2017-2018 NYCA IRM Requirement Study

IRM Base Case Model Assumptions

Assumption Matrix

~~February~~ March 29~~3~~, 2016

Draft V03~~2~~1~~1~~

Load Parameters

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	Peak Load Forecast (Preliminary Base Case – Parametric & Sensitivities)	2015 Gold Book NYCA: 33,636 MW NYC: 12,013 MW LI: 5,506 MW G-J: 16,441 MW	2016 Gold Book NYCA: xxxxxx MW NYC: yyyyy MW LI: zzzz MW G-J: uuuuu MW	Gold Book Forecast is used for Preliminary Base Case parametric study and sensitivity cases	N
2	Peak Load Forecast (Final Base Case)	October 2015 NYCA: 33377.6 MW NYC: 11777 MW LI: 5457 MW G-J: 16375 MW	NYCA: xxxxxx MW NYC: yyyyy MW LI: zzzz MW G-J: uuuuu MW	Forecast based on examination of 2016 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: ~~aaaa~~2006 Bin 2: ~~bbbb~~2002 Bins 3-7: ~~cccc~~2007	ICS Recommendation. Potential Sensitivity ~~with alternate shapes~~replacing 2002 shape	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)	Due to cool summer weather in 2014 and 2015, the LFU models do not need to be updated because there is no new information to model extreme weather conditions	N

Generation Parameters

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	Existing Generating Unit Capacities	2015 Gold Book values. Use min (DMNC vs. CRIS) capacity value	2016 Gold Book values. Use min (DMNC vs. CRIS) capacity value	~~2015~~ 2016 Gold Book publication	N
2	Proposed New Units (Non-Renewable)	374.4 MW of new or returning non- wind resources (Attachment B1)	ffff MW of new or returning non- wind resources (Attachment B)	~~2015~~ 2016 Gold Book publication and generator notifications	N
3	Retirements and Mothballed units	0 MW retirements or mothballs reported (Attachment B2)	gggg MW retirements or mothballs reported iiii MW of ~~U~~units in IIFO and IR[1] (Attachment B2)	Updated Policy 5 guidelines on retirement or mothball disposition in IRM studies	N
4	Forced and Partial Outage Rates	Five-year (2010-2014) GADS data for each unit represented. Those units with less than five years – use representative data (Attachments C and C1)	Five-year (2011-2015) 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 (2011-2015)	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

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

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
6	Summer Maintenance	Nominal 50 MWs – divided equally between upstate and downstate	Nominal YY MWs – divided equally between upstate and downstate	Review of most recent data	N
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	1455.1 MW of qualifying wind for study year (Attachment B3)	hhhhh MW Wind Capacity (Attachment B3)	Renewable units based on RPS agreements, interconnection Queue, and ICS input	N
9	Wind Shape	Actual hourly plant output of the 2013 calendar year. Summer Peak Hour availability of 14%	Actual hourly plant output over the period ~~2012~~2011-2015. New units ~~may have wind readings taken at or near the site~~will use zonal hourly averages ~~of~~for nearby units	Paper on new functionality of the GE MARS program to randomly select a ~~daily~~ wind shape from multiple years of production data	Y
10	Solar Resources	31.5 MW Solar Capacity per 2014 production data summer availability factor of 38.8 % (Attachment B4)	xxxx MW Solar Capacity per 2015 production data summer availability factor of aa.a % (Attachment B4) May consider production data output over the period 201~~1~~2-2015	Concepts in paper referenced in wind paper above may also apply to solar modeling.~~Above paper also applies to solar modeling.~~ GE MARS program can randomly select a ~~daily~~ solar shape from multiple years of production data	Y

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
11	Small Hydro Resources	Derate by 46%	Derate by yy%	Review of five years of unit production data over the years 2011 to 2015	N
12	Large Hydro	Probabilistic Model based on 5 years of GADS data	Probabilistic Model based on 5 years of GADS data	Transition Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period (2011-2015)	N

Transactions – Imports and Exports

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	Capacity Purchases	Existing Rights: PJM – 1080 MW HQ – 1090 MW +20 MW if awarded through Class Year 2015. Total HQ 1110 MW All contracts model as equivalent contracts	Grandfathered amounts: PJM – 1080 MW HQ – 1090 MW HQ TO 1110 MW if awarded CRIS rights All contracts model as equivalent contracts	Grandfathered Rights, ETCNL, and other awarded long-term rights including 20 MW CRIS potentially awarded to HQUS	N
2	Capacity Sales	Long Term firm sales Summer 286.6 MW	Long Term firm sales Summer yyy MW	These are long term federal contracts	N
3	FCM Sales	No Sales within study period	Xxxx MW	Sensitivity based on Examination of Neighbor's FCM auction results	N
4	New UDRs	No new UDR projects	No new UDR projects	Existing UDR elections are made by August 1st and will be incorporated into the model	N

Topology

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	Interface Limits	All changes reviewed and commented on by TPAS (Attachment E)	All changes reviewed and commented on by TPAS See (Attachment E)	Based on 201x: Operating Study, Operations Engineering Voltage Studies, Comprehensive Planning Process, and additional analysis including interregional planning initiatives	N
2	New Transmission	Transmission Owner Transmission Solutions (TOTS)	xxxx Identified	Based on TO provided models and NYISO review	N
3	Cable Forced Outage Rates	All existing Cable EFORs will be updated for NYC and LI to reflect most recent five-year history	All existing Cable EFORs updated for NYC and LI to reflect most recent five-year history	Based on TO analysis	N

Emergency Operating Procedures

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	Special Case Resources	July 2015 –1254 MW based on registrations and modeled as 961 MW of effective capacity. Monthly variation based on historical experience (no Limit on number of calls)*	July 2016 – ssss MW based on registrations and modeled as aaa MW of effective capacity. Monthly variation based on historical experience (~~no~~ Calls Limited to 5/month ~~on number of calls~~)*	Those sold for the program discounted to historic availability. Summer values calculated from July 2016 registrations (Attachment F)	N
2	EDRP Resources	July 2015 75 MW registered modeled as 12 MW in July and proportional to monthly peak load in other months. Limit to five calls per month	July 2016 bb MW registered model as cc 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 2016 registrations and forecast growth.	N
3	Other EOPs	671 MW of non-SCR/non-EDRP resources (Attachment D)	cccc 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 8760 hours.

External Control Areas

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	PJM	Load and Capacity data provided by PJM/NPCC CP-8. Data may be adjusted per NYSRC Policy 5 Acceptable DR of 1890 available but not needed per Policy 5. 4 zone model. ~~See~~ (Attachment E)	Load and Capacity data provided by PJM/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 ~~See~~ (Attachment E)	Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes. White paper on external EOPs	TBD
2	ISONE	Load and Capacity data provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (~~See~~ Attachment E)	Load and Capacity data provided by ISONE/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 ~~See~~ (Attachment E)	Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes	N
3	HQ	Load and Capacity data provided by HQ/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 (Attachment E)	Load and Capacity data provided by HQ/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 ~~See~~ (Attachment E)	Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes	N

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
4	IESO	Load and Capacity data provided by IESO/NPCC CP-8 data may be adjusted per NYSRC Policy 5 ~~See~~ (Attachment E)	Load and Capacity data provided by IESO/NPCC CP-8 data may be adjusted per NYSRC Policy 5 ~~See~~ (Attachment E)	Initial review performed by the NPCC CP-8 WG prior to Policy 5 changes	N
5	Reserve Sharing	All NPCC Control Areas and PJM interconnection indicate that they will share reserves equally among all members	All NPCC Control Areas and PJM interconnection indicate that they will share reserves equally among all members	Per NPCC CP-8 WG	N

Miscellaneous

#	Parameter	2016 Model Assumptions	2017 Model Assumptions	Basis for Recommendation	Model Change
1	MARS Model Version	Version 3.18	Version ~~v~~3.~~vv~~20	Per benchmark testing and ICS recommendation	N
2	Environmental Initiatives	No estimated impacts based on review of existing rules and retirement trends	No estimated impacts based on review of existing rules and retirement trends	Review of existing regulations and rules.	N

Attachment A

NYCA Load Forecast Uncertainty Model

2016 and 2017 LFU Models

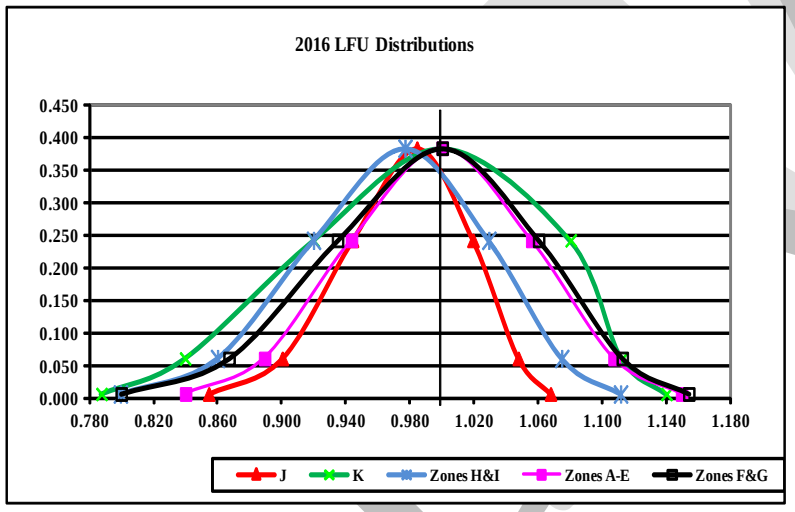
2016 Load Forecast Uncertainty Models

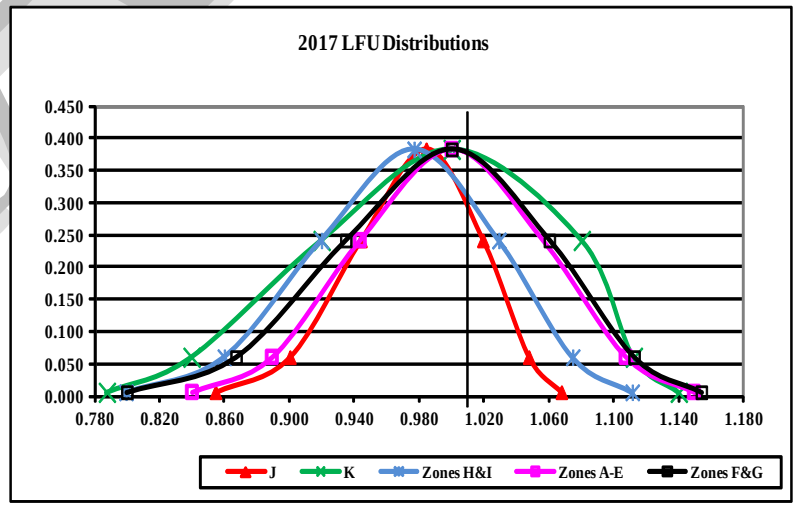
Multiplier	Zones A-E	Zones F&G	Zones H&I	Con Ed (J)	LIPA (K)
0.0062	0.8399	0.7997	0.7992	0.8543	0.7874
0.0606	0.8892	0.8670	0.8598	0.9002	0.8396
0.2417	0.9434	0.9347	0.9197	0.9440	0.9198
0.3830	1.0000	1.0000	0.9768	0.9842	1.0000
0.2417	1.0559	1.0602	1.0291	1.0192	1.0802
0.0606	1.1073	1.1124	1.0746	1.0475	1.1123
0.0062	1.1494	1.1539	1.1113	1.0676	1.1400

2017 Load Forecast Uncertainty Models

Multiplier	Zones A-E	Zones F&G	Zones H&I	Con Ed (J)	LIPA (K)
0.0062	0.8399	0.7997	0.7992	0.8543	0.7874
0.0606	0.8892	0.8670	0.8598	0.9002	0.8396
0.2417	0.9434	0.9347	0.9197	0.9440	0.9198
0.3830	1.0000	1.0000	0.9768	0.9842	1.0000
0.2417	1.0559	1.0602	1.0291	1.0192	1.0802
0.0606	1.1073	1.1124	1.0746	1.0475	1.1123
0.0062	1.1494	1.1539	1.1113	1.0676	1.1400

2017 LFU remains unchanged from the 2016 LFU forecast





Attachment B

New and Retiring Generating Units

Attachment C

Attachment C1

Attachment D

Emergency Operating Procedures

Attachment E

Attachment E1

Attachment F

SCR Determinations

Assumption Matrix History

Date	Ver	Preliminary Base Case	Ver	Final Base Case
2/3/16	V0.1	Preliminary assumptions without attachments.		
2/5/16	V01	Added "Draft" watermark. Editorial Changes as discussed at the 2/3 ICS meeting.		
2/22/16	V02	Load Shape, LFU, and LFU graph added. Solar 5-year assumption added.		
3/22/16	V03	Generator IIFO added, Wind Shape and Solar Resources assumption modified		