NEW YORK INDEPENDENT SYSTEM OPERATOR
10 Krey Boulevard ♦ Rensselaer, NY 12144

October 31, 2013

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: ***New York Independent System Operator, Inc.*****, Docket No. ER13-909-001; Informational Report**

Dear Secretary Bose:

The New York Independent System Operator, Inc. ("NYISO") hereby submits the Informational Report requested in the Commission's Order dated July 8, 2013 in this docket.[1] In its July Order, the Commission approved enhancements to the NYISO's scarcity pricing mechanism whereby the NYISO reprices Energy and / or certain Ancillary Services to recognize that Load reductions were necessary to maintain a reliable system.

In its Order, the Commission requested that the NYISO provide an Informational Report describing how well its revised scarcity pricing mechanism achieved its objectives during the summer of 2013 including a discussion of how well it provided locational price signals indicating the existence of scarcity conditions and whether there were any undesirable effects on market outcomes during the 2013 summer. The Commission also requested the NYISO to describe the steps that would need to be taken, and the resources required, to implement a real-time scarcity pricing optimization engine, including a real-time dispatch that i) minimizes the joint social costs of providing energy and Operating Reserves, ii) allows prices for energy and Operating Reserves to clear the market, and iii) establishes operating locational reserve requirements that are sufficiently granular to recognize important transmission constraints.

The NYISO is pleased to provide this Informational Report to answer these questions.

[1] New York Independent System Operator, Inc., 144 FERC ¶ 61,013 (2013) ("July Order")

I. Documents Submitted

1. This cover letter;

2. The Informational Report (Attachment I); and

3. Appendices to the Information Report ("Attachment II").

II. Communications and Correspondence

All communications and service in this proceeding should be directed to:

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III. Conclusion

Wherefore, the New York Independent System Operator, Inc. respectfully requests that the Commission accept the Information Report, and Appendix provided herein as complying with its request included in the Commission's July Order for further information on how well the NYISO's scarcity pricing mechanism achieved its objectives

this summer and on the resources necessary to pursue certain enhancements as discussed in the July Order.

Respectfully submitted,

/s/Mollie Lampi

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Rules of Practice and Procedure, 18 C.F.R. §385.2010.

Dated at Rensselaer, NY this 31st day of October, 2013.

/s/ Joy A. Zimberlin

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Attachment I

AN INFORMATIONAL REPORT TO THE FEDERAL ENERGY REGULATORY COMMISSION
DOCKET NO. ER13-909-000

ON THE NEW YORK INDEPENDENT SYSTEM OPERATOR'S SCARCITY PRICING'S 2013 PERFORMANCE

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October 31, 2013

I. INTRODUCTION

In an Order issued July 8, 2013 approving the New York Independent System Operator, Inc.'s ("NYISO") revised scarcity pricing mechanism,[1] the Commission requested that the NYISO provide an Informational Report describing how well its revised scarcity pricing mechanism achieved its objectives during the summer of 2013. The Commission asked the NYISO to include a discussion of how well its scarcity pricing mechanism provided locational price signals indicating the existence of scarcity conditions and whether there were any undesirable effects on market outcomes during the 2013 summer. The Commission also requested the NYISO to describe the steps that would need to be taken, and the resources required, to implement a real-time scarcity pricing optimization engine, including a real-time dispatch that i) minimizes the joint social costs of providing energy and Operating Reserves, ii) allows prices for energy and Operating Reserves to clear the market, and iii) establishes operating locational reserve requirements that are sufficiently granular to recognize important transmission constraints. The NYISO is pleased to report that its revised scarcity pricing mechanism worked as intended.

In Section II, the NYISO describes how scarcity pricing was successful in providing localized LBMPs reflecting scarcity in individual Load Zones, when scarcity was localized, and regionally, when the extent of scarce conditions was regional. The NYISO also presents evidence that its scarcity pricing outcomes were consistent with actual scarcity or shortages of capacity on the transmission system to serve Load in the Energy market.

In Section III, the NYISO presents its analysis of market outcomes during the periods of scarcity pricing and describes the opportunities for improvement that were revealed. Overall, however, the market outcomes did not evidence unexpected pricing or settlement results.

In Section IV, the NYISO describes the process it would need to undertake to pursue scarcity pricing from within its optimization engine. The NYISO also describes the effort it will be undertaking in early 2014 to review the need for operating reserves requirements that are sufficiently granular to recognize important transmission constraints.

The Appendices contains three sets of graphs and charts providing detail to the summary information provided, as discussed in the body of this Informational Report.

II. SCARCITY PRICING DURING THE SUMMER OF 2013 SUCCESSFULLY PROVIDED LOCALIZED PRICING REVISIONS COINCIDENT WITH ACTUAL SHORTAGES OF AVAILABLE CAPACITY ON THE TRANSMISSION SYSTEM

Scarcity pricing can occur only in real-time and only when the NYISO calls upon participants in its Emergency Demand Reduction Program ("EDRP") and its Special Case Resource ("SCR") program to reduce their Load. These calls are made whenever necessary to

[1] New York Independent System Operator, Inc., 144 FERC ¶ 61,013 (2013)

mitigate expected shortages in Available Reserves[2] and maintain safe and reliable service to New York Load. Requests for this Load reduction are typically made 21 hours before the first hour that Load reduction is expected to be needed and then, again, two hours before. During the period that EDRP / SCR resources are providing their Load reduction, the NYISO activates its revised scarcity pricing mechanism to reflect in the Energy price (the Locational Based Marginal Price or "LBMP") the $500/MWh cost to provide these EDRP / SCR resources. This cost is reflected in the LBMPs only when Available Reserves in the Load Zones where the EDRP / SCR programs were called are less than the called-upon MW of EDRP/SCR Load reduction.[3] That is, if the Load Reduction activation is effective at avoiding a deficiency in Available Reserves in the Load Zones where Load reduction was called, the EDRP/SCR resources are treated as a marginal resource for purposes of establishing the market clearing prices for Energy in those Load Zones. Similarly, if the Load reduction was effective at avoiding a deficiency in Available Reserves either East of Central East or statewide, the $500/MWh price will also be incorporated in the price of certain Ancillary Services. In the balance of this Informational Report, the tests for including the cost of EDRP / SCR resources in Energy or Ancillary Service prices are referred to as the "but-for" tests.

During the summer of 2013, the NYISO activated the EDRP and SCR programs on five consecutive days in response to hot summer weather peak load conditions. For a majority of the intervals during these calls, the NYISO would have experienced a deficiency in Available Reserves in the Load Zones where the EDRP and SCR programs were called but for the activation.[4] During these intervals, the NYISO's scarcity pricing mechanism successfully incorporated the $500/MWh price paid these resources in the cost of Energy. In a nearly equal number of intervals, the NYISO would have also experienced a deficiency in Available Reserves East of Central East had the EDRP / SCR resources not been called and the scarcity pricing mechanism also successfully recalculated Eastern Operating Reserves products as well. Thus, the revised scarcity pricing mechanism allowed the NYISO to localize scarcity-priced LBMPs to only those Load Zones that were experiencing the reliability issue that required the EDRP / SCR call and to use scarcity pricing statewide for LBMPs and certain Ancillary Services when the deficiency in Available Reserves was regional.

[2] Capitalized terms that are not otherwise defined herein shall have the meanings assigned in the NYISO's Market Administration and Control Area Service Tariff and Open Access Transmission Tariff.

[3] If Available Reserves statewide or East of Central East (the "Eastern region") are less than the called-upon MW of Load reduction, certain Ancillary Services may also be recalculated to incorporate the cost of these Load reduction resources pursuant to the rules in Services Tariff Sections 15.4.6.2.1, 15.4.6.2.2 and 15.3.5.2.

[4] The NYISO's Independent Market Advisor has also reviewed the extent to which the NYISO experienced deficiencies in available capacity when it activated its scarcity pricing mechanism. In early 2014, the NYISO will be reviewing with its Market Participants any recommendations he may have, among other issues, on whether the existing definition of Available Reserves appropriately measures actual scarcity during EDRP/SCR events. Should the conclusions of this and the other issue reviews that the NYISO indicated it would pursue in its early 2014 comprehensive review result in proposed tariff revisions, the NYISO will file them with the Commission. *See*: the NYISO's proposal for a comprehensive evaluation and proposal regarding shortage pricing in its *Response to Request for Further Information* filed in this docket May 9, 2013, p.3.

On each of the first three days in 2013 that scarcity pricing was activated, July 15, 16 and 17th, the NYISO activated 555.9 MW[5] of EDRP/SCR Load reduction in zones G through K. On the remaining two days, July 18 and 19th, the NYISO activated 1,268.8 MW of EDRP/SCR Load reduction state-wide. In all activated Load Zones, the NYISO saw scarcity prices emerge. Further details of the activation can be found in Table 1 below.

Table 1 July Activations

Date	Activated Hours	Zones	Activated ICAP MW
07/15/13	13:00-18:00	G-K	555.9
07/16/13	13:00-18:00	G-K	555.9
07/17/13	13:00-18:00	G-K	555.9
07/18/13	12:00-18:00	G-K	555.9
07/18/13	13:00-18:00	A-F	712.9
07/19/13	12:00-18:00	G-K	555.9
07/19/13	13:00-18:00	A-F	712.9

In the hours when EDRP/SCR was called, the "but-for" tests for scarcity in Energy ("LBMP") and in Operating Reserves for the Eastern region were met in a significant number of intervals and, in almost all intervals, both tests were met. A fewer number of intervals passed the Operating Reserves' "but-for" test statewide.[6] Table 2 shows the percentage of intervals each day that passed the various "but for" tests. Appendix 1 provides more details and shows, for each day and interval, Available Reserves vs. the Load reduction MW called.

Table 2 Summary of the "but for" test results

Date	Time	Zones	% Intervals passing the LBMP "but for" test	% Intervals passing Statewide Reserves "but for" test	% Intervals passing East of Central East Reserves "but for" test
07/15/13	13:00-18:00	G-K	86%	3%	86%
07/16/13	13:00-18:00	G-K	55%	0%	54%
07/17/13	13:00-18:00	G-K	89%	76%	89%
07/18/13	12:00-18:00	G-K	100%	0%	100%
07/18/13	13:00-18:00	A-F	100%	100%	100%
07/19/13	12:00-18:00	G-K	100%	33%	100%
07/19/13	13:00-18:00	A-F	100%	100%	100%

[5] All activated MW numbers are based on the EDRP/SCR ICAP values. The EDRP/SCR MW values are ICAP values. The NYISO activates enrolled EDRP / SCR MW by Load Zone

[6] Of those intervals that passed the "but for" test, there were still some instances each day where the original RTD LBMPs were higher than the calculated scarcity LBMPs, and thus, the original RTD LBMPs prevailed. The rules for using the RTD price when higher than the scarcity LBMP is set forth in the NYISO Tariffs, Section 17.1.2.2.2

The LBMP and Ancillary service prices, after application of scarcity pricing, are provided in Table 3, for Load Zones G-K, and in Table 4, for Load Zones A-F. The shaded area represents the hours EDRP / ECR were called. Ancillary service prices can be found in the Appendix 2.

Table 3 Average Hourly Time Weighted Integrated LBMPs for Zones G-K for the indicated days.

Hours	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
09:00	$ 45.08	$ 57.81	$ 79.12	$ 71.04	$ 110.16
10:00	$ 126.37	$ 104.23	$ 89.34	$ 131.42	$ 123.87
11:00	$ 102.90	$ 94.54	$ 85.88	$ 185.61	$ 209.21
12:00	$ 134.79	$ 70.67	$ 110.41	$ 515.02	$ 506.65
13:00	$ 361.56	$ 386.00	$ 289.60	$ 516.43	$ 506.38
14:00	$ 541.37	$ 454.12	$ 517.21	$ 545.54	$ 506.85
15:00	$ 534.21	$ 287.73	$ 661.56	$ 515.74	$ 564.77
16:00	$ 534.61	$ 234.94	$ 828.81	$ 515.32	$ 723.72
17:00	$ 481.27	$ 349.17	$ 483.00	$ 503.72	$ 486.21
18:00	$ 117.94	$ 86.77	$ 97.05	$ 298.22	$ 165.55
19:00	$ 100.69	$ 71.39	$ 63.75	$ 108.53	$ 131.68
20:00	$ 61.42	$ 83.97	$ 70.36	$ 120.46	$ 105.76
21:00	$ 60.08	$ 74.08	$ 66.76	$ 72.59	$ 71.92

Table 4 Average Hourly Time Weighted Integrated LBMPs for Zones A-F

Hours	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
09:00	$ 37.51	$ 53.91	$ 81.17	$ 63.28	$ 54.16
10:00	$ 77.39	$ 127.22	$ 129.24	$ 100.73	$ 74.25
11:00	$ 79.62	$ 127.95	$ 132.09	$ 139.40	$ 93.93
12:00	$ 124.63	$ 71.32	$ 115.41	$ 162.62	$ 92.44
13:00	$ 156.96	$ 359.42	$ 65.72	$ 502.29	$ 500.01
14:00	$ 317.33	$ 235.52	$ 152.35	$ 539.64	$ 499.90
15:00	$ 383.35	$ 152.46	$ 213.46	$ 501.66	$ 502.16
16:00	$ 266.67	$ 227.23	$ 77.28	$ 501.61	$ 522.10
17:00	$ 89.12	$ 226.34	$ 86.14	$ 492.37	$ 461.87
18:00	$ 96.88	$ 111.93	$ 59.05	$ 297.56	$ 60.48
19:00	$ 96.90	$ 78.38	$ 41.98	$ 92.44	$ 51.26
20:00	$ 50.22	$ 100.93	$ 61.65	$ 103.69	$ 43.90
21:00	$ 34.52	$ 114.09	$ 59.02	$ 61.71	$ 44.11

As the pricing results described above indicate, the NYISO's revised scarcity pricing mechanism reflected the scarcity condition in the price of Energy and certain Ancillary Services in all hours and most of the intervals in which the NYISO called upon EDRP / SCR resources.[7]

Another measure of the success of the NYISO's scarcity pricing revisions is the extent to which the periods during which the "but-for" tests triggered the use of scarcity pricing were coincident with actual scarcity or shortage in available capacity on the transmission system serving the Load Zones for which the EDRP/SCR call was made. Actual shortage is revealed by the amount of unused capacity on the transmission system leading into the EDRP/SCR activated regions during the EDRP / SCR call.[8] On each of the five days, EDRP/SCR resources were called in Load Zones G, H, I, J and K (the SENY region). Since the amount of power that can be imported into the SENY region from the less expensive upstate regions can be limited during high load periods with significant congestion, one can reasonably conclude that the existence of very little unused transmission capacity into the SENY region, during the times when EDRP / SCR calls were made for the SENY region, may indicate the presence of actual shortage in available transmission capacity serving those Load Zones.

The NYISO's analysis, which is described in detail below, shows that, with the exception of July 16, there is significant consistency between hours with actual shortages in available transmission capability to the SENY Load Zones and the hours in which the 'but-for" tests were triggered and scarcity pricing was used for Energy in those Zones. From this analysis, the NYISO believes that its "but-for" tests provided a reasonable proxy for actual shortages in available transmission capability.

In addition, because scarcity pricing was triggered when there was relatively little margin left on the transmission facilities into the SENY Load Zones, the NYISO believes that had scarcity pricing been activated within the optimization engine, rather than as an *ex post* pricing design, there would have been only a limited opportunity to select a different mix of Energy and Ancillary Service providers. While the discussion of market outcome settlements, in Section III below, indicates that there was some inconsistency between schedules and prices because scarcity pricing was not present in the optimization engine, it was limited in scope.

Constraints on the transmission system into SENY are revealed by congestion on either the Athens - Pleasant Valley 345kV (#91) for the loss of the Leeds-Pleasant Valley 345kV (#92) or the Leeds-Pleasant Valley 345kV (#92) for the loss of the Athens-Pleasant Valley 345kV (#91). To evaluate how constrained transmission was into SENY over these five days[9], the NYISO looked at the flows on those two lines relative to the rating of each line.

Figure 1 shows the difference between the line rating and the actual flow during each hour (the "margin") on these facilities on the days demand resources were activated. The flows are generally within 100 MW of the limit during hours of EDRP/SCR activation on four of the five days indicating that there was little to no unutilized transmission into SENY on those days.

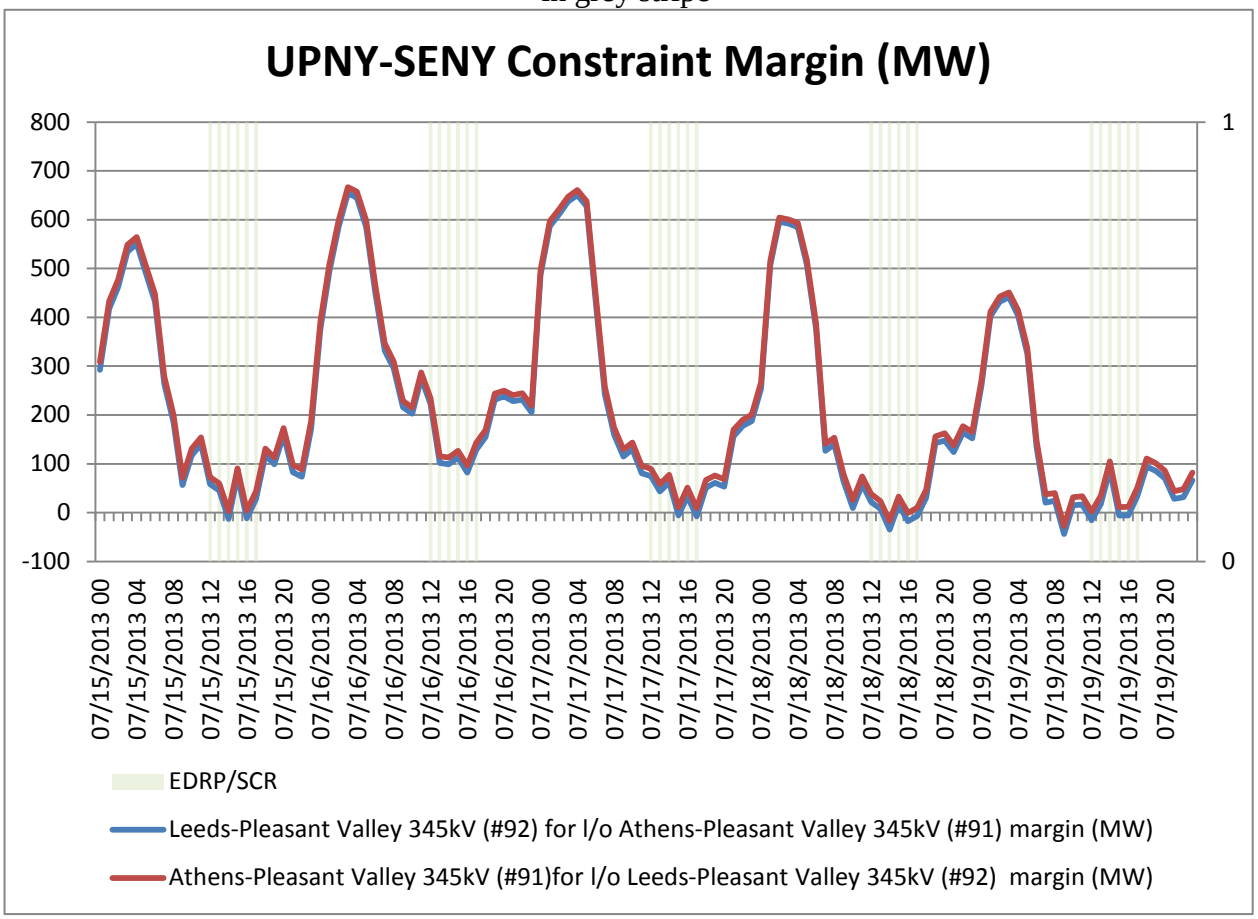
[7] Representative daily zonal LBMPs for this period are found in Appendix 3.

[8] Unused, or available, additional flow capability, for the purposes of this report is identified when the difference between the line rating and the flow on the line, or "margin" is more than 100 MW.

[9] The analysis is most relevant for the first three days when the Demand Response call was for Zones G-K.

On July 16th, there was a 100 to 200 MW margin. The frequency of binding constraints on these days supports the conclusion that the system was constrained on all five days, but to a lesser degree on the 16th. From this, the NYISO concludes that there was no systematic underutilization of the transmission system in the hours when EDRP/SCR resources were activated except perhaps in some hours on July 16.

Figure 1 UPNY-SENY Constraint Margin (MW) – EDRP/SCR activated hours shown in grey stripe



III. ACTIVATION OF EDRP/SCR DURING THE SUMMER OF 2013 PRODUCED FEW UNDESIRABLE MARKET OUTCOMES.

In analyzing whether there were any undesirable effects on market outcomes during the 2013 summer, the NYISO looked at five measures of the appropriateness of actual market outcomes:

- Utilization of the transmission system,
- Balancing Market Residuals (BMRs),
- Proxy bus pricing,
- Day-Ahead Margin Assurance Payments (DAMAP) to generators, and

- Balancing Market settlement outcomes

The NYISO has earlier explained that, with the exception of a few hours, there was no systematic underutilization of the transmission system capacity during the summer 2013 EDRP / SCR calls. To the extent the transmission system is being utilized efficiently, available reserves are being accurately accounted for and undesirable market outcomes are minimized. Thus, the relatively efficient utilization of the New York transmission system serving SENY load, in most of the hours of the EDRP/SCR calls, indicates that the NYISO's scarcity pricing mechanism did not produce undesirable outcomes.

As explained below, the use of Scarcity Pricing neither led to inappropriate Balancing Market Residuals during this five day period nor did it produce significant Day-Ahead Margin Assurance Payments ("DAMAP") for Generators buying out of Day-Ahead schedules at scarcity-based real-time prices (for Energy, Reserves or Regulation Service). However, the NYISO does see that the absence of scarcity-pricing at Proxy Generator Buses may not have encouraged the scheduling of imports during periods of scarcity in those regions. As explained below, this issue presents an opportunity for improvement.[10] Each of these three conclusions is explained in detail below

A. Scarcity Pricing Did Not Lead to Inappropriate Balancing Market Residuals

Balancing Market Residuals ("BMR") impose charges on Load when the Balancing Market charges to Suppliers and Loads are insufficient to offset the Balancing Market payments. These charges can arise as a consequence of managing the power system in real-time, for instance when there is less transmission availability in real-time than anticipated in the Day-Ahead market and therefore more expensive real-time generation is needed to serve Day-Ahead Load contracts. It can also occur when fewer net imports are scheduled in real-time than were scheduled Day-Ahead and the External Transaction Balancing Market charges to these imports do not recover the costs of the internal generation that is needed to replace them.

Under most circumstances the Balancing Market payments are nearly equal to the Balancing Market charges and BMRs are small. Nonetheless the presence of high BMR charges does not, in and of itself, indicate market inefficiency.

The NYISO's analysis has revealed that the application of scarcity pricing amplified the dollar amount of the BMR on the five days EDRP/SCR resources were called, but that the use of scarcity pricing did not create a BMR that would not have otherwise occurred. The NYISO's conclusion stems from its observation that if scarcity pricing had not applied during the EDRP/SCR intervals, the MW basis leading to the BMR seen during this time frame would have been unchanged.

For the entire five day scarcity period, the BMR charge totaled only $1.4M.[11] Figure 2 shows the hourly BMR for the entire week. In the hours that EDRP/SCRs resources were called,

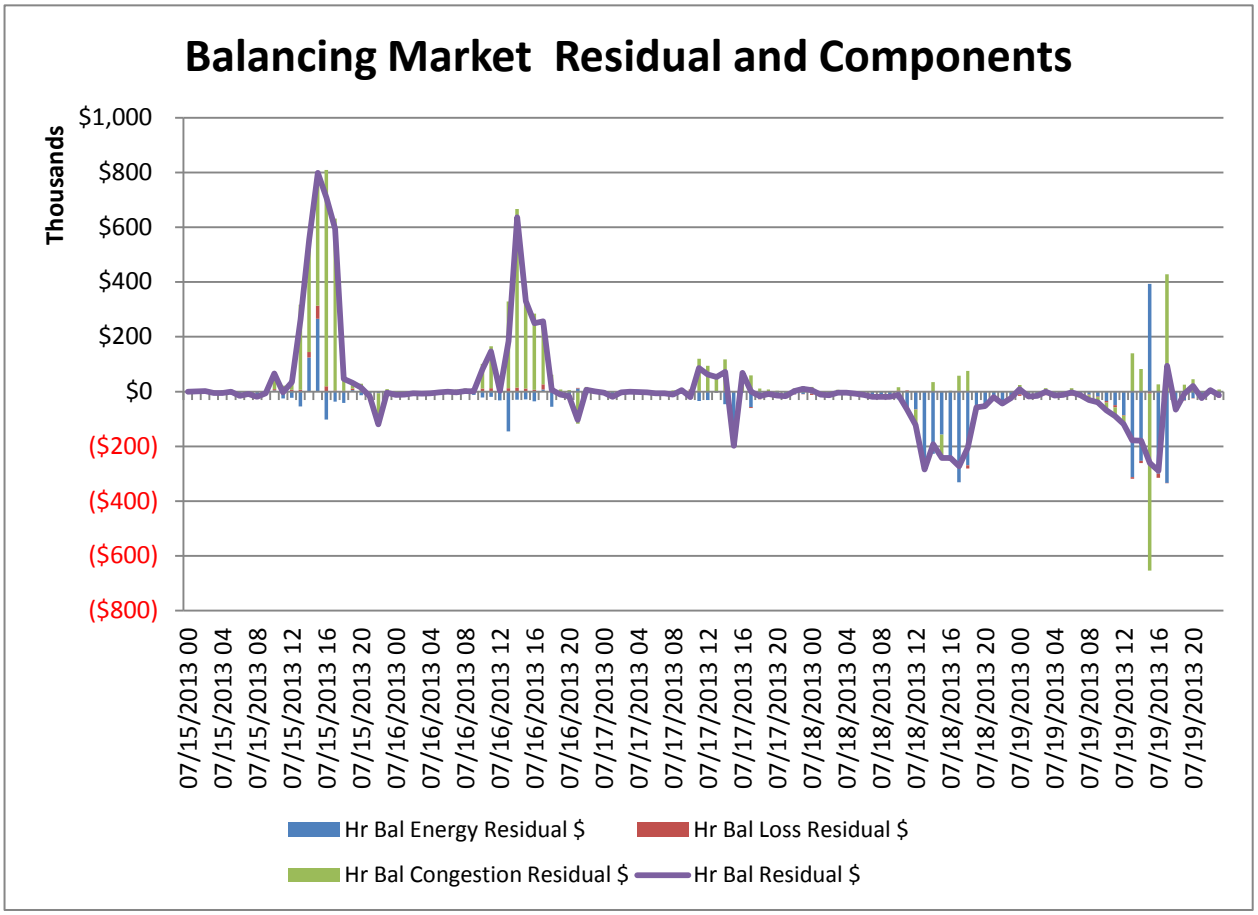
[10] Of course, even repricing the external Proxy Generator Buses will not increase imports if the neighboring control areas were incapable of supporting additional exports in those hours.

[11] For comparison, the monthly BMR charge for three summer months was: $0.92M for June 2013, $10.0M for July 2013 and $1.06M for August 2013

Load was charged $2.3M in BMR. When BMR is separated into its three components, Balancing Market Energy Residual (“ BMER”), Balancing Market Congestion Residual (“BMCR”), and the Balancing Market Loss Residual (“BMLR”), we see that, over the EDRP/SCR called hours, BMER totaled a $2.5M refund to Load; BMCR totaled a $4.7M charge to Load, and BMLR totaled an additional $0.1M charge to Load.

Scarcity pricing impacts each residual differently. When EDRP / SCR is deployed for a region that does not include the NYISO reference bus, the use of scarcity pricing impacts the congestion component of the LBMP for the resources in the EDRP/SCR deployment region. Thus we have a high BMCR charge of $4.7 M during the EDRP/SCR called hours. When EDRP / SCR is deployed in a region that includes the NYISO reference bus (in this case during the NYCA wide deployment) the use of scarcity pricing impacts the energy component of the LBMP. Scarcity pricing triggered in fewer statewide hours and the resulting net BMER over all the scarcity hours was actually as a credit to Load of $2.5M.

Figure 2 Hourly Balancing Market Residuals



B. There Was No Evidence of Large DAMAP Payments to Generators in Eastern New York

Interveners in this docket expressed a concern that the *ex post* scarcity pricing rules would lead to additional DAMAP payments for generators because the scheduling engine would not observe the scarcity price when optimizing the dispatch. Some interveners were concerned that the proposed mechanism could cause generators to incur losses that would be eligible for a Day Ahead Margin Assurance Payment.

The NYISO did find some evidence of units eligible for DAMAP because they incurred losses from having to buy out of high priced ancillary services when their reserves schedules were converted to non-scarcity priced Energy, but it was limited in scope. The NYISO looked at all of the sources of the DAMAP accruing on the five days during which scarcity pricing was activated and identified approximately $250,000 of DAMAP awarded that can be attributed to units buying out of a scarcity-priced reserve product in order to provide non-scarcity-priced energy. This DAMAP occurred over only ten hours during the week. Thus, DAMAP to Generators buying out of scarcity priced ancillary service schedules to generate non-scarcity-priced energy was not a significant contributor to the total amount of DAMAP accrued during July 2013, contributing less than four percent of the $6.7 M total.

The NYISO found some evidence of the reverse condition, also a matter of concern to some interveners; but it, too, was limited in scope. The reverse condition is the settlement a Generator may receive by buying out of a non-scarcity-priced Energy schedule to provide scarcity-priced Ancillary Services. Fewer than ten units fit this scenario. They received about $250,000 in Balancing Margin[12] when 676 MWh of their Energy was converted to scarcity-priced Ancillary Services. This occurred over eight hours during four of the five July days when Demand Response was called.[13]

C. The Implication of Not Using Scarcity Pricing at Proxy Generator Buses May Present an Opportunity for Improvement

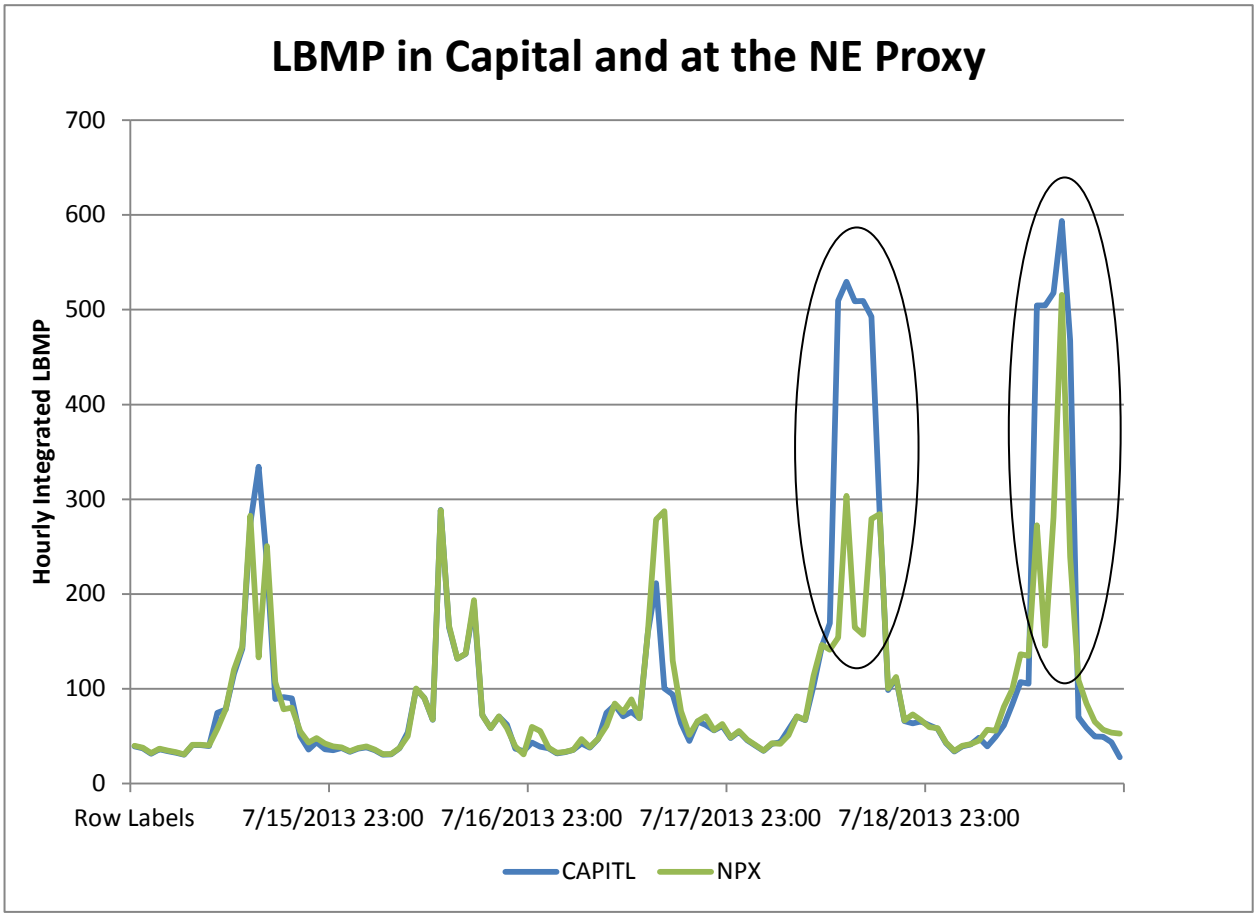
The NYISO's scarcity pricing mechanism does not reset prices at the NYISO's Proxy Generator Busses where external transactions are priced. Particularly when EDRP/SCR is called statewide, (as it was on July 18 and 19), this design can result in a large difference between the real time prices at the Proxy Generator Busses and internal Load Zone and generator prices. This condition contributes to amplified BMR charges as mentioned in the prior section. For example, when a DAM scheduled import does not flow in real-time, the importer must buy-out of its DAM position at the Real Time price at its Proxy Generator Bus. But the energy to serve internal Load (presuming it is still needed) would most likely be produced internally (rather than imported at another location) and, during scarcity, is likely to be paid the much higher price (and vice versa for exports). The price divergence between a proxy price and a nearby scarcity impacted price can be seen in Figure 3 on July 18 and 19.

[12] A Balancing Margin is the incremental hourly amount earned in the balancing market for Energy, Operating Reserves and Regulation Service.

[13] Generators did not need to buy out of a non-scarcity-priced Energy schedule to provide scarcity-priced Ancillary Services on July 16, 2013.

The NYISO will be looking at Proxy Generator pricing during periods of scarcity as part of its 2014 comprehensive evaluation to determine if the practice of not pricing its imports and exports using scarcity pricing is causing any inefficiency or results in an undesirable distortion to balancing market accounts.

Figure 3- LBMP in Capital and NE Proxy



IV. IMPLEMENTING SCARCITY PRICING IN THE NYISO'S OPTIMIZATION ENGINE

A. Implementing Scarcity Pricing in the NYISO's Optimization Engine To Produce a Real-Time Dispatch that Minimizes the Joint Social Costs of Providing Energy And Operating Reserves and Allow Prices for Energy and Operating Reserves to Clear The Market Would Require Both a Significant Effort to Design and Strong Stakeholder Support

The NYISO uses it real-time optimization engine to provide a least production-cost set of resources to supply Load. The optimization engine utilizes supply offers and a transmission system configuration to establish the least production-cost set of resource schedules necessary to meet demand while recognizing transmission system reliability limitations. Typically, the NYISO's optimization engine would be producing LBMP prices based upon the marginal cost to

meet the next increment of actual expected load. The problem objective for scarcity pricing would be to establish the marginal costs of meeting the next increment of load as if the EDRP/SCR resources were a dispatchable resource, available to meet the unreduced load (*i.e.* the load that would have occurred had the EDRP/SCR resources not been activated.) In both cases, the system must be physically operated to meet the real-time actual demands of the system. Creating an LBMP for pricing purposes when the cost of the next increment of supply is an offer from now-absent real-time Load is a challenge.

Complicating this design challenge is the fact that LBMPs, in the intervals immediately before the EDRP / SCR resources reduced their real-time Load, were set using the cost of generation -- the same supply resources that continue to serve actual real-time Load after the EDRP / SCR resources are activated. When the Load reduction created by the EDRP / SCR resources is seen by the optimization engine, the engine pursues a reduction in supplier dispatch which normally would result in a reduction in LBMPs. Adding scarcity pricing to the optimization will require the engine to calculate a higher price as Load is falling while still dispatching generation to meet actual load.

Reconfiguring the real-time dispatch to price the increment of supply to serve real-time Load at a scarcity price when the optimization engine will also see a reduction in the need for additional supply, also presents a significant challenge. Pursuing this challenge begins with understanding the choices for designing such a reconfiguration. Only after these choices are made can the NYISO estimate the costs and resources necessary to pursue this reconfiguration. One option may be to create a proxy product which the optimization engine can 'dispatch' to meet the next increment of actual real-time Load and also use as it creates LBMPs. There are likely to be different ways to construct this proxy product and the advantages (and disadvantages) of each will have to be carefully considered.

Stakeholders may also want to consider that the newly enhanced but still *ex post* nature of the current scarcity pricing mechanism has not introduced significant inefficiencies or adverse market impacts. As shown above, utilization of the transmission system remained relatively efficient during the periods that scarcity pricing was invoked. This indicates that the *ex post* nature of scarcity pricing is not introducing inefficient results. In this regard, anyway, pursuit of an optimization-engine-based scarcity design may not be time well spent

B. Several Steps Would be Necessary to Deploy Scarcity Pricing from the NYISO's Optimization Engine

1. Need for stakeholder input

At the outset, the NYISO and its stakeholders will need to address a number of complex, interrelated questions, some of which are described above, to determine if including scarcity pricing in the dispatch is feasible given its impacts on the dispatch. Only once these questions are answered will it be possible to determine what resources would be necessary to implement scarcity pricing in the dispatch.

Once the options are understood the NYISO and its stakeholders will need to assess the expected benefits of bringing scarcity into the optimization. Are the benefits worth the cost? The

costs are likely to be financial but they could also be cost in terms of efficiency or impacts on types of generators or other resources.

Even the pursuit of a theoretical answer – like creating a proxy product or using an existing reserves product as the proxy for the EDRP/SCR resource -- raises many additional questions. What necessary characteristics would the proxy product have – would it require zonal requirements and/or super zonal requirements – how would the new product interact with exiting reserve products -- how would the proxy product be incorporated into the real-time pricing and physical dispatch systems? How would incorporating a new product into the dispatch impact existing North American Reliability Corporation ("NERC") and New York State Reliability Council ("NYSRC") requirements? How would the product be compensated? No other RTO / ISO has incorporated scarcity pricing into their dispatch engine, limiting the NYISO's opportunity to look for answers in comparable systems.

These are important questions given the significance of the implementation effort as is explained in Parts 2 and 3 below. Particularly compelling in this feasibility / cost discussion is the ongoing NYISO effort to implement Real Time Demand Response. The continued need for existing, reliability based, EDRP/SCR programs and the related scarcity pricing mechanism needs to be re-examined as that effort moves forward. The issue of incorporating scarcity pricing into the real-time optimization engine may be premature given these other efforts to recognize in real-time prices the value of demand reduction.

2. Major Software Redesign is a Multi-Step Process

The following table provides the nine steps typically used by the NYISO in major software redesign projects. Depending on the complexity of both the change and the impact of the change on downstream systems, steps may be abbreviated or expanded.

Step	**Description**
Initial Design and Analysis	The NYISO reviews possible designs and their implementation feasibility to determine the recommended approach(s). Analysis on possible impacts to the NYISO markets, software and computer hardware may also be needed prior to determining a recommended approach or approaches.
Concept Design and Approval	The NYISO works with stakeholders to develop the concept design. This would be done in a number of Market Issues Working Group meetings; votes would then be taken at the Business Issues Committee meeting, as well as at the Management Committee meeting.
Stakeholder Tariff Revision and Approval	Tariff revisions may be necessary. This process generally happens concurrently with the Concept Design Approval. The stakeholder tariff development and approval process begins at the working group level with NYISO-prepared draft tariff sheets. It culminates in a vote by the Management Committee. Both the Concept Design and tariff revisions would have to be approved by the NYISO Board of Directors

	prior to filing with the Commission.
Detailed Market Design	As needed, the NYISO would continue to work with stakeholders on project details.
Software Specifications	The NYISO's co-optimization software occurs within Ranger. Changes to any optimization rules within Ranger require changes to Ranger as well as to downstream systems. The NYISO completes a functional requirement specification document ("FRS") describing any necessary changes in Ranger, downstream systems, and other software. The requirements would be based on output from the market design discussions with stakeholders and would implement the necessary tariff changes. The FRS specifies software applications and provides a detailed list of business needs that a new design would be required to support.
Software Requirements, or "Use Case" Development, Begins	The NYISO develops "Use Cases," which describe any necessary software changes, based on the Software Specifications. Working from these "Use Cases," software developers write the Software Design Specification ("SDS") necessary for a software re-design.
Development	Working off the SDS, developers implement any changes needed for the software implementation of the project. This could include changes to modules within RTD, as well as the databases supporting this application and downstream applications.
Testing	Before declaring that any needed software development is complete, the NYISO conducts extensive software testing. Quality assurance testing will be required of all processes impacted by any change to the software.
Manual Revisions	Revisions needed to any manuals impacted by changes to the software are provided to Market Participants for review and approval. Separately, revisions would be made to any in house documentation.

3. Consultant Resources as well as NYISO Resources will be Needed

The NYISO's co-optimization software lies within Ranger - the Energy Management System that dispatches the system. The Ranger software was constructed by the NYISO's software vendor, ABB. Moving the scarcity pricing software into the Ranger system would require changes to Ranger and to the downstream systems that rely on Ranger such as price verification processes and software and the Market Information System. These systems have largely been developed in-house. Thus, any software development effort to move scarcity pricing into the Ranger system would require a combination of NYISO labor and non-NYISO consultant services in all stages of the project.

C. Establishing Operating Reserve Requirements is a Separate Process

The Commission's July 8 Order also requested that the NYISO describe the steps that would need to be taken, and the resources required to establish operating locational reserve requirements that are sufficiently granular to recognize important transmission constraints. The NYISO's reserve requirements are static determinations established pursuant to rules issued by the NYSRC. The NYISO's reserve requirements are solved by the optimization engine but they are not established by it.

The NYSRC directs the NYISO to maintain sufficient ten (10) minute operating reserve to replace the operating capacity loss caused by the most severe contingency observed under normal transfer criteria multiplied by the Contingency Reserve Adjustment Factor. It requires the NYISO to maintain sufficient thirty (30) minute operating reserve equal to one half of the ten (10) minute operating reserve necessary to replace the operating capacity loss caused by the most severe contingency observed under normal transfer criteria. At all times, the NYISO is required to maintain sufficient ten (10) minute operating reserve to cover the energy loss due to the most severe normal transfer criteria contingency within the NYCA or the energy loss caused by the cancellation of an interruptible energy purchase from another system, whichever is greater multiplied by the Contingency Reserve Adjustment Factor.

The NYISO is also required to ensure that the ten (10) minute operating reserves are fully available within ten (10) minutes. At least one-half of the ten (10) minute operating reserve is to be supplied by unused but synchronized resource capacity. The remainder of the ten (10) minute operating reserve may be composed of non-synchronized resource capacity such as hydro, pumped storage hydro, and quick start combustion generation, which can be synchronized and loaded to claimed capacity in ten (10) minutes or less, and interruptible load that can be activated in ten (10) minutes or less. The thirty (30) minute operating reserve portion of the NYISO's operating reserve requirement is that portion of unused resource capacity or interruptible load which can and will be made fully available as promptly as possible, but in no more than thirty (30) minutes. The NYSRC also requires the NYISO to maintain sufficient ten (10) minute operating reserves in Load Zone J. A detailed description of the Operating Reserves products the NYISO procures is provided as an addendum to this report.[14]

The NYISO's optimization engine schedules appropriately qualified resources for each of these reserves requirements. The NYISO agrees that its experience with scarcity pricing this summer may indicate the need for redesigned more granular locational Operating Reserve requirements in order to recognize important transmission constraints. This is one of the questions the NYISO intends to address in its early 2014 comprehensive review of this summer's scarcity pricing experience. It is also an issue that would need to be resolved prior to deciding on the feasibility and desirability of putting scarcity pricing in the real-time optimization engine.

After evaluating this summer's experience, the NYISO and its stakeholders will consider the appropriateness of pursuing a more granular set of Operating Reserve requirements. The

[14] All Operating Reserve requirements can be found in the NYSRC Reliability Rule sat the following link: http://www.nyiso.com/public/webdocs/markets_operations/market_data/reports_info/nyiso_locational_reserve_reqmts.pdf

resources required to address this issue are the active participation of the NYISO and its stakeholders in considering and, as appropriate, recommending a change to the NYISO's existing Operating Reserve requirements and the staff necessary to pursue appropriate software revisions to implement as recommended.

Addendum

NYISO
Locational Reserve Requirements

The NYISO shall define requirements for Spinning Reserve, which may be met only by Suppliers that are eligible to provide Spinning Reserve; 10-Minute Reserve, which may be met by Suppliers that are eligible to provide either Spinning Reserve or 10-Minute Non-Synchronized Reserve; and 30-Minute Reserve, which may be met by Suppliers that are eligible to provide any Operating Reserve product. The NYISO shall also define locational requirements for Spinning Reserve, 10-Minute Reserve, and 30-Minute Reserve located East of Central East and on Long Island as shown in the following table:

	NYCA	Eastern NY	Long Island
A=most severe NYCA Operating Capability Loss (1310 MWs)	Zone A-K	Zone F-K	Zone K
10 Minute Spinning Reserve	½ A = 655 MWs (I)	¼ A = 330 MWs (IV)	0 MWs (VII)
10 Minute Total Reserve	A = 1310 MWs (II)	1200 MWs (V)	1/10 V = 120 MWs (VIII)
30 Minute Reserve	1½ A = 1965 MWs (III)	1200 MWs (VI)	270-540 MWs (I)

I NYCA 10-minute spinning reserve is equal to at least one-half of the 10-minute total reserve. [NYS RC D-R3]

II NYCA 10-minute total reserve is equal to the operating capability loss caused by the most severe contingency under normal transfer conditions. [NYS RC D-R2]

III NYCA 30-minute total reserve is equal to one and one-half the 10-minute reserve necessary to replace the operating capability loss caused by the most severe contingency under normal transfer conditions. [NYS RC D-R2]

IV ENY 10-minute spinning reserve is based on the NERC requirement to plan to meet energy reserve requirements, including the deliverability/capability for any single Contingency and the NPCC requirement that reserves be distributed to ensure that they can be used without exceeding individual element ratings or transfer limitations. [NERC TOP-002, NPCC A-06]

V ENY 10-minute total reserve is based on Reliability Rules that require immediate measures (activation of ENY 10-minute reserves) be applied to bring loadings on an internal NY transfer interface to within limits in 15 minutes. [NYS RC F-R6]

VI ENY 30-minute total reserve is based on the NERC requirement to plan to meet energy reserve requirements, including the deliverability/capability for any single Contingency and the NPCC requirement that reserves be distributed to ensure that they can be used without exceeding individual element ratings or transfer limitations. [NERC TOP-002, NPCC A-06]

VII LI 10-minute spinning reserve is based on the NERC requirement to plan to meet energy reserve requirements, including the deliverability/capability for any single Contingency and the NPCC requirement that reserves be distributed to ensure that they can be used without exceeding individual element ratings or transfer limitations. [NERC TOP-002, NPCC A-06]

VIII LI 10-minute total reserve is based on the NERC requirement to plan to meet energy reserve requirements, including the deliverability/capability for any single Contingency and the NPCC requirement that reserves be distributed to ensure that they can be used without exceeding individual element ratings or transfer limitations. [NERC TOP-002, NPCC A-06]

IX LI 30-minute total reserve is based on Reliability Rules that require the ability to restore a transmission circuit loading to Normal Operating Criteria within 30 minutes of the contingency. The LI 30-minute reserve requirement will vary from 270MW for off-peak hours to 540MW for on-peak hours. [NYS RC F-R1]

Attachment II

Appendices

Appendix 1: Available Reserves vs. EDRP/SCR MW called by day

Chart 1-1: July 15th

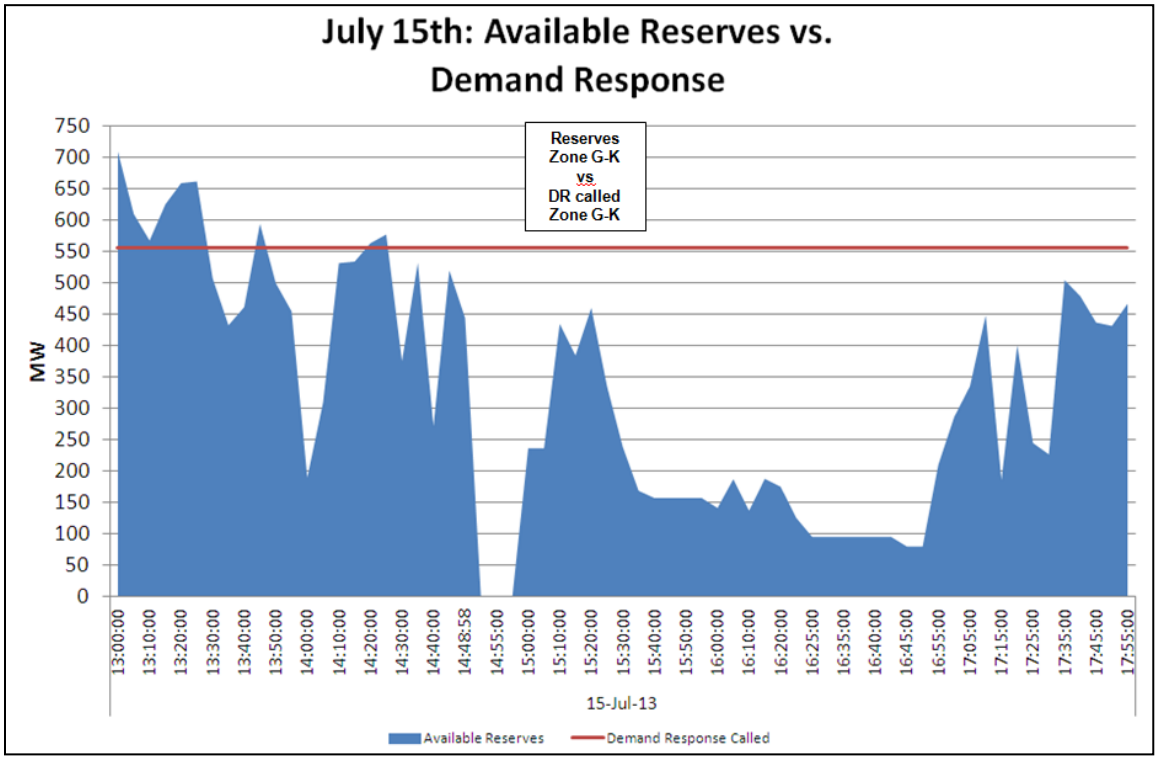


Chart 1-2: July 16th

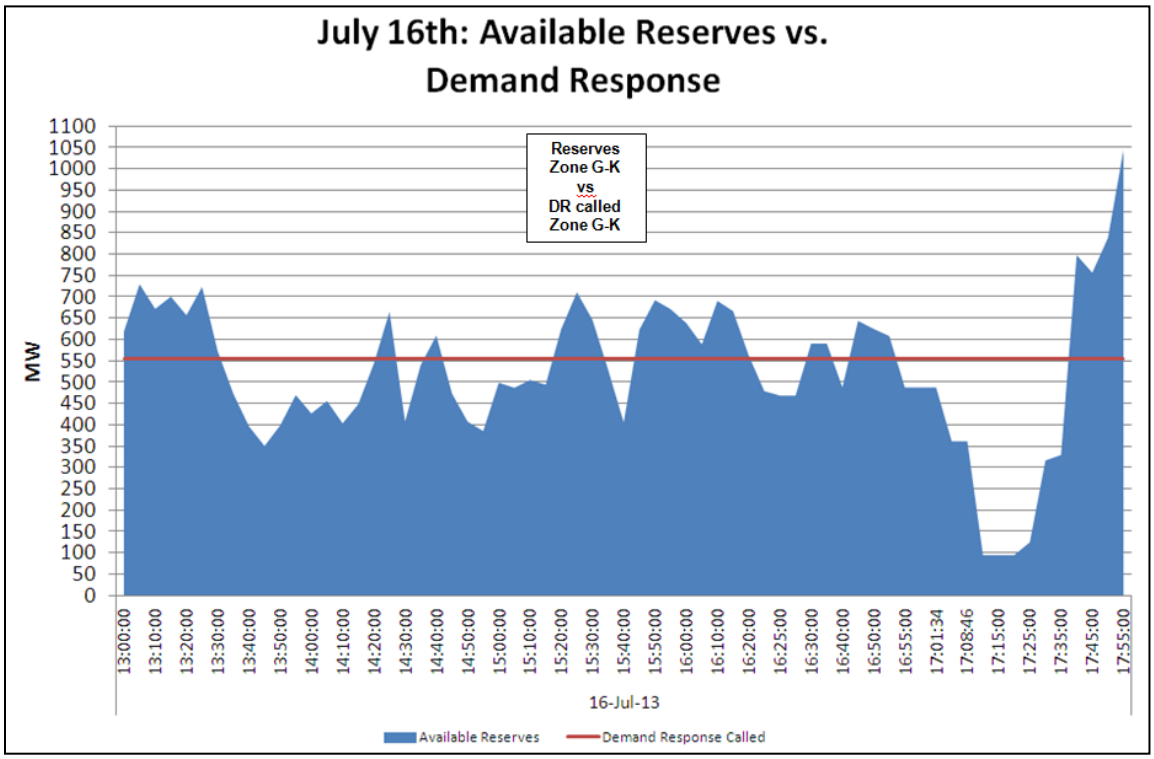


Chart 1-3: July 17th

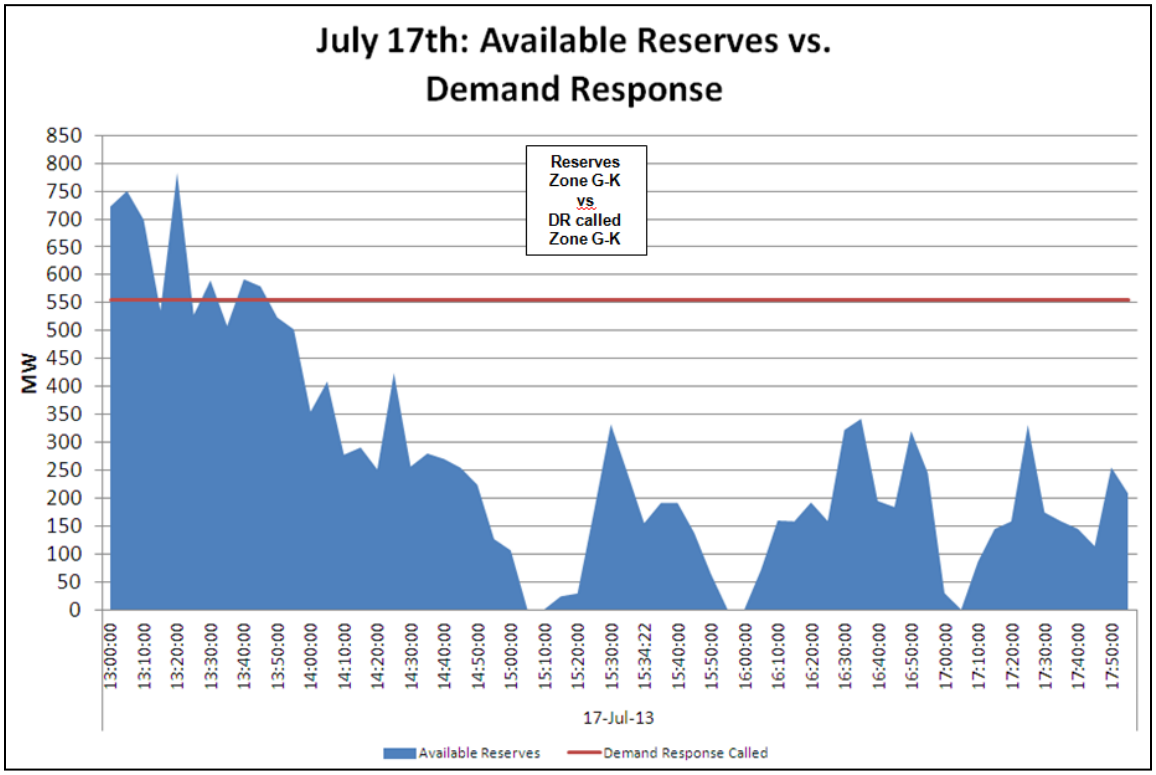


Chart 1-4: July 18th

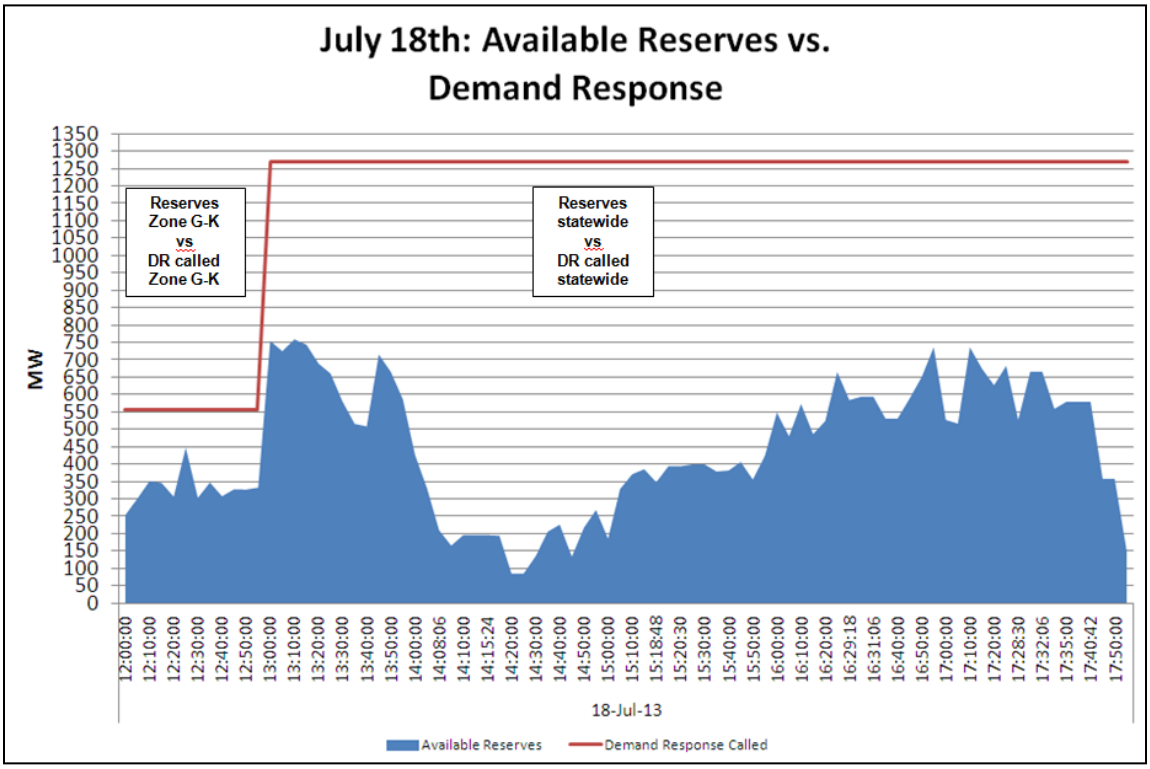
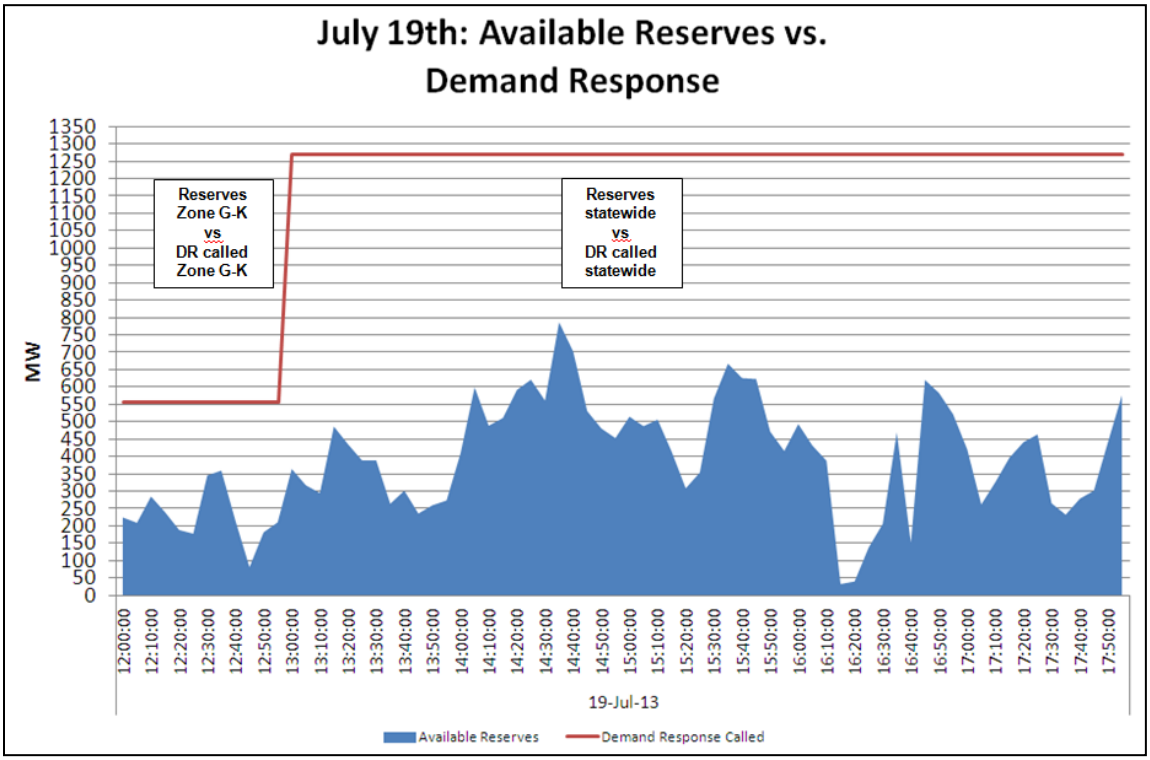


Chart 1-5: July 19th



Appendix 2: Ancillary Service Average Hourly Integrated Prices

Table 2-1 Eastern 10 Minute Synchronized Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ 0.17	$ 2.01
10	$ -	$ -	$ -	$ 24.79	$ 28.52
11	$ -	$ -	$ -	$ 132.32	$ 98.41
12	$ 64.18	$ 3.97	$ 9.10	$ 455.56	$ 362.33
13	$ 293.49	$ 266.09	$ 225.60	$ 434.80	$ 500.63
14	$ 462.44	$ 354.07	$ 455.18	$ 477.26	$ 489.82
15	$ 464.54	$ 197.76	$ 420.17	$ 468.37	$ 498.22
16	$ 424.97	$ 147.08	$ 310.59	$ 469.16	$ 505.54
17	$ 373.32	$ 222.31	$ 394.42	$ 445.94	$ 455.74
18	$ 9.67	$ 3.62	$ -	$ 215.24	$ 27.76
19	$ 11.70	$ -	$ -	$ 47.06	$ -
20	$ -	$ -	$ -	$ 76.54	$ 0.65
21	$ -	$ -	$ -	$ 3.40	$ 3.31

Table 2-2 Western 10 Minute Synchronized Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ 0.17	$ -
10	$ -	$ -	$ -	$ 1.14	$ -
11	$ -	$ -	$ -	$ -	$ -
12	$ -	$ -	$ -	$ 22.68	$ 36.64
13	$ -	$ -	$ -	$ 287.65	$ 433.84
14	$ 112.50	$ -	$ 59.23	$ 559.00	$ 442.76
15	$ -	$ -	$ 60.31	$ 519.42	$ 457.31
16	$ -	$ -	$ 5.29	$ 531.26	$ 448.55
17	$ -	$ -	$ 14.36	$ 562.25	$ 411.79
18	$ -	$ -	$ -	$ -	$ -
19	$ -	$ -	$ -	$ -	$ -
20	$ -	$ -	$ -	$ -	$ -
21	$ -	$ -	$ -	$ -	$ -

Table 2-3 Eastern 10 Minute Non Synchronous Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ -	$ 2.01
10	$ -	$ -	$ -	$ 23.65	$ 28.52
11	$ -	$ -	$ -	$ 123.29	$ 98.41
12	$ 60.01	$ 3.97	$ 9.10	$ 345.95	$ 203.99
13	$ 166.01	$ 219.23	$ 169.79	$ 328.28	$ 353.82
14	$ 227.68	$ 177.97	$ 347.76	$ 412.98	$ 376.50
15	$ 291.25	$ 51.82	$ 346.38	$ 325.37	$ 457.68
16	$ 249.91	$ 92.09	$ 159.26	$ 382.63	$ 485.03
17	$ 22.76	$ 153.65	$ 313.03	$ 308.17	$ 381.45
18	$ 5.54	$ 3.62	$ -	$ 215.24	$ 27.76
19	$ 11.70	$ -	$ -	$ 47.06	$ -
20	$ -	$ -	$ -	$ 76.54	$ 0.65
21	$ -	$ -	$ -	$ 3.40	$ 3.31

Table 2-4 Western 10 Minute Non Synchronous Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ -	$ -
10	$ -	$ -	$ -	$ -	$ -
11	$ -	$ -	$ -	$ -	$ -
12	$ -	$ -	$ -	$ -	$ 36.64
13	$ -	$ -	$ -	$ 226.64	$ 353.82
14	$ 112.50	$ -	$ 59.23	$ 370.77	$ 360.04
15	$ -	$ -	$ 60.31	$ 321.01	$ 423.83
16	$ -	$ -	$ 5.29	$ 417.30	$ 340.17
17	$ -	$ -	$ 14.36	$ 300.48	$ 276.18
18	$ -	$ -	$ -	$ -	$ -
19	$ -	$ -	$ -	$ -	$ -
20	$ -	$ -	$ -	$ -	$ -
21	$ -	$ -	$ -	$ -	$ -

Table 2-5 Eastern 30 Minute Reserves Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ -	$ -
10	$ -	$ -	$ -	$ -	$ -
11	$ -	$ -	$ -	$ 28.81	$ 28.28
12	$ -	$ -	$ -	$ 345.95	$ 177.45
13	$ 72.07	$ 57.56	$ 166.31	$ 317.32	$ 353.82
14	$ 3.88	$ 114.50	$ 347.76	$ 254.11	$ 376.50
15	$ -	$ -	$ 267.85	$ 308.40	$ 440.25
16	$ 92.27	$ 28.43	$ 141.76	$ 382.63	$ 388.93
17	$ -	$ 28.83	$ 313.03	$ 219.17	$ 380.31
18	$ -	$ -	$ -	$ 0.11	$ -
19	$ -	$ -	$ -	$ -	$ -
20	$ -	$ -	$ -	$ -	$ -
21	$ -	$ -	$ -	$ -	$ -

Table 2-6 Western 30 Minute Reserves Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ -	$ -	$ -	$ -	$ -
10	$ -	$ -	$ -	$ -	$ -
11	$ -	$ -	$ -	$ -	$ -
12	$ -	$ -	$ -	$ -	$ 36.64
13	$ -	$ -	$ -	$ 226.64	$ 353.82
14	$ -	$ -	$ -	$ 370.77	$ 360.04
15	$ -	$ -	$ 13.67	$ 321.01	$ 423.83
16	$ -	$ -	$ -	$ 417.30	$ 340.17
17	$ -	$ -	$ 4.17	$ 300.48	$ 276.18
18	$ -	$ -	$ -	$ -	$ -
19	$ -	$ -	$ -	$ -	$ -
20	$ -	$ -	$ -	$ -	$ -
21	$ -	$ -	$ -	$ -	$ -

Table 2-7 Regulation Movement Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ 0.28	$ 0.51	$ 0.54	$ 0.75	$ 0.90
10	$ 0.29	$ 0.83	$ 0.98	$ 0.92	$ 0.92
11	$ 0.95	$ 1.00	$ 0.85	$ 0.92	$ 0.83
12	$ 0.93	$ 0.34	$ 0.45	$ 1.00	$ 0.75
13	$ 0.55	$ 0.93	$ 1.00	$ 1.00	$ 1.00
14	$ 0.68	$ 1.00	$ 1.00	$ 0.65	$ 1.00
15	$ 0.69	$ 0.92	$ 1.08	$ 0.83	$ 0.75
16	$ 0.68	$ 0.79	$ 0.67	$ 0.34	$ 0.62
17	$ 1.00	$ 0.23	$ 0.42	$ 0.39	$ 0.84
18	$ 0.77	$ 0.62	$ 0.78	$ 0.68	$ 1.00
19	$ 0.83	$ 0.26	$ 0.34	$ 0.31	$ 0.34
20	$ 0.55	$ 0.38	$ 0.33	$ 1.00	$ 0.35
21	$ 0.22	$ 0.83	$ 0.92	$ 0.78	$ 0.51

Table 2-8 Regulation Capacity Average Hourly Integrated Price

Hour	7/15/2013	7/16/2013	7/17/2013	7/18/2013	7/19/2013
9	$ 14.36	$ 17.26	$ 14.82	$ 19.93	$ 15.17
10	$ 10.33	$ 13.87	$ 14.65	$ 18.14	$ 16.77
11	$ 14.32	$ 15.00	$ 14.12	$ 52.76	$ 27.57
12	$ 15.62	$ 15.63	$ 14.00	$ 77.97	$ 106.48
13	$ 13.62	$ 16.10	$ 42.06	$ 422.12	$ 461.06
14	$ 19.57	$ 15.00	$ 344.94	$ 580.91	$ 460.91
15	$ 36.67	$ 15.76	$ 301.13	$ 540.83	$ 466.10
16	$ 12.36	$ 13.16	$ 164.70	$ 553.73	$ 466.00
17	$ 15.00	$ 34.28	$ 299.60	$ 357.59	$ 428.82
18	$ 13.78	$ 15.47	$ 19.82	$ 108.10	$ 15.00
19	$ 15.65	$ 14.41	$ 17.05	$ 42.26	$ 18.49
20	$ 15.81	$ 16.12	$ 23.78	$ 39.11	$ 16.91
21	$ 11.52	$ 13.66	$ 15.51	$ 18.85	$ 14.71

Appendix 3: Representative Daily Zonal LBMPs

Chart 3-1 July 15th

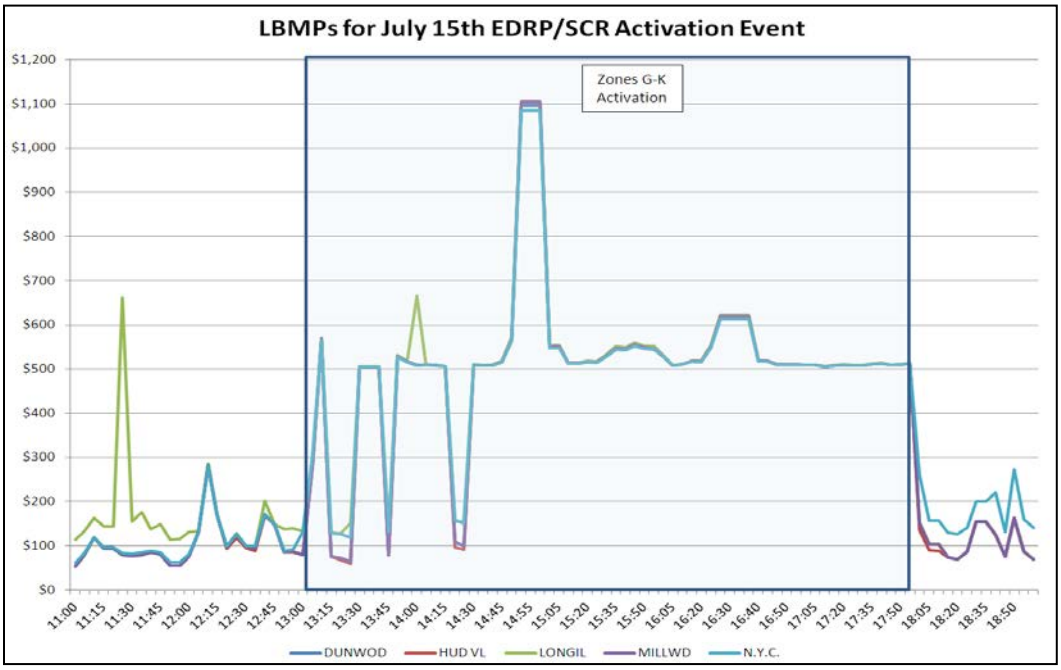


Chart 3-2 July 16th

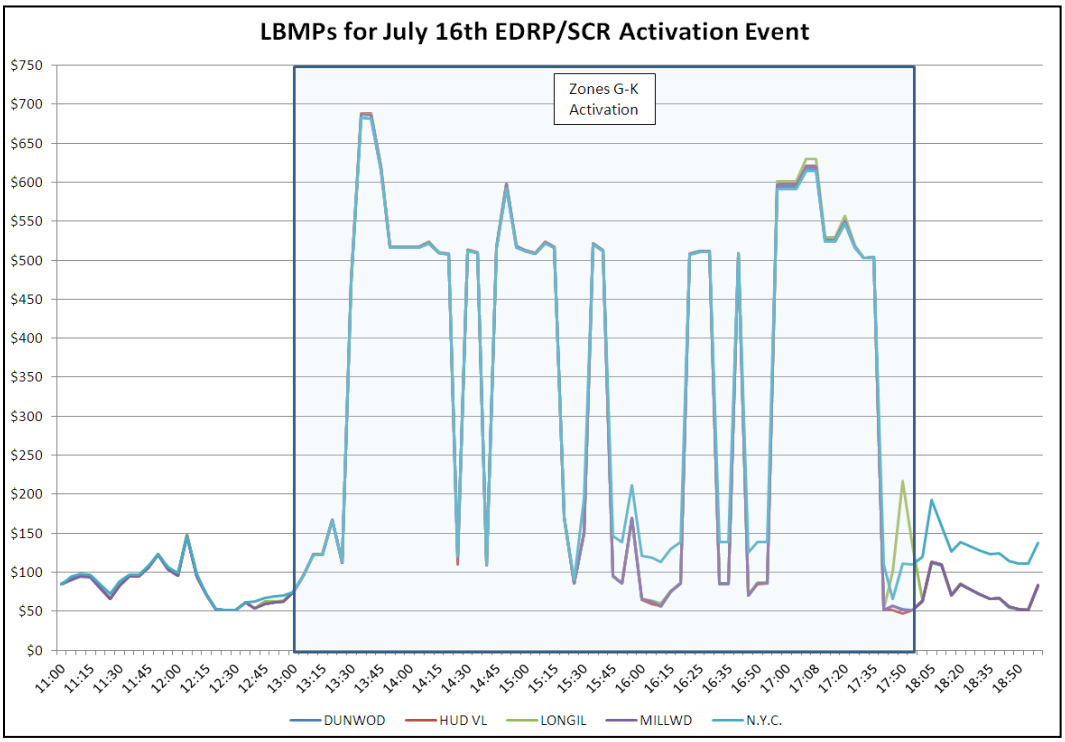


Chart 3-3 July 17th

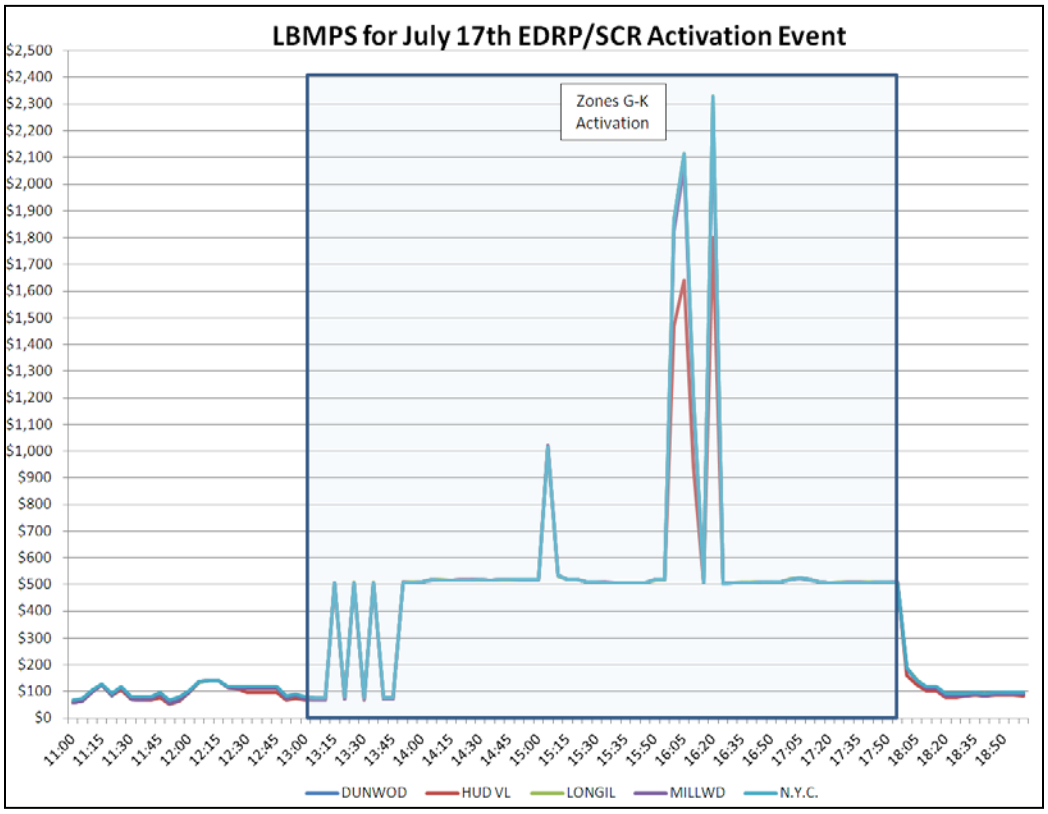


Chart 3-4 July 18th

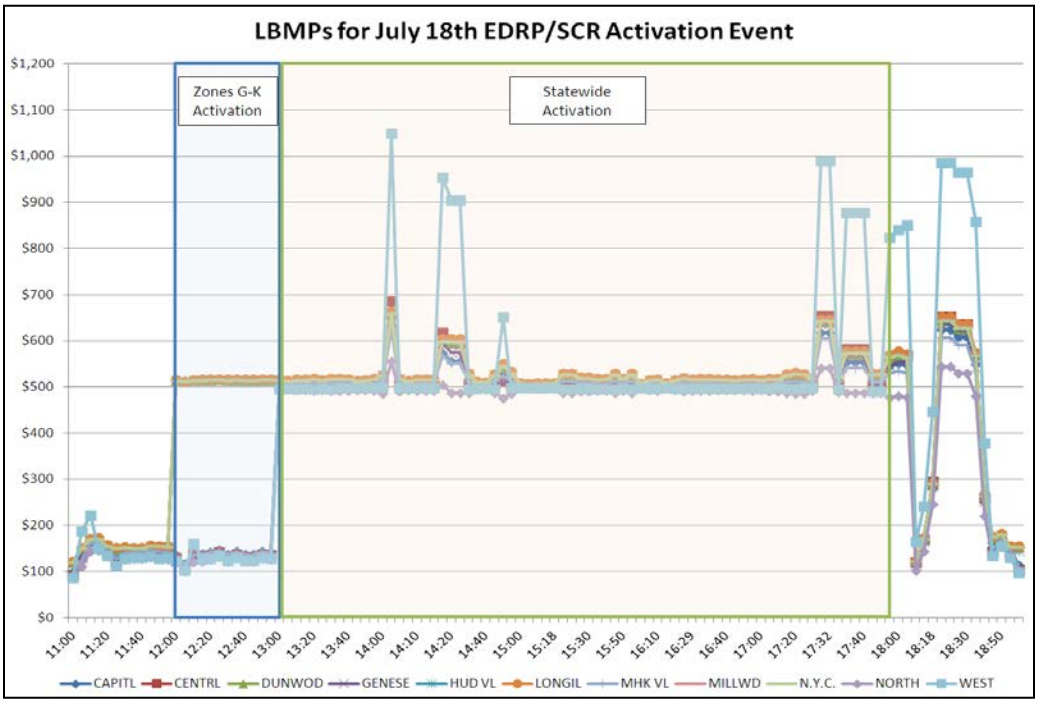


Chart 3-5 July 19th