UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Midcontinent Independent System System Operator, Inc.	**)** **)**	**Docket No. ER18-462-000**

MOTION TO INTERVENE OUT OF TIME AND PROTEST OF THE MISO INDEPENDENT MARKET MONITOR

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), 18 C.F.R. §§ 385.212 and 214 (2007), Potomac Economics, Ltd. respectfully moves to intervene in the above-captioned proceedings concerning the December 15, 2017 filing ("the Filing") by the Midcontinent Independent System Operator, Inc. ("MISO") in which it re-submitted Module E of the MISO Open-Access Transmission, Energy, and Operating Reserve Markets Tariff ("Tariff").

Potomac Economics is the Independent Market Monitor ("IMM") for MISO and, in that capacity, seeks to ensure the efficiency and integrity of the MISO markets. Module E of the Tariff governs MISO's Resource Adequacy Construct ("RAC"), which establishes procedures for load-serving entities to procure capacity to meet their planning requirements either through bilateral contracts, self-supply, or the Planning Resource Auction ("PRA"). The PRA is the central market-based feature of the RAC and is the focus of this Protest. The PRA as filed by MISO contains a critical design flaw that causes the PRA to produce inefficient, unjust, and unreasonable prices.

TABLE OF CONTENTS

I. NOTICE AND COMMUNICATIONS

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II. MOTION TO INTERVENE OUT OF TIME

Potomac Economics is the Independent Market Monitor for MISO. In this role, we are responsible for monitoring and evaluating the performance of the energy and ancillary services markets. We also are responsible for recommending market design changes to improve the performance of the markets and for evaluating design changes proposed by MISO or market participants. As the IMM for MISO, Potomac Economics has a unique responsibility to monitor, evaluate, and comment on the efficiency and integrity of MISO wholesale power markets. Potomac Economics' interests, therefore, cannot be adequately represented by any other party.

Good cause also exists to permit Potomac Economics' motion to intervene out of time as it has a significant interest in this proceeding and a unique perspective as MISO's market monitor.[1] Permitting Potomac Economics to intervene at this time will not prejudice any party in the proceeding as the Commission has not yet acted on the filings. Potomac Economics agrees to accept the record in this case as developed to date. For these reasons, Potomac Economics respectfully requests that the Commission grant this motion for leave to intervene out of time in this proceeding.

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[1] *See, e.g.*, 18 C.F.R. § 385.214(d) (2007) (requirements for motion for late intervention); *Consolidated Gas Supply Corp.*, 20 FERC ¶ 61,305, at 61,599 (1992) (factors considered by Commission in determining whether good cause exists to permit late intervention).

III. SUMMARY AND BACKGROUND

A. Summary of Protest

As the IMM for MISO, we are filing this protest because the MISO capacity market governed by Module E has failed, since its inception, to perform efficiently and competitively because its design is fundamentally flawed. The Commission relies on well-designed competitive markets to produce prices and market outcomes that are just and reasonable. No objective analysis of the MISO capacity market could demonstrate that the outcomes under the current Module E are just and reasonable by any appropriate standard. In fact, the flawed design of the market precludes it from producing just and reasonable prices, as we describe in this Protest. Further, MISO made no attempt to provide evidence that its capacity market has produced reasonable outcomes or that it is an economically sound market design. In fact, MISO argued, in a separate filing in 2017 concerning its competitive retail capacity market reforms, that its capacity market has not produced efficient prices.[2]

The design problem is straightforward. Two fundamental economic factors determine the performance of any market: supply and demand. Tariff provisions have been designed to ensure that supply offers in the capacity market are competitive, including mitigation measures that prevent capacity from being withheld. The sum of all resource offers by the participants in MISO determines the supply in the planning resource auction. The demand in the planning resource action, alternatively, is entirely determined by MISO under Module E. MISO is a central buyer in the auction on behalf of its loads. How the demand is modeled is critical. Under the current Module E, now re-submitted by MISO, demand is a single quantity (by zone) for which MISO will pay any price up to a deficiency price. This arrangement is commonly referred to as a vertical demand curve.

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[2] MISO Proposed Competitive Retail Solution in Docket No. ER17-284-000.

The flaw in this design is that the reliability value of the capacity being purchased should determine the shape of the demand curve. If MISO were to recognize the diminishing marginal value of the capacity in maintaining reliability (*i.e.*, each additional unit provides slightly less incremental reliability and, therefore, less value than the prior unit), the demand curve would be sloped.[3] Every other ISO/RTO capacity market in the Eastern Interconnection has recognized this problem and implemented sloped demand curves in their capacity markets.

To show how significant this flaw is, we estimated results for MISO's 2017-2018 PRA with the actual capacity offers and a representative sloped demand curve based on reasonable parameters.[4] For comparison purposes, the actual PRA (with the vertical demand curve) cleared throughout MISO at $1.50 per MW-day. This would provide suppliers with less than *one percent* of the revenues needed to break-even on an investment in a new peaking resource in MISO. These break-even revenues are known as the net cost of new entry or "net CONE". With a representative sloped demand curve, the clearing price throughout MISO would have been roughly $115 per MW-day. The $115 per MW-day clearing price would provide revenues still less than half of net CONE for a new peaking resource, but it would cover the going forward costs of a large number of generators that will likely otherwise retire or export to other markets. It does not seem possible for $115 per MW-day and $1.50 per MW-day to both be just and reasonable prices under identical supply conditions, except if no appropriate economic criteria are applied to determine whether capacity prices are just and reasonable.

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[3] Technically, the MISO's vertical demand curve is also "sloped", but infinitely so. In the discussion herein, sloped means a non-vertical demand curve declining with respect to the quantity of planning resources procured.

[4] *See* Section IV.B below for a more detailed description of the representative sloped demand curve.

In reality, the Commission has articulated economic objectives for capacity markets in issuing orders in other RTO markets. If the Commission applies comparable economic criteria to the capacity market framework in Module E, the evidence will not support a finding that the MISO capacity market is just and reasonable. Fortunately, a relatively simple design change to utilize a sloped demand curve would reverse such a finding. Hence, we encourage the Commission to require MISO to transition to a sloped demand curve.

While moving to a sloped demand curve is relatively simple design change, it will require time to develop the necessary empirical basis for the demand curve parameters. A key aspect, as we discuss herein, is determining the marginal reliability values provided by additional planning resources at various points on the demand curve.[5] It would not be reasonable to expect such analyses and stakeholder discussions to be completed, and tariff changes to be developed, filed, and approved by the Commission in time for the 2018-19 PRA to be conducted in early April.

Although the vertical demand curve will not produce just and reasonable outcomes over the long-term, canceling the 2018-2019 PRA would be destructive because it would undermine participants' market expectations. Therefore, even though the current Module E will result in unjust and unreasonable outcomes, we recommend the Commission conditionally accept the filing as an interim measure to allow the 2018-19 PRA to be completed while also initiating a proceeding under Federal Power Act ("FPA") Section 206 to direct the MISO develop design changes prior to the 2019-2020 PRA that would allow MISO capacity market to produce just and reasonable outcomes over the long-term.

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[5] Reliability effects are generally measured by resources' effects on loss of load expectations ("LOLE").

B. Background on the Role and Performance of Capacity Markets

1. The Role of RTO Capacity Markets

In wholesale electricity markets, the capacity market exists to facilitate long-term resource decisions to satisfy the system's planning requirements. Planning requirements are established through the planning process in accordance with standards set by the North American Electric Reliability Council ("NERC"). RTOs generally perform the planning process in their region to establish their individual planning requirements. RTOs utilize capacity markets to efficiently satisfy the planning requirements in conjunction with their energy and ancillary services markets. The economic signals provided by the capacity market and an RTO's energy and ancillary services markets inform long-term capacity decisions, including decisions to:

- Build new units;
- Make capital investments in and incur other fixed maintenance costs for existing resources;
- Retire existing resources;
- Import capacity resources from external areas;
- Export capacity resources to external areas; and
- Develop or maintain demand response resources.

Additionally, prices in well-designed capacity markets will be equitable for consumers because they will reflect the marginal value of the capacity being procured by the RTO. In other words, consumers will enjoy reliability that is consistent with the costs they incur for it.

Therefore, the economic signals provided by the capacity market play a pivotal role in efficiently satisfying an RTO's planning requirements because they provide the additional expected revenues (*i.e.*, the "missing money") needed to sustain adequate resources. While well-designed capacity markets will provide efficient prices and revenues to sustain adequate capacity at least cost, there are other benefits as well, including:

- Coordinating efficient capacity imports and preventing inefficient exports;
- Supporting a vibrant forward bilateral contract market; and
- Facilitating low-cost merchant investment.

We believe the MISO capacity market should be structured to achieve these benefits. However, as we explain in detail in this protest, the MISO capacity market does not achieve these benefits because it does not efficiently represent demand, which creates uncertainty and undermines efficient incentives for suppliers. The next subsection provides background on the primary factors that govern the economic performance of capacity markets.

2. Determinants of Capacity Market Performance: Supply and Demand

At the fundamental level, the outcomes in any market are determined by two factors: the supply and the demand for the product. In RTO capacity markets, the RTO determines the demand while the supply remains determined by many different sellers. It is critically important to represent demand in an efficient and reasonable manner, otherwise the market outcomes will be predictably inefficient and unreasonable.

Demand. The demand for any product should reflect the value it provides to the buyer, and capacity is no different. For capacity, the value is derived from the reliability capacity provides to electricity consumers. However, the demand in MISO's planning resource auction as under Module E is set at the level necessary to satisfy MISO's minimum planning reserve requirements with the price capped at a deficiency price based on the cost of building a new resource. This single-quantity demand results in a vertical demand curve for the market.

The implication of a vertical demand curve is that the last MW of capacity needed to satisfy the minimum requirement has a value equal to the deficiency price, while the first MW of surplus has no value. In reality, each unit of surplus capacity above the minimum requirement will increase system reliability and lower real-time energy and ancillary services costs for

consumers, although these effects diminish as the surplus increases. The contribution of surplus capacity to reliability can only be captured by a sloped demand curve. The fact that a vertical demand curve does not reflect the underlying value of capacity to consumers is the source of our major concerns associated with the PRA market design.

Supply. In a workably competitive market, supply will be offered at the marginal cost of providing the capacity. The cost of selling capacity from existing resources is based on:

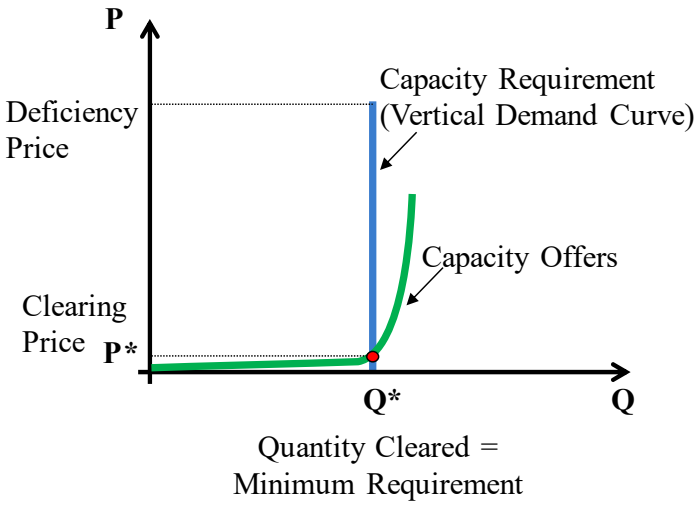
- The net "going-forward costs" ("GFC"), which are the residual costs of remaining in operation that are not covered by profits from the energy and ancillary services markets. Because most existing resources earn enough energy and ancillary services revenues to entirely cover their going-forward costs, the net GFC is zero or very close to zero.

- The costs the supplier will incur to satisfy the capacity obligations for the resource, which are extremely low in MISO.

- The opportunity costs of resources that can sell their capacity in another market that a supplier otherwise would give up when it clears the PRA. These opportunities are very limited, particularly since resources must now be pseudo-tied to PJM in order to be exported to PJM, which is the highest-value potential export opportunity.

Therefore, existing resources' competitive offers will generally be close to zero, which is consistent with the actual data from MISO's PRA and other' capacity markets. Given the nature of capacity market supply, any capacity market with a vertical demand curve and a small amount of surplus capacity would clear close to zero, which is consistent with the recent auction results in MISO, as we reported above. This falsely indicates that additional capacity beyond the planning requirement has little or no value to MISO. Figure 1 illustrates this outcome. The blue line in the figure is the "demand" curve. The green line is the stack of supply offers in the PRA. The clearing price is the intersection of demand and supply, which is close to zero under this supply and demand illustration.

Figure 1: Supply and Demand in MISO's PRA



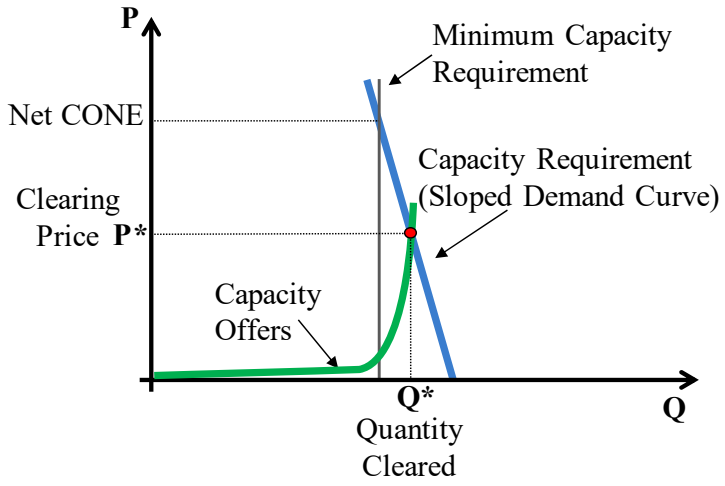
The market outcomes produced under this structure raise serious concerns regarding the long-term performance of the current capacity market. The price produced by such a construct does not accurately reflect the true marginal value of capacity. Although the minimum requirement is set at a level that will achieve the 1-in-10 level of reliability, each additional resource procured above this level produces additional reliability. This incremental or marginal reliability value of additional resources declines with each resource procured, which can only be accurately represented with a downward-sloping capacity demand curve. The vertical demand curve shown above implies that the additional resources provide no reliability value to the system and virtually guarantees that prices will be understated. Hence, the market will not be capable of providing efficient long-term economic signals to govern investment and retirement decisions. For this reason, all other capacity markets in the Eastern Interconnection have implemented sloped demand curves.

3. Sloped Capacity Demand Curves and Capacity Market Performance

Sloped demand curves reflect the fact that the initial increments of capacity in excess of the minimum requirement are valuable from both a reliability and economic perspective. Because such curves more accurately reflect the marginal reliability value of the capacity, they will result

in much more efficient capacity market prices and outcomes. Figure 2 illustrates the sloped demand curve and how prices would be determined.

Figure 2: Market Outcomes under a Sloped Demand Curve



Under a reasonable sloped demand curve, clearing prices will reflect the marginal value of additional capacity above the planning requirement. This provides a more efficient price signal from the capacity market because additional capacity will be procured until the marginal cost of supply is equal to its marginal benefit, a fundamental tenet of economic efficiency. In addition, the figure illustrates how a sloped demand curve would serve to stabilize market outcomes and reduce the risks facing capacity suppliers. This occurs because prices will slide up and down the demand curve as supply changes rather than jumping unpredictably from close to zero to the deficiency prices, which can occur under a vertical demand curve. Because the volatility and its associated risk is inefficient, stabilizing capacity prices in a manner that reflects the prevailing marginal value of capacity would improve the incentives of suppliers that rely upon these market signals to make investment and retirement decisions.

A sloped demand curve will also significantly reduce suppliers' incentives to withhold capacity from the market by increasing the opportunity costs of withholding (foregone capacity revenues) and by decreasing the price effects of withholding. This incentive to withhold falls as

the market approaches the minimum capacity requirement level. While it would not likely completely mitigate potential market power, a sloped demand curve would significantly improve suppliers' incentives.

If a sloped demand curve is introduced, MISO will need to work with its stakeholders to develop the various parameters that define the curve. However, if the Commission were to allow MISO's to continue with a construct consisting of a minimum requirement and a deficiency price (*i.e.*, a vertical demand curve), it would be permitting some of the most important parameters of the market to being established implicitly with no analysis, discussion, or evidence that they are just and reasonable. In other words, there is no analysis in the record suggesting that a vertical demand curve is efficient, just, or reasonable and MISO has made virtually no effort to argue otherwise.

C. The Applicable Standard for Determining that Module E is Just and Reasonable

MISO's Module E can only be accepted or approved when the Commission finds that it will produce just, reasonable, and not unduly discriminatory outcomes. The MISO filing provides no evidence that Module E will produce just and reasonable outcomes, or that the results that have been produced through the Planning Resource Auction under Module E have been just and reasonable. As we have detailed in our State of the Market Reports and in these comments, we do not believe that the outcomes have been just and reasonable due to the fact that prices produced through the PRA have departed sharply from any reasonable measure of an efficient capacity price level, as we will explain herein. Before discussing why Module E is not just and reasonable, it is important to first establish what attributes and criteria would allow the Commission to find any capacity market just and reasonable.

Accordingly, in this subsection we define the core elements of the applicable just and reasonable standard for market design. The starting point for the assessment of any market design

proposal is whether it will produce just and reasonable rates, terms, and conditions of jurisdictional service.[6] The Commission may rely on market forces to produce just and reasonable outcomes to the extent such reliance will produce efficient outcomes that are consistent with the existence of a competitive market. Indeed, "[w]here there is a competitive market, the Federal Energy Regulatory Commission . . . may rely on market-based rates in lieu of cost-of-service regulation to ensure that rates satisfy [the just and reasonable] requirement."[7] However, without reasonable assurances that market forces will produce outcomes consistent with an efficient, competitive market, the Commission cannot rely on market forces to set rates, terms, and conditions of service.[8]

For these reasons, the Commission's focus in evaluating market structures and related rules has been on whether those market structures and rules will lead to efficient outcomes that are consistent with a competitive market.[9] A separate but related principle in the Commission's

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[6] *See, e.g., California Independent System Operator Corporation*, 143 FERC ¶ 61,087 at P 61 (2013) (summarizing holding, and explaining that the California Independent System Operator had demonstrated that its then-existing rule allowing convergence bidding on interties was unjust and unreasonable); *PJM Interconnection, L.L.P.*, 117 FERC ¶ 61,331 at P 5 (recounting background of PJM capacity market proceedings, and emphasizing that the ultimate goal of those proceedings was to "determine a just and reasonable replacement for the existing market structure.").

[7] *Louisiana Energy and Power Authority v. FERC*, 141 F.3d 364, 365 (D.C. Cir. 1998). *See also Tejas Power Corp. v. FERC*, 908 F. 2d 998, 1004 (D.C. Cir. 1990) ("In a competitive market, where neither buyer nor seller has significant market power, it is rational to assume that the terms of their voluntary exchange are reasonable, and specifically to infer that price is close to marginal cost, such that the seller makes only a normal return on its investment.").

[8] *See Farmers Union Cent. Exchange, Inc. v. FERC*, 734 F. 2d 1486, 1510 (D.C. Cir. 1984) ("In setting extraordinarily high price ceilings as a substitute for close regulation, FERC assumed that, with the wide exposed zone between the ceiling and the 'true' market rate, existing competition would ensure that the actual price is just and reasonable. Without empirical proof that it would, this regulatory scheme, however, runs counter to the basic assumption of statutory regulation, that Congress rejected the identity between the 'true' and the 'actual' market price.").

[9] *See, e.g., California Independent System Operator Corporation*, 116 FERC ¶ 61,274 at P 615 (2016) (reviewing CAISO's proposed market redesign structure for settling energy charges for load, and focusing, in particular, whether the proposal will "yield efficient market outcomes, provide adequate protection to the market participants and [is] reasonable should [high prices and curtailments] arise

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policies regarding reliance on competitive markets is that market structures and market conditions can be highly variable and fluid, and that it is necessary to conduct an independent examination of the details in each proposed market to determine whether they will produce efficient outcomes.[10] Hence, it is necessary to conduct a more rigorous, detailed analysis of the proposed market design, in order to determine whether it will produce efficient market outcomes.

In the context of capacity markets, the key driver of whether a market design is just and reasonable is whether the market will "attract and retain" the needed capacity at prices that are just and reasonable.[11] The "attract and retain" standard has long been at the center of whether a capacity market construct is just and reasonable.

In *New York Independent System Operator, Inc.,* 136 FERC ¶ 61,165 (2011), the Commission addressed, and rejected, certain proposed criteria for identifying new capacity zones on the ground that they focused too much on the market as designed, rather than on the market as it actually operated. The Commission emphasized the need for such an approach in order to ensure that existing transmission constraints are appropriately accounted for in the capacity zone design, and thus to attract sufficient capacity at just and reasonable rates. The Commission emphasized that "if a new zone is created that will allow the auction to recognize the constraint,

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in the future."). *Cf. Duke Energy Corporation, et al.*, 137 FERC ¶ 61,210 at P 85 (2011) ("[W]e believe that competition is now the best tool to discipline wholesale electric markets and thereby protect the public interest. But the competition needed to protect the public interest will not be efficient and deliver lower prices in poorly structured markets.") (citing *Inquiry Concerning the Commission's Merger Policy Under the Federal Power Act: Policy Statement*, FERC Stats. & Regs. ¶ 31,044 at 30,117 (1996).

[10] *See, e.g., California Independent System Operator Corporation*, 146 FERC ¶ 61,204 at P 102 (2014) ("any proposal before the Commission is evaluated on its own merits based on the record in the proceeding" and is not conflated with the issues presented in any other proceeding).

[11] *See, e.g., New York Independent System Operator, Inc.,* 111 FERC ¶ 61,117 at P 25 (2005) ("The purpose of an ICAP requirement is to ensure a minimum amount of capacity in the market to promote reliability, and thus, to elicit additional capacity that might not otherwise enter the market.").

(Continued…)

prices in the constrained area will be allowed to rise above prices in the unconstrained area, thereby providing stronger incentives to attract and retain capacity needed to meet reliability objectives in the constrained area."[12]

In addition, the Commission has recognized the importance of how the demand in the capacity market it modeled by an RTO. For example, in late 2015, the Commission issued an order holding that the continued use of vertical demand curves in constrained zones in the ISO-New England Forward Capacity Market ("FCM") was unjust, unreasonable, and unduly discriminatory.[13] The Commission had previously encouraged ISO-New England to move away from the use of vertical demand curves in the FCM because of the propensity of such curves to produce significant price volatility, and to expose markets to additional risks of the exercise of market power. The Commission initially refrained from ordering ISO-New England to move away from vertical demand curves immediately. However, when ISO New England's stakeholder process subsequently failed to produce a proposal that would have addressed the Commission's concerns, the Commission issued an Order holding that the use of vertical demand curves in constrained areas in the FCM was no longer just, reasonable, or not unduly discriminatory. The Commission found that an immediate move away from vertical demand curves in the ISO-NE FCM was required to produce competitive market outcomes.

This type of market assessment also is evident in many other cases involving RTOs and ISOs.[14] The key inquiry in all of these contexts, as it should be in this proceeding, is whether the

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[12] *New York Independent System Operator, Inc.*, 136 FERC ¶ 61,165 at PP 57-58 (2011).

[13] *ISO New England, Inc., et al.*, 153 FERC ¶ 61,338 (2015).

[14] *See, e.g., ISO New England, Inc., et al.*, 155 FERC ¶ 61,121 at P 17 (2016) (finding that ISO New England tariff is unjust and unreasonable because it does not specify how new and existing capacity at the same generating station should participate in the FCM auctions); *PJM Interconnection, L.L.C.*, 154 FERC ¶ 61,151 at P 51 (2016) (finding that use by PJM of cost-based offers in PJM RPM market as the sole measure of short-run marginal cost in calculating capacity market mitigation

(Continued…)

RTO's market design will lead to efficient outcomes that are consistent with the existence of a competitive market. In the specific context of MISO's Module E, this question turns on whether MISO's proposed market construct will set efficient prices that attract and retain the necessary capacity. This inquiry requires an assessment of the supply and demand in MISO's capacity market as established under Module E, as we describe above.

In the next section, we address how the characteristics of MISO's capacity market diverges from the sound economic principles approved for other capacity market designs. We explain why the capacity market proposed and previously implemented under Module E cannot produce just and reasonable market outcomes.

IV. EVALUATION OF MODULE E

A. Evaluation of the Design of MISO's Planning Reserve Auction

At the core of MISO's capacity market is the PRA, which runs once per year in advance of the planning year (June 1 to May 31). Participants are not required to procure or sell their capacity through the PRA. For example, utilities may "self-schedule" resources that they own or have purchased bilaterally to satisfy their requirements. However, the PRA includes all supply in the supply and demand (self-scheduled resources are entered as price takers).

Although most of the load-serving entities and suppliers in MISO are regulated utilities, the PRA should play the same role in facilitating long-term decisions as the capacity market serves in other RTOs. The prices set by the PRA should facilitate good, efficient decisions by both regulated and vertically-integrated entities (state-regulated utilities, and municipal utilities and cooperatives) and unregulated entities (competitive retail LSEs and merchant generators).

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is unjust and unreasonable given the use of market-based offers in the PJM energy market); *ISO New England, Inc., et al.*, 147 FERC ¶ 61,172 at P 23 (2014) (finding ISO New England capacity market "to be unjust and unreasonable, because it fails to provide adequate incentives for resource performance, thereby threatening reliable operation of the system and forcing consumers to pay for capacity without receiving commensurate reliability benefits.").

This is particularly important for the competitive retail loads and competitive suppliers that rely entirely on the wholesale market prices to guide their decisions. These competitive participants constitute a significant share of all generation and load in the MISO region. It is no less important for the PRA to produce efficient price signals than it is for the markets in PJM, New York, or New England. MISO itself has expressed the very same concerns in a recent filing:

> Through its stakeholder process and special workshops, MISO determined that its current Planning Resource Auction ("PRA") construct may become unable to produce efficient or timely price signals for competitive retail areas that depend on market price signals to incent resource investment.[15]

Since its inception, the MISO PRA has modeled demand as a single quantity, subject to a deficiency price, *i.e.,* using a vertical demand curve. MISO also models minimum zonal demands for capacity, which are also vertical demand curves. The PRA's vertical demand curve undermines the incentives because in most circumstances, the auction will clear at a price that is much lower than the marginal reliability value of the resources or the level necessary for the MISO markets to maintain adequate planning reserves (generally close to zero). However, the auction design also creates the potential for significant price volatility and uncertainty for market participants when supply margins become tight, which can cause price to move from close to zero up to the deficiency price in a single year.

This volatility can create risk that will hinder long-term contracting and investment. The most serious problem, however, is that such a market cannot provide sufficient revenues to support investment at levels that would satisfy the 1-day-in-10-years reliability standard. To understand why the MISO capacity market has historically and will continue to produce inefficient and unreasonably low prices, one simply needs to observe the actual supply and demand in the 2017-2018 PRA conducted in the spring of 2017 as shown below in Figure 3.

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[15] MISO Proposed Competitive Retail Solution in new Module E-3 and corresponding revisions to Tariff sections in Modules A, D, and E, Docket No. ER17-284-000, at p. 4.

Figure 3: Supply and Demand in the 2017-2018 PRA

The supply and demand shown in this figure result in a clearing price at the intersection of the curves of $1.50 per MW-day, which is effectively zero. This represents less than one percent of the revenues an investor would need to build a new peaking resource in MISO. PRA prices cleared only slightly higher for planning years 2014-2015 and 2015-2016. The highest the PRA has ever cleared on a regional basis in MISO's Midwest Region or South Region is at $72 per MW-day for the 2016-2017 planning year in the Midwest Region. This price was inflated by a large quantity of resources that were exported to PJM and a significantly understated transfer constraint that stranded a large quantity of resources located in the South. Even so, this highest price is still only roughly one quarter of the net cost of new entry.[16]

We expect exports to fall over time because of new restrictions imposed on capacity imports by PJM and stranded resources to fall because MISO increased the transfer constraint

16 A capacity price of $72/MW-day translates to about $26/kW-year, which is 27 percent of the estimated cost of new entry (for the estimated cost of new entry see "Narrow Constrained Area Mitigation Thresholds", https://cdn.misoenergy.org/2017%20NCA%20Threshold102560.pdf.

between the South and Midwest by more than 50 percent. Together, this should cause prices to clear at close to zero indefinitely, as occurred in the PRA for 2017-2018, even though capacity margins are falling to levels close to the minimum planning reserve requirement. Pricing capacity in MISO at close to zero in either the short term or long term cannot be reconciled with the economic objectives the Commission has employed in determining whether the capacity markets in New York and New England are just and reasonable.

Based on these factors alone, and the fact that MISO has presented no evidence supporting its proposed vertical demand curve as just and reasonable, we do not believe the Commission can declare the proposed Module E just and reasonable. Nonetheless, we also evaluate the effects of MISO's proposed vertical demand curve by estimating a re-clearing of the 2017-2018 PRA with a representative sloped demand curve. This analysis is discussed in the following subsection.

B. The Effects of the Design Flaw in Module E

To demonstrate the significance of the design flaw, we estimated the clearing price in MISO that would have prevailed in the 2017-2018 PRA if MISO employed sloped demand curves in the PRA. These clearing prices are more reasonable and better reflect the marginal value of reliability in MISO.

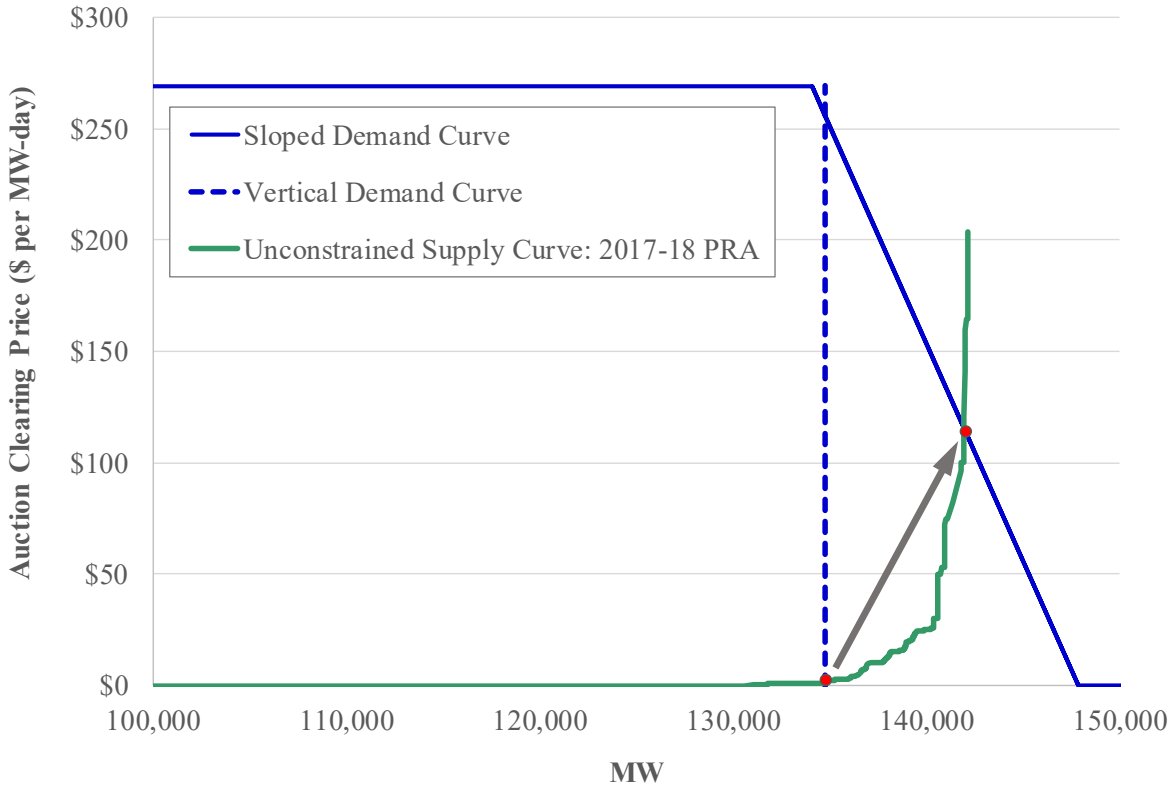
The sloped demand curve we use in this simulation is similar to the curve used by MISO witnesses in the analysis of MISO's "competitive retail solution" in FERC Docket ER17-284. The top of the curve is at 1.05 x Net CONE and 99% of the planning reserve margin requirement ("PRMR"). The sloped demand curve and the vertical demand curve intersect at net CONE. In other words, the sloped demand curve price is equal to net CONE at the PRMR quantity.

For our simulation, we assumed a linear demand curve where the zero-crossing point (the point where additional capacity is assumed to have no value) determines the slope of the demand curve. Any sloped demand curve must be parameterized through analysis and discussion with

market participants. The capacity demand curve for the New York Control Area (*i.e.*, all of New York State) crosses zero at 112% of the minimum capacity requirement. The capacity demand curve for the PJM crosses zero at 107.5% of the minimum capacity requirement. For our simulation, we used the average of these two values and assumed a zero-crossing point of 109.75% of the MISO-wide PRMR. Changing this slope will change the precise clearing price we estimate but not the overall conclusion that assuming a vertical demand curve produces prices that do not reflect the marginal reliability value of capacity resources in MISO.

The blue dashed line in Figure 4 represents the vertical demand curve actually used in the 2017-2018 PRA, and the solid green line indicates the maximum amount of capacity in MISO that was not stranded behind auction constraints. The supply curve is constructed using all capacity that was offered into the MISO auction either with an associated price or through self-supplied resources (from Fixed Resource Adequacy Plans).

Figure 4: Supply and Demand in the 2017-2018 PRA



In the 2017-2018 MISO PRA, almost 135 GW of capacity cleared, and the auction clearing price for the entire MISO footprint was $1.50 per MW-day. In the sloped-demand-curve alternative, roughly 142 GW of capacity cleared. The additional cleared constrained resource zones did not cause any of the constraints to bind so the price in all zones is the same in the simulated case.

More importantly, this figure shows that the clearing price on the system increases from $1.50 to $115 per MW-day by transitioning to an efficient capacity demand curve. This is an enormous difference that highlights the serious impact of the flawed market design under the current Module E. We believe that this demonstrates that the current vertical demand curve that is proposed in MISO's filing is not just and reasonable.

C. Short-Term Impacts of Remedying the Design Flaw

Based on the simulation described in the prior section, we estimate how improving the design of the PRA would have affected various types of market participants in the 2017-2018 PRA. We do this by calculating the estimated settlements for each participant based on their net sales. We then aggregate the participant-level results into three participant categories: competitive suppliers, competitive retail load-serving entities ("LSEs"), and vertically-integrated utilities.

These effects are important because the economic price signals from the wholesale market guide key decisions by unregulated participants in MISO, including competitive suppliers and competitive retail LSEs. These effects are shown in Table 1 below. For each type of participant, the values are aggregated for the participants that whose net revenues would increase and those whose net revenues would decrease (or costs that would increase).

Table 1: Effects of Sloped Demand Curve by Type of Participant
2017-2018 PRA ($Millions)

Type of MP	Net Revenue Increases	Net Revenue Decreases	Total
Vertically-Integrated LSEs	$443	-$286	$158
Merchant Generators	$396		$396
Retail Choice Load		-$553	-$553

Although the vertically-integrated utilities are the largest group of participants, the aggregate changes in net revenues and costs are smaller than for other types of participants. Additionally, the vertically-integrated LSEs would have benefited in aggregate by $158 million from the use of the sloped demand curve. The effects on the vertically integrated LSEs are smaller on average than the competitive participants because they tend to self-supply most of their requirements through owned generation or bilateral purchases. Hence, the vertically LSEs' exposure to the PRA price is limited. Overall, 61 percent of these participants would benefit by implementing a sloped demand curve because they can sell their excess resources at an efficient price. Conversely, costs would rise for 39 percent of the vertically-integrated utilities.

The more significant effects are seen by the competitive participants. Merchant generators would have received significantly more revenue ($396 million) through the PRA, providing more efficient signals to maintain existing resources and build new resources. This effect will grow as capacity margins fall in MISO. Costs borne by competitive retail loads would have risen by $443 million. This is desirable because it provides efficient incentives for these LSEs to arrange for their own capacity needs rather than leaning the current spot market that provides capacity at inefficiently low prices. An efficient PRA would potential motivate competitive retail LSEs to contract for capacity efficiently and contribute to satisfying the region's resource adequacy needs.

D. Long-Term Impacts of Remedying the Design Flaw on MISO's Vertically Integrated Utilities

LSEs and their ratepayers generally should benefit from a sloped demand curve in the long-term. This is because LSEs in MISO have generally planned and built resources to achieve a small surplus on average over their minimum planning requirement because:

- Investment in new resources is "lumpy," occurring in increments larger than necessary to match the gradual growth in an LSE's requirement; and
- The costs of being deficient are large.

Under a vertical demand curve, the cost of the surplus must entirely be borne by the LSEs' retail customers because LSEs will generally receive very little capacity revenue to offset the costs that they incurred to build the resources. Because this additional capacity provides reliability value to MISO, the fact that LSEs receive no capacity revenues is inefficient. Adopting a sloped demand curve would benefit most regulated LSEs, as we explain below.

Table 2 shows how hypothetical LSEs are affected by a sloped demand curve when they hold varying levels of surplus capacity beyond the minimum capacity requirement. The scenarios assume: (1) an LSE with 5,000 MW of minimum required capacity; (2) net CONE of $65,000 per MW-year and demand curve slope of -0.01 (matching the slope of the NYISO curve); and (3) a market-wide surplus of 1.5 percent, which translates to an auction clearing price of $4.74 per kW-month ($54.85 per kW-year).

For each of the scenarios, we show the amount that the LSE would pay to or receive from the capacity market along with the carrying cost of the resources the LSE built to produce the surplus. Finally, in a vertical demand curve regime where the LSE will not expect to receive material capacity revenues for its surplus capacity, all of the carrying cost of the surplus must be paid by the LSE's retail customers. The final column shows the portion of the carrying cost borne by the LSE's retail customers under a sloped demand curve.

Table 2: Costs for a Regulated LSE under Alternative Capacity Demand Curves

LSE Surplus	Market Surplus	Capacity Market Revenues ($Million)	Carrying Cost of Surplus ($Million)	Carrying Cost Borne by Retail Load	Surplus Cost: Sloped Demand Curve	Surplus Cost: Vertical Demand Curve
1.0%	1.5%	$-1.43	$3.25	100%	$4.68	$3.25
2.0%	1.5%	$1.41	$6.50	78%	$5.09	$6.50
3.0%	1.5%	$4.25	$9.75	56%	$5.50	$9.75
4.0%	1.5%	$7.10	$13.00	45%	$5.90	$13.00

These results illustrate three important effects that sloped capacity demand curve would have on regulated load-serving entities in the MISO. In particular, the sloped demand curve:

- *Does not* raise the expected costs for most regulated LSEs. In this example, if an LSE fluctuates between 1 and 2 percent surplus (around the 1.5 percent market surplus), its costs will be virtually the same under the sloped and vertical demand curves.

- Reduces risk for LSEs by stabilizing the costs of having differing amounts of surplus. The table shows that the total costs incurred by the LSE at surplus levels between 1 and 4 percent vary by only 26 percent versus a 300 percent variance in cost under the vertical demand curve.

- Reduces the share of costs borne by retail customers. Because wholesale capacity market revenues play an important role in helping the LSE recover the costs of new resources, the LSE's retail customers will bear a smaller share of these costs when the LSE's surplus exceeds the market's surplus. Under the 3 percent case, for example, the current market would produce almost no capacity revenue even though the LSE's surplus is improving reliability for the region. Under the sloped demand curve in this case, almost half of the costs of the new unit would be covered by the capacity market revenues.

Hence, although a sloped demand curve could increase costs to non-vertically integrated LSEs that must purchase large quantities of capacity through an RTO's market, the example above shows that this is not the case for the vertically-integrated LSEs that dominate the MISO footprint. In fact, it will likely reduce the costs and long-term risks facing MISO's LSEs in satisfying their planning reserve requirements. In addition, this will provide efficient market

signals to other types of market participants, such as unregulated suppliers, competitive retail providers, and capacity importers and exporters.

As discussed in the prior section, understated capacity prices are a particular problem for competitive load-serving entities and competitive suppliers, both of which rely on wholesale market prices and revenues to govern their long-term decisions.

V. CONCLUSION

WHEREFORE, for the foregoing reasons, Potomac Economics, Ltd., respectfully requests the Commission to grant its motion to intervene in this proceeding and accept this protest.

As described in this protest, MISO has not provided evidence that would allow the Commission to concluded Module E will produce efficient market outcomes that can be deemed just and reasonable. We have described the flaw in the design of MISO's PRA relating to the vertical demand curve and demonstrated how this flaw will cause the capacity market to produce market outcomes that are unjust and unreasonable. We describe how a sloped demand construct, based on actual marginal reliability benefits, is fully achievable and will produce efficient capacity market outcomes.

While moving to a sloped demand curve is relatively simple design change, it will require significant time to: a) develop analytic support for the demand curve parameters, b) conduct stakeholder discussions, c) develop and file revised tariff provisions, and d) implement the revised design. This process cannot be completed prior to the 2018-2019 PRA to be conducted in early April.

Although the vertical demand curve will not produce just and reasonable outcomes over the long-term, canceling the 2018-2019 PRA would undermine participants' market expectations. Therefore, even though the current Module E will result in unjust and unreasonable outcomes, we recommend the Commission conditionally accept the filing as an interim measure to allow the

2018-19 PRA to be completed while also initiating a proceeding under FPA Section 206 to direct the MISO develop design changes prior to the 2019-2020 PRA that would allow MISO capacity market to produce just and reasonable outcomes over the long term.

Respectfully submitted,

/s/ David B. Patton

David Patton
President
Potomac Economics, Ltd.

February 7, 2018

CERTIFICATE OF SERVICE

I hereby certify that I have this day e-served a copy of this document upon all parties listed on the official service list compiled by the Secretary in the above-captioned proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated this 7th day of February, 2018 in Fairfax, VA.

/s/ David B. Patton