

MEMORANDUM

TO: Joint and Common Market
FROM: David B. Patton, Michael Wander
DATE: May 24, 2016
RE: Comments on Pseudo-Time Impacts and Alternative Firm Capacity Delivery Procedures

This memo summarizes our concerns with the economic and reliability effects of the current pseudo-tie requirements. It also provides our views on alternative firm capacity delivery procedures.

A. Summary

This memo discusses the adverse effects of pseudo-tying large numbers of MISO resources to PJM, including providing an analysis showing the number of constraints and value of congestion that will be affected by the pseudo-tied resources.

To avoid these adverse effects, we recommend that the RTOs adopt Alternative Firm Capacity Delivery Procedures. With a few modifications, MISO's proposed procedures can:

- Meet PJM's objectives for reliably delivering external capacity;
- Fully enforcing PJM's capacity obligations to ensure that MISO resources gain no advantage in selling capacity into PJM;
- Avoid the significant adverse efficiency and reliability consequences for both RTOs created of pseudo-tying large quantities of MISO resources to PJM; and
- Prevent the substantial congestion costs and FTR funding issues that the pseudo-ties may be cause PJM's customers because of the new market-to-market flows that will occur over MISO's constraints.

B. Impacts of Pseudo-Tying MISO Resources to PJM

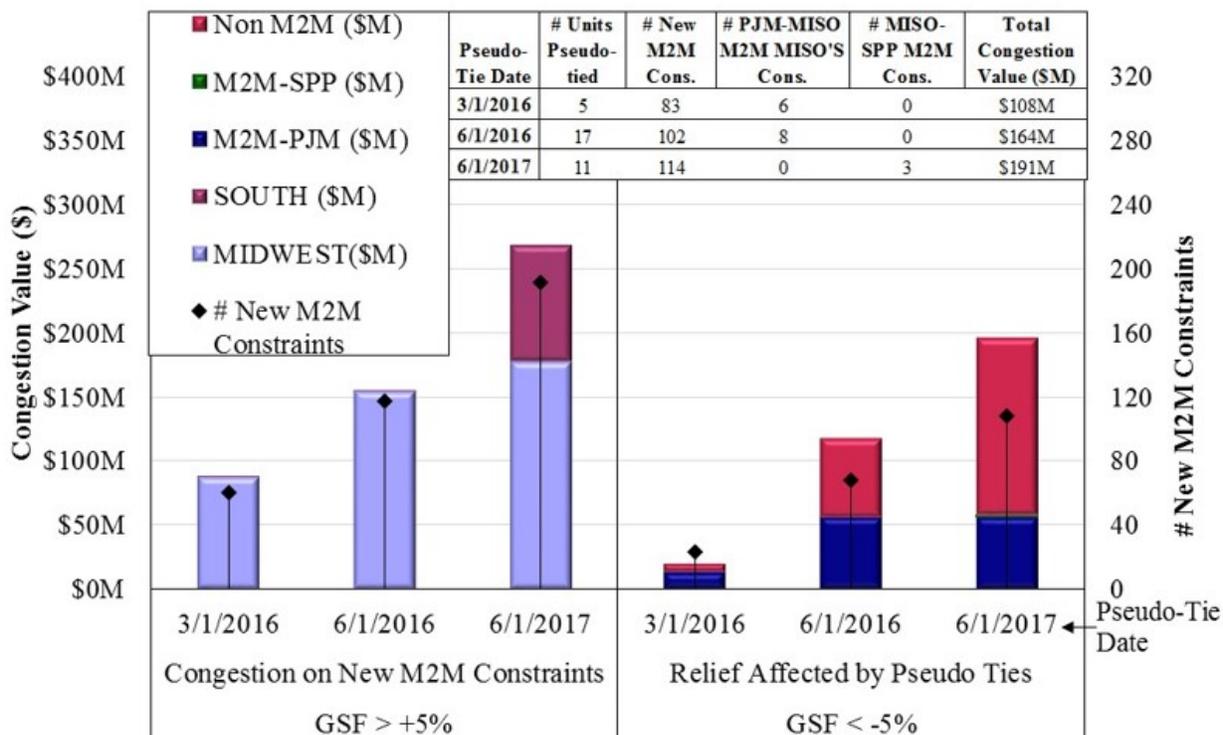
Having PJM take dispatch control of large numbers external generators will harm both MISO and PJM by undermining MISO's dispatch and exposing PJM to large levels of congestion costs on MISO's network. These concerns arise because the pseudo-tying:

- Causes forward flows over a large number of MISO transmission facilities that are difficult to manage; and
- Will transfer generators that create counter flows over other MISO constraints that will no longer be available to manage congestion on these constraints.

The first issue can be partially addressed to the extent that the constraints loaded by these generators are defined as market to market constraints and, therefore, coordinated with PJM. However, this coordination is much less efficient to managing the flows caused by these resources through MISO’s own 5-minute dispatch. Additionally, PJM is exposing itself and its customers to substantial costs.

Based on our analysis shown in figure below, more than 300 MISO non-M2M constraints that bound in 2015 will now need to be defined as market-to-market constraints so they can be coordinated. This will occur because units located on MISO’s transmission system will be under the dispatch control of PJM so the flows they cause on MISO’s constraints will now become PJM’s market flows and the market-to-market process will be necessary to manage these flows. Unfortunately, the market to market coordination is not nearly as effective as full dispatch control and many of the constraints will remain non-market to market constraints. This is a serious issue because the figure also shows that the value of the congestion on these constraints exceeded \$400 million in 2015, roughly 30 percent of all MISO congestion.

The left panel of the figure shows the constraints that the pseudo-tied units load and the right panel shows the constraints that they unload. The drop line in each panel shows the number of new MISO constraints in each class that will now qualify as market-to-market constraints while the bars show the value of the real-time congestion on the constraints. Finally, the data is divided to show the effects of each of the groups of resources that have or are pseudo-tying to PJM on March 2016, June 2016, and June 2017.



This figure shows that the constraints and associated congestion in 2015 that would be affected by the pseudo-tied resources is large. The value of the congestion affected by the pseudo-ties will rise in the future if gas prices rise and/or if congestion becomes more poorly managed because of the pseudo-ties.

C. Firm Capacity Delivery Procedures Proposal

We continue to participate in discussions with MISO and PJM on alternatives to pseudo-tying in an attempt to meet PJM's objectives for comparability between internal and external resources while avoiding the negative impacts of pseudo-tying. These proposals would establish procedures to guarantee the delivery of the capacity purchased by PJM. The discussions have been productive and we believe an agreement can be achieved that will satisfy all of PJM's objectives, while benefiting the participants of both RTOs by protecting the efficiency and reliability of the system.

The MISO IMM proposal that was presented in February to the JCM included:

- The host RTO would be obligated to deliver energy associated with capacity resources in an amount equal to the lower of:
 - ✓ The quantity of capacity purchased by the attaining RTO; or
 - ✓ The maximum dispatch level of the unit (zero if the resource is on outage, or a reduced amount if the unit is derated due to a generation or transmission issue).
- To mimic the availability of an internal unit, the host RTO will schedule the firm export subject to notice being provided by the attaining RTO by:
 - ✓ 20 minutes prior to real time if the resource is online; or
 - ✓ The length of the start-up time prior to real time if the resource is offline.
- When scheduled, the external capacity supplier will settle the export with both RTOs consistent with the settlement of all imports and exports.
 - ✓ The export need not clear in the day-ahead market;
 - ✓ Exports called by the attaining RTO would be scheduled in the real-time and necessary ramp would be allocated to it (ahead of exports being scheduled to any other location);
- The host RTO shall not curtail the firm exports unless PJM approves the curtailment because host RTO has declared an emergency.

This is comparable to MISO presentation in most regards, MISO's proposal offered to make the firm energy available to PJM even if the unit was derated. We believe this is excessive and raises comparability concerns for PJM. Additionally, MISO proposed to curtail the exports pro-rata with its own load. We do not believe this is justified since PJM should receive the capacity value of the resource. Only the units availability/rating should be the basis for reducing the delivery to PJM.

D. Response on Remaining Concerns and Principles

Capacity cleared in RPM must be available for commitment and dispatch in day-ahead and real-time

- This capacity import to PJM may be called or scheduled by PJM in the day-ahead or real-time market.
- However, the transaction need not be scheduled day ahead to be available to PJM.
- Under the IMM proposal, the operational flexibility should be equal to or better than the pseudo-tie.

Internal and external generation must be treated comparably (deliverability & equal opportunity)

- The delivery rules can be set up to ensure comparability.
- As proposed by the IMM, PJM will only have access to firm energy to the extent that the external capacity unit is available. If it derated, forced out of service, or otherwise unavailable (including due to local transmission or interconnection issues), the supplier will be subject to capacity shortfall penalties.
- Additionally, because MISO can provide any necessary assistance required by PJM to enforce the capacity performance requirements, the external units will have to fully comply with these requirements.
- Choosing between pseudo-tying and the capacity delivery procedures will not change the deliverability of an external resource to PJM in the operating horizon. In addition, MISO resources are subject to comparable deliverability tests by MISO to ensure that they can be delivered to the network and, if not, must make network upgrades.

External generation needs to be treated consistently between neighboring entities (consistency & equal opportunity)

- The capacity delivery procedures could be adopted by any other neighboring entities that choose to adopt them. If they do not adopt them, the units could still provide capacity to PJM via pseudo-tie.
- Since the capacity delivery procedures are designed to be comparable to capacity from internal units, and PJM believes pseudo-ties are comparable to internal units, there should be no comparability or competitive concerns between MISO generators and pseudo-tied resources located in other external areas.

Capacity offers need to reflect replacement capacity costs & re-dispatch costs

- Under the IMM proposal, PJM load will not be exposed to congestion or upgrade costs through MISO's dispatch. MISO will simply perform an economic dispatch to serve its load and net import/export needs. Any associated costs on any network constraints are borne by MISO. Importantly, no market flows would be attributed to PJM associated with the capacity sale (if market flows were attributed to PJM, it would convey cost responsibility).

- In contrast, pseudo-tied resources will create market flow over many MISO constraints for which PJM has no firm flow entitlements.
- Our analysis indicates that roughly 300 new constraints from 2015 will qualify as M2M constraints once all of the units are pseudo-tied that have cleared in PJM's RPM. These new constraints experienced in excess of \$400 million in congestion in 2015 (and 2015 was a mild congestion year). This will expose PJM load to substantial costs.
- Although some of the congestion associated with this new market flow may be borne by the pseudo-tied supplier, this will often not be the case. If the constraint doesn't bind in the day-ahead market or isn't modeled in the day-ahead market, all of the market-to-market charges/costs to coordinate in the real-time market would be borne by PJM's other customers.