

# 2015-2016 NYCA IRM Requirement Study

## Base Case Model Assumptions

### Load Parameters

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Preliminary Peak Load (for preliminary base case study and sensitivities)	2013 Gold Book: NYCA: 33,725 MW NYC: 11,658 MW Long Island: 5,566 MW	2014 Gold Book: NYCA: aaa,aa MW NYC: bb,bbb MW Long Island: c,ccc MW Zones G-J: dd,ddd MW	This peak load forecast is utilized for the parametric results.	N	
Peak Load	October 1 , 2013 forecast NYCA: 33,655 MW NYC: 11,740 MW Long Island 5,461 MW	October 1 , 2014 forecast NYCA: xx,xxx MW NYC: yy,yyy MW Long Island z,zzz MW	Forecast based on examination of 2014 weather normalized peaks. Top three external Area peak days aligned with NYCA	N	
Load Shape	Multiple Load Shapes Model using years <b>2002, 2006, and 2007</b>	Multiple Load Shapes Model using years <b>xxxx, yyyy..., and zzzz</b>	Evaluation of load shapes per previous white paper	N	
Load Forecast Uncertainty	Zonal model updated to reflect current data	Zonal model updated to reflect current data	Based on collected data and input from LIPA, Con Ed, and NYISO. (See attachment A)	N	

## 2015-2016 IRM Study Assumption Matrix

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### Capacity Parameters - Generation

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Existing Generating Unit Capacities	2013 Gold Book values. Use min (DMNC vs. CRIS) capacity value	2014 Gold Book values. Use min (DMNC vs. CRIS) capacity value	2014 Gold Book publication	N	
Proposed New Non-Wind Units	76.9 MW of capacity was repowered or returned to service	Yyy MW of new wind resources (see Attachment B)	Units built since the 2014 Gold Book and those non-renewable units with Interconnection Agreements signed by August 1.	N	
Retirements	164 MW retirements reported	xxx MW retirements reported See Attachment B3	Policy 5 guidelines on retirement disposition in IRM studies	N	
Forced and Partial Outage Rates	Five-year (2008-2012) GADS data for each unit represented. Those units with less than five years – use representative data.	Five-year (2009-2013) GADS data for each unit represented. Those units with less than five years – use representative data. See attachments C and C1	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods over the most recent five-year period (2009-2013)	N	
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	
Summer Maintenance	Nominal 50 MWs – divided equally between upstate and downstate	Nominal 50 MWs – divided equally between upstate and downstate	Review of most recent data	N	

## 2015-2016 IRM Study Assumption Matrix

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### Capacity Parameters – Generation (continued)

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
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	
Proposed New Wind Units	No new wind	Xxx MW of new wind See Attachment B1	Renewable units based on RPS agreements, interconnection Queue and ICS input	N	
Wind Resources	Wind Capacity – 1366.6 MWs	Wind Capacity yyyy MWs		N	
Wind Shape	Actual hourly plant output of the 2012 calendar year. Summer Peak Hour availability of 17%	Actual hourly plant output of the 2013 calendar year. Summer Peak Hour availability of yy%	Production data	N	
Solar Resources	Solar Capacity of 31.5 MW plus 12.5 MW of new units. See Attachment B-2	Solar Capacity of xx MW plus yy MW of new units. See Attachment B-2	Based on collected hourly solar data Summer Peak Hour capacity factor based on June 1 – Aug 31, hours HB14 – HB18	N	
Non-NYPA Hydro Resources	Derate by 45%	Derate by xx%	Review of unit production and hydrological conditions including recognized forecasts (i.e. NOAA)	N	

## 2015-2016 IRM Study Assumption Matrix

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### Capacity Parameters – Import and Exports

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Capacity Purchases	Grandfathered amounts: PJM – 1080 MW HQ – 1090 MW All contracts model as equivalent contracts	Grandfathered amounts: PJM – 1080 MW HQ – 1090 MW All contracts model as equivalent contracts	Grandfathered Rights, ETCNL, and other FERC identified rights	N	
Capacity Sales	Long Term firm sales (279 MW)	Long Term firm sales (yyy MW)	These are long term federally monitored contracts	N	
New UDRs	No new UDRs	No new UDRs		N	

## 2015-2016 IRM Study Assumption Matrix

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### Topology Parameters

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Interface Limits	All changes reviewed and commented on by TPAS See Attachment E	All changes reviewed and commented on by TPAS See Attachment E	Based on 2014 Operating Study, 2014 Operations Engineering Voltage Studies, 2014 Comprehensive Planning Process, and additional analysis including interregional planning initiatives	N	
New Transmission	None Identified	None Identified(?)	Based on TO provided models and NYISO review	N	
Cable Forced Outage Rates	All existing Cable EFORs 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	

## 2015-2016 IRM Study Assumption Matrix

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### Emergency Operating Procedure Parameters

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Special Case Resources	July 2014 – 1195 MW based on registrations and modeled as 758 MW of effective capacity . Monthly variation based on historical experience (no Limit on number of calls)	July 2014 – xxxx MW based on registrations and modeled as yyy MW of effective capacity . Monthly variation based on historical experience (no Limit on number of calls)	Those sold for the program discounted to historic availability. Summer values calculated from July 2014 registrations (see attachment F).	N	
EDRP Resources	July 2013 – 93.9 MW registered model as 12.8 MW in July and proportional to monthly peak load in other months. Limit to five calls per month	July 2014 – uuu MW registered model as rr 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 2014 registrations and forecast growth.	N	
Other EOPs	721 MW of non-SCR/non-EDRP resources See Attachment D	vvv MW of non-SCR/non-EDRP resources See Attachment D	Based on TO information, measured data, and NYISO forecasts	N	

## 2015-2016 IRM Study Assumption Matrix

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### External Control Areas Parameters

Parameter	2014 Model Assumptions	2015 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
PJM	Load and Capacity data provided by PJM/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 See Attachment E	Load and Capacity data provided by PJM/NPCC CP-8 <del>Some EOPs allowed.</del> Data may be adjusted per NYSRC Policy 5 See Attachment E	Initial review performed by the NPCC CP-8 WG. <del>Additional analysis per White Paper.</del>	<del>Y</del> N	<del>Low (-)</del>
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	
HQ	Load and Capacity data provided by HQ/NPCC CP-8 Data may be adjusted per NYSRC Policy 5 See 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	
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	
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	

## 2015-2016 IRM Study Assumption Matrix

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### Miscellaneous Parameters

<b>Parameter</b>	<b>2014 Model Assumptions</b>	<b>2015 Model Assumptions Recommended</b>	<b>Basis for Recommendation</b>	<b>Model Change</b>	<b>Possible IRM Impact*</b>
MARS Model Version	Version 3.16.5	Version 3.18.x	Per benchmark testing and ICS recommendation	N	
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	Impacts mitigated by operational procedure during peak hours	N	



# 2015-2016 IRM Study Assumption Matrix

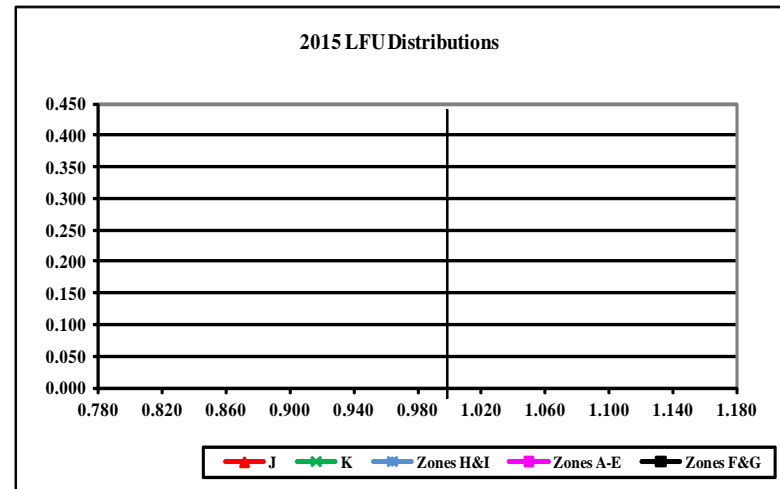
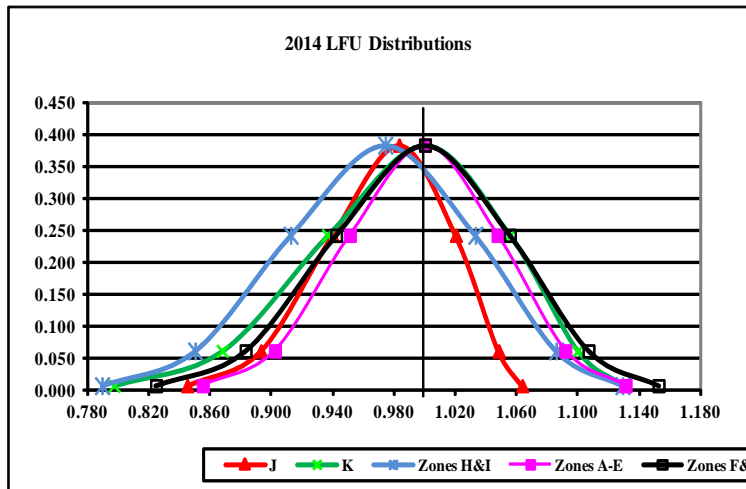
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## Attachment A NYCA Load Forecast Uncertainty

### 2014 and 2015 LFU Models

Multiplier	Zones A-E	Zones F&G	Zones H&I	Con Ed (J)	LIPA (K)
0.0062	1.1309	1.1524	1.1289	1.0635	1.1295
0.0606	1.0916	1.1067	1.0856	1.0481	1.0996
0.2417	1.0474	1.0554	1.0329	1.0202	1.0554
0.3830	1.0000	1.0000	0.9741	0.9831	1.0000
0.2417	0.9510	0.9420	0.9123	0.9397	0.9364
0.0606	0.9021	0.8830	0.8500	0.8929	0.8677
0.0062	0.8550	0.8245	0.7893	0.8449	0.7971

Multiplier	Zones A-E	Zones F&G	Zones H&I	Con Ed (J)	LIPA (K)
0.0062					
0.0606					
0.2417					
0.3830					
0.2417					
0.0606					
0.0062					



## 2015-2016 IRM Study Assumption Matrix

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Attachment B  
**List<sup>1</sup> of Proposed Units**  
**(To be in-service by summer of 2015)**

<b><u>Project Name</u></b>	<b><u>IS Date</u></b>	<b><u>Zone</u></b>	<b><u>MW</u></b>
<b>Total</b>			

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<sup>1</sup> The list on this page does not show wind units which are presented on Attachment B-2. These additions are since the publication of the Gold Book.

## 2015-2016 IRM Study Assumption Matrix

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### Attachment B1 Renewable Generating Wind Projects for Inclusion in the 2014-2015 Installed Reserve Margin Study

Facility Name	Zone	Connecting Transmission Owner	NYISO Interconnection Study Queue Project Number	Projected/ Actual In-Service Date	New Wind Capacity for 2015 IRM (MW)	Total Wind Capacity for 2015 IRM (MW)
<b>Existing Units</b>						
Steel Wind	A	National Grid		2007 Jan		20.0
Bliss Wind Power	A	Village of Arcade	173	2008 May		100.5
Canandaigua Wind Power	C	NYSEG	135&199	2008 Jun		125.0
Hardscrabble Wind	E	National Grid	156	2011 Sept		74.0
Howard Wind	C	NYSEG	182	2011 Dec		55.4
Wethersfield Wind Power	C	NYSEG	177	2008 Dec		126.0
High Sheldon Wind Farm	C	NYSEG	144	2009 Feb		112.5
Altona Wind Power	D	NYPA	174	2008 Sept		97.5
Chateaugay Wind Power	D	NYPA	214	2008 Sept		106.5
Clinton Wind Power	D	NYPA	172 & 211	2008 May		100.5
Ellenburg Windpark	D	NYPA	175	2008 May		81.0
Munnsville	E	NYSEG	127A	2007 Aug		34.5
Maple Ridge 1	E	National Grid	171	2006 Feb		231.0
Maple Ridge 2	E	National Grid	171	2006 Feb		90.7
Madison Wind Power	E	NYSEG	N/A	2000 Sept		11.5
<b>Proposed Units</b>						
<b>TOTAL CAPACITY - ALL CATEGORIES</b>						

## 2015-2016 IRM Study Assumption Matrix

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### Attachment B-2

#### List of Solar proposed Units

To be in-service by summer of 2015

<u>Project Name</u>	<u>IS Date</u>	<u>Zone</u>	<u>MW</u>
LI Feed-in-Tariff(?)	6/15	K	12.5 MW

### Attachment B-3

#### Proposed Generating Unit Retirements

(for Inclusion in the 2015-2016 Installed Reserve Margin Study)

<u>Unit</u>	<u>Zone</u>	<u>MW*</u>
	<b>Total:</b>	

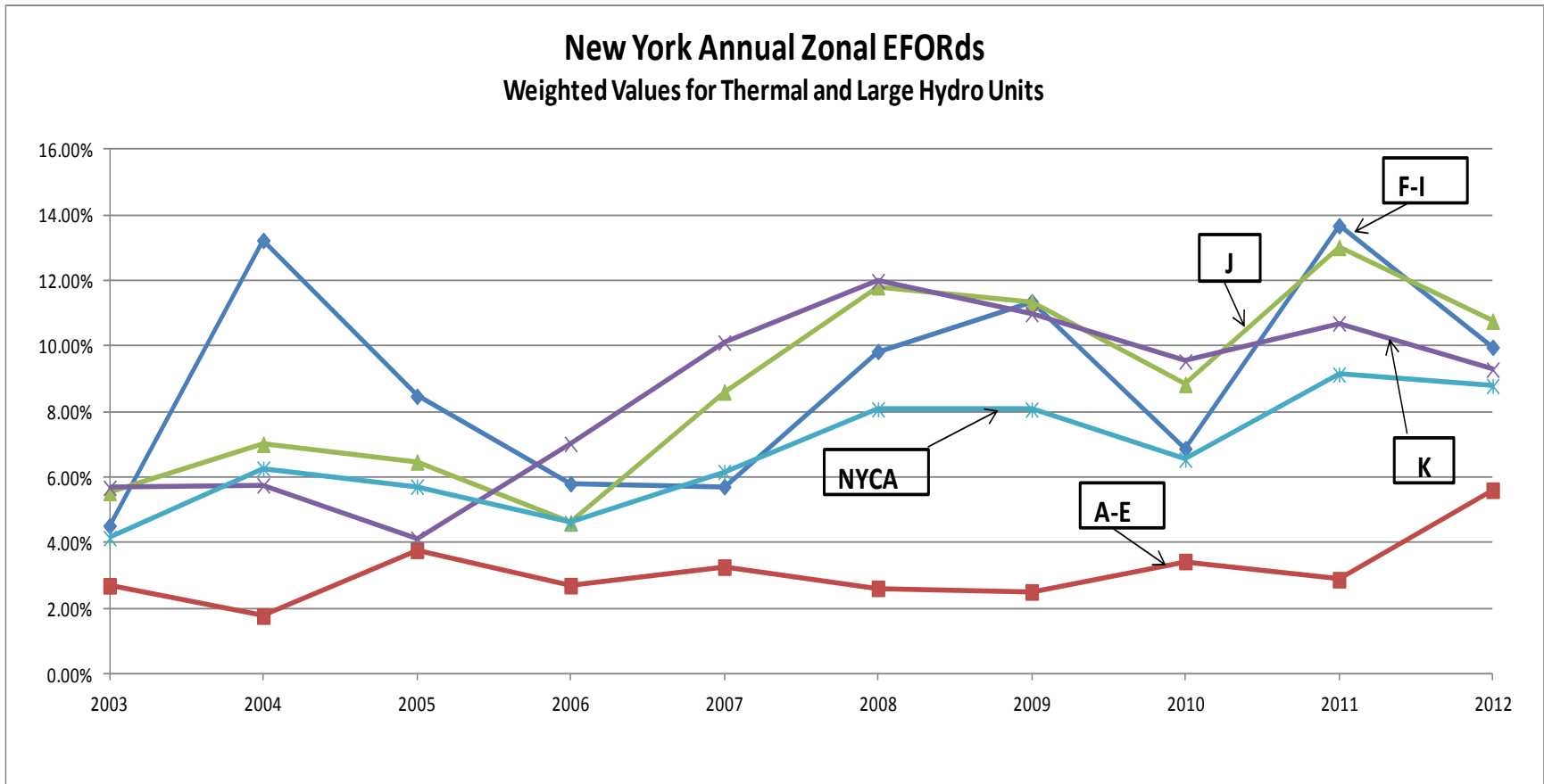
\*MW output based on latest DNMC testing.

All differences in MW's are starting from the Gold Book Values

# 2015-2016 IRM Study Assumption Matrix

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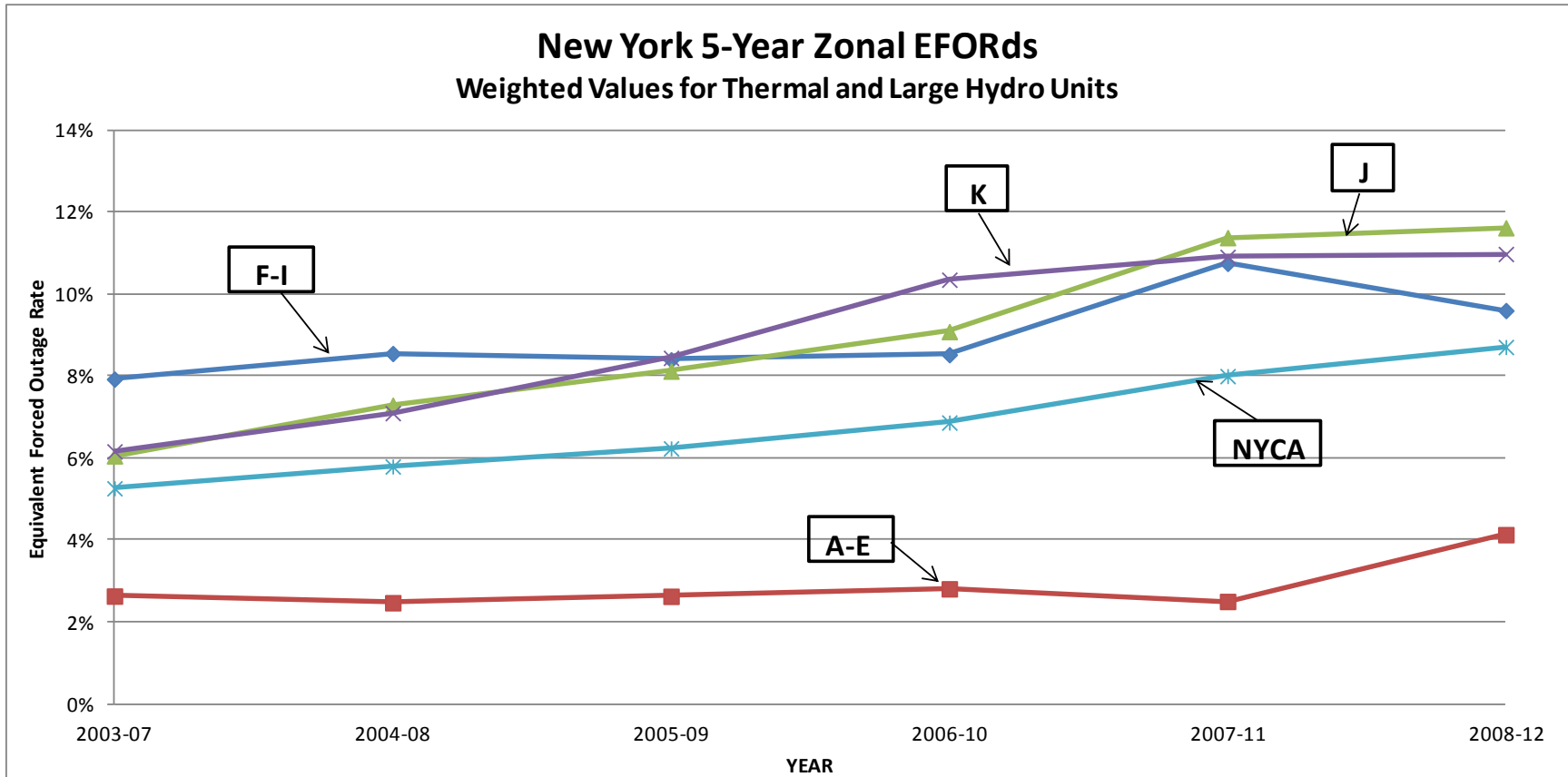
## Attachment C (to include 2013)



# 2015-2016 IRM Study Assumption Matrix

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## Attachment C1 (to include 2009-2013)



## 2015-2016 IRM Study Assumption Matrix

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### Attachment D (to be updated) Emergency Operating Procedures

<b>Step</b>	<b>Procedure</b>	<b>Effect</b>	<b>2014 MW Value</b>	<b>2015 MW Value</b>
1	Special Case Resources	Load relief	1195 MW (representing the amount sold)	1195 MW (representing the amount sold)
2	Emergency Demand Response Program*	Load relief	94/13MW	MW
3	5% manual voltage Reduction	Load relief	73 MW	MW
4	Thirty-minute reserve to zero	Allow operating reserve to decrease to largest unit capacity (10-minute reserve)	655 MW	MW
5	5% remote voltage reduction	Load relief	444 MW	MW
6	Voluntary industrial curtailment	Load relief	116 MW	MW
7	General public appeals	Load relief	88 MW	MW
8	Emergency Purchases	Increase capacity	Varies	Varies
9	Ten-minute reserve to zero	Allow 10-minute reserve to decrease to zero	1310 MW	MW
10	Customer disconnections	Load relief	As needed	As needed

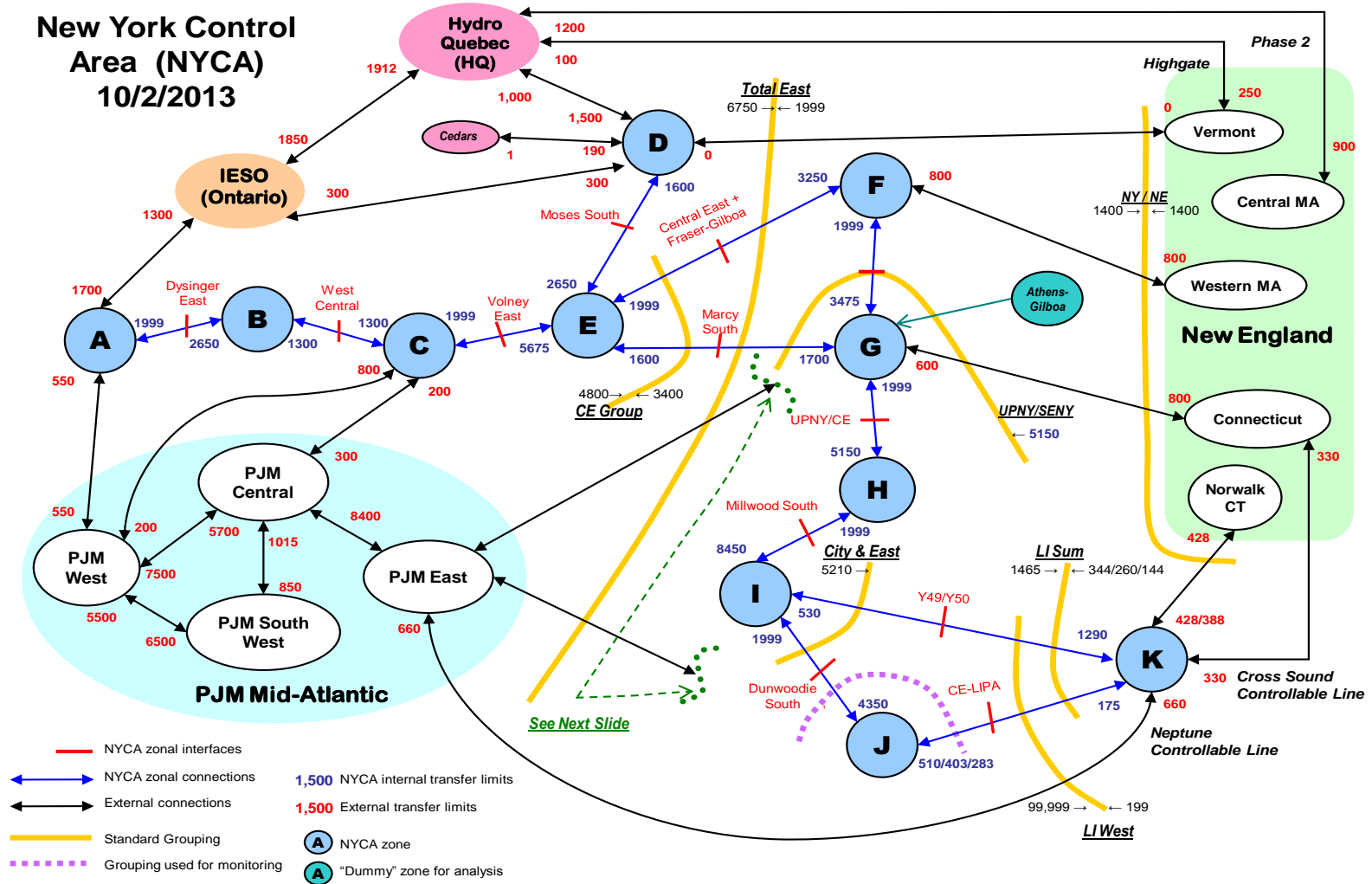
\* These values represent the registered and effective amounts

# 2015-2016 IRM Study Assumption Matrix

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## Attachment E (to be updated)

Transmission System Representation 2014 IRM Study - Summer Emergency Ratings (MW)





# 2015-2016 IRM Study Assumption Matrix

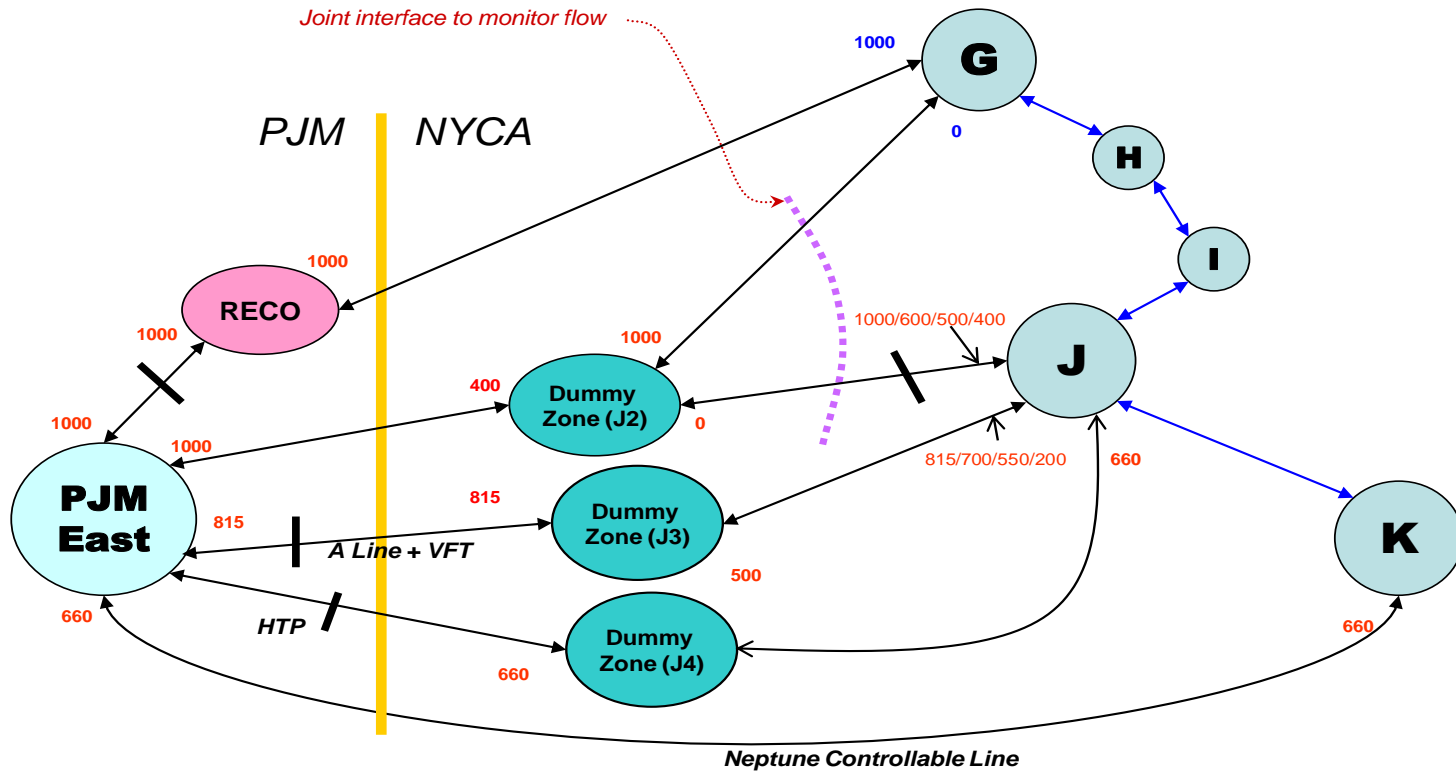
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Attachment E1 (to be updated)

Transmission System Representation 2014 IRM Study - Summer Emergency Ratings (MW)

## PJM-SENY MARS Model

10/2/2013



(PJM East to RECO) + (J2 to J) + (PJM East to J3) + (PJM East to J4) = 2000 MW. The reverse limit is 1500 MW

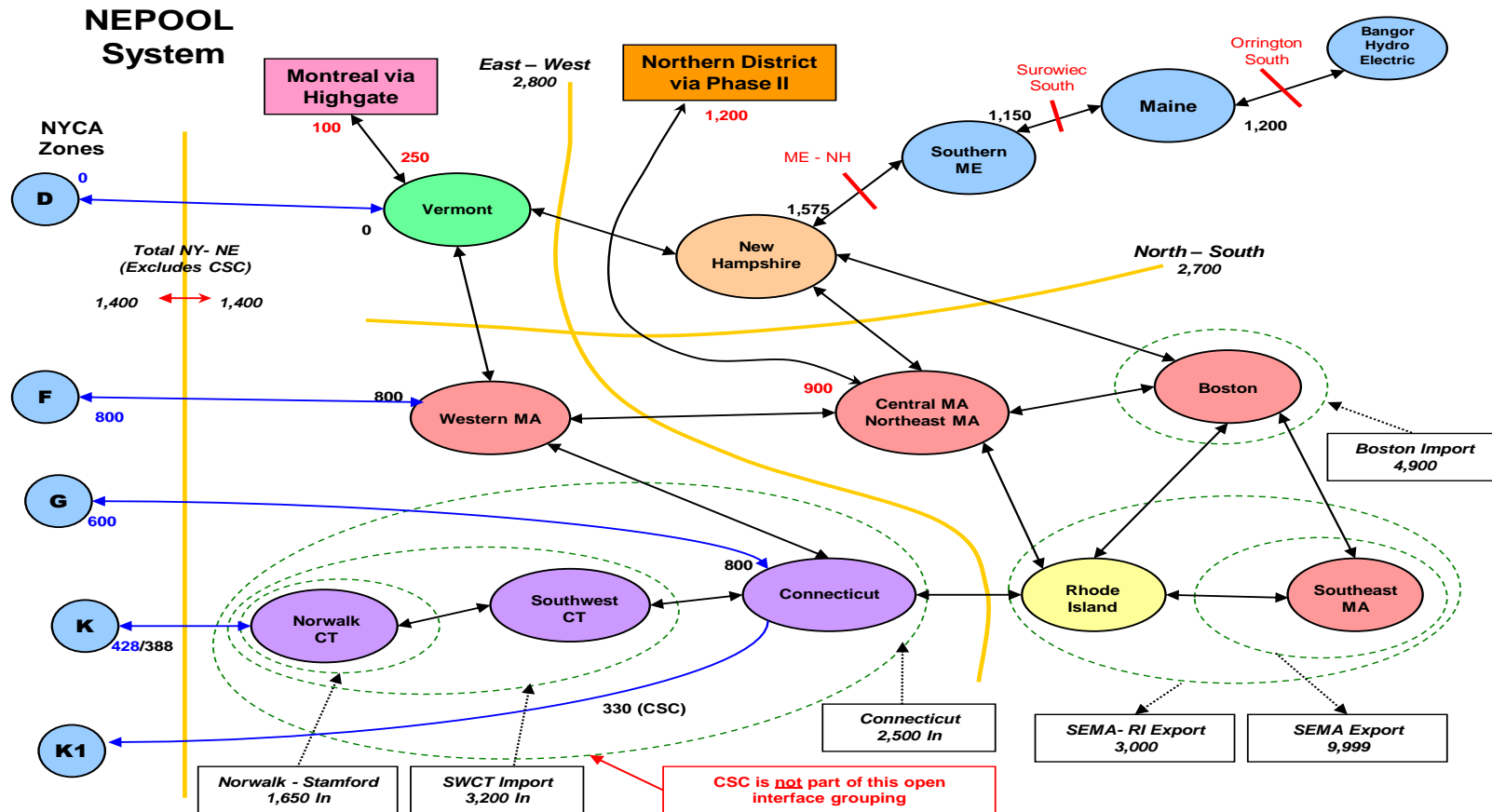
Based on the delays in supporting transmission projects, the 2000 MW Limit is maintained. This interface grouping contains those interfaces with the Bold hash mark. MARS will distribute this flow accordingly. This limit will change to 2340 MW when additional transmission and generation comes into service in 2016.

# 2015-2016 IRM Study Assumption Matrix

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## Attachment E2 New England Representation (to be updated)

Transmission System Representation 2014 IRM Study - Summer Emergency Ratings (MW) – August 1, 2013



## 2015-2016 IRM Study Assumption Matrix

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### Attachment F(to be updated) SCR Determinations

### SCR Performance

	A	B	C	D	E	F
		=A*(?%)		=B*C		=D*E
<u>Zones</u>	<u>July 2014 Registrations</u>	<u>2015 Forecast<sup>1</sup></u>	<u>Performance Factor<sup>2</sup></u>	<u>2015 UCAP</u>	<u>Derate Factor<sup>3</sup></u>	<u>In Model Value</u>
A-E						
F-I						
J						
K						
Total	0.0	0.0		0		0

1. These values represent no growth from July 2014 ICAP based registrations.
2. Based on ACL
3. This SCR Derate factor captures three different performance derates. These are; 1) the translation factor betw ACL and CBL values (=0.90), 2) the Effective Capacity Value (ECU)(=0.95), and 3) the fatigue factor (=0.95).