisting of four 25 megawatt units may be able to offer 50 megawatts into the capacity market. Suppose that during a performance assessment hour, two of the four units don't perform (e.g., two of them are located in cloudy regions) but the other two perform at 100%. But because the portfolio delivered 50 megawatts, then the overall resource complied with Capacity Performance requirements.

Assume now that the four units are divided between four wholesale buyers under ReCO and Capacity Performance penalties apply to the ReCO resources individually. If two of the four units don't perform, those two are non-compliant and would pay Capacity Performance penalties while the other two would get Capacity Performance bonuses. If bonuses equal penalties then the four resources would still get the same net revenues as before, but Capacity Performance bonus and penalty rates don't necessarily [balance](#).

As wholesale capacity buyers acquire portfolios of ReCO resources, they could more efficiently manage the overall performance of their portfolios, minimizing the risk of penalties and maximizing the rewards, compared to a system where each ReCO unit has its own performance requirements. For example, a utility serving customers with a ReCO portfolio with one of the 25 megawatt solar units combined with 75 megawatts of storage, demand response, and other resources could guarantee 50 megawatts during a performance assessment hour from its portfolio. In that case, it should not matter to PJM or customers exactly which resources performed. (The wholesale buyer could compensate higher and lower performers differently through negotiated contracts.)

Energy Storage

Energy storage can reliably provide capacity to satisfy peak demand over a limited duration, especially as part of a portfolio of complementary resources. However, energy storage does not fit well within PJM's annual-only capacity construct as storage is not available at all times. Appropriate incentives applied to a portfolio of capacity resources could include energy storage and other limited duration resources as part of a utility's plan to ensure reliability to its customers.

Economic efficiencies may be gained by giving wholesale capacity buyers the option to contractually accept the risks and rewards for under- and over-performance of their ReCO resources as a portfolio, not applied to each individual ReCO unit. That flexibility could decrease the overall compliance cost of implementing ReCO and potentially enable more megawatts of seasonal resources as well as limited duration resources like energy storage to be counted as capacity.

CONCLUSION: NEXT STEPS IN CAPACITY MARKET DESIGN

This FERC proceeding will likely not be the last implementing major changes to PJM's capacity market. Good market design anticipates coming changes and builds in flexibility. Although a well-designed ReCO would provide states with some flexibility to procure resources the capacity market does not target, taking resources out of the market denies the states the efficiency gains obtained through [market mechanisms](#), and thus may result in a less cost-effective means of procuring these resources. Pricing externalities and attributes in the market or providing the option to procure capacity with attributes in the market would leverage market efficiencies to obtain the desired resources at least cost. The ReCO offers a good first step, and nothing forecloses PJM and its stakeholders from developing such market mechanisms.

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Review

This policy brief has not undergone a formal review process, but has been reviewed by some experts in the field. It is intended to stimulate discussion and inform debate on emerging issues.

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