

2019-2020 NYCA IRM Requirement Study

Preliminary Base Case (PBC) Model Assumptions

Assumption Matrix

Draft V0

Load Parameters

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|--|---|---|---|--------------|------------------|
| 1 | Peak Load Forecast (Preliminary Base Case – Parametric & Sensitivities) | 2017 Gold Book NYCA: 33,078 MW NYC: 11,707 MW LI: 5,305 MW G-J: 16,070 MW | 2018 Gold Book NYCA: xx,xxx MW NYC: yy,yyy MW LI: z,zzz MW G-J: ww,www MW | Most recent Gold Book Forecast is used for Preliminary Base Case parametric study and sensitivity cases | N | |
| 2 | Peak Load Forecast (Final Base Case) | October 2017 Fcst. NYCA: 32,868 MW NYC: 11,541 MW LI: 5,445 MW G-J: 15,890 MW | October 2018 Fcst. NYCA: xx,xxx MW NYC: yy,yyy MW LI: z,zzz MW G-J: ww,www MW | Forecast based on examination of 2018 weather normalized peaks. Top three external Area peak days aligned with NYCA | N | |
| 3 | Load Shape (Multiple Load Shape) | Bin 1: 2006 Bin 2: 2002 Bins 3-7: 2007 | Bin 1: 20aa Bin 2: 20bb Bins 3-7: 20cc | ICS Recommendation | N | |
| 4 | Load Forecast Uncertainty | Zonal Model to reflect current data with input from Con Ed and LIPA. (Attachment A) | Zonal Model to reflect current data with input from Con Ed and LIPA. (Attachment A) | Based on TO and NYISO data and analyses. | N | |

Generation Parameters

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|--|--|--|--|--------------|------------------|
| 1 | Existing Generating Unit Capacities | 2017 Gold Book values. Use min (DMNC vs. CRIS) capacity value | 2018 Gold Book values. Use min (DMNC vs. CRIS) capacity value | Latest Gold Book publication | N | |
| 2 | Proposed New Units (Non-Renewable) and re-ratings | 784 MW of new non-wind resources, plus 52 MW of project related re-ratings. (Attachment B1) | ddd MW of new non-wind resources, plus ee MW of project related re-ratings. (Attachment B1) | Latest Gold Book publication, NYISO interconnection queue, and generator notifications | N | |
| 3 | Retirements, Mothballed units, and ICAP ineligible units | 0 MW retirements or mothballs reported or Units in IIFO and IR (Attachment B2) | vv MW retirements or mothballs reported or Units in IIFO and IR ¹ (Attachment B2) | Latest Gold Book publication and generator notifications | N | |
| 4 | Forced and Partial Outage Rates | Five-year (2012-2016) GADS data for each unit represented. Those units with less than five years – use representative data. (Attachments C and C1) | Five-year (2013-2017) GADS data for each unit represented. Those units with less than five years – use representative data. (Attachments C and C1) | Transition Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period | N | |
| 5 | Planned Outages | Based on schedules received by the NYISO and adjusted for history | Based on schedules received by the NYISO and adjusted for history | Updated schedules | N | |
| 6 | Summer Maintenance | Nominal 50 MWs – divided equally between zones J and K | | Review of most recent data | N | |

¹ ICAP Ineligible Forced Outage (IIFO) and inactive Reserve (IR)

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|----|--------------------------------------|---|---|---|--------------|------------------|
| 7 | Combustion Turbine Derates | Derate based on temperature correction curves provided | Derate based on temperature correction curves provided | Operational history indicates the derates are in-line with manufacturer's curves | N | |
| 8 | Existing and Proposed New Wind Units | 77.7 MW of Wind Capacity additions totaling 1733.4 MW of qualifying wind (Attachment B3) | ggg MW of Wind Capacity additions totaling hhhh MW of qualifying wind (Attachment B3) | Renewable units based on RPS agreements, interconnection queue, and ICS input. | N | |
| 9 | Wind Shape | Actual hourly plant output over the period 2012-2016. New units will use zonal hourly averages or nearby units. | Actual hourly plant output over the period 2013-2017. New units will use zonal hourly averages or nearby units. | Program randomly selects a wind shape of hourly production from the most recent five-year period for each model iteration. | N | |
| 10 | Solar Resources (Grid connected) | Total of 31.5 MW of qualifying Solar Capacity. (Attachment B3) | Total of hh MW of qualifying Solar Capacity. (Attachment B3) | ICAP Resources connected to Bulk Electric System | N | |
| 11 | Solar Shape | Actual hourly plant output over the period 2012-2016. New units will use zonal hourly averages or nearby units. | Actual hourly plant output over the period 2013-2017. New units will use zonal hourly averages or nearby units. | Program randomly selects a solar shape of hourly production from the most recent five-year period for each model iteration. | N | |

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|----|-----------------------|---|---|--|--------------|------------------|
| 12 | BTM- NG Program | Change Stony Brook to its full 47 MW output (formerly modeled at 9.6 MW net of host load). Forecast Load adjusted to account for exposure of host load. (Attachment B5) | | Both the generation of the participating resource and the full (former) host load is modeled. | N | |
| 13 | Small Hydro Resources | Derate by 46% | Actual hourly plant output over the period 2013-2017. | Program randomly selects a Hydro shape of hourly production from the most recent five-year period for each model iteration. | N | |
| 14 | Large Hydro | Probabilistic Model based on 5 years of GADS data | Probabilistic Model based on 5 years of GADS data (2013-2017) | Transition Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period | N | |

Transactions – Imports and Exports

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|--------------------|--|---|--|--------------|------------------|
| 1 | Capacity Purchases | Existing Rights: PJM – 1080 MW HQ – 1110 MW All contracts model as equivalent contracts | Existing Rights: PJM – 1080 MW HQ – yyyy MW Cedars – yy MW(?) All contracts model as equivalent contracts | Grandfathered Rights, ETCNL, and other awarded long-term rights. | N | |
| 2 | Capacity Sales | Long Term firm sales Summer 283.8 MW | Long Term firm sales Summer xxx MW | These are long term federal contracts. | N | |
| 3 | FCM Sales | No Sales within study period | | White Paper, NYISO recommendation, and ICS discussions | N | |
| 4 | New UDRs | No new UDR projects | No new UDR projects | Existing UDR elections are made by August 1 st and will be incorporated into the model. | N | |

Topology

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|------------------------------|--|--|---|--------------|------------------|
| 1 | Interface Limits | All changes reviewed and commented on by TPAS | All changes reviewed and commented on by TPAS (Attachment E) | Based on the most recent NYISO studies and processes, such as Operating Study, Operations Engineering Voltage Studies, Comprehensive System Planning Process, and additional analysis including interregional planning initiatives. | N | |
| 2 | New Transmission | None Identified | None Identified | Based on TO provided models and NYISO's review. | N | |
| 3 | AC Cable Forced Outage Rates | All existing Cable EFORs updated for NYC and LI to reflect most recent five-year history (2012-2016) | All existing Cable EFORs will be updated for NYC and LI to reflect most recent five-year history (2013-2017) | TO provided transition rates with NYISO review. | N | |
| 4 | UDR Line Unavailability | Five year history of forced outages(2012-2016) | Five year history of forced outages (2013-2017) | NYISO/TO review. | N | |

Emergency Operating Procedures

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|------------------------|--|--|---|--------------|------------------|
| 1 | Special Case Resources | July 2017 –1219 MW based on registrations and modeled as 868 MW of effective capacity. Monthly variation based on historical experience* | July 2018 –yyyy MW based on registrations and modeled as zzz MW of effective capacity. Monthly variation based on historical experience* | SCRs sold for the program discounted to historic availability. Summer values calculated from July 2018 registrations. Performance calculation updated per ICS presentations on SCR performance. (Attachment F) | N | |
| 2 | EDRP Resources | July 2017 16 MW registered modeled as 3 MW in July and proportional to monthly peak load in other months. Limit to five calls per month | July 2018 aa MW registered modeled as b MW in July and proportional to monthly peak load in other months. Limit to five calls per month | Those sold for the program discounted to historic availability. Summer values calculated from July registrations and forecast growth. | N | |
| 3 | Other EOPs | 609.6 MW of non-SCR/non-EDRP resources | Ccc MW of non-SCR/non-EDRP resources (Attachment D) | Based on TO information, measured data, and NYISO forecasts. | N | |

* The number of SCR calls is limited to 5/month when calculating LOLE based on all 8,760 hours.

External Control Areas

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|----------------------|--|--|--|--------------|------------------|
| 1 | PJM | Load and Capacity data provided by PJM/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 | Load and Capacity data provided by PJM/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (Attachment E) | Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes. | N | |
| 2 | ISONE, Quebec, IESO | Load and Capacity data provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 | Load and Capacity data provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (Attachment E) | Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes. | N | |
| 5 | Reserve Sharing | All NPCC Control Areas indicate that they will share reserves equally among all members and then among non-members | All NPCC Control Areas indicate that they will initially share reserves equally among all members and then among non-members | Per NPCC CP-8 WG. | N | |
| 6 | Emergency Assistance | Statewide Limit of 3,500 MW of emergency assistance allowed from neighbors. | Statewide Limit of 3,500 MW of emergency assistance allowed from neighbors. | White paper on Modelling of Emergency Assistance for NYCA in IRM studies | N | |

Miscellaneous

| # | Parameter | 2018 Model Assumptions | 2019 Model Assumptions | Basis for Recommendation | Model Change | Est. IRM Impact* |
|---|---------------------------|--|------------------------|---|--------------|------------------|
| 1 | MARS Model Version | Version 3.21.9 | Version d.e.f | Per benchmark testing and ICS recommendation. | N | |
| 2 | Environmental Initiatives | No estimated impacts based on review of existing rules and retirement trends | | Review of existing regulations and rules. | N | |

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Attachment A

NYCA Load Forecast Uncertainty Model

Attachment B1

New Non-Wind Units and Unit Re-ratings²

Attachment B2

Retiring and Ineligible Generating Units

Attachment B3

Existing and New Wind Resources

Attachment B4

Existing and New Solar Resources

Attachment B5

Resources and Peak Load Adjustment Modeled in the Behind the Meter
Net Generation Program (BTM-NG)

² Unit re-ratings are for generation facilities that have undergone uprate projects.

Attachment C

NYCA Annual EFORds

Attachment C1

NYCA Five Year EFORds

Attachment D

Emergency Operating Procedures

Attachment E

IRM Topology

Attachment F

SCR Determinations

Assumption Matrix History

| Date | Ver | Preliminary Base Case | Date | Ver | Final Base Case |
|---------|-----|--|------|-----|-----------------|
| 1/30/18 | V00 | Preliminary assumptions without attachments. | | | |
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