

Discussion Paper on Resource Adequacy for the Midwest ISO Energy Markets

I. Introduction and Overview

The terms “resource adequacy” or, equivalently, “supply adequacy” relate to the concept of whether or not there has been sufficient investment over time in physical assets (including generation, transmission, distribution, and demand-side measures) to ensure that the supply and demand for electricity in real time can be balanced at some price. By this definition, resource adequacy is a long-term, or investment, issue. That is, resource adequacy is not, nor should it be, *primarily* related to (1) flaws in spot market design (including Day Ahead and Real Time Energy Markets) that may cause participants to periodically or systematically withhold capacity, or (2) the “management” of price volatility.

Resource adequacy is important for at least two reasons that are fundamental to the future of the industry. First, the financial consequences are significant. It is understood that physical investment in the electricity industry is both needed and costly. What is less well known is that the difference between the cost of investment facilitated (i.e., incentivized) under different institutional structures could potentially be very significant. It is not an oversimplification to say that cost alone justifies the amount of debate that has occurred. Second, to date the primary focus of ISOs/RTOs has been on designing, implementing, and operating short-term electricity markets (i.e., Day Ahead and Real Time Energy Markets).¹ The dominant organizing principle behind these markets has been the implementation/operation of centralized bid-based dispatch to achieve reliability and efficiency gains in how the existing infrastructure is used. The design principle underlying these markets is that as long as reliability is maintained, the dispatch function itself should remain indifferent to any specific outcome. That is, the ISOs/RTOs are not *principals in the market* but rather *service providers to the market*.

Long-term markets such as those for capacity and financial transmission rights are therefore problematic because they potentially make an ISO/RTO a principal. The reason being, is that in the absence of a proper market, i.e., one with both buyers (demand) and sellers (supply), the RTO has to serve as one side of the market. In the case of capacity, certain proposals currently under discussion establish the ISO/RTO as the single buyer acting on behalf of future demand in determining a price. In other words, the ISO/RTO is both a service provider and a principal. The creation of this new relationship raises

¹ The obvious exception to this assertion is the market for Financial Transmission Rights, which extends out a year. It is also worth noting that the NYISO originally offered FTRs with a 5-year time horizon but has been gradually reducing the length of these instruments.

important questions around market design,² regulatory matters,³ and commercial obligations.⁴ Creating a forward looking capacity construct is therefore potentially not “just” an incremental increase in responsibilities for an ISO or RTO; but rather it is a significant structural change to the role they currently perform.⁵

Given that resource/supply adequacy is (or should be) focused on investment in physical assets⁶ the central question is: what mechanisms guide or facilitate investment decisions? In a market arrangement it is, among other things, the forward price. If there is no market – or if the market is “poor” – alternative mechanisms have to be used. It is useful then to begin the discussion on a potential capacity mechanism for the Midwest ISO Region with the question of how best do we enhance and/or create a forward price signal that will guide or facilitate investment decisions.

II. Regulatory Imperatives

The Midwest Independent Transmission System Operator, Inc. (“Midwest ISO”) received directives from the Federal Energy Regulatory Commission (“FERC” or “Commission”) to file with the Commission a “permanent” or long-term plan that will address resource adequacy requirements in the Midwest ISO Region no later than June 1, 2006.⁷ In developing this plan, the Commission has provided that the Midwest ISO should:

- Consider: (1) the unique characteristics of the Midwest ISO’s Market Participants; (2) the Midwest ISO Region’s needs; and (3) the views of applicable state regulators and the Organization of MISO States (“OMS”).
- Give due consideration to stakeholder views, although FERC recognizes that achieving uniform agreement on all aspects of such a plan may be impossible.

² For example, how does the “market” ensure that the least-cost dispatch objective is pursued regardless of capacity decisions that have been made by the ISO/RTO?

³ ISOs/RTOs while having State Regulatory Authorities as their stakeholders are regulated by the Federal Energy Regulatory Committee.

⁴ To the extent that ISOs/RTOs engage in activities that are very similar to Integrated Resource Planning are local utilities absolved from performing similar exercises? If not how are conflicts between the two (or more) plans resolved?

⁵ While ISOs/RTOs engage in transmission planning they do this as a service to their customers and they do not establish a price or enter into contracts – either implicit or explicit – that affect planning outcomes.

⁶ Where the term is understood to include any processes or procedures related to demand-side management.

⁷ *Midwest Independent Transmission System Operator, Inc., et al.*, 108 FERC ¶ 61,163 at P 397 (2004) (“August 6 Order”), *order on reh’g*, 109 FERC ¶ 61,157 (2004) (“November 8 Rehearing Order”), *order on reh’g*, 111 FERC ¶ 61,043 (2005) (“April 15 Rehearing Order”).

- Provide a consistent platform to support the region’s short-term reliability needs and encourage long-term planning and investment in infrastructure.
- Develop a construct that does not directly conflict with the resource adequacy requirements of the PJM Interconnection (“PJM”).

III. Jurisdictional Issues

In FERC’s August 6 Order on the Midwest ISO’s EMT, it stated that “we expect that the final RAR plan will give due consideration to stakeholder views...”⁸ These stakeholder views include the views of the OMS. While stakeholder views are disparate, certain State Regulators firmly believe that the states have sole jurisdiction over the resource adequacy construct. In furtherance of this position, many parties cite the Federal Power Act, where it states, “The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this subchapter and subchapter III of this chapter, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.”⁹

The diversity in the Midwest ISO Region results in market participants in certain states in the Region being vertically integrated utilities where the state regulatory commission works with these companies to set adequate reserve margins using some form of an integrated resource planning process (“IRP”). Still, other market participants in certain other states in the Midwest ISO Region have state regulatory commissions that have voluntarily chosen to defer setting reserve margins to a regional body like the regional reliability organization (“RRO”). In either case, it’s not clear if the state regulatory body has a desire to relinquish this kind of influence on the setting of reserve margins for their regulated utilities.

Recognizing the dichotomy between Federal and State Regulatory preference related to Resource Supply Adequacy, the Midwest ISO will endeavor to implement a construct satisfies federal regulatory directives while recognizing the diversity of state regulatory oversight in this area.

IV. Current MISO Market Design

Several aspects of the energy markets articulated in the Midwest ISO’s Transmission and Energy Market Tariff (“EMT”) are relevant to a discussion on capacity markets. First, the current Tariff does not include a specific

⁸ See ¶ 397 of August 6 Order.

⁹ See § 201(b) of Federal Power Act.

capacity market. While there is a linkage between capacity and the energy markets through Module E, the Midwest ISO does not operate a capacity construct. Second, not only is there a \$1000 ceiling on offers into the real time market, there is real time dynamic market monitoring and mitigation. Third, the EMT codifies NERC reserve requirements for each of the three reliability regions in the footprint.

In essence the Midwest ISO operates a physical real time market and a financial (very near term) forward Day Ahead energy market. Module E notwithstanding, long-term generation capacity does not currently play a role in either the Midwest ISO's market operations or in the market aspects of the EMT itself (i.e., Modules C, D, and E of the Tariff). The extent to which long-term "capacity" is linked to the market is limited to the relationship between transmission service, designated network resources and eligibility in the allocation process for Financial Transmission Rights. However, it is worth noting that as a short-term concept capacity (i.e., operating as compared to planning reserves), is an important aspect of reliability.

V. Past, Present and Future Trends in Capacity Market Constructs

Capacity market constructs in the eastern ISOs/RTOs began with the Installed Capacity ("ICAP") approach, though prior to this they had reserve requirements to meet their resource adequacy needs. Under this ICAP approach, resource owners participating in the capacity market received capacity payments for some estimated maximum output from the plant. These ICAP payments were to ensure adequate supply was available to meet demand under peak load conditions. Over time it became apparent that if the ISO/RTO was going to meet its short term reliability standard, then outage rates for resources needed to be considered when buying capacity in the capacity markets. Resources were receiving capacity payments for capacity not available during the operating year. As a result, the eastern ISOs/RTOs moved to the Unforced Capacity ("UCAP") approach.¹⁰

The UCAP approach solved the problem of availability of the resources by calculating a historic forced outage rate for each resource and then used the rate to decrement the available capacity that the resource could offer into the capacity market. Unfortunately, this approach creates some perverse incentives like a reluctance of resources to report forced outages, endangering reliability by leaning on the system. In addition, other design elements like universal deliverability, fuel and emissions use limitations, resource mix, vertical demand curves and bipolar capacity prices became significant issues in UCAP markets:

¹⁰ Some participants may still call it an ICAP approach, though in fact the ISO/RTO is counting only unforced capacity.

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- Universal deliverability. With little or no locational deliverability requirement, capacity can be built where it is cheapest to build, without regard to enhancements in reliability, especially if capacity revenues recover a significant portion of a unit's costs.
- Use limitations. Capacity can count as meeting resource requirements, without regard to whether, for example, gas will be available for operating a CT, or emissions limits would be restrictive during critical operating hours.
- Resource mix. Capacity is required to meet a peak load forecast plus a reserve margin, ignoring the load duration curve. This means excess capacity is prevalent for huge amounts of the calendar year.
- Bipolar capacity prices (i.e., capacity prices that went from very low to very high without hitting an intermediate level). With daily capacity auctions to accommodate retail access programs, if supply is limited, capacity auction prices move towards the capacity price cap. If supply is slightly in surplus, the market-clearing price moves towards zero. These prices occur in part because the ISO/RTO has a fixed reserve margin target which translates into a vertical demand curve. Bipolar capacity prices result in increased risk for investment.
- Vertical demand curves. Imposing a downward sloping demand curve dampens the price volatility, and hopefully reflects enhance reliability with additional reserve procurement.

As a result, the eastern ISOs/RTOs have moved to towards another capacity approach. The New England ISO has developed the "LICAP" or Locational ICAP market while PJM has produced the Reliability Pricing Model or RPM. Similar in some ways, the trend in capacity market constructs appears to:

- Impose locational requirements,
- Account for forced outage rates for resources,
- Provide capacity payment premiums for resources that provide more operational flexibility, like black start or load following, and
- Impose sloped demand curves set by administrative fiat.

PJM's RPM has these design characteristics in its capacity construct, as does ISO NE's LICAP. The three primary differences between the two proposals are:

- While RPM establishes capacity needs using a four year time horizon, PJM purchases on behalf of future load on a yearly basis. In contrast, LICAP is based on a one year time horizon with ISO NE running a monthly spot auction to procure the required capacity,
- Whereas RPM uses unforced capacity in the usual way, LICAP calculates capacity based on the unit's availability during 'shortage hours', and
- The RPM proposal address for resources with specific characteristics, e.g. load following, while LICAP includes no such proposal.

New England filed their proposal with FERC on March 1, 2004.¹¹ On June 2nd of that year, FERC delayed the effective date instituting LICAP from June 2004 to June 2006, and established hearings on critical LICAP design issues. The ALJ issued his decision on June 15 2005. PJM has yet to file their RPM proposal although they continue to have ongoing discussions with their stakeholders.

VI. Steps Forward

As stated above, the Midwest ISO must file a long-term resource adequacy plan with FERC. In developing this plan there are specific characteristics of the Midwest ISO's Region that must be accounted for in a fundamental rather than peripheral manner. Specifically:

- The electrical, political and regulatory diversity of the footprint.
- The stage of market development, (i.e., the Midwest does not have a long history of centralized market structures in electricity).
- The implementation costs, as well as, ongoing administration costs.
- The costs and benefits of the proposal as compared to the "counterfactual" (i.e., the most likely alternative).

In addition there are specific general guiding principles that should be used to guide the recommendation:

- The Resource Adequacy Plan should enhance system reliability and security,

¹¹ Importantly the Proposed Energy Bill specifically recognizes the LICAP proposal and requires FERC to "carefully consider the States' objections."

- The Resource Adequacy Plan should provide market participants with reliable price signals that will drive investment in generation and transmission assets,
- The Resource Adequacy Plan should not impose any additional costs for the Midwest ISO's market participants without a commensurate increase in system reliability,
- The Resource Adequacy Plan should not promote the abuse of market power; and
- The Resource Adequacy Plan should not be in conflict with the market principles identified below.

Finally with respect to market design and operation the Midwest ISO has endeavored to implement robust, transparent and competitive spot energy markets to manage congestion on the electric grid. To achieve these kinds of results.

- Markets work best when there are many buyers and sellers,
- Markets work best when market participants voluntarily choose to participate in the market,
- Sellers will sell if there's an opportunity to earn a return commensurate with the risks; and
- Competition yields lower prices.

Based on the above characteristics and guidelines, the Midwest ISO believes that the appropriate starting point for discussion on a eventual capacity market is to focus on the efficacy of long-term forward contracting.

With that as the working hypothesis, the Midwest ISO believes that it can best achieve resource adequacy by promoting the use of long-term energy contracting and performing an advisory role in transmission and resource planning. Long-term energy contracting can be facilitated by developing and offering a standardized forward energy contract and by creating the incentives for market participants to engage in such contracts by letting the Midwest ISO energy markets work through a relaxation of the offer caps, an alteration of the market mitigation protocols and the offering of long-term FTRs.

Energy Plus Operating Reserve Markets

When functioning properly, energy markets with relaxed offer caps and altered market mitigation protocols will promote resource adequacy and create

the incentive for investment in infrastructure. Spot markets primarily run to maintain system balance and reliability – they are not intended to be the primary source of revenue for asset owners, i.e., spot markets are imbalance markets and are intended to complement rather than substitute for bilateral contracts which should remain the dominant transaction medium. Resource owners will invest in new assets if there's an opportunity to earn a return on their investment commensurate with the risks. Allowing real time spot prices to reflect the supply-demand balance should allow owners of infrequently used resources the opportunity to recover a portion of the fixed costs assigned to such units in the spot markets. This opportunity, if not fleeting, will provide a clear signal for investment in infrastructure.

In coordination with the Independent Market Monitor (“IMM”), the Midwest ISO shall include relaxed offer caps and altered market mitigation in its energy markets to allow generation resource owners the opportunity to recover some of their fixed costs and create the incentive for long-term contracting.

1) Offer Caps – relaxed. A balance must be struck between the political reality of necessarily lower offer caps and appropriately higher caps for investment incentive. As a transition it might be prudent to relax the existing \$1000 offer cap by \$500 each successive year under the new Resource Adequacy Plan.

2) Market Mitigation – altered. Market Mitigation should not create or exacerbate a supply shortage by capping prices below the level needed to attract investment that would relieve the shortage. Conduct and impact tests can be developed that are tailored specifically based on whether resources are in rate base, have long-term contracts or depend significantly on revenues from the spot markets. Cumulative price thresholds can be developed specifically for each resource.

The Midwest ISO's Energy Markets will more accurately reflect the cost of wholesale power and provide direction for infrastructure investment. They will provide economic signals indicating where investment in the bulk power system is needed, whether it is in generation, transmission or demand side response. They will provide the correct price signals to influence market behavior while providing mechanisms to hedge against congestion costs as well as price uncertainty and volatility in the Real-Time Energy Market.

Long-term Energy Contracts

Allowing for the possibility of spot market price volatility is the key for creating incentives for long-term contracting. Forward energy contracts can serve several purposes:

- Buyers can use forward contracts to lock in prices for blocks of energy required to serve load over various terms; therefore, allowing buyers to hedge against price increases.
- Sellers can use the contracts to lock in prices for their energy production over various terms therefore allowing sellers to hedge against drops in prices.
- Traders can seek profitable arbitrage opportunities.
- Forward contracts can ensure that adequate generation capacity will be in place to meet demands in the future.

While the market participants will determine the final terms of the contract, the forward energy contract will take a standardized form with certain terms that will allow it to be a fungible instrument that may be traded many times prior to the actual delivery of the energy contracted for under the contract. Specifically, the contract will need to take into account the homogeneity of the good sold under it, the deliverability of such good, and the settlement of such good and possible liquidated damage provisions.

With a standardized contract, the parties to the contract can evaluate the risks that they face and pursue a way to mitigate those risks. For example, a party selling energy forward could control the risks it faces in meeting its obligation by investing in generation capacity or demand side options. The existence of a market for forward contracts could ensure a party investing in generation capacity a guaranteed income stream it may need to secure financing for its project.

Buyers have little incentive to engage in long-term contracts in a market with stringent market mitigation and offer caps.

While longer term contracts currently exist, they do not provide for a long-term hedge to accompany the transaction contemplated by the contract, therefore limiting transactions under such contracts. The proposed contract and accompanying long-term financial transmission rights (“FTRs”) discussed in the next section will fill a gap that exists in the current industry transaction structure.

Long-term FTRs

The parties to a forward energy contract may be exposed to congestion costs. The hedge provided by a forward energy contract will be incomplete unless the parties to the contract can also hedge the congestion costs to which they will be exposed. A means to obtain appropriate long-term FTRs would provide an opportunity to hedge such congestion costs.

If the ISO/RTO over allocates the capacity of the transmission system when it provides FTRs (including long-term FTRs), the market participants are likely to bear the costs of the over allocation whether through pro-rated payments to FTRs or uplifts to fund the FTRs. This would tend to blunt any incentives for investment by market participants.

As a result of these two countervailing effects, the ISO/RTO should proceed slowly and incrementally in offering long-term FTRs. One approach would be to offer long-term FTR entitlements to market participants with commensurate long-term energy contracts, but only in the first tranche of the FTR allocation.

Many issues lend themselves to the discussion surrounding forward energy contracts and long-term FTRs ranging from the theoretical to the technical. The Midwest ISO identified a number of these issues in its comments on long-term FTRs submitted to the Commission on June 26, 2005. The Midwest ISO envisions a vigorous debate in the stakeholder process to iron out the details surrounding the issuance of long-term FTRs.

Demand Response

Buyers have little incentive to offer demand response resources in a market with stringent market mitigation and offer caps because typically, the cost of providing demand response exceeds the offer caps. Allowing for the possibility of spot market price volatility with potential for high scarcity prices is the key for creating incentives for demand response offers. Price responsive demand can set the market clearing prices in shortage conditions and trim the needle portion of the load duration curve.

Reserve Requirements

One of the roles of an RTO is to perform long-term planning and analysis for the region. Currently the Midwest ISO performs generation and transmission adequacy assessments. An energy-only market may require the ISO/RTO to not only perform long-term analyses but short-term as well, to ensure reliable grid operation.

- 1) State or RRO requirements. States and/or RROs can continue to set reserve margin requirements for market participants under their jurisdiction.
- 2) ISO planning. With the incorporation of a standardized forward energy contract, the Midwest ISO can look ahead to assess resource adequacy in its footprint. One tool to accomplish this task would be offering LMP price forecasts. These price forecasts can be useful information for market participants to consider investment in infrastructure. Periodically, the

Midwest ISO would update these price forecasts; for example, these forecasts could be updated one year prior to the Operating Day, six months prior, 3 months prior and the like.

Operating reserve requirements, both the nature of these requirements and the mechanism for achieving it, are appropriately being addressed by the Ancillary Services Task Force, a Midwest ISO stakeholder group.

VII. Conclusion

The Midwest ISO's proposed resource adequacy construct differs from the eastern ISOs/RTOs' existing or proposed capacity market mechanisms in the following ways:

- *States' rights regarding the levels of resource adequacy required by state entities are maintained;*
- *The Midwest ISO is not imposing on all market participants in its footprint a market clearing price for capacity or future energy through a capacity market construct. Forward prices can be arranged voluntarily by market participants through bilateral arrangements. As this resource adequacy construct moves towards further development, the Midwest ISO may facilitate an exchange where market participants can move from their long or short positions;*
- *This Midwest ISO resource adequacy construct has the flexibility to encompass physical capacity mechanisms like the MAPP construct under its umbrella, depending on the needs of market participants and the requirements imposed by state jurisdictions.*
- *The cost implications and risks associated with this resource adequacy plan are dwarfed by comparison to PJM's or ISO NE's proposed capacity market constructs.*