ASSESSMENT OF THE BUYER-SIDE MITIGATION EXEMPTION TESTS FOR THE CLASS YEAR 2015 PROJECTS

by:

POTOMAC ECONOMICS

NYISO Market Monitoring Unit

February 2, 2017

Table of Contents

I. EXECUTIVE SUMMARY

The NYISO administers Buyer-side mitigation ("BSM") measures in New York City ("Zone J") and the G-J Locality to prevent entities from artificially depressing capacity prices below competitive levels by subsidizing uneconomic entry. The BSM measures deter such anticompetitive entry by imposing an Offer Floor on resources that do not satisfy criteria that are described below. The Offer Floor acts as a deterrent because it would prevent such a resource from reducing the clearing price to a level below the resource's Offer Floor.

The NYISO evaluates each Examined Facility in a Class Year to determine whether the particular project should be subject to Offer Floor mitigation.[1] The NYISO's Tariff requires the Market Monitoring Unit to prepare a report that must be posted concurrently with the results of any BSM determinations. This report provides our review of the BSM evaluations for the Class Year 2015 ("CY15") Examined Facilities.

The NYISO provided BSM determinations to six CY15 Examined Facilities, including five Additional CRIS MW projects (see (a) – (e)) and one controllable transmission line (see (f)):

a) A capacity uprate of 27.8 MW to the combined cycle units at the Astoria East facility (557 MW of existing capacity) that is located in Zone J.

b) A capacity uprate of 10 MW to the East River 1 cogeneration unit (existing capacity of 151 MW) that is located in Zone J.

c) A capacity uprate of 10 MW to the East River 2 cogeneration unit (existing capacity of 152 MW) that is located in Zone J.

d) A capacity uprate of 35.5 MW to the Linden cogeneration facility (existing capacity of 755 MW) that is located in Zone J.

e) A capacity uprate of 10 MW to the Bowline Unit 2 steam turbine (existing capacity of 557 MW) that is located in Zone G.

f) The Champlain Hudson Power Express ("CHPE") Project, which is a proposed 333-mile 1,000 MW HVDC merchant transmission line running from the US-Canada border to New York City.

[1] Terms with initial capitalization not defined in this report have the meaning set forth in the NYISO's Market Administration and Control Area Services Tariff ("MST"), and if not defined therein, then in Open Access Transmission Tariff Attachment S.

NYISO's Process of Issuing BSM Determinations

The NYISO's BSM evaluation of the Class Year projects is coordinated with its Project Cost Allocation ("PCA") process. In each round of the process, the NYISO provides each project remaining in the Class Year with its estimated PCA and its BSM determination (if applicable), so each developer can consider this information before deciding whether to accept its PCA. To receive CRIS, the developers of the Class Year projects are required to accept their PCA, headroom payment, and Deliverable MW and post the required Security. If a CY Project developer does not satisfy one or more of these requirements, the project does not receive CRIS and a new PCA round begins.

When a project leaves the CY process, the PCA amount for other projects in the Class Year may change, and the ICAP, Energy, and Ancillary Services price forecasts (which are inputs to the BSM determinations for other Examined Facilities) are also likely to change. Thus, the NYISO must provide an updated BSM determination in each round for each remaining Examined Facility until the completion of the Class Year.

In CY15, the NYISO conducted three rounds of the PCA process. All six Examined Facilities received BSM determinations in the initial round. After the Caithness II Project (a proposed 750 MW combined cycle unit located in Long Island) dropped out of CY15, the CY15 Examined Facilities received updated PCA and BSM determinations in the second round. The CHPE Project was removed from the CY15 after it failed to post the Security for its PCA at the end of the second round of the PCA process. The five remaining CY15 Examined Facilities received revised BSM determinations in the final round.

Evaluation of Champlain Hudson Power Express Project (First and Second Rounds)

In CY15, the NYISO implemented new tariff provisions that would allow it to grant a Competitive Entry Exemption ("CEE") to unsubsidized merchant projects. In CY15, the NYISO evaluated the CHPE Project, which was the first applicant for a CEE exemption. The NYISO reviewed the CHPE Project certification and other related documentation, and provided a BSM determination to the CHPE Project developer during the first and second rounds. The project

developer subsequently failed to post the required Security for the PCA and the CHPE project was removed from CY15.

Evaluation of Additional CRIS MW Projects (All Three Rounds)

Additional CRIS MW projects involve uprates to existing facilities, and the Additional CRIS MW is the amount of capacity at the existing facility for which increased CRIS is requested. The NYISO conducted a BSM evaluation of such projects for the first time in CY15.

The NYISO's BSM evaluation for the Additional CRIS MW projects consists of Part A and Part B tests. The purpose of the Part A test is to ensure that a resource will be determined to be exempt when its capacity will be needed to satisfy the capacity requirement for a particular Locality. An Examined Facility is determined to be exempt under the Part A test if the price forecast for the first year of its operation is higher than the Default Net CONE.[2] The purpose of the Part B test is to ensure that a resource is not mitigated when it would be economic to enter the market. An Examined Facility is determined to be exempt under the Part B test if the price forecast for the initial three years of operation is higher than the Unit Net CONE of the Examined Facility. An Examined Facility is exempt from Offer Floor mitigation if it passes either the Part A test or the Part B test.

CY15 Part A Test Results in the Final Round

The NYISO's forecasted UCAP prices in the Part A test for Zone J and the G-J Locality were lower than the Default Net CONE of $131 per kW-year UCAP in Zone J and higher than the $89 per kW-year UCAP value in G-J Locality for the same period. While none of the Additional CRIS MW projects in Zone J were determined to be exempt under the Part A test, the G-J

[2] The Part A test compares a forecast of capacity prices in the first year of an Examined Facility's operation to the default net CONE ("DNC"), which is 75 percent of the Mitigation Net CONE ("MNC"). MNC is the price corresponding to the net CONE ("Net CONE") of the hypothetical unit modeled in the currently effective Demand Curve reset. Net CONE refers to the annualized levelized cost of new entry after deducting the annual revenues earned in excess of operating costs from the sale of energy and ancillary services.

Locality price forecast was sufficiently high to exempt the Additional CRIS MW of Bowline Unit 2 under the Part A test.

The key driver of the Part A test results for the Zone J Examined Facilities was that the assumed amount of capacity from existing suppliers exceeded the forecasted ICAP requirements during the first year of the Mitigation Study Period by relatively large margins. Before including the capacity of the Examined Facilities, the NYISO forecasted that capacity sales during the Summer Capability Period would exceed the requirement for Zone J by approximately 8 percent. However, the Zone J CY15 Examined Facilities would generally not be exempt under the Part A test unless the forecasted capacity margin was less than approximately 6 percent.[3] Consequently, the NYISO forecasted that none of the Zone J Examined Facilities will be needed to satisfy the capacity requirements (plus the applicable margin). Overall, we find that the assumptions used in the Part A test were in accordance with the NYISO's tariff.

The key driver of the Part A test results for the Bowline 2 Unit was that the NYISO forecasted capacity sales during the 2018 Summer Capability Period would exceed the requirement for the G-J Locality by just 3 percent, while Examined Facilities would generally be exempt under the Part A test if the forecasted capacity margin was less than approximately 4 percent.

CY15 Part B Test Results in the Final Round

The NYISO forecasted UCAP prices in the Part B tests for Zone J and the G-J Locality that were higher than the Unit Net CONEs of the Additional CRIS MW projects. Therefore, all five of these projects were determined to be exempt under the Part B test in the final round of the BSM evaluation.

The Unit Net CONEs for the CY15 Additional CRIS MW projects were calculated by the NYISO after considering the developer's submissions on the incremental costs and revenues associated with the requested increase in capacity. Additional CRIS MW projects involve

[3] The Part A test is actually based on a comparison of conditions in the Summer and Winter Capability Periods. Details are provided in Section IV.

uprates to existing facilities and do not incur many of the costs of building a new generator. Consequently, the cost of developing such projects is often well below the cost of new entry of a new power plant.

The primary drivers of the final outcome of the Part B test were (a) the low investment costs needed to develop the Additional CRIS MW, and (b) the high net revenues for projects that improved the operating efficiency of the existing capacity. Since the CY15 Additional CRIS MW projects were determined to be exempt under the Part B test, they will not be subject to Offer Floor mitigation. Overall, we find that the results of the Part B test were in accordance with the NYISO's tariff and consistent with the fundamental objective of the BSM measures, which is to allow new capacity investment that is consistent with competitive conduct.

Enhancements to BSM Measures

The NYISO made several modifications to its test methodology in the CY15 BSM evaluation. These modifications generally enhanced the alignment of the test procedure with the Tariff and with the underlying intent of the BSM evaluations. Hence, we support continuing the use of the modified test procedure in future BSM evaluations.[4]

As a part of our review, we have identified several issues that, if addressed, would improve the accuracy of the BSM evaluations.[5] These mainly relate to the test assumptions regarding forecasted in-service capacity supply and capacity requirements, entry dates of the Examined Facilities, and estimation of interconnection costs. A number of the proposed improvements require changes to the NYISO's Tariff. Although we find that addressing these issues would not have altered the CY15 BSM determinations, these issues may have significant impacts on the results of future BSM evaluations. Accordingly, we recommend the NYISO continue to work with its stakeholders to develop reasonable rules for future evaluations.

4 This is discussed in more detail in Section VIII.F.

5 See Section IX. The NYISO has initiated stakeholder processes to address some of the issues discussed herein.

II. INTRODUCTION AND SUMMARY

The NYISO's Market Administration and Control Area Services Tariff ("MST" or "Tariff") requires that the Market Monitoring Unit ("MMU") prepare a report to be posted concurrently with the results of buyer-side mitigation evaluations.[6] The NYISO has conducted the Part A and Part B tests of the BSM evaluations for five Class Year 2015 Examined Facilities.[7,8] In addition, the NYISO evaluated one Examined Facility for the Competitive Entry Exemption ("CEE"). This report provides our review of the NYISO's BSM evaluations, and it has been posted concurrently with the final BSM determinations for the CY15 Examined Facilities.[9]

Six Examined Facilities received BSM determinations and PCA during the first round of the PCA process. After the Caithness II Project dropped out of CY15, all six received updated BSM determinations and PCA in the second round. The CHPE Project developer subsequently failed to post Security for its PCA and the project was removed from CY15 prior to the final round. Five Examined Facilities remained in the Class Year at the time of its completion and were determined to be exempt from an Offer Floor. We find that the NYISO's CY15 BSM evaluations were performed in accordance with the Tariff and based on reasonable assumptions.

---

6 See *Astoria Generating Company, L.P., et al. v. New York Independent System Operator, Inc.,* 139 FERC ¶ 61,244 (2012) at PP 130. Also see MST §23.4.5.7.7.

7 The Part A and Part B tests are set forth in MST §23.4.5.7.2. Details on the NYISO's general application of these tests are provided in the *BUYER SIDE MITIGATION NARRATIVE AND NUMERICAL EXAMPLE* ("BSM Numerical Example"), dated December 1, 2016. Details on the capacity price forecast assumptions used for CY15 Examined Projects are provided in *BUYER SIDE MITIGATION ICAP FORECAST – ASSUMPTIONS AND REFERENCES FOR CLASS YEAR 2015 EXAMINED PROJECTS* ("BSM CY15 Forecast Assumptions"), dated December 1, 2016. Both documents are available at: "http://www.nyiso.com/public/markets_operations/services/market_monitoring/index.jsp".

8 Terms not defined herein have the meaning set forth in the MST, and if not defined there, then as defined in the Open Access Transmission Tariff ("OATT").

9 The NYISO's determination is available on the NYISO's website with Class Year 2015 information at: "http://www.nyiso.com/public/markets_operations/services/market_monitoring/index.jsp.".

A. CY15 Examined Facilities

Additional CRIS MW Projects

Additional CRIS MW is the amount of capacity at an existing facility for which CRIS rights are requested.[10] The NYISO conducted the Part A and Part B tests in all three rounds for the following five Additional CRIS MW projects:

- Astoria Energy LLC submitted a request for a capacity uprate of 27.8 MW to the combined cycle units at the Astoria East facility (with 557 MW of existing capacity), which is located in Zone J.
- Consolidated Edison submitted two separate requests for 10 MW capacity uprates to each of its East River 1 and East River 2 cogeneration units (with 151 and 152 MW of existing capacity per unit), which are located in Zone J.
- East Coast Power LLC submitted a request for a capacity uprate of 35.5 MW to its Linden cogeneration facility (with 755 MW of existing capacity), which is located in Zone J.
- NRG submitted a request for a capacity uprate of 10 MW to its Bowline Unit 2 steam turbine facility (with 557 MW of existing capacity), which is located in Zone G.

Champlain Hudson Power Express ("CHPE") Project

The NYISO also evaluated the CHPE Project for a CEE in the first and second rounds.[11] The CHPE Project is a proposed 333-mile 1,000 MW High Voltage Direct Current ("HVDC") merchant transmission line running from the US-Canada border to New York City. The proposed line includes two 345 kV cables with submarine portions totaling 196 miles and upland portions totaling 137 miles. A converter station would be built at the Astoria Generating Complex in Astoria, Queens and would connect to the NYISO system at the Astoria Annex GIS substation. The project is under development by the Transmission Developers Inc. ("TDI").

---

10 See MST §23.2.1 for the definition of Additional CRIS MW and MST §23.4.5.7.6 for the provisions related to BSM evaluation of Additional CRIS MW projects.

11 The NYISO confidentially provided a BSM determination for the CHPE Project as part of its CY12 evaluation. However, the project developers rejected their PCA and dropped out of CY12. The CHPE Project subsequently entered CY15.

B. Summary of BSM Report for CY 15 Examined Facilities

Overall, we found that the results of the NYISO's BSM determinations were consistent with the requirements of the Tariff. This report discusses key results and assumptions in the BSM exemption tests for the six CY15 Examined Facilities. For each assumption, the report discusses how the outcome of the test was affected by the assumption, whether the assumption was in accordance with the MST, and whether the assumption was reasonable and consistent with the purposes of the BSM measures. In discussing the reasonableness of the particular assumptions, we identify potential concerns that may justify future enhancements to the NYISO's procedures and BSM rules. A list of assumptions that may be improved for future BSM exemption tests is provided in Section I of this report.

The following sections review key elements of the NYISO's BSM evaluations:

- Section III discusses the NYISO's review of the CHPE Project for the Competitive Entry Exemption
- Section IV discusses the Part A test in which the NYISO compares the forecasted ICAP price in the first year of the Mitigation Study Period ("MSP") to the Default Net CONE.
- Section V discusses the results of the Part B test in which the NYISO compares the forecasted ICAP price during the three-year MSP to the project's Unit Net CONE. Key inputs to the Part B test are discussed in Sections VI and VII.
- Section VI evaluates the NYISO's estimates of the Cost of New Entry ("CONE") for each Examined Facility, which is used to calculate its Unit Net CONE.
- Section VII evaluates the estimated net revenues for each project from the NYISO's Energy and Ancillary Services markets. The estimated net revenues are also used to calculate the project's Unit Net CONE.
- Section VIII discusses assumptions that affect both the Part A and Part B tests.
- Section IX summarizes our overall conclusions and discusses issues that could be addressed in future BSM evaluations.

III. EVALUATION OF EXAMINED FACILITIES FOR COMPETITIVE ENTRY EXEMPTION

In response to a Commission Order, the NYISO developed tariff provisions that grant a Competitive Entry Exemption to Examined Facilities that would otherwise be subject to the Part A and Part B tests in order to be exempt from an Offer Floor.[12] The CEE was designed to exempt unsubsidized merchant projects from buyer-side mitigation because the developers of such projects should have competitive incentives to enter based on their own expectations of market conditions. MST §23.4.5.7.9 specifies the requirements that a project developer needs to fulfill in order to establish that the project is not supported by subsidies (either direct or indirect) through contracts with non-qualifying entities.

In CY15, the CHPE Project was the only Examined Facility that requested a CEE.[13] The project developer executed an initial Certification and Acknowledgement form at the time of its request and again as it recertified at different points during the evaluation. The developer also submitted a number of planned or existing contracts with non-qualifying entities along with other documentation and information necessary to calculate a Unit Net CONE ("UNC") for the project. The CHPE Project developer's submission to the NYISO included non-disclosure agreements, interconnection studies, environmental compatibility studies, and feasibility reports, among other documents. The NYISO reviewed the submitted documents and provided a determination for the CHPE Project during the first and second rounds of the CY15 BSM evaluation. However, the developer failed to post the required Security, and consequently, the CHPE Project was removed from the final round of the CY15 BSM evaluation.[14]

---

12 *See Consolidated Edison Co. of New York Inc., v, New York Indep. Sys. Operator, Inc., 150 FERC ¶ 61,139 (2015); see also, Consolidated Edison Company of New York, Inc., et al. v. New York Independent System Operator, Inc., 152* FERC ¶ 61,110 (2015).

13 The NYISO confidentially provided a BSM determination for the CHPE Project as part of its CY12 evaluation. However, the project developer rejected its PCA, dropped out of CY12 and entered CY15.

14 See *Notice of Class Year 2015 Second Round Security Posting Default – Initiation of Third Round* at www.nyiso.com/public/markets_operations/services/planning/documents/index.jsp?docs=interconnection-studies/other-interconnection-documents.

IV. PART A TEST RESULTS

The Part A test compares a forecast of capacity prices for the first year of the MSP to the Default Net CONE, which is 75 percent of Mitigation Net CONE.[15] The purpose of the Part A test is to ensure that a resource is not mitigated when its capacity will be needed to satisfy the capacity requirement for a particular Locality.

In the CY15 BSM evaluation, the NYISO conducted the Part A test for five Additional CRIS MW projects. The NYISO tested these five projects sequentially according to their presumptive Offer Floors from lowest to highest. A unit is exempt in the Part A test if the price forecast for the first year of the MSP is higher than the Default Net CONE. If a project receives an exemption, it is included in the test for the subsequent project. If a project does not receive an exemption, then it is excluded from the ICAP forecast for the subsequent project in the sequence.[16]

In the final round, the forecasted UCAP prices for the first year of the MSP were lower than the Default Net CONE of $131/kW-year UCAP for Zone J and higher than the $89/kW-year UCAP for the G-J Locality.[17] While none of the Zone J CY15 Projects were exempt under the Part A test, the Additional CRIS MW of Bowline 2 Unit in the G-J Locality were determined to be exempt under the Part A test of the final round of the CY15 BSM evaluation.

We find that the Part A test in all three rounds was performed using reasonable assumptions that were in accordance with the NYISO MST. Sub-section IV.A evaluates the assumptions used to forecast capacity prices and to compare the capacity prices with the Default Net CONE.

---

15 See *BSM Numerical Example*, Section 2.

16 This sequential test procedure is a significant enhancement over the procedure that was used in CY12. Our concerns with the previous procedure were discussed in sub-section VII.G of our CY12 BSM report and in sub-section VIII.F.1 of this report.

17 The Part A ICAP price forecast for the Zone J and G-J Locality was not sensitive to the presence of the Caithness II Project. This is because the forecasted capacity margin in the G-J Locality was sufficiently large for the prices in the G-J Locality to be higher than the forecasted NYCA prices regardless of whether the Caithness II Project was assumed to be in service during the MSP. Hence, the forecasted capacity prices were identical across the first two rounds of the CY15 BSM evaluation.

A. Implications of Factors Identified in Section VIII

This sub-section discusses how key factors identified in Section VIII affected the outcome of the Part A test. The conclusion of this section describes how these factors in combination likely affected the overall results of the test.

1. Starting Capability Period of Summer 2018

In accordance with the Tariff, the CY15 Projects were assumed to enter in Summer 2018.[18] However, it is unrealistic to assume that the Additional CRIS MW projects in CY15, which have very short lead times, would begin to operate at the same time as the CHPE Project, which would require a much longer development period. Assuming that all CY15 Projects would enter in May 2018 could depress the price forecast and cause an Additional CRIS MW project to be determined not exempt under the Part A test, if the forecast includes the capacity of the CHPE Project. However, since the CHPE Project was removed from CY15 in the final round of BSM evaluation, using a more realistic Starting Capability Period would not have altered the outcome of the Part A test.

2. Capacity Assumed to be In-service During the Mitigation Study Period

The NYISO forecasted capacity prices using the following assumptions as required by the Tariff:[19]

- 104 MW (ICAP Summer) from units that are in a Mothball Outage or an ICAP Ineligible Forced Outage ("IIFO") would be offered as price-takers in New York City even though such capacity would not likely to return to service under the conditions modeled in the Part A test forecast;
- All the existing capacity in New York City and G-J Locality is assumed to be in-service, even though some of the capacity would likely retire or mothball under the conditions modeled in the Part A test forecast.[20]

---

18 The assumption regarding the Starting Capability Period is discussed in further detail in subsection VIII.A.

19 These assumptions are discussed in further detail in Sub-section VII.B.

20 See Analysis Group's report on *NYISO Capacity Market – Evaluation of Options* (January 2015) pp 40-41 for estimates for average revenues and costs of various types of units in New York.

Excluding all of the capacity in a Mothball Outage or IIFO would raise the capacity price forecast for Zone J and the G-J Locality by up to $16/kW-year UCAP and $8/kW-year UCAP, respectively in the final round of the CY15 BSM evaluation.[21] In addition, excluding some existing capacity would tend to increase the Part A capacity price forecast. However, we find that excluding these two categories of capacity would not have changed the outcome of the Part A test. Nonetheless, it is still important to modify the Tariff to implement more reasonable assumptions for mothballed, IIFO, and in-service capacity in future BSM evaluations.

3. Estimating Locational Capacity Requirements for the Mitigation Study Period

The 2017/18 Capability Year Locational Minimum Installed Capacity Requirements ("LCRs") for Zone J and G-J Locality are 81.5 percent and 91.5 percent respectively.[22] However, for each round of the BSM determinations the NYISO adjusted the LCRs for Zone J and the G-J Locality to account for the entry of the CPV Valley Project prior to the MSP. The NYISO assumed the LCR for Zone J to be 80.5 percent and 95.5 percent for the G-J Locality the final round of the BSM evaluation, which occurred after the 2017/2018 LCRs became final. A one percent point increase in LCR could increase the Part A price forecast by $13/kW-year in G-J Locality and $8/kW-year in New York City. Consequently, this adjustment had a significant impact on the Part A price forecast (particularly for the G-J Locality) in the CY15 BSM evaluations. While reversing the NYISO's LCR adjustment would have changed the Part A test determination for Bowline 2's Additional CRIS MW, it would not have changed the outcome of the Part A test for the CY15 Zone J Examined Facilities.

B. CONCLUSIONS

The forecasted capacity prices in the Part A test of the final round were lower than the DNC in Zone J and higher than the DNC in the G-J Locality. Hence, while the Zone J CY15 Examined

---

21 However, this increase would be offset partly by higher forecasted sales from UDR projects and/or resources subject to an Offer Floor.

22 See Section 2.2 of the BSM CY15 ICAP Forecast Assumptions (January 31, 2017), available at http://www.nyiso.com/public/markets_operations/services/market_monitoring/index.jsp.

Facilities did not receive a Part A exemption, Bowline 2's Additional CRIS MW in the G-J Locality received one in the final round. We find that the test was performed in accordance with the NYISO MST.

The purpose of the Part A test is to ensure that a project is not mitigated when its capacity will be needed to satisfy the capacity requirement for a particular Locality. The adjustment the NYISO made to the G-J Locality LCR to account for the entry of the CPV Valley Project prior to the MSP had a significant impact on the Part A test determination for Bowline 2's Additional CRIS MW. Zone J is expected to have surplus capacity during the MSP, so the overall results were consistent with the purpose of the Part A test. However, if the assumptions regarding the Mothballed and IIFO units and existing capacity at risk of leaving the market were modified to be more realistic, it would tend to increase the capacity price forecast. Although this would not have altered the ultimate outcome of the Part A test, we recommend the NYISO modify the Tariff to allow more reasonable assumptions regarding in-service capacity in future BSM evaluations.

In the CY15 BSM evaluation, the NYISO changed its test procedure for the Part A test whereby it tested units sequentially from lowest to highest in the order of their presumptive Offer Floors. We believe this change enhances the evaluation and ensures that the Part A test is conducted in accordance with the Tariff. However, we note that the Part A test results would have remained unchanged had the NYISO performed their evaluation without this enhancement. Hence, we support continuing the use of the modified test procedure in future BSM evaluations.

V. PART B TEST RESULTS

An exemption is granted in the Part B test if the average capacity price forecast over the three-year MSP is higher than the Unit Net CONE of the Examined Facility.[23] The Unit Net CONE is equal to the annualized levelized CONE of the project minus the net revenue earned from selling Energy and Ancillary Services.[24] The purpose of the Part B test is to ensure that a project is not mitigated when it would be economic for the project to move forward.

In the CY15 BSM evaluation, the NYISO conducted the Part B test for five Additional CRIS MW projects. The NYISO ordered these five projects and the CHPE Project according to their presumptive Offer Floors from lowest to highest and tested them sequentially. If a project received an exemption, it was included in the test for the subsequent project. If a project did not receive an exemption, then it was excluded from the ICAP forecast for the subsequent project in the sequence.[25]

For all five Additional CRIS MW projects, the Unit Net CONE of the project was lower than the corresponding capacity price forecast in the final round of the CY15 BSM evaluation.[26] Therefore, all five projects received an exemption under the Part B test.

We find that the Part B test in all three rounds was performed using reasonable assumptions that were in accordance with the NYISO MST. Sub-section V.A evaluates the assumptions used to

---

23 See *BSM Numerical Example*, Section 3.

24 The assumptions for the estimated annual levelized CONE calculations for the Examined Facilities are evaluated in Section V, while the reasonably anticipated net revenue assumptions are evaluated in Section VII. Other relevant forecasting assumptions are discussed in Section VII.

25 This sequential test procedure is a significant enhancement over the procedure that was used in CY12. Our concerns with the previous procedure were discussed in sub-section VII.G of our CY12 BSM report and in sub-section VIII.F.1 of this report. Section VIII.F.2 discusses the modified procedure and how it addressed the shortcomings of the previous procedure. This procedural change did not alter the outcome of the CY15 Part B test.

26 The Part B ICAP price forecast for the Zone J and G-J Locality was not sensitive to the presence of the Caithness II Project. This is because the forecasted capacity margin in the G-J Locality was sufficiently large for the prices in the G-J Locality to be higher than the forecasted NYCA prices regardless of whether the Caithness II Project was assumed to be in service during the MSP. Hence, the forecasted capacity prices were identical across the first two rounds of the CY15 BSM evaluation.

forecast capacity prices and to perform the BSM evaluation for each Examined Facility in the final round of the Class Year PCA process.

A. Implications of Factors Identified in Sections VI, VII and VIII

This sub-section discusses how several key factors identified in other sections of this report affected the outcome of the Part B test in the final round of the Class Year PCA process. Sections VI, VII, and VIII discuss in detail other assumptions that were used in the Part B test.

1. Starting Capability Period of Summer 2018

In accordance with the Tariff, the CY15 Projects were assumed to enter in Summer 2018.[27] However, it is unrealistic to assume that the Additional CRIS MW projects, which have very short lead times, would begin to operate at the same time as the CHPE Project, which would require a much longer development period. Assuming that all CY15 Projects would enter in May 2018 would tend to depress the price forecast for projects with short lead times and, thus, could lead an economic Additional CRIS MW project to be determined not exempt under the Part B test. Ultimately, all the Additional CRIS MW projects received an exemption under the Part B test and the CHPE Project was removed from the third round of the BSM evaluation, so this issue did not alter the outcome of the Part B test.

2. Capacity Assumed to Be In-service during the Mitigation Study Period

The NYISO forecasted capacity prices using the following assumptions as required by the Tariff:[28]

- 104 MW (ICAP Summer) of from units that are in a Mothball Outage or IIFO would be offered as price-takers in New York City even though such capacity would not likely return to service under the conditions modeled in the Part B test forecast;

---

27 The assumption regarding the Starting Capability Period is discussed in further detail in subsection VIII.A.

28 These assumptions are discussed in further detail in Sub-section VII.B.

- All the existing capacity in New York City and G-J Locality is assumed to be in-service, even though some of the capacity would likely retire or mothball under the conditions modeled in the Part B test forecast.[29]

Excluding all of the capacity in a Mothball Outage or IIFO would raise the capacity price forecast for Zone J and the G-J Locality by up to $17/kW-year UCAP and $8/kW-year UCAP respectively in the final round of the CY15 BSM evaluation.[30] In addition, excluding some existing capacity that would likely retire or mothball would also increase the Part B capacity price forecasts. However, excluding capacity in these two categories would not have changed the outcome of the Part B tests, since all five projects were determined to be exempt even with this capacity was included. Nonetheless, it is still important to modify the Tariff to implement more reasonable assumptions for mothballed, IIFO, and in-service capacity in future BSM evaluations.

3. Estimating Locational Capacity Requirements for the Mitigation Study Period

The 2018/17 Capability Year LCRs for Zone J and G-J Locality are 81.5 percent and 91.5 percent respectively.[31] However, to account for the entry of the CPV Valley Project prior to the MSP, the NYISO assumed the LCR for Zone J would fall to 80.5 percent and the LCR for the G-J Locality would rise to 95.5 percent.[32] A one percent point increase in LCR could increase the Part B price forecast by $13/kW-yr in G-J Locality and $18/kW-yr in New York City. Consequently, this adjustment had a significant impact on the Part B price forecasts (particularly for the G-J Locality). We support the NYISO's adjustments to the LCRs for purposes of the BSM test, since it is important to consider the effects of new entry on the capacity price forecast. Nonetheless, reversing the NYISO's LCR adjustment would not change the outcome of the Part

29 See Analysis Group's report on *NYISO Capacity Market – Evaluation of Options* (May 2015) pp 43-44 for estimates for average revenues and costs of various types of units in New York.

30 However, this increase would be offset partly by higher forecasted sales from UDR projects and/or resources subject to an Offer Floor.

31 See Section 2.2 of the BSM CY15 ICAP Forecast Assumptions (January 31, 2017), available at http://www.nyiso.com/public/markets_operations/services/market_monitoring/index.jsp.

32 These assumptions are discussed in further detail in Sub-section VIII.D.

B test for the CY15 Projects.

4. Estimating the Unit Net CONE for Additional CRIS MW Projects

The existing capacity at the facilities requesting Additional CRIS MW in CY15 is exempt from Offer Floor because all of the facilities were in-service when the BSM measures were originally implemented in their respective locality.[33] Therefore, in accordance with MST §23.4.5.7.6.1, the NYISO based its UNC estimates on the incremental costs and revenues associated with the Additional CRIS MW.

As a general matter, Additional CRIS MW projects involve uprates to existing facilities and do not incur many of the costs of developing a new generator. Consequently, the CONE for such projects is often well below the CONE of a new facility. Furthermore, some of the Additional CRIS MW projects in CY15 resulted from capital investments that are expected to improve the operating efficiency of the existing capacity at the facility in addition to increasing its total generating capacity. As a result, the net revenues from such projects included significant contributions from fuel cost savings of the existing capacity.[34] Accordingly, the UNCs for several Additional CRIS MW projects were significantly lower than that of a new generator, enabling some of these projects to be determined to be exempt under the part B test by a significant margin.

5. Amortization Period for Additional CRIS MW Projects

The assumed amortization period affects the levelized CONE of a project in a significant manner. For instance, the CONE of the Demand Curve unit in Zone J would increase by $122 per kW-year (or 63 percent) if the assumed economic life was reduced from 20 years to seven years.[35] For CY15 Additional CRIS MW projects, the assumed economic life ranged from seven

---

33 See Section 23.4.5.7.5 of the Services Tariff.

34 These assumptions are discussed in further detail in Sub-section VII.C.

35 The increase in CONE of the unit used to establish the Demand Curves (in 2016$) is estimated using updated cost of capital parameters developed as part of the latest ICAP Demand Curve reset study (see Section VI.B.1).

to 30 years, depending on the nature of the upgrade and the existing facility.[36]

B. CONCLUSIONS

The UNCs of all five Additional CRIS MW projects were lower than the average capacity price forecast over the three-year MSP in the final round of the CY15 BSM evaluation. Hence, all five of the CY15 Projects evaluated under the Part B test were determined to be exempt from the Offer Floor. The low CONEs associated with the Additional CRIS MW and, in some instances, high net revenues from the uprates were the primary drivers of the final outcome of the Part B test (as discussed in sub-section V.A.4). We find that the NYISO appropriately calculated the incremental costs and revenues associated with the Additional CRIS MW in its calculation of the UNCs. Overall, we find that the Part B tests were performed using reasonable assumptions in accordance with the NYISO MST.

We identify two issues (in sub-sections V.A.1 and V.A.2) with the Tariff related to the assumed Starting Capability Period and the status some types of existing capacity that, if addressed, would improve the accuracy of the capacity price forecast. Although we find that the two issues did not affect the final determinations for the Additional CRIS MW projects, they affect the forecasted capacity prices and could, therefore, adversely affect the Part B tests in future BSM evaluations. Therefore, we recommend the NYISO modify the MST to allow more reasonable assumptions regarding the status some types of existing capacity and the Starting Capability Period in future BSM evaluations.

In the CY15 BSM evaluation, the NYISO enhanced its test procedure for the Part B test by testing units sequentially from lowest to highest in the order of their presumptive Offer Floors and treating them as price takers (i.e., offering capacity at $0 in the spot market). The NYISO made comparable enhancements to the Part A test procedure. This change is a significant

[36] These assumptions are discussed in further detail in Sub-section V.A.4.

improvement that addresses our concerns with the previous test procedure.[37] Hence, we support continuing the use of the modified test procedure in future BSM evaluations.

[37] Our concerns with the previous procedure were discussed in sub-section VII.G of our CY12 BSM report and in sub-section VIII.F.1 of this report.

VI. PART B TEST INPUT – COST OF NEW ENTRY

The BSM exemption test requires the NYISO to estimate the annual levelized CONE of an Examined Facility for use as an input to the Part B test. The developers of the CY15 Projects provided cost information which was evaluated by the NYISO with the assistance of Sargent & Lundy. In some cases, the NYISO substituted cost estimates that were developed by its staff or by Sargent & Lundy. The NYISO used its expert judgment about how to reflect costs in the estimated CONE of the Examined Facilities. This section evaluates key assumptions used in the CONE estimates.

A. ASSUMPTIONS AFFECTING CONE OF MULTIPLE CY15 PROJECTS

This section discusses the general principles and methods used to estimate components of CONE for all the CY15 Projects.

1. CONE of Additional CRIS MW Projects

MST §23.4.5.7.6.1 indicates that the net CONE for Additional CRIS MW projects will be based on the revenues and costs associated with the requested increase in CRIS MW when the Examined Facilities meet certain criteria. This provision was applicable to all of the Additional CRIS MW requests in CY15, since they were all for generators that were exempt from Offer Floor mitigation because they had already been in service at the time of the original implementation of buyer-side mitigation rules.[38]

The incremental cost of an Additional CRIS MW project is equal to (a) the investment cost minus (b) any avoided cost the developer would have incurred if the uprate were not undertaken but maintenance was required instead.[39] In the CY15 BSM evaluation of Additional CRIS MW

---

38 See Section 23.4.5.7.5 of the Services Tariff.

39 For example, suppose the owners of a 200 MW combustion turbine unit replace existing turbine blades with newer blades and as a result, secure an additional output of 10 MW from the unit. Further, suppose annual fixed maintenance costs of the unit would be $5 million (i.e. $25 per kW-year) without the upgrade and $4.62 million (i.e. $22 per kW-year) with the upgrade. If the investment cost of the upgrade and the carrying charge for the investment were $4 million (i.e. $400 per kW) and 20% respectively, the CONE of such an Additional CRIS MW project would be calculated as $400 x 20% + $22 - $25 = $77 per kW-year.

projects, if the avoided cost information was not available or complete, the NYISO used the full increase in cost associated with the new components in its estimate of CONE. If such information was available and considered, the resulting incremental costs would have produced an even lower estimate of CONE than the NYISO's estimate. Thus, this information would not have altered the outcome of the evaluation of the Additional CRIS MW projects, all of which received an exemption under the Part B test.

2. Cost of Capital

The NYISO used the cost of capital estimates submitted by the CY15 Projects' developers when they were well substantiated. If a submitted estimate was unsubstantiated, the NYISO estimated the project-specific weighted average cost of capital ("WACC") after considering:

- Publicly available information including regulatory filings, company financial statements and outstanding bond issues;
- The Capital Asset Pricing Model ("CAPM"), which was calibrated in a manner consistent with the 2016 Demand Curve reset study report; and
- Adjustments to the WACC given the shorter economic life and lower risk profile of most Additional CRIS MW projects when compared to a newly constructed project.

To the extent that firm-specific or project-specific information was unavailable or unsuitable for the WACC calculation for a particular Examined Facility, the NYISO used values developed in relation to the latest Demand Curve reset study report.[40] We find the cost of capital parameters used by the NYISO in the CY15 BSM evaluations to be reasonable.

---

40 The cost of capital estimates developed as part of the latest ICAP Demand Curve reset study that was filed on November 18, 2016 can be found at http://www.nyiso.com/public/webdocs/markets_operations/market_data/icap/Reference_Documents/2017-2021_Demand_Curve_Reset/Analysis%20Group%20NYISO%20DCR%20Final%20Report%20-%209_13_2016%20-%20Clean.pdf.

The cost of capital parameters estimated as part of the latest ICAP Demand Curve reset study represent the most current estimate of the returns expected by merchant generators in the NYISO markets. For CY15 Projects for which cost of capital information was unavailable or unsuitable, the NYISO's review did not suggest anything distinctive about these projects' risk profile, which could justify the developers demanding a substantially different return than what the market requires. Therefore, although the individual cost of equity or cost of debt parameters are likely to vary, the overall WACC of these Examined Facilities is likely to tend towards the expected returns of a merchant generator.

3. Amortization Period

The estimated CONE of each CY15 Project was amortized over the project's economic life, which is the period over which an owner seeks to recover the project costs along with a return on investment. The assumed economic life affects the levelized CONE estimate in a significant manner. For instance, the CONE of the Demand Curve unit in Zone J would increase by $122 per kW-year (or 63 percent) if the assumed useful life was decreased from 20 years to seven years.[41]

In CY15, Additional CRIS MW projects involved replacement of older components with newer, more efficient components or repairs/additions of components that allow the generator to produce more output. A blanket assumption for economic life across all projects is not appropriate given the variation in investments that result in Additional CRIS MW. The NYISO developed economic life assumptions for Additional CRIS MW projects as summarized below:[42]

- In situations where the physical life of the recently installed components is less than the remaining economic life of the generating facility, the NYISO used the physical life of the new equipment.[43] For some Additional CRIS MW projects, the recently installed components will need to be replaced periodically to maintain the increased capacity. The interval between such maintenance is likely to be less than the remaining economic life of the plant(s). Therefore, the NYISO assumed the economic life of such projects to be the estimated time between the relevant maintenance outages.
- If the recently installed components are likely to be physically operable at the end of the economic life of the generating facility, the NYISO amortized the investment over the remaining economic life of the generation facility. In its CY15 BSM evaluations, the NYISO evaluated the submitted values for remaining economic life considering future market conditions (in electricity and/or steam markets) and generator specific criteria, including, for example, the time since any major repairs.

We find the NYISO's approach for estimating the economic life of CY15 Additional CRIS MW

41 The increase in CONE of the Demand Curve unit (in 2016$) is estimated using updated cost of capital parameters developed as part of the latest ICAP Demand Curve reset study (see Section VI.B.1).

42 It is possible for the economic life of the newly installed equipment to be shorter than its physical life. In such situations, the appropriate amortization period for the Additional CRIS MW projects is the economic life of the new equipment.

43 Economic life of a piece of equipment can be different from its physical life for several reasons.

projects to be reasonable.

4. Interconnection Costs

Consistent with Commission directives in previous BSM evaluations, the NYISO used the PCAs for System Upgrade Facilities ("SUFs") and System Deliverability Upgrades ("SDUs") and the headroom payments from the CY15 Facilities Studies Reports to estimate the interconnection costs of the Examined Facilities.[44] For the first and second rounds of the PCA process, the PCAs and headroom payments were as high as $155/kW.[45]

The NYISO is responsible for developing the PCAs, so cost estimates were developed for each Examined Facility by the NYISO with input from the Connecting or Affected Transmission Owners ("TO") and the developer.

A developer must post financial security for the amount equal to its PCA in order to remain in the Class Year. If the actual cost of constructing the SUFs and/or SDUs is lower than the amount of Security, the developer is only responsible for the actual cost incurred.[46] The purpose of the PCA is to ensure that the developer is financially responsible for any interconnection costs, while the purpose of the BSM evaluation process is to estimate the expected cost of new entry of an Examined Facility. So, the differing purposes of the processes may justify the use of two estimates.

Although this issue neither impacted the CY15 BSM determinations in a significant manner, nor did it change the outcomes, it could nevertheless impact the NYISO's future BSM evaluations. Therefore, we recommend that the NYISO consider whether to modify its tariff to allow the BSM evaluation to develop interconnection cost estimates.

---

44 See MST §23.4.5.7.3.3.

45 "Class Year 2015 Facilities Studies System Upgrade Facilities (SUF)." NYISO. December 1, 2016.

46 See OATT §25.8.6.2.

5. Interest During Construction

The NYISO estimated the Interest During Construction ("IDC") as appropriate for CY15 Projects using the adjusted pre-tax WACC that was derived based on the principles outlined in Part 1 of this sub-section. The adjusted discount rate is applied to the project-specific construction draw schedule to determine the IDC component of the CONE. Some of the CY15 Projects require significantly less build time compared to new generation projects. Hence, the IDC calculation was not necessary for all Examined Facilities.

B. CONE OF THE CHAMPLAIN HUDSON POWER EXPRESS PROJECT

The NYISO estimated the levelized CONE for the CHPE Project for use in the Part A and Part B tests of the CY15 Additional CRIS MW projects. The NYISO estimated the project's CONE using methodologies developed during the CY12 BSM evaluation, although the NYISO considered additional and updated information that was submitted by the project developer in the CY15 process.[47]

C. CONCLUSIONS – COST OF NEW ENTRY

We reviewed detailed information on the NYISO's estimates of the annual levelized CONE values for the CY15 Examined Facilities. We find that the NYISO's estimates were reasonable and made in accordance with the Tariff.

---

47 See the MMU report "Assessment of the Buyer-Side Mitigation Exemption Tests for the Class Year 2012 Projects" available at: http://www.nyiso.com/public/webdocs/markets_operations/services/market_monitoring/ICAP_Market_Mitigation/Buyer_Side_Mitigation/Class%20Year%202012/MMU%20Report%20on%20CY%202012%20BSM%20Tests.pdf

VII. PART B TEST INPUT – NET REVENUE

The forecasted net energy and ancillary services revenue is a key component of the Part B test, since a project developer expects to recoup a large share of its investment from future energy and ancillary services revenues.[48] Estimating the net revenue of a generator is a complex endeavor, requiring the use of models to estimate future LBMPs at which the facility would sell its output and forecast when the Examined Facility will be scheduled. Likewise, estimating the net revenue of a new UDR project is also a complex endeavor, requiring additional models to estimate the UDR rights holder's future cost of procuring electricity and forecast how the line will be operated based on the estimated price spread across its termini.[49]

We reviewed the assumptions used by the NYISO to estimate the net revenues for the CY15 Examined Facilities to determine whether they were reasonable and consistent with the Tariff. We find that the NYISO used assumptions that were reasonable and tariff compliant.

This section is divided into the following sub-sections:

- Implications of key assumptions described in Section VIII
- Estimating net revenues for Additional CRIS MW projects
- LBMP estimation model – This component of the net revenue model forecasts market clearing prices where the Examined Facility would sell electricity.
- Scheduling models – These forecast how the Examined Facility will be scheduled based on the forecasted LBMPs, the operating costs of the Examined Facility, and other factors.

The conclusion discusses the overall results of the net revenue evaluation.

---

48 Net revenues are an input to the Unit Net CONE, which is directly used in the Part B test. See *BSM Numerical Example*, Section 3.1.

49 Although the developer of the CHPE Project requested a CEE for the project in CY15, the tariff requires the NYISO to calculate a Unit Net CONE for each Examined Facility, so the NYISO estimated net revenues for the CHPE Project. The CHPE Project was evaluated in CY12 for an exemption under the Part B test until it withdrew from that Class Year. So the NYISO's net revenue model for UDR project like the CHPE Project was discussed in our CY12 BSM evaluation report. In its net revenue estimates for the CHPE Project in CY15, the NYISO updated information for the following inputs: peak load and energy consumption forecasts, forecasted capacity additions, forecasted LBMPs at locations where exports from HQ sink in or imports to HQ source from, transmission service charges, and the USD/ CAD exchange rate.

A. Implications of Assumptions Discussed in Section VIII

This sub-section discusses how factors identified in Section VIII affected the Net Revenue estimates for CY15.

1. Starting Capability Period of Summer 2018

Under the current Tariff, all CY15 Examined Facilities are assumed to begin operating in Summer 2018. This assumption can be important because the inclusion of a large resource like the CHPE Project in the LBMP forecast tends to reduce forecasted net revenues for other Examined Facilities. However, it is unrealistic to assume that the Additional CRIS MW projects in CY15, which have very short lead times, would begin to operate at the same time as the CHPE Project, which requires a much longer development period. If the Starting Capability Period was aligned more closely with the expected CODs of the Examined Facilities, the forecasted net revenues for the Additional CRIS MW projects would tend to be higher.

Ultimately, all of the Additional CRIS MW projects passed the Part B test and the CHPE Project was removed from CY15 prior to the final round, so modifying the Starting Capability Period would not have affected the outcome of their MET in CY15, but this issue could adversely affect the outcome of a future evaluation.

2. Capacity Assumed to be In-service During the Mitigation Study Period

The NYISO forecasted LBMPs using the following assumptions as required by the Tariff:[50]

- 104 MW (ICAP Summer) from units that are in a Mothballed Outage or IIFO would be offered as price-takers in New York City even though this capacity would not likely to return to service under the conditions forecasted in the MET;
- All the existing capacity in New York City and G-J Locality is assumed to be in-service, even though some of the capacity would likely retire or mothball under the conditions forecasted in the MET.[51]

---

51 See Analysis Group's report on *NYISO Capacity Market – Evaluation of Options* (January 2015) pp 40-41

Using more realistic assumptions would tend to raise net revenues by a relatively small amount, since units in the two categories above are likely to have low capacity factors and a correspondingly low impact on forecasted LBMPs. Hence, the outcome of the Part B test for the CY15 Additional CRIS MW projects would not have been affected by the use of more realistic assumptions.

B. Estimating Net Revenues for Additional CRIS MW Projects

As in the previous BSM evaluations, the NYISO's approach for estimating net revenues for the CY15 Examined Facilities over the MSP is based on the methodology used to derive the currently effective Demand Curves.[52] We describe some of the modifications the NYISO made for the purpose of the current BSM evaluation in this and following sub-sections.

As discussed in subsection VI.A.1, the NYISO is required to calculate the UNC for the Additional CRIS MW projects in CY15 based on the incremental costs and revenues that result from the increase in capacity. Hence, the operating characteristics of the existing facility and the nature of the proposed uprate have a significant impact on the net revenues for Additional CRIS MW projects.

In CY15, the increased capacity of the Examined Facilities generally resulted from upgrading existing components with newer and more efficient components, from repairing broken equipment, or from installing additional equipment at the existing facility. Therefore, the incremental net revenues earned by a CY15 Additional CRIS MW project entailed: (a) a reduction in the fuel costs for existing capacity due to efficiency improvements, and/or (b) an increase in energy and ancillary service revenue from the additional capacity.

For Additional CRIS MW projects that involved efficiency improvements, the upgrades

for estimates for average revenues and costs of various types of units in New York.

52 The NYISO's methodology for calculating net revenues in the previous Demand Curve reset study relied on an econometric model, a GE-MAPS model and a dispatch model. See NERA report on *Independent Study to Establish Parameters of the ICAP Demand Curve for the New York Independent System Operator* (August 2013) pp 60-81.

generally resulted in greater efficiency at most operating points on the heat rate curve of the facility. So, the upgrades decreased fuel costs regardless of whether the additional capacity was producing energy. Additional CRIS MW projects that involve increases in generation efficiency, particularly ones with relatively small increases in CRIS MW, can have large net revenues on a $/kW-year basis. For example, suppose a 400 MW unit with a pre-uprate heat rate of 8 MMBtu/MWh installs parts that increase its output by 10 MW and reduce heat rate by 0.2 MMBtu/MWh. If the average fuel price over the MSP is $4.5 per MMbtu and the capacity factor of the unit is 65%, the fuel cost savings over the existing 400 MW would amount to $2.05 million per year. This would translate to $205 per kW-year of net revenues for the Additional CRIS MW project.[53]

For increases in CRIS MW that are not associated with efficiency improvements, the NYISO's methodology for estimating the associated incremental net revenues considered the specific characteristics of the underlying generation technology and the upgrade. Some of the upgrades resulted in increased capacity at all operating points on the heat rate curve, while others added capacity at only the highest point of the curve. The resulting incremental net revenues from such uprates were generally lower than the net revenues from efficiency-related improvements.

C. Use of Gas Futures in LBMP Estimation Model

For the purposes of the current BSM evaluation, the NYISO employed a gas price-adjustment to the econometric model that was used in the Demand Curve reset for the currently effective demand curves. The adjustment considered how differences between the gas prices that prevailed from May 2012 to April 2015 ("the Historic Period") and the gas prices expected by the futures market would affect the net revenues of each project. Similar adjustments were made

[53] Although the capacity factor of the unit is likely to increase after the uprate, we assume that it remains the for the purpose of this example. The fuel savings on the existing 400 MW can be calculated in the following manner.

Fuel cost savings per year = Annual fuel cost before uprate – Annual fuel cost after uprate

= 400 MW x 65% x 8760 hours x 4.5 $/MMBtu x (8 MMBtu/MWh - 7.8 MMBtu/MWh) per year

= $2.05 million per year

in the Part B tests for projects in previous Class Years. The currently effective Demand Curve model used historic gas prices for the Iroquois Zone 2, Transco Zone 6 (NY), and other trading hubs to estimate the relationship of Zonal LBMPs to natural gas prices. Specifically, forecasted LBMPs for projects in Zone J were based on forward gas prices at Transco Zone 6 (NY), while the LBMPs for projects in G-J Locality were based on Iroquois Zone 2. We support the use of this adjustment.

D. SCHEDULING MODELS

This section discusses the key assumptions the NYISO used in the scheduling models for the combined cycle, steam turbine, and cogeneration plants in its CY15 BSM evaluation.[54]

1. Cogeneration Plants

The Linden cogeneration and East River 1 and 2 units in Zone J are cogeneration plants, so the operating characteristics of these facilities are substantially different from the peaking plant used to establish the currently-effective Demand Curves. Cogeneration plants generally offer into the energy market in accordance with steam offtake contracts, so they are less responsive to energy prices in the short term. Therefore, modeling the production of such facilities based on the model used to project the energy and ancillary services revenues for the Demand Curve unit would be inconsistent with actual operations of cogeneration plants.

In the CY15 BSM evaluations, the NYISO assumed that the commitment of cogeneration plants during the MSP would be similar to the observed energy market schedules of these units from the Historic Period. The NYISO estimated the incremental revenues associated with the Additional CRIS MW from the cogeneration facilities by calculating the difference between two scenarios. The first scenario utilized the heat rate curves of these facilities prior to the uprates to forecast the net revenues. In the second scenario, the NYISO used the improved heat rate curve to forecast net revenues over the MSP. In both the scenarios, the NYISO assumed that the unit

[54] The NYISO's net revenue model for UDR projects like the CHPE Project was discussed in CY12 BSM evaluation report. See Section VI, pp 35-41.

would produce energy at the same operating point as determined by its schedule during the Historic Period. In addition, to the extent that the uprate enabled more output at a higher heat rate, the NYISO's scheduling model evaluated whether it would be profitable to generate such additional MW given the spread between projected LBMPs and gas prices.

2. Combined Cycle and Steam Turbine Technologies

The Demand Curve units in New York City and the G-J Locality are simple cycle combustion turbines while the Astoria East Generating Station is a combined cycle and the Bowline 2 Project is a steam turbine facility. The NYISO adapted the scheduling model it used for its Demand Curve peaking plants to account for the differences in the generation technologies of the Demand Curve unit and these two CY15 Examined Facilities. As with the previous BSM evaluations of combined cycle facilities, we support the NYISO's use of scheduling models that are better suited for the CY15 Examined Facilities.[55]

The NYISO estimated the incremental net revenues associated with the Additional CRIS MW projects by considering the difference between Examined Facility net revenues before and after the uprate. As with the scheduling model for the cogeneration plants, the NYISO considered the nature of the uprate and modified the heat rate curve accordingly when forecasting the net revenues for the Examined Facility after the uprate is in place. The commitment model used in this context is similar to the model the NYISO utilized for its BSM evaluations for the Berrians I and III (CY11 and CY12), Cricket Valley Energy Center (CY12), and CPV Valley (CY11) Projects.

Overall, we find the NYISO's approach to estimating the net revenues associated with Additional CRIS MW to be reasonable.

[55] See MMU CY11 Berrians Project Report at pp 21-22, 26-27, MMU CY11 CPV Project Report at pp 24-25, 27-28 and MMU CY12 Projects Report at pp 35-36.

E. CONCLUSIONS – NET REVENUES

We reviewed detailed information on the NYISO's estimate of the reasonably anticipated net revenues of the CY15 Examined Facilities. We find that the NYISO's estimates were reasonable and in accordance with the Tariff. The net revenues are used in the calculation of the Unit Net CONE, which is used in the Part B test as described in Section IV.

VIII. ASSUMPTIONS AFFECTING THE PART A AND PART B TESTS

This section of the report discusses key assumptions that affect multiple components of the BSM evaluations for the CY15 Examined Facilities.

A. STARTING CAPABILITY PERIOD OF SUMMER 2018

The Starting Capability Period is the Capability Period in which the CY15 Examined Facilities are assumed to begin operating and offering capacity for the purposes of the BSM determinations. The Tariff requires the NYISO to assume that all Examined Facilities will be in service three years after the start of the Class Year, so the NYISO assumed that CY15 Projects will be in service beginning in May 2018.[56] The Starting Capability Period is important because the timing of entry affects the load forecast and other assumptions that are used in the ICAP price forecasts and the net CONE values that are inputs to the Part A and Part B tests.[57]

If the Starting Capability Period is not aligned with the likely commercial operation dates ("CODs") of Examined Facilities, it might disadvantage Examined Facilities with CODs that are likely to be earlier than other projects in the Class Year. For instance, Additional CRIS MW projects that involve uprates to existing facilities would typically begin operation well ahead of a new greenfield project. In this situation, assuming that the greenfield project will begin operating at the same time as the Additional CRIS MW project may result in an unrealistically low capacity price forecast if it includes the capacity of the greenfield project.[58]

---

56 See MST §23.4.5.7.2.

57 The effects of the Starting Capability Period on the Part A and Part B tests are discussed in Sub-sections IV.A.1, V.A.1, and VII.A.1.

58 Previous BSM Reports have identified other problems with the Starting Capability Period assumption. For example, if the Starting Capability Period is significantly earlier than an Examined Facility's likely COD, it can depress the ICAP price forecasts and inflate the Unit Net CONE, thereby increasing the likelihood of mitigating an economic resource. Similarly, a delayed Starting Capability Period could inflate load and ICAP price forecasts in the Part A and Part B tests, thereby increasing the likelihood of exempting an uneconomic unit. See CY12 BSM Report at page 43-44.

The three-year rule was implemented to increase transparency and the certainty of developers and market participants regarding the assumptions of BSM evaluations and to avoid gaming of the timing a project's identification of its COD. However, this approach results often in a misalignment of the Starting Capability Period with the likely CODs of Examined Facilities in two ways:

- First, the COD of an Examined Facility depends on the underlying technology and its timeline for securing the required permits. As a result, assuming that all Examined Facilities will begin operations three years from the calendar year of the Class Year is likely to be incorrect for several Examined Facilities.
- Second, the NYISO's current approach for determining the Starting Capability Period is tied to the start of the Class Year and does not account for the time required to perform CY studies.[59] Therefore, in cases where the project owner's decision to move forward with the project is contingent on the PCA and/or the determination, the Starting Capability Period is much earlier than the likely operational date.

The owners of the CY15 Projects did not learn their project's final Class Year PCA of SDUs and SUFs (generally, interconnection costs) and their BSM determinations until the fourth quarter of 2016 — less than 18 months before the Starting Capability Period. The BSM measures are intended to provide a developer with the exemption test results *before* it begins building a new facility, since a competitive supplier might not move forward with such a large investment if it was not reasonably certain to receive capacity market revenues. In order for some of the CY15 Examined Facilities to begin operating by May 2018, construction would have had to begin long before they learned their respective interconnection costs or BSM exemption test results.

Hence, we recommend the NYISO modify its Tariff provisions related to the Starting Capability Period to improve alignment with the likely CODs of the Examined Facilities. A potential alternative to the three-year rule could be to assume a COD that is based on the underlying technology of the Examined Facility.[60] Such a technology-specific start date could be deferred

[59] For instance, CY15 and CY12 Facilities Studies have taken 20 months and 15 months respectively from the time they were initialized to when the PCAs were finalized.

[60] For instance, the Energy Information Administration in its NEMS model assumes a lead time that varies from two years (for Combustion Turbine and Solar PV facilities) to four years (for Biomass, Coal and

as needed to reflect an Examined Facility's progress in meeting its permitting milestones and any delays in conducting the CY studies.[61]

B. Capacity Assumed to be In-service During the Mitigation Study Period

The BSM exemption test requires the NYISO to project capacity prices as much as six years into the future. The set of generators that is assumed to be in service is important because the more capacity that is assumed to be in service, the lower the projected capacity prices. Consequently, over-estimating the amount of in-service capacity increases the likelihood of mitigating an economic project, while under-estimating the amount of in-service capacity may lead to under-mitigation. The capacity price forecast is very sensitive to the amount of capacity that is assumed to be in service. A 100 MW adjustment in UCAP changes Zone J prices by up to $17 per kW-year UCAP in the Part A test.

The LBMP forecasts are also affected by both the quantity of in-service resources and the anticipated capacity factor of the resources. High-capacity factor resources (e.g. current or prior CY Projects) have more impact on LBMPs than low-capacity factor resources (e.g. units in a Mothball Outage). The LBMP forecasts are a key input to the energy and ancillary services net revenues, which are used to calculate Unit Net CONE.

In this sub-section, we discuss the treatment of several categories of units in the NYISO's ICAP price forecasts and LBMP forecasts for CY15 Examined Facilities. We also identify areas where the Tariff or the current procedures for determining the in-service capacity need to be modified.[62]

Offshore wind facilities) for most of the generation technologies.

61 The NYISO has proposed multiple options for revising the rules regarding the MSP at a stakeholder meeting. See presentation to NYISO ICAP Working Group, *Enhancements to the Mitigation Study Period for Buyer-Side Mitigation*, by Nathaniel Gilbraith and Scott Godfrey (October 27, 2016).

62 The NYISO has included some of the issues identified in sub-section VIII.B in the set of potential BSM enhancements it is considering as part of its stakeholder process. See presentation to NYISO ICAP Working Group, *Capacity Market Mitigation Rule Enhancements*, by Lorenzo Seirup (May 18, 2016).

1. Units in a Mothball Outage or an ICAP Ineligible Forced Outage and Units under a Retirement Notice

The treatment of existing capacity in the BSM evaluation is governed by the Tariff's definition of Expected Retirements and subsequent Commission Orders.[63,64,65] This sub-section discusses how the treatment of the following categories of generation affects capacity price forecasts and LBMP forecasts: units in a Mothball Outage, units in a ICAP Ineligible Forced Outage ("IIFO"), and units for which a retirement notice has been submitted to the Public Service Commission.[66,67]

Units in a Mothball Outage or IIFO – The NYISO has included in its price forecasts 104 MW of capacity (ICAP Summer) from units that are in a Mothballed Outage or IIFO in Zone J.[68] In some cases, it is realistic to assume that units in a Mothball Outage or IIFO would re-enter the market if capacity prices rose to the levels that might induce new investment in generation, although the requirement to do this in all cases will generally lead to unrealistically low capacity forecasts and LBMP forecasts because:

63 Existing resources are included in the ICAP price forecast and the LBMP forecast at their CRIS-adjusted DMNC values. SCRs' capacity values are based on the most recently published Gold Book data.

64 The Commission has stated that Expected Retirements as defined in MST §23.4.5.7.3.2 includes *only* resources that have filed a retirement notice with the New York Public Service Commission. *See New York Independent System Operator, Inc.*, 143 FERC ¶ 61,217 (2013) at P 111("June 2013 Order"). This does not include resources that are mothballed or that a supplier plans to replace with a new resource.

65 Although MST §23.2 at definition of Unit Net CONE or § 23.4.5.7.3 *et. seq.* does not specify which resources should be treated as existing for the purposes of the LBMP forecast, the Commission has determined that it is appropriate to include the same as the set of resources included for the purposes of the ICAP forecast. *See Hudson Transmission Partners, LLC v. New York Independent System Operator, Inc.,* 145 FERC ¶ 61,156 (2013) at PP 87 - 88.

66 The effects of such treatment in the Part A test, the Part B test, and the net revenue forecast are discussed in Sections IV.A.2, V.A.2, and VII.A.2.

67 Previous BSM Reports have also identified problems when a supplier is transferring CRIS rights from an existing facility to an Examined Facility. See CY12 BSM Report at page 47.

68 The amount of capacity in Mothball Outage and IIFO is reported monthly by the ISO in a web site posting, available at: <http://www.nyiso.com/public/markets_operations/services/planning/documents/index.jsp>.

- Units in a Mothball Outage or a IIFO may face significant costs to re-enter, particularly if this would require significant repairs or other capital expenditures; and
- Suppliers with large generation portfolios that include units in a Mothball Outage or IIFO may not have competitive incentives to re-enter the market, since this would lower the capacity prices for other units in the portfolio. There are currently no mitigation measures that would compel a supplier to return a unit in a Mothball Outage or IIFO to service if it were economic to do so.

Although the NYISO's inclusion of units in a Mothball Outage or IIFO in the capacity price forecasts was done in accordance with its Tariff, we believe there is substantial deficiency in this methodology as it does not consider the units' economics or any indications of return. The Commission has provided guidance on this issue and the NYISO is working with stakeholders to amend the BSM rules.[69]

Capacity Under a Retirement Notice – The NYISO has excluded from its forecasts 850 MW of capacity from the Fitzpatrick nuclear plant, although it is likely to remain in operation for the foreseeable future. The current owner of the plant submitted a notice of intent to retire in November 2015. The plant owner has subsequently initiated several actions (including those related to refueling and sale of the plant) that indicate the plant will continue to operate. Although the plant owner has not rescinded its notice, there is considerable evidence to suggest the plant will remain in service beyond the retirement date specified in the notice.[70]

---

69 This problem is discussed in the June 2013 Order at P 111. The NYISO's proposal is described in the December 14, 2016 Business Issues Committee meeting materials. See http://www.nyiso.com/public/webdocs/markets_operations/committees/bic/meeting_materials/2016-12-14/agenda%208%20BSM%20Forecast%20Enhancements-BIC%2012142016.pdf

70 Exelon has agreed to assume ownership and operation of the Fitzpatrick plant following the adoption of the Clean Energy Standard ("CES") by the NYPSC. Under the Zero Emission Credits program of the CES, Fitzpatrick will receive payments for every MWh produced by the plant.

The transaction is subject to approvals from a number of state and federal agencies. See http://www.fitzpatrickpower.com/operational-update.html. The NYPSC and FERC have approved the transaction. *See Entergy Nuclear FitzPatrick, LLC Exelon Generation Company, LLC,* 157 FERC ¶ 61,183 Order Authorizing Proposed Transaction.

Given the above developments, Exelon and Entergy (the current owner) have deemed the conditions to be favorable enough to proceed with refueling of the plant that would allow the plant to continue operating beyond the originally proposed closure date of January 2017. *See* http://www.fitzpatrickpower.com/operational-update.html and http://wrvo.org/post/federal-energy-

We agree that the NYISO's treatment of Expected Retirements in the current and past BSM evaluations is compliant with its Tariff.[71] However, the application of the NYISO's Tariff to Fitzpatrick (in the CY15 evaluation) and Danskammer (in the CY12 evaluation) highlight shortcomings with the current approach. The current criteria for deeming a generator retired for the purposes of the forecasts used in BSM evaluation may lead to inflated price forecasts under two circumstances in BSM evaluations.

First, the current rules do not allow inclusion of units in the price forecast even if the units are widely expected to return to or remain in service, but are yet to rescind their notice. In the CY15 BSM evaluation, the NYISO is constrained to disregard all the positive indicators of the continued operation of Fitzpatrick and exclude the unit from its price forecasts. Similarly, if the CY12 BSM evaluation had been conducted several months earlier, the Danskammer plant would likely have been excluded from the forecasts even though its return to service was widely expected.

Second, filing a retirement notice with the PSC is not binding and does not necessarily prevent a unit from remaining in service, so the current criteria allow the unit owner to issue a notice without retiring the unit accordingly.[72] This may lead units to be excluded from the forecast even when their retirement is unlikely. Hence, we support the NYISO's efforts to work with stakeholders to improve the BSM rules relating to the treatment of recently retired units in the price forecasts.

regulatory-commission-approves-fitzpatrick-sale

71 In the CY11 and CY12 BSM evaluations, there was uncertainty about the status of the Danskammer plant which retired in January 2013 and then subsequently was returned to service in June 2014. Consequently, the plant was treated as retired in the CY11 BSM price forecasts and treated as in-service in the CY12 BSM price forecasts. This was discussed in the CY11 CPV Valley BSM Report at page 10 and the CY12 BSM Report at page 46.

72 The NYISO's Reliability Must Run ("RMR") tariff provisions require the owner to file a 12-month notice with the NYISO before a proposed unit deactivation. If the unit owners rescind the notice, they may be required to reimburse the NYISO and the Transmission Owners for the fees associated with conducting the RMR studies.

2. Currently Operating Units at Risk of Retiring or Mothballing

The NYISO, in accordance with its Tariff, included all the units that are currently in-service in its price forecasts. However, several capacity suppliers that are currently operating may choose to mothball or retire if capacity prices drop to levels that are insufficient to cover their fixed operating costs. Therefore, it is unrealistic to assume that all existing units will continue to operate during the MSP regardless of how low the forecasted prices are. In addition, there may be situations where the plant owners have indicated their intention to retire specific facilities during or prior to the MSP, without having submitted a notice to the PSC or the NYISO at the time of analysis.[73] In such situations, the NYISO's current Tariff does not afford it the opportunity to consider the facts and circumstances of the owners' indications while developing the price forecasts.

In the CY15 BSM evaluation, the capacity price forecasts for the NYCA, Zones J, and K were lower than the going-forward costs ("GFCs") of some existing resources in those areas. Although this issue did not affect the ultimate outcome of the BSM evaluations, unrealistically low price forecasts could act as a barrier to new entry in future class years. Therefore, we recommend the NYISO work with its stakeholders to develop reasonable criteria for treatment of existing supply that is at risk of retiring or mothballing.

3. Prior Class Year Projects in the Interconnection Queue

The BSM exemption test requires the NYISO to estimate the effects on capacity and energy prices of prior CY projects in the Interconnection Queue ("Prior-CY Projects") that accepted their PCA in a previous Class Year but have not begun construction. The developer of a new project must post security for the amount of the PCA, but there is no guarantee that such a project will eventually be built. In some cases, the PCA may be very small relative to the overall investment, so there is little cost to the developer of remaining in the queue. In other cases, a project may remain in the interconnection queue for more than a year with little risk to the

[73] For instance, the State of New York and the owner of the Indian Point facility have indicated that they reached an agreement in which the two remaining reactors would be permanently retired by 2021. See http://www.entergynewsroom.com/latest-news/entergy-ny-officials-agree-indian-point-closure-2020-2021.

developer that it might lose a portion of its deposit if the project does not ultimately move forward. The assumptions regarding such projects are important because over-estimating the amount of in-service capacity tends to depress the capacity price forecast and the LBMP forecast. Since new projects usually have high capacity factors, over-estimating the amount of new in-service capacity will tend to have large effects on the LBMP price forecast, which will also tend to inflate the Unit Net CONE of the Examined Facilities.

The NYISO's tariff does not prescribe any specific assumptions for the treatment of Prior-CY Projects in the BSM exemption tests. Hence, it is important to use a reasonable approach for treatment of these projects in both the ICAP forecast as well as the net revenue calculations. The NYISO's treatment of these projects is described below.

Exempt Prior-CY Projects – Prior-CY Projects that were determined to be exempt were included in the price forecasts. The 680 MW CPV Valley Energy Center was determined to be exempt in CY11.

Mitigated Prior-CY Projects – For Prior-CY Projects that were mitigated, the NYISO included the project in the price forecasts based on whether it was reasonably likely that the project would be built under the circumstances modeled in the CY15 BSM evaluation. The NYISO assumed the project will be built if: (a) the project was under construction, (b) the developer has made some other significant irrevocable financial commitment towards the project, or (c) the developer would earn sufficient forecasted revenues from the NYISO markets for it to be profitable for the developer to move forward. The specific criteria for including a mitigated Prior-CY Project is as follows:[74]

Step 1: Threshold Assumptions:

- Include Prior CY Projects that were determined to not be exempt from BSM provided the project has incurred or expended, in the aggregate, more than 5 percent of the project's cost of new entry for the following: engineering, procurement, and construction costs; financing costs; or interconnection costs invoiced by the interconnecting Transmission

[74] These criteria are also described in the BSM CY15 Forecast Assumptions at Section 3.2.4.

Owner(s), *e.g.*, Transmission Owner attachment facilities, System Deliverability Upgrades, and System Upgrade Facilities; net of any amounts that would likely be recouped if the project was not completed (*e.g.*, a deposit that would be returned) ("5 percent threshold").

- Proceed to "Step 2" for Projects that have not met such 5 percent threshold.

Step 2: Prior CY Projects that have not met the 5 Percent Threshold:

- For each Prior CY Project, examine whether it would earn sufficient capacity revenue to recoup its Unit Net CONE, considering its Offer Floor, in a capacity price forecast for a three-year period starting one year before the Class Year 2015 MSP, and which does not include the current Class Year Examined Facilities (i.e., for the Class Year 2015 determinations, Step 2 utilizes Capability Years 2017/2018, 2018/2019, and 2019/2020.) If a Prior CY Project earns sufficient capacity revenue under this test, it is included in the BSM ICAP Forecast.

The NYISO's treatment is reasonable given the uncertainty about whether Prior-CY Projects will ever enter service. However, the NYISO's current treatment of exempted Prior-CY Projects could be improved by considering additional criteria for including them in the price forecasts. As discussed above, mitigated or exempted Prior-CY Projects may not necessarily proceed with the project as planned due to several uncertainties that are inherent in the development of new power projects. Two circumstances where the developer of an exempted Prior-CY Project may not move forward include: (a) inability to secure permits or financing for constructing the project, or (b) changes in the electric or gas market conditions which render the project uneconomic from the developer's perspective. Assuming that all exempted Prior-CY Projects will be in service during the MSP might unreasonably depress the price forecast in future BSM evaluations. Therefore, it would be beneficial for the NYISO to develop additional criteria for including such projects in its price forecasts.

Ultimately, the treatment of Prior-CY Projects in the CY15 BSM exemption tests did not impact the BSM evaluations for CY2015 Examined Facilities.

4. Examined Facilities Seeking Competitive Entry Exemption

As discussed in Section III, the NYISO considered a request for a CEE (from the CHPE Project) for the first time as part of its CY15 BSM evaluation. The treatment of Examined Facilities

seeking a CEE ("CEE Projects") could impact the price forecasts for other Examined Facilities seeking an exemption under the Part A and Part B tests. A blanket assumption that all CEE Projects will be in-service during the MSP, without considering the project economics or the level of developer's commitment, would be unreasonable, may depress significantly the price forecasts and could result in mitigating economic Examined Facilities.

The NYISO's Tariff requires the NYISO to conduct the Part A and Part B tests modeling the potential entry of CEE Projects like other Examined Facilities. Accordingly, the NYISO estimated the Unit Net CONE for the CHPE Project based on the information provided by the project developer. The NYISO subsequently incorporated the Unit Net CONE of the CHPE Project in the ICAP price forecast in the first two rounds of the BSM evaluation in a manner that is consistent with the test procedure described in Section VIII.F. We agree that the NYISO's treatment of the CHPE Project is reasonable given its Tariff provisions.

One of the fundamental drivers for developing CEE provisions is to allow unsubsidized merchant entrants to invest in the NYISO markets based on their expectations of market conditions. Hence, it is possible for the developers of CEE Projects to have a view of the future market conditions that is significantly different from the NYISO's forecasts. A developer's choice to move forward with its CEE Project will be driven by its own expectations, but the same information is not incorporated into the NYISO's Unit Net CONE calculations. In such situations, the Unit Net CONE calculated in compliance with the tariff may not represent a reasonable approximation of the net CONE as perceived by a CEE Project developer. Therefore, the NYISO's current approach could result in excluding the CEE Projects in some situations, thereby biasing the NYISO's price forecasts used in evaluating other Examined Facilities.

We recommend the NYISO develop Tariff provisions that would allow it to take into consideration well-substantiated forecasts by CEE Project developers into its treatment of their respective projects.

5. Class Year 2015 Projects Located Outside the Mitigated Capacity Zones

In addition to units being evaluated under the Part A and Part B tests, CY15 included projects located in areas outside the Mitigated Capacity Zones ("MCZs").[75] The treatment of such projects could have a significant impact on BSM evaluations under certain circumstances. This could happen in situations of excess supply where the ICAP prices in the G-J Locality and Zone J are determined based on the NYCA ICAP Demand Curve parameters. The Tariff does not provide any guidance regarding to treatment of CY15 Projects located in Zones A-F or Zone K in the BSM evaluations. Although the presence of CY15 Projects in non-MCZs did not impact the CY15 BSM evaluation, we recommend the NYISO develop reasonable criteria for treatment of such units in future BSM evaluations.

C. Impact of Imports on Capacity Price Forecast

The NYISO's assumptions regarding capacity imports from neighboring control areas are important since they impact the ICAP price forecast used in the BSM evaluations. This sub-section discusses the underlying assumptions for imports into the NYCA from PJM, ISO-NE, HQ and IESO across various transmission lines.

1. Imports from PJM to New York City

The BSM exemption tests require the NYISO to estimate the effects on capacity prices of controllable transmission lines that possess Unforced Capacity Deliverability Rights ("UDRs"). The assumptions regarding such facilities possessing UDRs are important, since there is currently 1 GW of potential capacity associated with UDRs between the PJM Interconnection ("PJM") and New York City. The evaluation of potential UDR capacity is complicated by two factors:

- Holders of rights to use UDRs must obtain capacity from the neighboring market in order to sell capacity into New York. They will not generally do this unless the New York City price is expected to be greater than the price in the neighboring market.

[75] The initial round of the CY15 PCA process included over 1.5 GW (summer UCAP) of capacity located in Zones A-F and Zone K.

- If the holder of rights to use the UDRs elects by the annual deadline not to use its UDRs to import capacity to New York, the New York State Reliability Council's annual IRM technical study and Study Report will assume the line can provide emergency assistance. Consequently, the existence of the transmission line will tend to reduce the Locational Minimum Installed Capacity Requirements ("LCR") for New York City and the G-J Locality.

When conducting the BSM exemption tests for the CY15 Projects, the NYISO assumed that transmission lines possessing UDRs would import capacity to New York City when capacity could be sold at a price that would compensate the UDR rights holder for the cost of obtaining capacity in the neighboring market.[76] This criterion was applied by Capability Year for the MSP since the PJM market runs annual rather than monthly auctions to satisfy installed capacity requirements. Overall, we find that the assumptions related to capacity imports that sink in New York City are reasonable and compliant with the NYISO Tariff.

2. Imports to Zones A-F and Zone K

The amount of net imports to and generation in NYCA Load Zones external to the G-J Locality can have a significant impact on the BSM exemption test for projects in the G-J Locality and New York City. This is because capacity prices in the G-J Locality and New York City are sometimes determined by the NYCA ICAP Demand Curve when there is substantial surplus capacity in either of those Localities. In general, capacity surpluses are forecasted to occur most during the Winter Capability Periods when the seasonal capability of most generators is highest. This subsection discusses assumptions made by the NYISO that affect the NYCA capacity price forecast.

Imports to Zone K

In recent years, there has not been a strong relationship between the capacity price spread between Long Island and neighboring ISOs, and the levels of capacity imports to Long Island across the Cross Sound Cable and the Neptune line (both of which have associated UDRs).

[76] The NYISO assumes that the cost of capacity in PJM's PSEG-North Local Delivery Area is equal to the clearing price in the Base Residual Auction in the closest year for which data is available.

Hence, the NYISO assumed that imports across the Cross Sound Cable and the Neptune line would remain at recently observed levels throughout the MSP.

Imports to Zones A-F

The NYCA's interfaces with neighboring Control Areas allow external resources from PJM, Hydro Quebec, ISO-NE and IESO to offer capacity into the NYCA region (*i.e.*, only the region outside of the G-J Locality, NYC, and Long Island). Capacity imports from neighboring control areas are limited by the NYISO-determined interface limits and Highway Deliverability Criteria. Exports to neighboring areas may be limited by internal criteria or by criteria that is determined by the neighboring control area.[77]

PJM Interface - The NYISO reviewed the quantities and direction of the capacity imports from the PJM control area and did not find a clear relationship between the level of net imports and prices. Therefore, for the interface with PJM, the NYISO assumed that net imports during the MSP to be at the historically observed average levels over the past three years.

ISO-NE Interface - For the interface with ISO-NE, the NYISO followed a price differential-based approach as described in the context of UDRs (see Section VIII.C.1) for determining the direction of capacity imports.[78] The limits on the magnitude of net imports or exports from ISO-NE were based on the results of the most recent ISO-NE capacity auctions.

HQ Interfaces – Although HQ exports large amounts of capacity to neighboring control areas, HQ has reliability criteria that limit the amount of capacity that is available for export to upstate New York and its other neighbors during some winter months. The NYISO used the following information to determine how much capacity would be exported from HQ to upstate New York during the months of December, January, February, and March:

---

77 See Installed Capacity Manual Section 4.9.6 Maximum Allowances for Installed Capacity Provided by Resources Outside the NYCA (December 2016).

78 The cost of ISO-NE capacity is based on average clearing prices for ISO-NE Rest of System of $7.97/kW-month for 2018/19, $6.26/kW-month for 2019/20, and $6.40/kW-month for 2020/21.

- Historic average net imports to upstate New York for the month over the last three winters (i.e., 2013/14, 2014/15 and 2015/16);
- Plus forecasted increase in supply resources in HQ;[79]
- Minus forecasted increase in capacity requirement for HQ because of load growth;[80]
- Minus forecasted exports to New York City across the CHPE transmission line.[81]

In the other eight months of the year, net imports were assumed to be equal to the historic average net imports for those eight months during the three-year period from May 2013 to April 2016. This resulted in assuming approximately 1100 MW of net imports in the Summer Capability Period, November, and April, while the assumed net imports varied during the remaining months of the Winter Capability Periods of the MSP.

IESO Interfaces – As of April 30, 2016 (the end of the most recent Capability Year), IESO and the NYISO had yet to finalize the Memorandum of Understanding regarding the export of capacity to the NYISO.[82] Moreover, IESO had not previously bought or sold ICAP in the NYISO administered markets. As a result, there is no historical data on the quantity or price-sensitivity of transactions to the capacity exports from Ontario to the NYISO markets. In addition, considering the imports from IESO to the NYISO would only lower the forecasted ICAP prices in Rest of State, which did not impact the Zone J or G-J Locality prices in the CY15

79 See 2015 Long-Term Reliability Assessment by North American Electric Reliability Corporation (December 2015), available at: "http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2015LTRA%20-%20Final%20Report.pdf".

80 See 2015 Long-Term Reliability Assessment by North American Electric Reliability Corporation (December 2015), available at: "http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2015LTRA%20-%20Final%20Report.pdf".

81 This adjustment was not considered in the final round of the BSM evaluation.

82 The NYISO signed an MOU with IESO regarding import of capacity from Ontario beginning with the Winter 2016-2017 Capability Period. See IESO to NYISO Installed Capacity (ICAP) Memorandum of Understanding dated August 25, 2016 at http://www.nyiso.com/public/webdocs/markets_operations/market_data/icap/Reference_Documents/MOU/MOU%20IESO%20NYISO%20-%20ICAP.pdf

BSM evaluations. Therefore, the NYISO did not model capacity imports from IESO for the purpose of CY15 BSM evaluations.

Overall, we find that the assumptions related to imports sinking in Zones A – F and Zone K were reasonable and compliant with the NYISO Tariff.

D. Estimating Locational Capacity Requirements for the Mitigation Study Period

The NYISO determines the Locational Minimum Installed Capacity Requirements ("LCRs") every year for New York City, Long Island and the G-J Locality, which it uses in conjunction with the locational annual peak load forecast to calculate the locational ICAP requirements. The capacity price forecast used in the NYISO's BSM evaluation is dependent on the LCR levels that are assumed for the duration of the MSP. An increase of one percentage point in the Zone J LCR increases the capacity prices by $18 per kW-year UCAP, while an increase of one percentage point in the G-J Locality LCR increases the capacity prices by $13/kW-year UCAP, making the LCRs important assumptions in the BSM evaluation.

The NYISO's current Tariff does not provide any guidance regarding the LCRs to be used in the BSM evaluations. In its previous BSM evaluations, the NYISO assumed the actual LCRs that were in place at the time of analysis for the duration of the MSP. However, the LCRs for MCZs over the MSP may differ from the current LCRs because of several factors that include:

- Changes in the assumed in-service capacity mix (e.g. new entry from current or prior CYs, retirements or mothballing of existing capacity);
- Changes in capacity sales using UDRs (see Section VIII.C.1); and
- Changes to the transmission system topology resulting from transmission upgrades.[83]

The NYISO, based on the criteria outlined in Section VIII.B.3, assumed that the Competitive Power Ventures Valley Energy Center ("the CPV Valley Project" – a 680 MW CY11 Examined

[83] The LCRs and IRM in a given year are influenced by a number of additional factors that include the load forecast, distribution of Equivalent Demand Forced Outage Rates ("EFORd"), system, load conditions in neighboring control areas, etc.

Facility located in Zone G), will be in service during the MSP for the purpose of the ICAP and energy price forecasts. Under the current method for setting the LCRs, an increase in the amount of capacity in Zones G-I has led to: (a) an increase in the LCR for the G-J Locality, and b) a decrease in the LCRs for Zone J and Zone K.[84] Given the size of the CPV Valley Project, its entry is likely to have a substantial impact on the LCR for the G-J Locality over the MSP.

Hence, in the CY15 BSM evaluation, the NYISO considered the following information to determine how the entry of the CPV Valley Project may affect the LCRs for the G-J Locality and Zone J:

- Under the current methodology, the addition of generation resources in Zones G-I will result in nearly a one-to-one increase in the G-J Locality's LCR.
- Limitations on the ability of generation located in Zones G-I to serve load in Zone J are close to binding, thereby preventing the LCR for Zone J from falling much below the current levels.

Ultimately for CY15, the NYISO estimated for purposes of the BSM determinations the LCR levels during the MSP to be: (a) 95.5 percent for the G-J Locality, and (b) 80.5 percent for Zone J to account for the entry of the CPV Valley Project. We find the NYISO's adjustment to the LCRs to be reasonable and compliant with the Tariff. For future BSM evaluations, we recommend the NYISO consider further refinements its procedure for estimating LCRs during the MSP, so that its forecasted ICAP requirements will more accurately reflect its other assumptions regarding future system conditions.

E. Treatment of Mitigated Projects in Capacity Forecast

The BSM exemption test requires the NYISO to estimate the effects on capacity prices of resources that have been determined to be subject to an Offer Floor. An Offer Floor is imposed on such resources until the resource clears for 12 months, which do not have to be consecutive.[85]

---

84 For instance, the return of the Danskammer unit in 2014 was largely responsible for the increase in LCR for G-J Locality from 88% to 90.5%. This was accompanied by a reduction in Zone J LCR from 85% to 83.5%.

85 The 12-month criterion is applied by the level of UCAP that cleared in the ICAP Spot Market Auction.

The assumptions regarding such resources are important, since several projects in prior Class Years have been determined to not be exempt under the BSM rules. The treatment described below was applied to all MW of capacity that are subject to an Offer Floor and, including the mitigated units from Prior-CY Projects in accordance with Sub-section VIII.E.

The NYISO considered how the Offer Floor of a mitigated unit would evolve over time in the capacity price forecasts. This required the NYISO to forecast capacity prices not only during the MSP, but also for the months leading up to the MSP. Accordingly, if MW of capacity subject to an Offer Floor was expected to clear in a month prior to the MSP or during the initial portion of the MSP, those sales would be considered in the NYISO's assumptions regarding how much of the unit's capacity would be subject to the Offer Floor in subsequent months of the MSP. The price level of each Offer Floor was adjusted annually for inflation, using the 2.2 percent inflation rate underlying the currently-effective ICAP Demand Curves. We find that NYISO's methodology in this regard was reasonable and compliant with the NYISO Tariff.

F. Testing Multiple Examined Facilities

MST §23.4.5.7.3.2 states that "when the ISO is evaluating more than one Examined Facility concurrently, the ISO shall recognize in its computation of the anticipated ICAP Spot Market Auction forecast price that Generators or UDR facilities will clear from lowest to highest, using for each Examined Facility the lower of (i) its Unit Net CONE or (ii) the numerical value equal to 75% of the Mitigation Net CONE". This provision is designed to ensure that the test identifies the most economic Examined Facility when some but not all of the Examined Facilities in the Class Year are economic.

In this sub-section we discuss how the NYISO addressed the above Tariff requirement in its previous and current BSM evaluations, identify issues with the NYISO's test procedures, and recommend further enhancements for future BSM evaluations.

Thus if a 100 MW resources clears 60 MW for six months and 100 MW for six months, 60 MW of the resource's cleared UCAP would not be mitigated and 40 MW would still be subject to the Offer Floor. See *BSM Numerical Example*, Section 6.4.

1. Test Procedure Used in Previous BSM Evaluations

The NYISO addressed its Tariff requirements in previous BSM evaluations in the following manner:

- In the Part A test, all the Examined Facilities were assumed to offer as price takers (i.e., at $0) in the one-year ICAP price forecast. If the resulting price forecast was greater than the DNC, all Examined Facilities would be exempt under the Part A test.[86]
- In the Part B test, all the Examined Facilities were assumed to offer at the lower of their UNC and DNC in the ICAP price forecast. If the resulting price forecast was greater than the Examined Facility's UNC, the facility would be exempt under the Part B test.[87]

In our CY12 BSM report, we identified several issues with the Part A and Part B test procedures that were used when multiple Examined Facilities were tested:

Part A Test – First, the ICAP price was forecasted assuming all Examined Facilities offer as price takers, resulting in the same ICAP price forecast for each Examined Facility. Therefore, the previously-applied Part A test procedure did not "recognize…Generators and UDR facilities will clear from lowest to highest."[88] Second, this procedure resulted in the same determination for all the Examined Facilities irrespective of their economics or size. Therefore, this procedure did not allow the NYISO to exempt a subset of the Examined Facilities even when they were necessary to avoid a local capacity deficiency.

Part B Test – The previously-applied Part B test procedure is reasonably consistent with the Tariff, but the procedure could lead to unintended consequences under certain circumstances. The ICAP price was forecasted assuming all Examined Facilities offer at their presumptive Offer Floor (i.e., the lower of UNC and DNC as if they were mitigated), so it was possible for an Examined Facility to set the forecasted price in some of the capability periods during the MSP. In such a case, a portion of its capacity would not clear in the price forecast, indicating that the

86 The purpose of the Part A test is to exempt an Examined Facility when its capacity is needed to avoid a capacity deficiency in a particular locality.

87 The purpose of the Part B test is to exempt an Examined Facility that is expected to be economic (i.e., earn sufficient revenue from the NYISO markets to be profitable) based on its Unit Net CONE.

88 MST §23.4.5.7.3.2.

Examined Facility would not be expected to earn sufficient revenue at the forecasted price to be economic.[89] Hence, an Examined Facility that was uneconomic could pass the NYISO's Part B test if it fully cleared in just one Capability Period and partially cleared in the other five Capability Periods.[90]

2. Test Procedure Used in the CY15 BSM Evaluation

In the CY15 BSM evaluation, the NYISO applied MST §23.4.5.7.3.2 to the Part A and Part B tests using a modified procedure that addressed the concerns described above.[91] Specifically, the NYISO first tested the Examined Facility with the lowest presumptive Offer Floor by itself in the Part A and Part B tests assuming it offers as a price taker. If the first Examined Facility received an exemption, it was included in the test for subsequent Examined Facilities. If the first Examined Facility did not receive an exemption, then it was excluded from the ICAP forecast for the subsequent Examined Facilities in the sequence.

The NYISO's modified approach builds on the procedure used in previous BSM evaluations and addresses the issues discussed in Section VIII.F.1. First, the modified procedure (by ranking and sequentially testing Examined Facilities) explicitly recognizes that the Examined Facilities will "clear from the lowest to highest" order of their presumptive offer floors. This ensures that the test procedure for both the Part A and Part B is fully compliant with the Tariff.

---

89 In such a case, if the price was forecasted assuming the Examined Facility was offered as a price taker (as would be expected if the project received a BSM exemption), all of its capacity would clear and the forecasted capacity price would be lower than its Unit Net CONE, supporting the conclusion that the Examined Facility is not expected to be economic.

90 To illustrate, suppose an Examined Facility has a presumptive Offer Floor of $10/kW-month in the summer and $5/kW-month in the winter, and the forecasted capacity prices are $10/kW-month, $10/kW-month, and $12/kW-month during the three summer Capability periods during the MSP and $5/kW-month, $5/kW-month, and $5/kW-month during the three winter Capability Periods during the MSP. This could occur if the large size of the Examined Facility resulted in its setting the clearing price in most periods. In this case, the annualized Offer Floor would be $90/kW-year, and the average capacity price would be $94/kW-year, so the Examined Facility would be exempt. However, further suppose that if the Examined Facility were offered as a price taker, the forecasted capacity prices would be $6/kW-month, $9/kW-month, and $12/kW-month in the three Summer Capability Periods and $2/kW-month, $3/kW-month, and $4/kW-month in the three Winter Capability Periods. This would result in an average ICAP Spot Market clearing price of $72/kW-year, implying that the Examined Facility would not be economic during the MSP.

91 See *BSM Numerical Example*, Section 6.1 and Section 6.2.

Second, in the part A test, the modified procedure (by testing units sequentially) allows the NYISO to examine the impact of each Examined Facility on the ICAP price forecast in an incremental manner. This procedure ensures that if capacity from one of the Examined Facilities was needed to satisfy requirements, sales from the more expensive projects (i.e. projects with higher UNC) would not cause the capacity price to drop and cause the less expensive project (i.e. project with a lower UNC) to fail the Part A test. Therefore, this procedure would appropriately result in an exemption for the subset of the Examined Facilities that would be needed to resolve a capacity shortfall.

Third, in the Part B test, the NYISO's modified procedure recognizes that if Examined Facility in the CY is determined to be exempt and is subsequently constructed, it would offer as a price taker (instead of offering at its presumptive Offer Floor) and sell its full capacity. Consequently, this procedure eliminates the possibility of only a portion of the Examined Facility clearing in the price forecast. This way, the ICAP price forecast in the Part B test reflects that if a project enters with a BSM exemption, it tends to lower capacity prices. This reduces the likelihood of an uneconomic unit securing an exemption under the Part B test.[92]

We find the enhancements the NYISO made to the test procedure to be compliant with the Tariff and that they improve the alignment of the test procedure with the intent of the BSM evaluations.

92 This procedure also ensures that if one of two Examined Facilities was economic, sales from the more expensive project would not cause the capacity price to drop and cause the less expensive project to appear uneconomic for the purpose of Part B test.

IX. CONCLUSIONS AND RECOMMENDATIONS

In the first and second rounds of the CY15 BSM evaluation, the NYISO evaluated five Additional CRIS MW projects in the Part A and Part B tests, and the NYISO evaluated the CHPE Project for a Competitive Entry Exemption. We reviewed materials documenting the NYISO's evaluation of investment costs, the reasonably anticipated LBMPs and net revenues, and capacity price forecasts for all the CY15 Examined Facilities. We conclude that the NYISO's BSM determinations in the first two rounds were made in accordance with the requirements of the Tariff and based on reasonable assumptions.

In the third round of the CY15 BSM evaluation, the CHPE Project was removed from CY15. While all five Additional CRIS MW projects were determined to be exempt in the Part B test, the Bowline 2 Unit was also determined to be exempt under the Part A test. Therefore, all the CY15 Additional CRIS MW projects are exempt from an Offer Floor. We conclude that the NYISO's final CY15 BSM determinations were made in accordance with the requirements of the Tariff and based on reasonable assumptions.

Ultimately, the five CY15 Additional CRIS MW projects were determined to be exempt under the Part B test primarily because of the low investment costs (compared to a new build), and for some of the projects large net revenues, associated with the requested increases in capacity.

We identify five issues with the Tariff that, if addressed, could improve the accuracy of the capacity price forecasts and the Unit Net CONE. We also identify three improvements to the BSM evaluation assumptions that do not require tariff modifications. However, as discussed in Sections IV.A.3 and V.B, the outcomes of the Part A and Part B tests for CY15 would not have been altered by the proposed improvements. Nonetheless, these issues may have significant impacts on the results of future BSM evaluations. Accordingly, we recommend that the NYISO address these issues in future evaluations.

The following table summarizes the issues for which we identified a potential improvement (indicated by an "I" in the last column) in an assumption or an issue with the test that could be

addressed by a tariff change (indicated by a "T" in the last column). The second column indicates where each issue is discussed in this report.

Table 1: Summary of Recommended Enhancements to BSM Evaluation

Issue:	Section:	Rec:
Interconnection costs may be inflated for some Examined Facilities (Part B test)	VI.A.4	T
Starting Capability Period is unrealistic for most Examined Facilities (Part A & B tests)	VIII.A	T
Treatment of units in a Mothball Outage or an ICAP Ineligible Forced Outage or under a retirement notice is unrealistic for some units (Part A & B tests)	VIII.B.1	T
Treatment of some currently operating units at risk of retiring or mothballing is unrealistic for some units (Part A & B tests)	VIII.B.2	T
Treatment of Examined Facilities seeking Competitive Entry Exemption may be inconsistent with developers' expectations (Part A & B tests)	VIII.B.4	T
Treatment of Class Year projects located outside the Mitigated Capacity Zones may be unrealistic (Part A & B tests)	VIII.B.5	I
Treatment of exempt Prior Class Year Projects in the Interconnection Queue may be unrealistic (Part A & B tests)	VIII.B.3	I
Estimation of Locational Minimum Installed Capacity Requirements for the Mitigation Study Period needs refinement (Part A & B tests)	VIII.D	I