

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Modernizing Electricity Market Design)
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Docket No. AD21-10-000

**TECHNICAL CONFERENCE COMMENTS OF DAVID B. PATTON AND
PALLAS LEE VAN SCHAICK OF POTOMAC ECONOMICS, LTD.**

Pursuant to the Supplemental Notice dated March 16 issued in the above-captioned proceedings by the Federal Energy Regulatory Commission (the “Commission” or “FERC”), Potomac Economics hereby respectfully submits these comments in response to the questions raised by the Commission regarding capacity markets.

Potomac Economics is the Independent Market Monitor (“IMM”) for Midcontinent ISO (“MISO”) and ERCOT, the Market Monitoring Unit for the New York ISO (“NYISO”), and the External Market Monitoring Unit (“EMMU”) for ISO New England. In these roles, we are responsible for monitoring and evaluating the performance of each RTO’s energy, operating reserves, and capacity markets. We also recommend market design changes to improve the performance of the markets and evaluate design changes proposed by the RTOs or market participants. Hence, our experience and expertise with these markets uniquely qualifies us to address the questions raised by the Commission in the docket regarding the evolution of capacity markets and the various Minimum Offer Price Rules (“MOPR”).

I. NOTICE AND COMMUNICATIONS

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II. INTRODUCTION AND SUMMARY COMMENTS

Wholesale power markets were deregulated to encourage innovation and efficient investment, as well as to shift market risk from ratepayers to generation developers. These markets have been successful at motivating large amounts of new competitive investment and maintaining existing resources needed to satisfy the RTOs' reliability needs. Ultimately, this has lowered costs and removed large financial liabilities from ratepayers since the 1990s.

In recent years, states have increasingly pursued carbon emission reductions by promoting investment in renewable energy resources outside the market. This activity, while justified by environmental objectives, can create artificial capacity surpluses that undermine the performance of the market in facilitating efficient decisions by owners of flexible resources. This raises concerns because studies of deep decarbonization scenarios have consistently found that large quantities of flexible resources will be needed to integrate renewables efficiently. Therefore, competitive markets must continue to provide incentives to invest in new flexible resources and maintain existing resources needed to satisfy resource adequacy objectives. Likewise, policy makers have the option of using efficient markets to achieve ambitious environmental policy objectives at the lowest possible cost to ratepayers.

In our analyses of wholesale markets, we have identified significant opportunities to reform energy and ancillary services markets to improve incentives for flexible resources that

can help integrate clean resources more efficiently and reliably. Furthermore, capacity market rules should be refined to compensate each technology in accordance with its marginal reliability value. These reforms would provide more efficient investment incentives for intermittent renewable generation and the flexible resources such as battery storage that are needed to integrate intermittent resources.

The Commission must reconcile the objectives of maintaining just and reasonable rates, achieving the benefits of competitive and efficient markets, and allowing states to shape the characteristics of their generation fleets. Under a centralized planning paradigm, state governments can essentially mediate all entry and exit through bilateral contracts. Under a competitive market paradigm, state governments can use their regulatory authority to recognize the value of clean resources and/or tax dirty resources to bring about a cleaner generation fleet. However, in a competitive market paradigm, allowing states unlimited flexibility to enter into long-term contracts will eventually devolve into the centralized planning paradigm as subsidized entrants push down wholesale prices to the point where no resource is financially viable without a bilateral contract with the central procurement entity.

The controversy around MOPR currently pits the interests of conventional generators against environmental policy objectives. In reality, however, these issues pit the interests of new subsidized resources against all existing resources. As the resource mix evolves, therefore, we will soon perceive the divide between the interests of existing renewable resources and new renewable resources. We already hear existing renewable generators express concern regarding state policies that pay new units more than existing resources because this drives down energy prices for existing renewable generators. Therefore, it is critical for the Commission to encourage a competitive market framework that compensates all resources—both new and old—

equitably based on the wholesale products and environmental attributes they provide to the system. Establishing reasonable means for doing so will allow the competitive market to continue to satisfy reliability objectives efficiently as it has for the past two decades while facilitating the environmental objectives of the states. We discuss such approaches and related issues in response to the Commission's questions in the next section of these comments.

III. INITIAL RESPONSES TO THE COMMISSION'S QUESTIONS

- 1. What should be the goals of the centralized capacity markets in the Eastern RTOs/ISOs? For instance, should the goal of centralized capacity markets in the Eastern RTOs/ISOs be limited to ensuring resource adequacy, or are there other objectives that a capacity market should meet? Why?*

The singular goal of the capacity market is to procure resources needed to satisfy the planning reliability requirements of the RTOs, which include resource adequacy and transmission security requirements. This is best done by clearly defining the capacity product and setting transparent prices that reflect the marginal reliability value of capacity. This promotes competition, which motivates entry of resources that provide capacity at the lowest marginal investment cost and the exit of uneconomic resources.

Transparent and efficient spot capacity prices facilitate forward contracting by helping parties estimate the value of capacity. Transparent spot prices assist state agencies in estimating the costs and benefits of renewable portfolio standards and other policies. Transparent spot prices are critical for any non-discriminatory mechanism to promote clean resources such as cap-and-trade and carbon pricing and for renewable energy credits. Although these are not primary goals of the capacity market, they are indirect benefits of a well-functioning capacity market.

- 2. Is the concept of "Missing Money" still the purpose of capacity markets, and if so, should there be an effort to minimize the missing money through enhancements to energy and ancillary service markets where resources are paid to provide specific services? If not, why not?*

The purpose of the capacity market is to satisfy resource adequacy requirements. Because an efficient energy-only market would generally sustain a long-term capacity level far below the planning requirements of the Eastern RTOs, additional revenues are needed to sustain capacity levels to satisfy these requirements. The capacity markets, therefore, set prices that reflect the marginal cost of satisfying these planning requirements and provide the “missing money”. This marginal cost or “missing money” in the long-run is equal to the cost of investment minus the operating revenues from the sale of energy, ancillary services, etc.

If resources are under-compensated for energy and ancillary services, it will tend to increase the missing money and raise capacity prices. Importantly, if flexible resources are systematically under-compensated, it will inefficiently shift revenues into the capacity market and shift incentives in favor of investment with less flexible characteristics. For this reason, we have repeatedly sought to promote energy and ancillary services market reforms that will reduce the need for out-of-market actions to maintain reliability, which while necessary in the short-term, are particularly harmful to incentives for investment in flexible resources.

3. *What purpose do price signals produced by a capacity market serve in a structure in which state actions are a primary driver of resource entry?*

The purpose of the price signals produced by the capacity market remains the same under this structure. Some assume that given the magnitude of the state actions, that they will naturally tend to satisfy all of the RTOs’ planning reliability requirements. This is simply not true. The marginal value of intermittent renewable resources falls as the penetration of renewable resources increase. At high penetration rates, the marginal value of additional resources is close to zero. Hence, controllable and flexible resources will continue to be necessary to satisfy the RTOs’ planning reliability requirements for the foreseeable future. As discussed above,

providing a competitive market to satisfy these requirements is the singular purpose of the capacity market and the state actions do not alter or eliminate this purpose.

At a practical level, these price signals will play an important role in determining which new resources (both renewable and conventional resources) move forward to completion, as well as facilitating orderly and efficient retirement decisions to the extent that the public policy resources render some existing resources unnecessary. Incentives for investment in generating resources are driven by multiple revenue streams, including energy, ancillary services, capacity, and increasingly environmental attributes. Very few new generation investments would be financially viable with only one type of revenue. For example, while New York State is entering into long-term REC contracts with developers of 20 or more years, the contract terms are specifically designed to expose new renewable generators to certain types of wholesale market risks which give developers incentives to locate where their energy and capacity will be more valuable to the grid. Thus, even when new generation developers are primarily motivated by state and federal incentives, the specific projects that move forward to construction will be strongly influenced by wholesale energy and congestion prices and capacity compensation. Wholesale market prices will also determine which existing conventional generators retire soon and which will be retained to facilitate the transition to a cleaner generation mix.

Ironically, a major financial risk to renewable generators entering the market now is from state policies to subsidize future renewable generation through bilateral contracts. If these contracts are more lucrative in the future, the entry of new units in the future will push down prices for the older ones. This understanding will ultimately make it more difficult and expensive for states to achieve their environmental policy objectives. This is a key reason why

the Commission should continue to preserve competitive wholesale electricity markets that provide efficient, just and reasonable prices and discourage undue discrimination.

4. *Should the design of a capacity market change in light of the evolving resource mix? Are the needs of the evolving resource mix better addressed in the capacity market or the energy and ancillary services market? Could RTOs/ISOs play a role in helping states achieve their diverse policy goals through a centralized resource procurement? Please explain.*

As more non-conventional resources enter the market, it will be increasingly important to refine the capacity compensation rules so that each resource is paid according to its marginal reliability value. This will ensure that if a region is saturated with a particular intermittent technology, transparent capacity market signals will encourage development of other complementary technologies. Inflexible conventional resources with long startup times will provide lower contributions to reliability as the penetration of intermittent resources increases. Alternatively, fast-ramping and fast-starting resources will be increasingly valuable from a reliability perspective. Improving the accreditation of resources to reflect these changes will assist greatly in efficiently transitioning the generating fleet and achieving states policy goals. For example, as the markets facilitate the retirement of low-value conventional resources, the market incentives to develop and maintain both clean and flexible resources will increase.

Clear product definition is a key element of efficient market design. So, energy and ancillary services markets should compensate resources efficiently based on their performance in the operating timeframe, while capacity markets should compensate resources based on their marginal reliability value in the planning horizon.

Before RTOs/ISOs are enlisted to play a direct role in facilitating state policy, it is important to consider whether they are uniquely situated to do this more efficiently than a state agency. We have heard proposals for RTOs/ISOs to centrally procure capacity and

environmental attributes, but these generally suffer from having inefficient product definition or unduly discriminating against existing resources. This is not always the case. For example, NYISO developed a carbon pricing proposal where it would have a significant role in providing price signals to efficiently support New York’s policy objectives. In this case, NYISO is needed to administer the proposed methods for addressing emissions leakage and allocating proceeds to customers. This type of solution can improve efficiency because it prices the objective in a non-discriminatory manner.

5. *Could enhancements to the energy and ancillary services markets serve to make the energy market a more significant driver of resource entry and exit decisions vis-à-vis capacity markets? Please explain.*

Yes, it is critically important to identify gaps in the energy and ancillary services markets that weaken incentives for flexible resources. In all of the markets we monitor, insufficient representation of operating reserve requirements leads to understated prices for ancillary services and energy, requiring operators to schedule out-of-market resources that are compensated through discriminatory make-whole payments rather than transparent market-based prices.

A major focus of our recent annual reports has been recommending that MISO, NYISO, and ISO-NE enhance their operating reserve market requirements and improve their shortage pricing.¹ This is because energy and ancillary services market design deficiencies tend to inflate the “missing money”, which distorts investment incentives in favor of inflexible generation.² Ultimately, better incentives for flexible resources will facilitate integration of intermittent renewables both operationally and financially.

¹ [2019 State of the Market Report for MISO](#) at xvii-xviii, see #2018-1, #2016-1, and #2015-1.

[2019 State of the Market Report for NYISO](#) at xii-xiii, see #2019-1, #2017-1, #2017-2, #2016-1, & #2015-16.

[2019 Assessment of the ISO New England Electricity Markets](#) at xvi-xvii, see #3 & #7.

² [2019 State of the Market Report for NYISO](#), see Figures 20 & 21.

We have also supported the introduction of carbon pricing because it would alter the energy revenues of resources consistent with their relative contributions to satisfying the states' policy objectives. This is another example of how improving energy and ancillary services products and pricing can allow the market to efficiently satisfy both reliability needs as well as other policy objectives.

6. *What are the long run implications of continuing with the status quo Minimum Offer Price Rule (MOPR) framework? Is it a durable solution? Why, or why not?*

The purpose of the MOPR and Buyer Side Mitigation rules is to ensure just and reasonable prices when uneconomic entry would otherwise push capacity prices below efficient levels. These rules provide guard rails for the effects of state policies to subsidize new entry of supply and demand reduction.

States have choices about how to bring about a cleaner resource mix, which include not only subsidies to add supply and reduce demand, but also the use of regulatory authority to cause the retirement of high-polluting conventional generation and building transmission that facilitates the retirement of existing generators and the delivery of cleaner generation to population centers. In this regard, New York State has used its authority to bring about retirement of coal-fired units, some nuclear units, and high-emitting peaking units (those without backend emission controls). These actions can more than offset the adverse market effects of subsidizing large quantities of renewable energy resources. The MOPR rules in NYISO and ISO-NE encourage states to take a balanced approach to evolving the resource mix by pursuing policies that would avoid inefficient supply surpluses by both adding and subtracting generating resources.

MOPR rules can support the transition to a clean resource mix by helping to reduce the financial risks to flexible generation. We have observed battery storage developers enter the market without subsidies. Like conventional generators, battery storage units will depend to a

large degree on capacity revenues. MOPR rules mitigate the financial risk these resources face associated with future competitors being subsidized. Therefore, eliminating the MOPR would make it more difficult to motivate the market-based entry of battery storage and other flexible resources.

7. *How do the MOPR rules affect the ability of resources to clear the capacity market? Does that depend on whether or not those resources receive revenues pursuant to state programs? Will such resources remain in the market if they do not clear the capacity market? Why or why not? What, if any, challenges does this pose to the functioning of the capacity market as well as the energy and ancillary services markets?*

In NYISO and ISO-NE, the buyer-side mitigation rules are designed to avoid outcomes where resources are built, operate in the energy and ancillary services market, but are unable to sell capacity. This outcome is undesirable because it leads to inefficiently large amounts of capacity being in service because it provides signals for the retention of existing capacity and/or entry of new capacity when it is not needed. Rather, the NYISO and ISO-NE rules are designed to allow policy resources to sell capacity by facilitating the retirement of existing resources to the extent that the new entry would exceed demand growth. For example:

- NYISO's Renewable Entry Exemption allows new entry of subsidized intermittent renewables to the extent that it roughly matches the growth of demand and policy-driven retirements.
- ISO-NE's CASPR mechanism allows existing conventional resources to voluntarily exchange their capacity obligation with a subsidized resource for a payment if they agree to retire.
- NYISO's proposed Part A Enhancements would allow subsidized resources to be evaluated for MOPR exemption ahead of lower cost conventional generation when the installed capacity margin is not excessively large. This would ensure that when there is room for new entry, available slots for new entrants would go to resources that contribute to New York State environmental goals.

In NYISO, any resources that do not receive state subsidies qualify for a Competitive Entry Exemption. Additionally, resources that are economic will not be subject to mitigation in NYISO and ISO-NE. In ISO-NE and NYISO, subsidized intermittent resources are able to include the value of Renewable Energy Credits in the assessment of whether they are economic, which substantially reduces the likelihood of being mitigated.

8. *The quantity of capacity procured in the Eastern RTOs/ISOs has often exceeded the amount of capacity that each RTO/ISO aims to procure in the capacity market to meet the target 1-in-10 loss of load expectation. What are the drivers of that result (e.g., specific parameters used to establish the demand curve(s) in the capacity market, resource offer behavior, etc.)? Do the additional reliability benefits provided by this additional amount of capacity exceed the incremental costs? Why or why not?*

ISO-NE sets its capacity demand curves at a level that is designed to satisfy a 1-in-10 loss of load expectation, while NYISO's capacity demand curve is designed to provide a surplus that results in a 1-in-15 or 1-in-20-year standard. The NYISO approach recognizes that capacity levels will naturally fluctuate, and its objective is to ensure that the minimum capacity levels in this fluctuation do not fall below the 1-in-10 level. Nonetheless, we typically observe higher capacity levels because:

- Electricity demand has been very slow and even negative over the last decade;
- Actual competitive new entrants typically enjoy some cost advantages over the generic demand curve unit that is used to set capacity demand curves, so they have sometimes entered when there was a capacity surplus; and
- A significant amount of existing generation has been subsidized to slow its retirement, which is not generally subject to buyer side mitigation; and
- New generation has been subsidized to enter in areas of the NYISO with no buyer-side mitigation.

As the capacity surplus increases, the capacity demand curves fall so that capacity prices reflect the drop in the marginal value of capacity for providing additional reliability. However, we have found that the implied VOLL—that is, the value of lost load implied by the marginal amount the capacity market will pay for reliability at the minimum requirement—is \$150,000 to \$200,000 per megawatt-hour for ISO-NE and around \$1 million per megawatt-hour for NYISO. It would be reasonable for policy makers to consider whether these implied VOLL levels are in the public interest because they serve to sustain existing resources that would otherwise retire.

9. *In a multi-state RTO with a centralized capacity market, please describe how one state's actions to shape the resource mix can affect other states. What are the Commission's responsibilities with respect to addressing such effects?*

Markets do not respect state boundaries so the actions of one state that affect market outcomes will have collateral effects on all other states. In general, all states will benefit from markets that perform well and such markets will produce prices that are just and reasonable. Therefore, we believe the Commission has a responsibility to structure capacity markets that will perform well, efficiently motivating long-term investment and retirement decisions that satisfy RTOs' planning reliability requirements.

10. *Should there be options for states that want to achieve resource adequacy outside of the capacity market? Are these options compatible with continuing a capacity market for states that do wish to participate in it?*

No, such an option would undermine the performance of the market for the other states. The reason sloped-demand curves are utilized in all well-functioning capacity markets is that it allows the markets to procure capacity above the minimum requirement at prices that reflect the marginal reliability provided by the resources. Allowing states to opt-out of the capacity market allows them to benefit from the capacity procured above the minimum requirement level without

having to pay for it. It is discriminatory, unreasonable, and would undermine the competitive performance of the capacity market.

IV. CONCLUSION

This concludes comments in response to the Commission's questions regarding the interaction of resource adequacy and state policies ahead of the March 23 technical conference.

Respectfully submitted,

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