Broader Regional Markets

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Abstract
This paper outlines the market design changes undertaken by the ISO/RTOs in the US Eastern Interconnection to improve the regional dispatch. The paper shows that by managing regional congestion and increasing the frequency of energy interchange together with setting appropriate prices at “proxy buses” achieves significant improvements in regional dispatch efficiency. The savings from such regional coordination runs at several hundred million dollars a year.

1. Introduction

Electricity flows along the grid the way water flows down a stream – following the path of least resistance. Place a barrier in that stream and the water seeks out new, less direct routes that enable it to reach its ultimate destination. Similarly, electricity naturally tends to follow the path of least resistance from its source (a generation plant) to the sink (the ultimate end user). All things being equal, that path tends to be the most direct route between the source and the sink. However, with thousands of sources and sinks placing demands on the grid continuously in support of their individual and sometimes competing needs, the path of least resistance can become convoluted. Congestion points build up where more electricity is attempting to follow a path than the path can physically allow, forcing electricity to seek out alternative, unplanned routes that may be less efficient and therefore more costly for end users.

While the interconnected nature of a transmission system that spans multiple regions affords participants the ability to schedule electricity flows along specific paths at specific times from the source to the sink, the historic inability to optimize the coordination of those scheduling patterns results in congestion and inefficiencies on the system that ultimately add costs for everyone. System congestion can effectively block access to certain paths, causing the actual flow of electricity to diverge from its scheduled path. This scenario, known as a “loop” or a “loop flow,” can lead to added and unnecessary system costs as power flows in a less than optimal manner. Further, differences in the market rules from one region to another have created unintended incentives for market participants to seek out circuitous scheduling paths in an effort to minimize transaction costs, but that ultimately cannot be physically followed, creating a loop. The impact of loop flows is primarily economic – added system costs. However, left unchecked, loop flows have the potential to create reliability challenges in addition economic costs as transmission facilities are loaded beyond their rated capacity.

For reasons of fostering more efficient markets and system operations, as well as minimizing threats to reliability, the NYISO has embarked upon a Broader Regional Markets initiative since 2008 to better coordinate the flow of power across regional markets. Through a combination of physical modifications to the grid and market enhancements to establish better pricing signals and remove barriers to the interregional flow of power, the frequency and magnitude of loop flows can be reduced and the added system costs associated with them can be more fairly allocated to those responsible for causing them. Enhanced Broader Regional Markets have the added benefit of making the system more responsive to dynamic market and physical conditions by expanding the pool of supply resources available to each market and increasing the flexibility at which those resources can be utilized. An analysis of NYISO’s Broader Regional Markets initiatives indicates a potential for $193 million in annual savings on New York interfaces and constraints and $362 million in annual savings regionally.

2. Origins of Broader Regional Markets

NYISO’s Broader Regional Markets initiatives have their roots in issues that came to light in 2008 concerning the flow of power along transmission paths surrounding Lake Erie and physically connecting the New York market with markets operated by Ontario, MISO, and PJM. Because there are no transmission lines under Lake Erie, flows in this area are meant to split around the lake, with a

portion of the power flowing clockwise around the lake and a portion flowing counterclockwise around the lake\(^2\). Loop flows on these lines were fairly common and significant. At times, as much as 2,000 MW might flow clockwise around the lake while at other times as much as 2,000 MW might flow counterclockwise around the lake. In some instances, the direction of the loop flow varied by as much as 1,000 MW in a matter of a few hours\(^3\). Historically however, counterclockwise loop flows around Lake Erie were more common, a direction that tends to benefit the New York system, and ultimately end users of that system, in that the counterclockwise flow reduces congestion on the NYISO’s west-to-east and north-to-south transmission constraints. Conversely, other systems, notably PJM’s and MISO’s systems, tend to see more congestion as a result of the counterclockwise loop flow.

It is to be noted that loop flows exist due to the presence of multiple RTOs that individually attempt to minimize costs within their own control area. In addition, the fictitious notion of scheduling over a contract path continues in today’s restructured markets contributing to unscheduled flows, or loop flows. The various aspects of regional coordination among the RTOs attempt to mimic a “virtual regional dispatch,” trying to replicate the outcomes that would be realized if the entire region operated under a single central dispatch. There are a number of theoretical constructs to achieve this virtual regional dispatch\(^4\)\(^5\). This paper describes the practical approach being taken by the eastern ISO/RTOs (New York, PJM, ISO-NE and MISO) to achieve regional coordination.

Concern about the Lake Erie loop flows came to a head beginning in January 2008 when power prices in New York were observed to be higher than expected given the general supply and demand conditions experienced at that time. In examining what might be causing these inflated prices, it was noted that the loop flow around Lake Erie was increasingly moving in a clockwise fashion and the magnitude of the loop flow was growing as well. Ultimately, the NYISO determined that the cause of this reversing loop flow stemmed from a small number of market participants that were buying lower cost power in New York and selling it in the PJM market where prices were higher.

All things being equal, exporting power from New York to PJM is not cause for concern provided that the transactions are reflective of true market signals. In fact, exporting power from one region to another can be evidence of a functioning competitive market where end users can access the least-cost power available to them, whether generated within their borders or beyond, and power producers are able to seek out the best prices for their output, leading to a convergence of prices across regions. Looking further into these particular transactions, however, some questions arose as to whether they were desirable responses to market signals or a case of market participants seeing unintended signals that reflected a lack of coordination among the markets across the region.

Rather than schedule the power to flow directly from the New York Control Area to the immediately adjacent PJM Control Area, the market participants during this time scheduled the power to travel around Lake Erie in a counterclockwise direction, via Ontario and MISO, and then to its ultimate destination in the PJM market. The reason these participants scheduled the power along this circuitous path had to do with differences in the manner in which power was priced in these four markets whereby power scheduled along this indirect path resulted in lower transaction costs, and/or higher energy payments, than had the power been exported directly from NYISO to PJM. In other words, the market was unintentionally creating an incentive for participants to seek out this circuitous delivery path and participants were acting accordingly given what they saw.

The concern arose not because of any reliability issues stemming from the increase in circuitous scheduling patterns, but rather due to higher costs observed in the New York market than could be justified on the basis of supply and demand conditions alone. In its investigation into the cause of the higher prices, the NYISO, in cooperation with PJM, MISO and Ontario, concluded that this increasing practice of circuitous transaction scheduling was contributing to an increasing clockwise loop flow around Lake Erie as the power being scheduled physically travelled along the more direct route from New York into the PJM market rather than the contracted path the participants scheduled around the lake. The resulting loop.

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\(^3\) FERC Order Authorizing Public Disclosure of Enforcement Staff Report and Directing the Filing of an Additional Report, Pg. 2, July 2009


consequently increased congestion on New York’s system, adding system costs.

It should be noted that following investigations into the Lake Erie loop flow by the RTOs and FERC it was determined that the market participants were not engaged in any market manipulation activities, nor were they violating any tariffs. Rather, these participants were scheduling transactions in an economically rational manner based on the rules in place at the time and the pricing signals they saw in the market. However, the NYISO determined that there was no reliability or market-wide benefits associated with these circuituous transactions and acted swiftly to halt the practice. In effect, these participants were minimizing their own transaction costs in such a manner that resulted in increased congestion costs to the entire New York market.

With the approval of FERC, the NYISO amended its tariffs to effectively ban certain external transactions along eight specifically defined paths that were being used, or could have been used, to schedule power circuituously between otherwise adjacent control areas. FERC accepted the tariff amendments on a temporary basis, recommending that long-term market solutions to the loop-flow problem should be worked out through a collaborative process.

The effect of the ban on circuitous scheduling was immediate. For the first 21 days of July 2008, prior to implementation of the ban on circuitous scheduling, the average hourly Lake Erie loop flows were 457 MW in a clockwise direction. Following implementation of the ban on circuitous scheduling, average hourly Lake Erie loop flows from July 23, 2008 to October 31, 2008 were 121 MW in a counterclockwise direction. With the adoption of the ban, the direction of loop flows reversed to its more historical counterclockwise pattern and the magnitude of loop flows was significantly diminished. As previously noted, counter-clockwise loop flows tend to reduce west-to-east congestion in New York, relieving the upward pressure on prices that was noticed in the first half of 2008.

While the ban on circuitous path scheduling effectively eliminated the loop flow problem that inflated prices in New York, the situation underscored a lack of coordination among regional markets that leads to inefficiencies. Notably, there was no means available to identify transactions that might be contributing to loop flows in real time and, therefore no means to mitigate for them in real time.

Further, there was no system in place to assign the added costs associated with loop flows to those responsible for creating them even if operators had that visibility into the root causes. As a result, the added congestion costs caused by power flows that diverged from their contracted paths around Lake Erie had to be recovered broadly from all New York market participants via uplift charges. Estimates at that time, provided by the NYISO’s Market Monitor Dr. David Patton, indicated that the added system costs associated with these loop flows were “up to $96 million” between January 1, 2008 and July 2008, when the NYISO ban on circuitous scheduling took effect.

It was therefore important for the NYISO to work with its neighboring RTOs to (1) reduce the frequency at which loop flows occurred, (2) reduce the magnitude of loop flows that cannot be avoided, and (3) infuse accountability into the markets so that any added system costs associated with loop flows are recovered from those responsible for causing them rather than the market as a whole.

3. Portfolio of Solutions

To accomplish these goals, the NYISO developed a comprehensive, coordinated Broader Regional Market initiative with all of its neighboring markets (PJM, Ontario, MISO, Hydro Quebec, and ISONE). The initiative is designed to optimize the interregional flow of power through a combination of physical upgrades to the bulk power system capable of better controlling the flow of power, as well as enhancements to underlying market structures to improve coordination among the regional markets. Doing so will enable each region to gain better visibility into the transactions that trigger loop flows, recover costs associated with those loop flows from those market participants that are responsible for causing them, and improve each region’s ability to respond to unanticipated loop flows, or other dynamic conditions on the grid.

The comprehensive approach undertaken by NYISO and its neighbors include:

- Installing and operating Phase Angle Regulators (PARs) to increase control over the flow of power on the grid;

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6 Lake Erie Loop Flow Mitigation, NYISO, November 2008, Page 5
7 Lake Erie Loop Flow Mitigation, NYISO, November 2008, Page 5
8 Lake Erie Loop Flow Mitigation, NYISO, November 2008, Page 5
Adopting a *Market-to-Market Coordination* protocol to enable resource dispatch across regions to address congestion;

Adopting *Interface Pricing Revisions* to improve pricing signals for power flowing across regions under various conditions; and

Adopting *Enhanced Interregional Transaction Coordination* to increase the frequency at which transactions can be scheduled across market borders.

The efforts being undertaken are not expected to eliminate loop flows on the system, either individually or collectively. But, the combination of these physical and market enhancements will substantially reduce the frequency and magnitude of loop flows, eliminate the incentives (intentional or unintentional) for engaging in transactions that result in loop flows, and provide greater visibility and accountability into the markets for the loop flows that do occur. They will enable the NYISO to identify the transactions responsible for causing loop flows, allow the responsible market participants to take actions to reduce or eliminate the loop flows once they have been identified, and allow the NYISO to seek cost recovery for those loop flows that are not, or cannot be, avoided from the market participants that caused them. Lastly, these initiatives will provide the NYISO with added resources and flexibility to respond more dynamically to dynamic grid conditions. Each of the initiatives is discussed in further detail below.

### 4. Potential and Actual Savings from Regional Coordination

Dr. David Patton (Independent Market Monitor for NYISO) estimated the regional savings from coordination in 2010\(^9\). Dr. Patton’s estimate of annual Production Cost Savings concluded that package of proposed Broader Regional Markets initiatives would reduce costs by approximately $362 million across all interfaces and constraints. Savings associated with NYISO interfaces and constraints were estimated to be approximately $193 million per year. Importantly, these figures assumed a gas price of $6 per MMBTU, a price level that is almost double of current gas price levels. The figure below contains the benefit calculation assumed by Dr. Patton.

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### Coordination of Scheduled Interchange

<table>
<thead>
<tr>
<th>Coordination of Scheduled Interchange</th>
<th>Estimated Benefits</th>
<th>Fuel-Price Adj. Benefits*</th>
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<tbody>
<tr>
<td>New York – Ontario</td>
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<td>New York – PJM</td>
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### Under-Priced Congestion Management

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<th>Under-Priced Congestion Management</th>
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<th>Estimated Benefits</th>
<th>Fuel-Price Adj. Benefits*</th>
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<td>NYISO Reverse Loop Flows</td>
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With the significant reduction in natural gas prices associated with shale development, the anticipated savings inherently will be reduced. NYISO has been working to track and report to its stakeholders the savings associated with its various Broader Regional Markets initiatives on a monthly basis. The figure below provides one recent cost savings calculation associated with implementation of the Market-to-Market concept with PJM, which enables better management of congestion through inter-regional dispatch of resources (explained in greater detail below). The figure illustrates that savings are increased significantly with increased demand for electricity, such as July 2013 when the NYISO saw record demand levels for electricity set at 33,956 MW. The summer of 2014, by comparison, showed moderate demand levels, with demand on NYISO’s system failing to exceed 30,000 MW and savings levels associated with Market-to-Market in July 2014 significantly diminished from the previous year.

The figure also illustrates the effect of gas prices on savings. December 2013 through February 2014 marked a particularly cold period, with three distinct polar vortex events that drove demand for natural gas to record levels and prompted a new NYISO winter peak demand for electricity of 25,738 MW on January 7, 2014. Nationwide, demand for natural gas reached a new daily record of 137 billion cubic feet per day in January. Dramatic increases in the cost of natural gas resulting from the record demand produced spikes in power prices that boosted the value of savings from improved congestion management between NYISO and PJM.

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*Adjusted to a $6 per MMBTU Natural Gas Price

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5. Regional PAR Coordination and Operation

The first line of defense against loop flows is to try to avoid them and, if that is not possible, reduce the magnitude of them to the greatest extent possible. Phase Angle Regulators (PARs) represent a technological approach to addressing this task. PARs are specialized transformers installed on the bulk system that that can be used to control the flow of power by varying the phase angle between the source and load voltages. They accomplish this by altering the impedance on the system to force the flow of power to follow a different path than it would travel if otherwise unimpeded. For purposes of loop flow avoidance, PARs can be used to physically alter the flow of power so that it better adheres to the contract path that market participants have scheduled. PARs are not capable of eliminating Lake Erie loop flows entirely, but when the PARs in the four markets surrounding Lake Erie are operated consistent with the device schedules, loop flows are better managed.

A final PAR to facilitate loop flow management was installed on the interconnection between Michigan and Ontario as of April 2012. The outcome of this device is the mitigation of inadvertent loop flows and their associated congestion management costs by working in conjunction with three other PAR units already installed along that same interface. Installation of PARs along this interface has been a work in process for many years with units installed and operating on three of the four lines linked the two regions prior to the 2008 loop flow events. To maximize control of loop flows, all four lines required PARs units operating in coordination.

Under normal conditions, the four PARs on the interconnection between Michigan and Ontario are to be operated in such a manner as to match the physical flow of power on the interface with the scheduled transactions across the interface to the maximum extent possible. Under emergency conditions, the PARs will be operated in a manner to help alleviate such emergencies and maintain reliability regardless of any divergence between scheduled and physical
paths\textsuperscript{11}. It is anticipated that the equipment will help to control Lake Erie loop flows of up to 600 MW in either direction, which should better enable scheduled power flows to be maintained among New York, Ontario, and Michigan\textsuperscript{12}.

As stated however, there are operating limitations on how much power can be controlled by the devices as well as limitations to the number of times the PARs can be adjusted each day and the response time for such adjustments that limit the technology’s capabilities if system conditions are particularly dynamic\textsuperscript{13}. As a result, PARs are not always going to be capable of avoiding loop flows and are not able to operate continuously. These physical limitations to the technology underscore the need for market-based mechanisms that will also contribute toward minimizing loop flows.

6. Market-to-Market Coordination

The highly interconnected nature of regional markets directly contributes to the presence of loop flows on the system as a whole because dispatch decisions in one market may inherently alter flows in neighboring markets. At the same time, however, the highly interconnected transmission network creates the opportunity for improved operational reliability and redundancy since resources in one regional market can potentially be called upon to support neighboring regional markets. The key to taking advantage of external resources to support congestion or other system challenges within a local system is to identify in advance those commonly congested elements and the external resources that potentially can be called upon to support them, and establish the protocols for dispatching those external resources towards.

The Market-to-Market initiative is being developed to improve system efficiencies by establishing a congestion management protocol that allows for “inter-control area” re-dispatch of resources to alleviate the congestion experienced in one control area with lower-cost generation resources in a neighboring control area. Market-to-Market establishes the parameters of allowable usage of each region’s transmission networks to support congestion management efforts across market borders. While it may not always be the case that generation resources in neighboring control areas will be available to alleviate congestion on a neighboring system, or available at a lower cost than resources within the congested area, implementation of Market-to-Market Coordination will provide added flexibility to system operators by ensuring that this option is possible. By identifying in advance a consistent set of constraints that can potentially be addressed with external generation resources, establishing protocols to communicate real-time constraint management costs between control areas, and devising an appropriate payment mechanism for those actions, neighboring control areas will expand the pool of resources at their disposal to alleviate certain constraints in the most efficient, least-cost manner possible.

Market-to-Market requires an extensive network modeling initiative to ensure both region’s visibility of grid conditions and impacts of generation re-dispatch on transmission constraints is aligned. Network models were compared and impacts benchmarked between the regions in advance of any coordination activities. Once the parameters are established, Market-to-Market Coordination can be incorporated into a given region’s price-setting protocols to maintain consistency between resource schedules and prices. Among the benefits of implementing Market-to-Market Coordination are:

- Reduced congestion costs due to the ability to access lower-cost resources from neighboring, but interconnected systems in order to address certain transmission constraints identified in advance;
- More consistent pricing across market borders as resources in one region potentially set prices in the neighboring region where they are being used to relieve transmission constraints; and
- Increased reliability as Control Areas expand the pool of economic resources available to them to resolve transmission constraints, building redundancy into the system.

7. Interface Pricing Revisions

One of the primary reasons that the Lake Erie loop flow issue came to light in 2008 was the fact that market participants responded to pricing signals that suggested it made more economic sense to schedule power to flow along a circuitous path counterclockwise from New York, through Ontario and MISO, and ultimately into PJM rather than schedule that power directly from New York to PJM.

\textsuperscript{11} Broader Regional Markets – Long Term Solutions to Loop Flow, NYISO, Pg. 8 (http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=12242018)
\textsuperscript{12} Broader Regional Markets – Long Term Solutions to Loop Flow, NYISO, Pg. 8
\textsuperscript{13} Broader Regional Markets – Long Term Solutions to Loop Flow, NYISO, Pg. 10
Essentially, the overall profitability of the scheduled transactions was higher by using the circuitous contract path than it would have been had the participants scheduled a more direct path. While the FERC-approved prohibition on such scheduling paths has eliminated the practice and therefore alleviated the system congestion they caused in the New York market, the actions taken by the market participants drew attention to the need for a more consistent pricing methodology across markets to eliminate incentives for scheduling behaviors that serve no greater reliability or market purpose. Ultimately, more compatible pricing mechanisms across regional Control Areas will result in the improved pricing signals that should guide scheduling activities.

The focus of the NYISO’s Interface Pricing Revisions is not about how the proxy prices are calculated, but rather what price is used in the settlement process. Prior to the NYISO’s Broader Regional Markets initiatives, the NYISO settled prices for transactions on the basis of the contract path rather than the physical path, which was the practice in PJM and MISO. Further, in settling these transactions the NYISO assumed a radial tie between the regions subject to the transaction. For instance, 100 percent of any power scheduled from Ontario into New York was assumed to follow a direct path between the two regions. The NYISO’s ban on circuitous scheduling of course cannot halt the physical flow of power along these circuitous routes. In reality, there is always going to be a certain amount of “spillage” that takes place for this type of transaction where a percentage of the scheduled power will physically travel along the circuitous route around Lake Erie from Ontario into New York. This spillage was unaccounted for during the settlement period.

The NYISO has since adopted a model similar to those used by PJM and MISO. This approach enables the NYISO, PJM, and MISO to settle transactions in a manner reflective of the fact that some portion of a scheduled transaction will not follow the contracted path. By recognizing the fact that there is an incremental distribution of power that flows around Lake Erie when evaluating and pricing the marginal impacts of transaction and generation schedules, the NYISO is more accurately recognizing the costs of the actual power flows and sending pricing signals consistent with those transactions impacts.

As part of its Interface Pricing initiative, the NYISO committed to evaluate the continued applicability of the prohibition on circuitous path scheduling discussed above, as well as the need to reexamine its pricing models upon completion of the Michigan-Ontario PARs installation. While initially adopted as a temporary ban, the NYISO’s thinking has evolved to the point where it believes the ban should remain in place due to the simple facts that it is (1) effective; and (2) there are no market or reliability benefits derived from the banned circuitous transactions. Even with improved interface pricing in place, the NYISO sees no need to permit circuitous scheduling as it simply serves no purpose in the market.

8. Enhanced Interregional Transaction Coordination

Historically, the market participants have only had the ability to schedule interregional energy transactions with the NYISO on an hourly basis. This scheduling inflexibility limits the NYISO’s ability to take advantage of external resources to address dynamic conditions on its system. PJM and MISO, on the other hand, have allowed market participants to schedule energy transactions across their interfaces on a fifteen-minute basis. Introducing this type of increased flexibility into the NYISO market would improve market and operational efficiency by allowing resources schedules to adjust to the dynamic changes in system conditions, as well as unexpected changes to projected conditions.

NYISO has already made substantial progress toward enhancing interregional transaction flexibility by enacting transaction scheduling on a fifteen-minute basis with Hydro Quebec (HQ) in 2011. While not directly involved in the issues related to the Lake Erie loop flows in 2008, NYISO recognizes that there are reasons beyond the issue of loop flows to increase scheduling flexibility with all of its neighboring markets. In the case of HQ, it was recognized that increased scheduling flexibility would help to balance the intermittent nature of the growing base of wind resources in New York’s North Country, along the border of Quebec, with predictable and abundant hydro resources available across the border in the HQ market. As wind energy production ramps up or down with the prevailing wind conditions in the North Country, the NYISO can balance its system more readily by increasing or decreasing hydro imports accordingly on an intra-hourly basis. NYISO has also completed implementation of fifteen-minute transaction scheduling protocols with PJM in 2012.

NYISO is currently pursuing an enhanced scheduling protocol of Coordinated Transaction Scheduling that leverages forecasted prices in each region to establish the most economically appropriate level of

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interchange between regions. NYISO expects to implement these improvements between NYISO and PJM in 2014 and between NYISO and ISO-NE in 2015.

Flexible transaction scheduling requires advancements to the existing processes in order to establish scheduling protocols and validate those schedules. The existing system lacks the automation and coordination necessary to efficiently establish schedules and coordinate their implementation between the multiple regions. Automation will be established to share schedules and facilitate coordination. Further, transaction schedules must be co-developed with regional neighbors rather than independently to ensure both regions participating in the effort arrive at the same outcomes and the same expectations for energy delivery or receipt. Projected prices will be shared with the NYISO to perform the economic scheduling activities. Resulting scheduling outcomes will be shared back with the corresponding neighbor for them to update their price projects. Through an iterative process of sharing prices and schedules, the regions can produce scheduling outcomes that maximize the utilization of the transmission system to economically move power between regions.

With such coordination however, new capabilities can be achieved and introduced into the market. For instance, a market participant could supply a single transaction request to be used by two neighboring regions indicating the transaction should be scheduled when a specified price spread between the regions exists. The regions would use the expected prices to select transaction requests with lower bids than the predicted difference in the market prices and incorporate the updated transaction schedules into the dispatch tools, repeating the process for each subsequent scheduling horizon.

As a result of the increased access to resources and added scheduling flexibility, Enhanced Interregional Transaction Scheduling, when combined with the NYISO’s Market-to-Market congestion mitigation initiative, should lower total system operating costs, foster price stability and convergence along market borders, and better respond to variable renewable resources and unanticipated changes in conditions on the system.

9. Conclusion

The New York power market does not exist as an island. Rather, it operates within the context of an expansive, interconnected transmission system that stretches across dozens of states and parts of Canada as well. Each transaction scheduled along this interconnected system has the potential to influence the flow of power within New York, influencing market prices, resource dispatch decisions, and ultimately investment decisions for new generation, transmission, or demand response. Far from monolithic or static, the interconnected system is dynamic and ever changing in response to the multitude of transactions scheduled across it on a continuous basis. The dynamic nature of the grid will only increase going forward with the influx of investments in renewable resources and as end users become savvier market participants capable of responding to price signals. A dynamic grid such as this requires a high level of coordination to maintain reliability and optimize system efficiency.

The NYISO’s Broader Regional Markets initiative, while an outgrowth of the events of 2008 involving Lake Erie loop flows, should not be viewed narrowly in the context of those circumstances. Improved coordination among the NYISO’s neighboring markets will reduce the presence and magnitude of loop flows, but the benefits will extend beyond Lake Erie. The Broader Regional Markets initiative is centered on the premise of helping New York better coordinate the operation of New York’s transmission system with the systems of its neighboring markets. The effort will help to avoid or minimize conditions on the grid, such as loop flows and congestion, that add cost, but it will also facilitate a more dynamic system through a combination of physical and market-based tools designed to maximize the flexibility of our response to the real-time conditions on the grid.

Broader Regional Markets mean improved visibility into the interactions of individual transactions and the root causes behind congestion and loop flows, improved overall system efficiency through an expanded pool of resources to serve the market, and improved price signals to help avoid behaviors that might lead to loop flows and congestion. It is estimated that the New York market stands to save as much as $193 million annually as a result of a more optimal use of the system that these initiatives will facilitate.

Further, the increased penetration of wind energy, solar energy, and distributed energy resources present a challenge to the system due to the variability of their output. The Broader Regional Markets initiatives will support the integration of these resources in New York by expanding access to resources beyond its borders that can be used to
balance out their variability with increased scheduling flexibility.

The benefits of New York’s Broader Regional markets initiatives extend beyond the mere prevention of loop flows toward a more optimal system capable of real-time, or near real-time response to conditions on the system such that the operation of the grid can be as dynamic as the changing conditions on the grid itself.

10. References


