REPORT REGARDING THE EXPECTED COMPETITIVENESS OF MARKETS IN THE NORTHERN ILLINOIS CONTROL AREA AFTER INTEGRATION INTO PJM

PJM MARKET MONITORING UNIT

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The PJM Market Monitoring Unit (MMU) has performed an analysis of expected market conditions in the Northern Illinois Control Area (NICA)[1] after integration into PJM, including the expected role of competition from the surrounding control areas. Based on that analysis, the MMU has reached conclusions regarding the expected competitiveness of the markets in the NICA following its integration into PJM. The relevant markets in the NICA include the energy markets, the capacity market, the ancillary services markets including regulation and spinning reserves, and the "markets" for blackstart and reactive services. Blackstart services and reactive services will be provided per tariff rates rather than via a clearing market. The MMU analysis included an examination of the structure of supply and demand within the NICA for the relevant markets and a series of simulations of the entire Eastern Interconnection focusing on the NICA energy market and the interaction between the NICA energy market and the PJM energy market, using the GE MAPS model. The analysis of the NICA market was based on unit by unit generation information, hourly loads, generation ownership and bilateral contracts. The Eastern Interconnection analysis was based on a full model of the entire Eastern Interconnection including all generating units and a fully detailed transmission model. The GE MAPS sensitivities included two basic approaches to hurdle rates, ranging from the approach used by PJM in its cost-benefit analysis to an approach that modeled hurdle rates based on historical interregional market price differentials. The explicit removal of all PJM/MISO through and out rates was also modeled, consistent with the FERC Order in Docket EL02-111 issued July 23, 2003. A technical appendix to this report will be prepared explaining the details of the simulations and providing more detailed quantitative results.

1. The Energy Market

a. Market Conditions

Competitive conditions in the NICA market depend on conditions internal to the NICA and on interactions with both the PJM market and the "markets" in the area surrounding the NICA. Conditions on the pathway between PJM and the NICA determine the relevant market(s) for analysis. For example, when PJM and the NICA are jointly dispatched, the relevant market includes both the PJM region and the NICA. When the pathway is constrained, the relevant markets are the PJM region and the NICA separately. Both the PJM market and the NICA market also include potential competition from generation in surrounding areas. The removal of PJM/MISO through and out rates by the Commission significantly increased the likely level of competition between generation inside the NICA and PJM regions and generation outside the NICA and PJM regions. The removal of through and out rates, however, also increased the possibility that transmission capability may be held for strategic reasons and that it will not be used efficiently. The MMU considered competitive conditions under each possible state of the pathway.

i. NICA Standalone Market Scenario

The analysis of the NICA on a standalone basis, without accounting for imports or exports from any source, reveals a potential cause for concern regarding

[1] This area has been referred to, at times, as the Commonwealth Edison (ComEd) region.

competitive conditions during the hours when the marginal source of supply is expected to be either a base load or a mid-merit unit. For both the base load and mid-merit segments of the supply curve, there is effectively only one supplier for each segment. That supplier would have the ability to unilaterally raise the price above the competitive level in the absence of competitive pressures from external resources. It is this characteristic of the NICA market that is the source of the market power concerns specified below. Relevant competitive pressures can come both from the PJM area via the pathway and from the areas around the NICA, including PJM, via non-pathway imports. In order to better evaluate the external competitive pressures, the MMU ran a series of analyses using the GE MAPS model.

ii. Unconstrained Pathway Scenario

When the pathway is not constrained and, as a result, when the NICA and the PJM region are jointly dispatched, the combined energy market is expected to be competitive and therefore the energy market in the NICA is expected to be competitive. When the NICA and PJM energy markets are operating as a single energy market, the current PJM market serves as a source of competition for the NICA market and vice versa. The results of the current PJM aggregate energy market are competitive, so the results of the larger, combined PJM and NICA markets that exist under conditions of joint dispatch are also expected to be competitive. The results of the MMU analysis indicate that the pathway is expected to be unconstrained from about 30 percent of the hours annually under the higher hurdle rates scenario to about 15 percent of the hours annually under the lower hurdle rates scenario.

iii. NICA to PJM Constrained Pathway Scenario

When the pathway is constrained from the NICA to the PJM region, the energy market in the NICA is expected to be competitive under normal market conditions. When the flow on the pathway is from the NICA to the PJM region, generation is cheaper at the margin in the NICA and therefore energy is flowing from the NICA to PJM. In effect NICA generation is serving NICA load and, in addition, displacing more expensive PJM generation at the margin in serving PJM area load. The more expensive PJM generation, in the competitive PJM energy market, serves as a competitive constraint on the ability of the NICA generation to increase market prices when PJM is in the relatively flat portion of its aggregate supply curve. Under these conditions, if the NICA generation increases its offers above those next in merit order in the PJM supply curve, it will be displaced by PJM generation. The results of the MMU analysis indicate that the pathway is expected to be constrained from the NICA to the PJM region from about 60 percent of the hours annually under the higher hurdle rates scenario to about 80 percent of the hours annually under the lower hurdle rates scenario.

However, there are market power concerns regarding the NICA market when the pathway is constrained from the NICA to the PJM region, when there are extreme market conditions in the PJM region but not in the NICA and when NICA

generation cannot substitute for PJM generation regardless of path. As a general matter, the balance of the PJM supply curve will serve to constrain the NICA generation offer behavior when PJM is in the relatively flat portion of its aggregate supply curve. However, under circumstances when demand is extremely high in PJM but is not extremely high in the NICA and further power transfers to PJM are not possible, this competitive constraint will not function effectively. This could occur, for example, when the weather is extremely hot in the MidAtlantic area but is moderate in the MidWest. Under such circumstances, the balance of the PJM supply curve will not serve to constrain the NICA generation offer behavior to competitive outcomes.

As an example of such a situation, the PJM competitive price could be $1,000 per MWh and the NICA competitive price could be $75 per MWh when NICA generation cannot substitute for PJM generation via the pathway or any other path to PJM. Clearly, the PJM supply curve would not serve as a source of competition for generation in the NICA under such conditions. Sources outside the NICA could serve as a potential source of competition for NICA generation under such conditions. However, it is not clear whether such competition would be adequate to ensure competitive market outcomes in the NICA. The combination of limited or uncertain external competitive forces combined with standalone market power concerns in the NICA leads to our conclusion that there are market power concerns during these times. Based on the experience in PJM, there are expected to be only a small number of hours when the pathway is constrained from NICA to PJM, when PJM faces high demand conditions while NICA does not and when NICA generation cannot substitute for PJM generation, regardless of path. PJM average system prices have exceeded $500 per MWh for only about 0.19 percent of the hours since April 1, 1999.

iv. PJM to NICA Constrained Pathway Scenario

When the pathway is constrained from the PJM region to the NICA, there are market power issues regarding the energy market in the NICA. When the flow on the pathway is from the PJM region to the NICA, generation is cheaper at the margin in PJM than in the NICA and therefore energy is flowing from PJM to the NICA. In effect PJM generation is substituting for more expensive NICA generation at the margin. However, when the pathway is constrained from PJM to the NICA, NICA units can set the price in the NICA without further competitive pressures from PJM generation. During the hours when the pathway is constrained from PJM to the NICA, our analysis shows that generation is supplied from segments of the NICA supply curve where ownership of generation is highly concentrated; there is effectively only one owner for each supply curve segment. The combination of limited or uncertain external competitive forces combined with standalone market power concerns in the NICA leads to our conclusion that there are market power concerns during these times. These conditions are expected to occur during a relatively small number of hours. The results of the MMU analysis indicate that the pathway is expected to be constrained from the PJM region to the NICA from about 10 percent of the hours annually under the

higher hurdle rates scenario to about 5 percent of the hours annually under the lower hurdle rates scenario.

v. Monopsony

In the NICA, unlike in the PJM area, Commonwealth Edison, the utility, will be the dominant purchaser of energy, in addition to a group of Load Serving Entities (LSEs), and ultimately a single, large buyer of capacity and ancillary services. This situation will continue until retail competition develops further. This fact gives rise to concerns that the single large buyer could exercise market power in the form of monopsony power. It is not clear exactly what forms this potential market power could take, but the MMU will monitor the potential for monopsony market power as the market evolves.

vi. Local Market Power

Regardless of pathway conditions, the energy market in the NICA may face local market power issues when units are required to run for local constraints to maintain reliability, exactly as is the case in the PJM region. There is not yet adequate information available to permit accurate estimates of the extent or duration of local market power in the NICA.

b. Market power mitigation

i. Unconstrained Pathway Scenario

Based on the analysis of competitive conditions, market power mitigation measures for aggregate market conditions are not expected to be required when the NICA and the PJM region are jointly dispatched and the pathway is not constrained. There are no automatic aggregate market power mitigation mechanisms in place in PJM because the aggregate energy market results are competitive. When the NICA is added to the PJM market, the entire market is larger and more diverse and the expectation is that aggregate market results will continue to be competitive.

ii. *NICA to PJM Constrained Pathway Scenario*

Based on the analysis of competitive conditions, market power mitigation measures for aggregate market conditions are not expected to be required under normal market conditions when the pathway is constrained from the NICA to the PJM region. Again, the combined PJM and NICA markets are expected to produce competitive results when PJM loads are in the relatively flat portion of its aggregate supply curve.

Based on the analysis of competitive conditions, market power mitigation measures for aggregate market conditions will be required when the pathway is constrained from the NICA to PJM, when there are extreme market conditions in the PJM region but not in the NICA and when NICA generation cannot substitute for PJM generation regardless of path. While the ideal situation would be that competition from areas outside the NICA would provide adequate competitive pressures in the NICA market, there is not adequate certainty that this will be the

case. As a result, aggregate market power mitigation mechanisms must be in place to address this issue. These mitigation measures must strike a balance between preventing any exercise of market power and ensuring that a competitive market price signal is permitted to emerge from the markets. In addition, the aggregate market power mitigation mechanism must be designed so as not to limit prices in the NICA market if generation in that market has the ability to deliver power to higher price markets and thus faces the associated higher, external opportunity cost. At present, PJM does not have an aggregate market power mitigation mechanism in place for PJM because the results of the PJM energy market as a whole are generally competitive on a standalone basis.

iii. *PJM to NICA Constrained Pathway Scenario*

Based on the analysis of competitive conditions, market power mitigation measures for aggregate market conditions will be required when the pathway is constrained from the PJM region to the NICA. When the pathway is constrained from PJM to the NICA, there is no competitive pressure from PJM units. The competitive pressure on the NICA market that may result from other generation is uncertain. As a result, generators in the NICA may be able to exercise market power under these conditions. Again, while the ideal situation would be that competition from areas outside the NICA would provide adequate competitive pressures, there is not adequate certainty that this will be the case. Thus, aggregate market power mitigation mechanisms must be in place to address this issue. These mitigation measures must strike a balance between preventing the exercise of market power and ensuring that a competitive market price signal is permitted to emerge from the markets.

iv. Monopsony

No explicit monopsony-based market power mitigation rules will be proposed at the outset of this market. The fact that the markets will be based on a centrally operated, least cost, security constrained dispatch should address these concerns, together with the ability of all parties to take purely financial positions in the day-ahead market. Nonetheless, the potential exercise of monopsony power in the energy market will be carefully monitored by the MMU as the market develops.

v. Local Market Power

Regardless of aggregate market conditions, local market power mitigation measures will be required when units are required to run for local constraints to maintain reliability. This is the same situation that currently exists in PJM where units are subject to local market power mitigation rules when units are required to run for local constraints. These measures should apply to all units in the NICA, regardless of the date of construction. There is nothing about the date of construction that reduces the need to prevent the exercise of local market power.

2. The Capacity Market

a. Market Conditions

There is currently no formal capacity market in the NICA. There is nonetheless an implicit capacity market in the NICA. MAIN capacity requirements result in the need for certain levels of capacity. To date the responsibility for ensuring that adequate capacity is available has been borne by Commonwealth Edison, the utility. Commonwealth Edison has entered into bilateral contracts to purchase the capacity, energy and ancillary services associated with generating units owned by other entities to supplement their owned capacity. Other Load Serving Entities (LSEs) have not had to directly address the capacity requirement issue to date.

The PJM transition mechanism for capacity is based on the purchase, by Commonwealth Edison, of capacity on behalf of all the LSEs through May of 2004. After this time, the LSEs would be responsible for purchasing capacity directly to meet their PJM capacity obligations from owners of capacity either within or external to the NICA. During the transition to capacity markets, Commonwealth Edison would provide the capacity to the LSEs from its owned capacity in addition to capacity purchased from other generators in the NICA. PJM is responsible for ensuring that Commonwealth Edison purchases adequate capacity to meet its reliability obligations. If Commonwealth Edison is short the capacity required to meet their total acquired capacity obligation prior to May 31, 2004, PJM should run an auction to acquire the required capacity from available generators.

It is expected that, when the capacity market begins, as the result of the structural conditions in the NICA market that the capacity market in the NICA will face market power issues. As in the PJM capacity market, it is expected that the structure of capacity ownership and the nature of the capacity markets will result in the ability of some generators to exercise market power in the NICA capacity market. The monopsony market power issue identified in the energy market also exists in the capacity market.

b. Market power mitigation

Based on the analysis of competitive conditions, market power mitigation measures will be required for the NICA capacity market. While the exact details will be developed in the coming period prior to the opening of the markets on June 1, 2004, these mitigation measures will be designed to limit offers in the capacity market to the marginal cost of capacity where marginal cost is defined to include all aspects of marginal costs including, where relevant, going forward costs, opportunity costs and risk. In addition, these mitigation measures will address market pricing during periods of shortage or scarcity. Again, the market power mitigation measures must strike the balance between preventing the exercise of market power and ensuring that a competitive market price signal is permitted to emerge from the markets. No explicit monopsony-based market power mitigation rules will be proposed at the outset of this market. The fact that the markets will be based on a centrally operated auction and that LSEs must

purchase an externally defined quantity of capacity resources should limit this potential. Nonetheless, the potential exercise of monopsony power in the capacity market will be carefully monitored by the MMU as the market develops.

3. Regulation Market

a. Market conditions

The regulation market in the NICA appears to be highly concentrated. Ownership of regulation capability appears to be concentrated in the hands of a very small number of generation owners. Regulation must be obtained either from resources within the NICA or resources dynamically scheduled into the NICA, so potential competition from external resources will not be a significant constraint in the regulation market.

b. Market power mitigation

Based on the structural analysis of the regulation market in the NICA, market power mitigation measures will be required for the regulation market. This is in contrast to the PJM Eastern Region where there is a competitive regulation market with an offer cap of $100. However, in the PJM Western Region there is not a competitive market in regulation and regulation is provided at cost.

We propose that the regulation market be a cost-based market in the NICA until adequate competition develops to permit a market design like that in the PJM Eastern Region. Costs would include the incremental costs of providing regulation plus opportunity costs.

4. Spinning Reserves Market

a. Market conditions

The spinning reserve market in the NICA appears to be highly concentrated. Ownership of generation with spinning reserve capability appears to be concentrated in the hands of a very small number of generation owners. Spinning reserves must be obtained either from resources within the NICA or dynamically scheduled into the NICA, so potential competition from external resources will not be a significant constraint in the spinning reserve market.

b. Market power mitigation

Based on the structural analysis of the spinning reserve market in the NICA, market power mitigation measures will be required for the spinning reserve market.

We propose that the spinning market in the NICA be structured as it is in the PJM Eastern Region. For Tier 1 spinning reserves, payments for spinning reserves are made only when actual spinning reserves are provided and the prices paid for those reserves are based on five-minute LMPs plus a fixed adder. For Tier 2 spinning reserves, availability payments are made based on costs plus a $7.50 margin and all resources receive the market clearing price. Opportunity costs are included in payments to spinning reserves resources.

5. **Blackstart**
   a. ***Market conditions***
      As in PJM, blackstart services in the NICA do not lend themselves to being organized as a competitive market as the structural conditions for a competitive market do not exist. Blackstart services must be provided from resources within the NICA, so potential competition from external resources will not be a constraint on blackstart pricing.
   b. ***Market power mitigation***
      In the NICA, as in the PJM region, blackstart services should be provided at cost pursuant to the PJM Tariff.
6. **Reactive**
   a. ***Market conditions***
      As in PJM, reactive services in the NICA do not lend themselves to being organized as a competitive market as the structural conditions for a competitive market do not exist. Reactive services must be provided from resources within the NICA, so potential competition from external resources will not be a constraint on reactive pricing.
   b. ***Market power mitigation***
      In the NICA, as in the PJM region, reactive services should be provided at cost pursuant to the FERC-approved rates, subject to PJM's determination that the purchased quantity of reactive services is needed.

7. Summary

The PJM MMU expects, based on our analysis, that the NICA energy market will be competitive under most market conditions. Based on our simulations, we expect that the energy market will be competitive from 90 to 95 percent of annual hours. For the remaining hours, the MMU will propose market power mitigation mechanisms that must be in place to ensure that market power is not exercised in the aggregate NICA energy market. These mitigation measures must strike a balance between preventing any exercise of market power and ensuring that a competitive market price signal is permitted to emerge from the markets.

The PJM MMU expects that there will be market power issues in the capacity market when it is implemented on June 1, 2004. The PJM MMU will propose specific market power mitigation mechanisms that must be in place to ensure that market power is not exercised. Again, the market power mitigation measures must strike the balance between preventing the exercise of market power and ensuring that a competitive market price signal is permitted to emerge from the markets.

The PJM MMU expects that there will be market power issues in the regulation market. As a result, the PJM MMU proposes that the regulation market be a cost-based market in NICA until adequate competition develops to permit a market design like that in the PJM Eastern Region.

The PJM MMU expects that there will be market power in the spinning reserves market. As a result, the PJM MMU proposes that the spinning market in NICA be structured as it is in the PJM Eastern Region.

The PJM MMU's view is that blackstart services and reactive services do not lend themselves to being organized as competitive markets. As a result, the PJM MMU proposes that both blackstart services and reactive services be provided at cost pursuant to the PJM Tariff and FERC-approved rates.