V4 April 30, 2013

2014-2015 NYCA IRM Requirement Study

Base Case Model Assumptions

Load Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Preliminary Peak Load (for preliminary base case study and sensitivities)	2012 Gold Book: NYCA: 33,696 MW NYC: 11,680 MW Long Island: 5,643 MW	2013 Gold Book: NYCA: 33,725 MW NYC: 11,658 MW Long Island: 5,566 MW	This peak load forecast is utilized for the parametric results.	N	None (uniform changes)
Peak Load	October 1 , 2012 forecast NYCA: 33,278MW NYC: 11,532 MW Long Island: 5,553 MW	October 1 , 2013 forecast NYCA: bbMW NYC: cc MW Long Island: dd MW	Forecast based on examination of 2013 weather normalized peaks. Top three external Area peak days aligned with NYCA	N	(?)
Load Shape	2002 Load Shape	Multiple Load Shapes See attachment Z	As determined by the NYSRC	Y	Med(-) less conservative
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. Method and values accepted by LFTF (See attachment A)	N	Med (+)

*(-) indicates a reduction in IRM while (+) indicates an increase. Range: Low < 0.5%, Medium 0.5% - 1%, High > 1%

Capacity Parameters - Generation

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Existing Generating Unit Capacities	2012 Gold Book values Use min (DMNC vs. CRIS) capacity value	2013 Gold Book values. Use min (DMNC vs. CRIS) capacity value	2013 Gold Book publication	N	None
Proposed New Non-Wind Units	See Attachment B	There are no new units identified having CRIS rights.	Units built since the 2013 Gold Book and those non-renewable units with Interconnection Agreements signed by August 1.	N	None
Retirements	924 MW of retirements See Attachment B2	No new retirements reported See Attachment B2	Newly adopted Policy 5 guidelines on retirement disposition in IRM studies	N	None
Forced and Partial Outage Rates	Five-year (2007-2011) GADS data Those units with less than five years – use representative data. See attachments C and C1	Five-year (2008-2012) GADS data Those units with less than five years – use representative data. See attachments C and C1	Most recent five-year period Includes proxy data for new unit(s) and units that are deemed suspect as part of the GADS screening process (ff suspect units identified this year)	N	**Low(+)** Despite Lower EFORd, 5 Year trend Is up
Transition Rates	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods from APA method using GADS Open Source software	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods from APA method using GADS Open Source software	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods	N	None

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Capacity Parameters – Generation (continued)

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
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	None
Summer Maintenance	Nominal 50 MWs – divided equally between upstate and downstate	Nominal LL MWs – divided equally between upstate and downstate	Review of most recent data	N	None
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	None
Proposed New Wind Units	215 MW of new wind See Attachment B1	No new wind Proposed See Attachment B1	Renewable units based on RPS agreements, interconnection Queue and ICS input	N	None
Wind Resources	Wind Capacity – 1584 MWs Derived from hourly wind data resulting in an average Summer Peak Hour availability of ~11%	Wind Capacity – 1362.5 MWs Derived from actual hourly plant output resulting in an average Summer Peak Hour availability of ~17%	Based on Summer Peak Hour capacity factor during the period June 1 – Aug 31, hours HB14 – HB18	N	Low(-) Less wind, lower IRM
Wind Shape	2002 Wind Generation Profile	2012 Wind Generation profile ~~modified by model to randomize wind output~~	Testing results and White Paper.	Y	Low(-) Better CF

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Capacity Parameters – Generation (continued)

Solar Resources	Solar Capacity – 31.5 plus 30.1 MW of new units Unit output checked against actual hourly solar data. See Attachment B-2	Forecasts of new solar have been optimistic. Only ½ of the proposed solar units were added. No units projected.	Based on collected hourly solar data Summer Peak Hour capacity factor based on June 1 – Aug 31, hours HB14 – HB18	N	None
Non-NYPA Hydro Resources	Derate by 45%	Derate by xx%	Review of unit production and hydrological conditions including recognized forecasts (i.e. NOAA)	N	None

Capacity Parameters – Import and Exports

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Capacity Purchases	Grandfathered amounts: ISONE – 50 MW (through 12/2013) 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. ETCNL not modeled	Grandfathered Rights, ETCNL, and other FERC identified rights	N	Low (-) possible EA from ETCNL
Capacity Sales	Long Term firm sales (283 MW)	Long Term firm sales (ttt MW)	These are long term federally monitored contracts	N	None
New UDRs	HTP line used for	None identified	UDRs awarded to Hudson	N	None

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	emergency assistance.		Transmission Project (HTP). HTP elected to use the line for emergency assistance.		

Topology Parameters

Parameter	2013 Model Assumptions	2014 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 2013Operating Study, 2013 Operations Engineering Voltage Studies, 2013 Comprehensive Planning Process, and additional analysis including interregional planning initiatives	N	
New Transmission	HTP – Hudson Transmission Project – scheduled for 2013 operation	None Identified	Based on TO provided models and NYISO review	N	None
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	Low(+)extended outages entering history

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Emergency Operating Procedure Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
Special Case Resources	July 2013 – 1767 MW based on registrations and NYISO growth rate forecast and modeled as 1437 MW . Monthly variation based on historical experience (no Limit on number of calls)	Note: Changes in participation expected	Those sold for the program discounted to historic availability. Summer values calculated from July 2013 registrations (see attachment F).	N	Low(+) Less participation, Higher unavailable
EDRP Resources	July 2012 – 143.9 MW registered model as 14.4 MW in July and proportional to monthly peak load in other months. Limit to five calls per month	July 2013 – uuu MW registered model as vv 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 2013 registrations and forecast growth.	N	None
Other EOPs	765 MW of non-SCR/non-EDRP resources See Attachment D	eee MW of non-SCR/non-EDRP resources See Attachment D	Based on TO information, measured data, and NYISO forecasts	N	None

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External Control Areas Parameters

Parameter	2013 Model Assumptions	2014 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 Data may be adjusted per NYSRC Policy 5 See Attachment E	Additional level of review (prior to Policy 5 changes) performed by the NPCC CP-8 WG	N	High(-)
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	Additional level of review (prior to Policy 5 changes) performed by the NPCC CP-8 WG	N	None
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	Additional level of review (prior to Policy 5 changes) performed by the NPCC CP-8 WG	N	None
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	Additional level of review (prior to Policy 5 changes) performed by the NPCC CP-8 WG	N	None

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External Control Areas Parameters (Continued)

Reserve Sharing	All NPCC Control Areas 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	None

Miscellaneous Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change	Possible IRM Impact*
MARS Model Version	Version 3.14	Version 3.16.5~~ss~~	Per benchmark testing and ICS recommendation	N	None
Environmental Initiatives	No estimated impacts based on review of existing rules and retirement trends	Generation will be affected in 2014. Impacts as described in Attachment W	An analysis of air and water pollution rules, Retirement trends, and Economic conditions	N	High (+)

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Attachment A
NYCA Load Forecast Uncertainty

DRAFT - NUMBERS HAVE BEEN USED FOR 2014. These values are still being discussed.

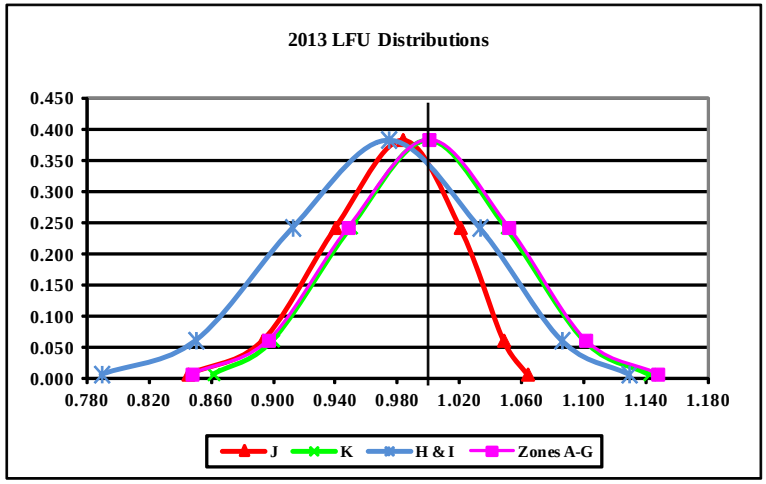
2013 and 2014 LFU Models

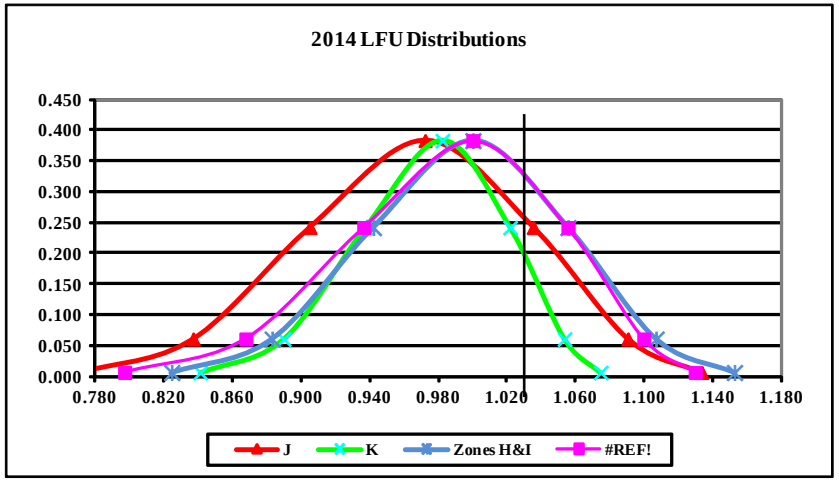
2013 Load Forecast Uncertainty Models

Multiplier	Zones H&I	Con Ed (J)	LIPA (K)	Zones A-G
0.0062	1.1289	1.0635	1.1420	1.1473
0.0606	1.0856	1.0481	1.1004	1.1009
0.2417	1.0329	1.0202	1.0502	1.0514
0.3830	0.9741	0.9831	1.0000	1.0000
0.2417	0.9123	0.9397	0.9498	0.9480
0.0606	0.8500	0.8929	0.8996	0.8967
0.0062	0.7893	0.8449	0.8613	0.8475

2014 Load Forecast Uncertainty Models

Multiplier	Zones A-E	Zones F&G	Zones H&I	Con Ed (J)	LIPA (K)
0.0062	1.1309	1.1524	1.1333	1.0745	1.1295
0.0606	1.0916	1.1067	1.0903	1.0534	1.0996
0.2417	1.0474	1.0554	1.0352	1.0217	1.0554
0.3830	1.0000	1.0000	0.9721	0.9822	1.0000
0.2417	0.9510	0.9420	0.9050	0.9374	0.9364
0.0606	0.9021	0.8830	0.8370	0.8897	0.8677
0.0062	0.8550	0.8245	0.7709	0.8411	0.7971





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Attachment B
List[1] of Proposed Units
(To be in-service by summer of 2014)

Project Name	IS Date	Zone	MW
No projects with CRIS rights			

List of Proposed Solar Farms

Facility Name	Zone	Connecting Transmission Owner	NYISO Interconnection Study Queue Project Number	Projected/ Actual In-Service Date	New Solar Capacity for 2014 IRM (MW)	Total Solar Capacity for 2014 IRM (MW)
Existing Units						
Upton Solar Farms	K	LIPA	330	2007 Jan		32.0
Proposed Units						
Brentwood RR	K	LIPA		2008 May		1.0
Cohalan	K	LIPA		2008 Jun		4.0
Dennison	K	LIPA		2011 Sept		2.0
North County	K	LIPA		2011 Dec		1.0
Riverhead	K	LIPA		2008 Dec		2.5
Ronkonkoma RR	K	LIPA		2009 Feb		5.0
TOTAL CAPACITY - Solar					**0.0**	**47.5**

[1] The list on this page does not show wind units which are presented on Attachment B-1.

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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 2014 IRM (MW)	Total Wind Capacity for 2014 IRM (MW)
Existing Units						
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		51.3
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
Marble River Wind Farm 1 and 2	D	NYPA	161 & 171	2012 Oct		0.0
Proposed Units						
TOTAL CAPACITY - ALL CATEGORIES					**0.0**	**1,362.5**

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Attachment B2
Proposed Generating Unit Retirements
(for Inclusion in the 2014-2015 Installed Reserve Margin Study)

Unit	Zone	MW
	Total:	

* Ravenswood GT 3-4 (32 MW) retired on 9/01/2011 and has already shown 0 MW of summer capability in the 2012 Gold Book. Several other units fall into this category and are listed in the 2012 Gold Book on table IV-3a (page 61).

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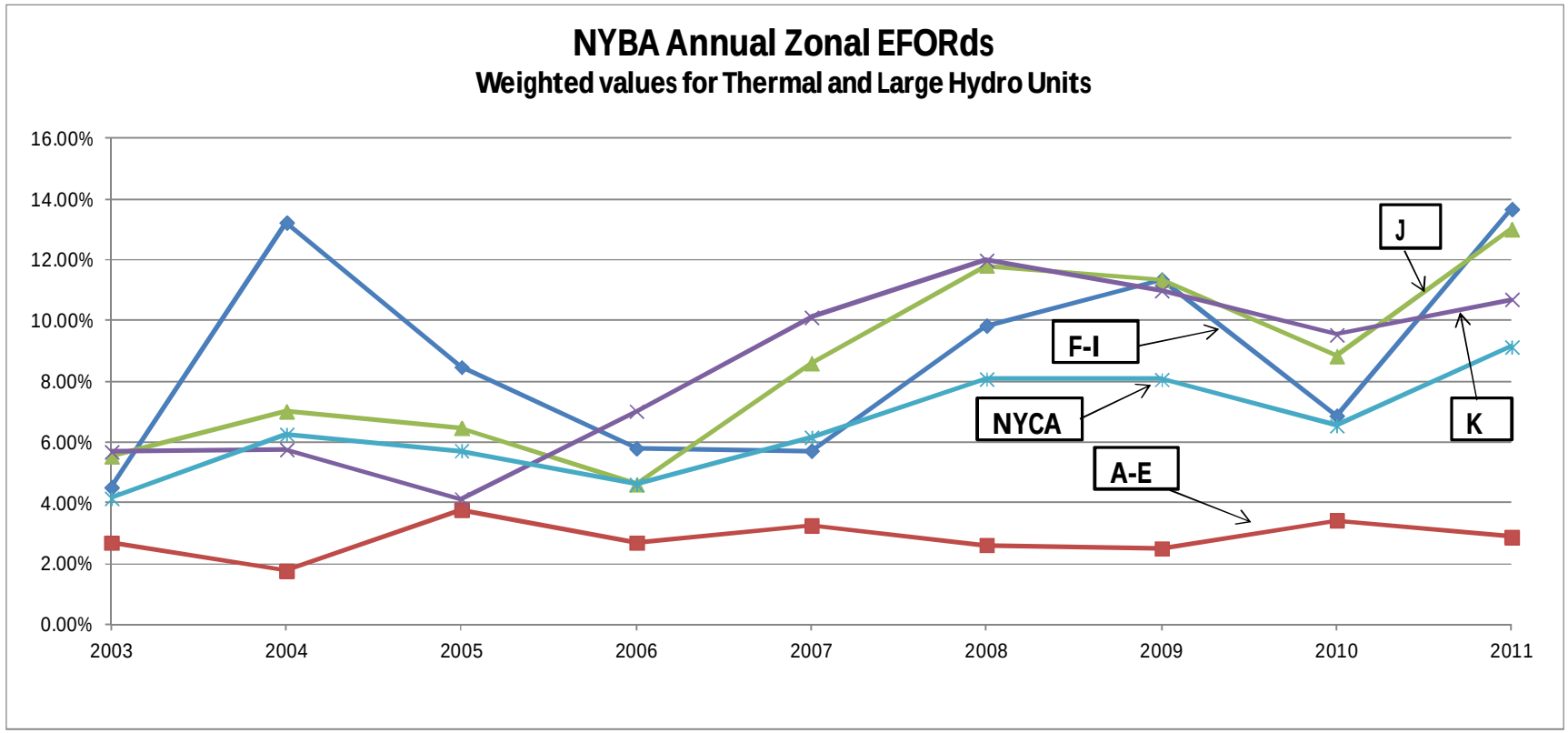
Attachment C (needs 2012)



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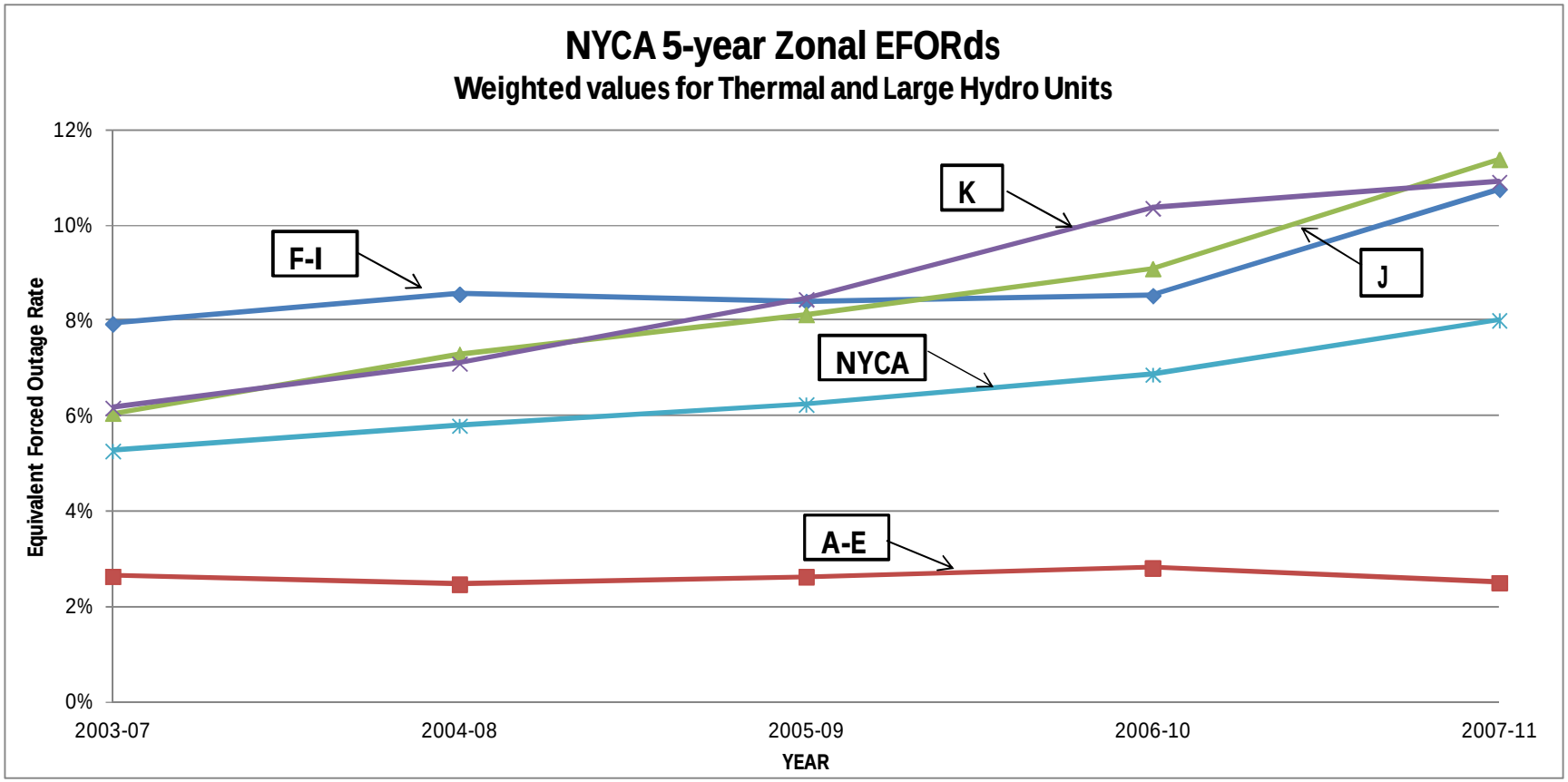
Attachment C1(Needs 08-12)



*(-) indicates a reduction in IRM while (+) indicates an increase. Range: Low < 0.5%, Medium 0.5% - 1%, High > 1%

Attachment D
Emergency Operating Procedures

Step	Procedure	Effect	2013 MW Value	2014 MW Value
1	Special Case Resources	Load relief	1767 MW (representing the amount sold)	xxxx MW (representing the amount sold)
2	Emergency Demand Response Program*	Load relief	144/14 MW	yyy/zz MW
3	5% manual voltage Reduction	Load relief	66 MW	aa MW
4	Thirty-minute reserve to zero	Allow operating reserve to decrease to largest unit capacity (10-minute reserve)	655 MW	655 MW
5	5% remote voltage reduction	Load relief	486 MW	bbb MW
6	Voluntary industrial curtailment	Load relief	125 MW	bbb MW
7	General public appeals	Load relief	88 MW	cc MW
8	Emergency Purchases	Increase capacity	Varies	Varies
9	Ten-minute reserve to zero**	Allow 10-minute reserve to decrease to zero	1310 MW	1310 MW
10	Customer disconnections	Load relief	As needed	As needed

* These values represent the registered amounts coupled with the effective amounts

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* *The reserves have increased from 1800 MW to 1965 MW as a result of the power uprate on Nine Mile 2.

Attachment E (needs update)

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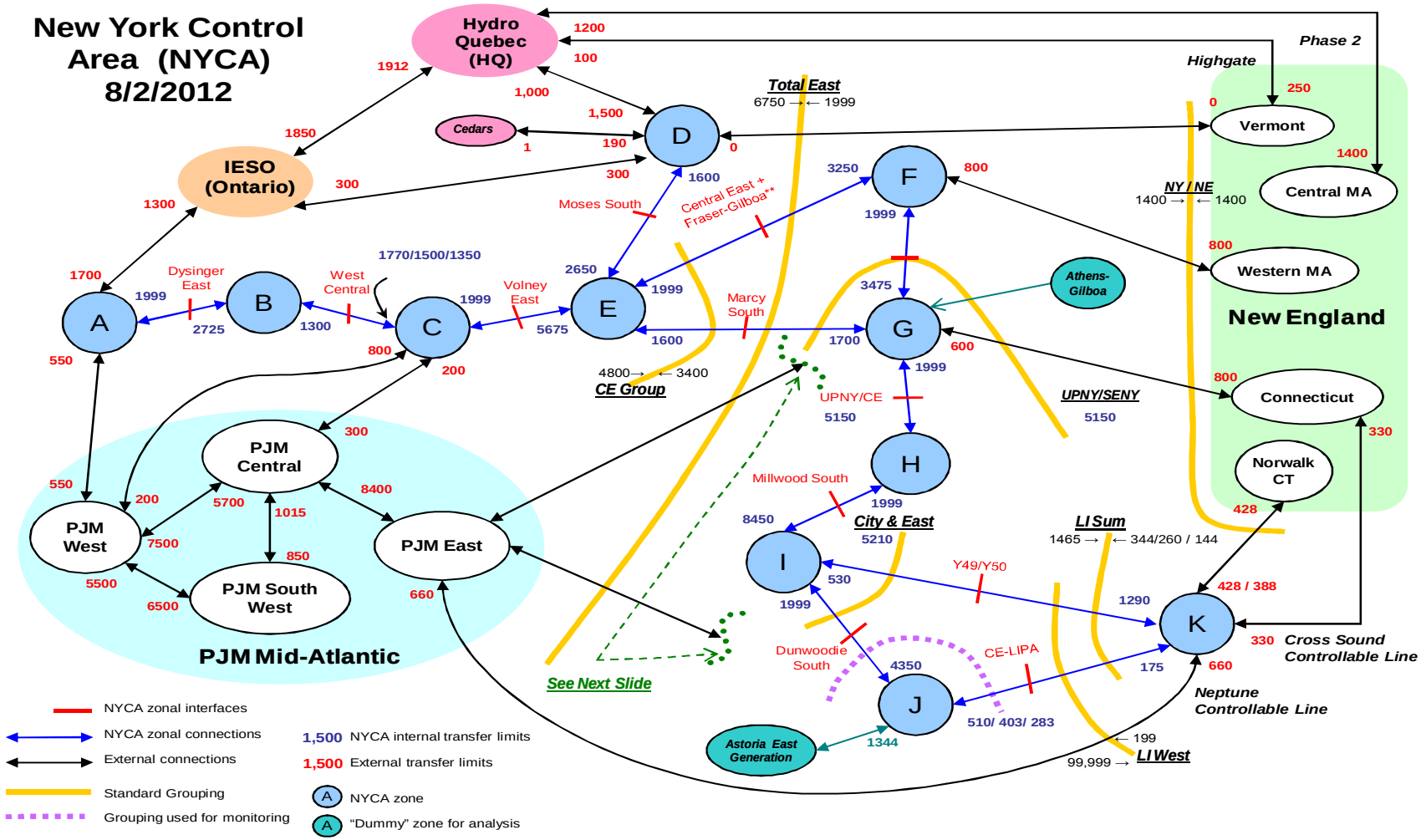
Transmission System Representation changes for 2013 IRM Study/2012 RNA - Summer Emergency Ratings (MW)



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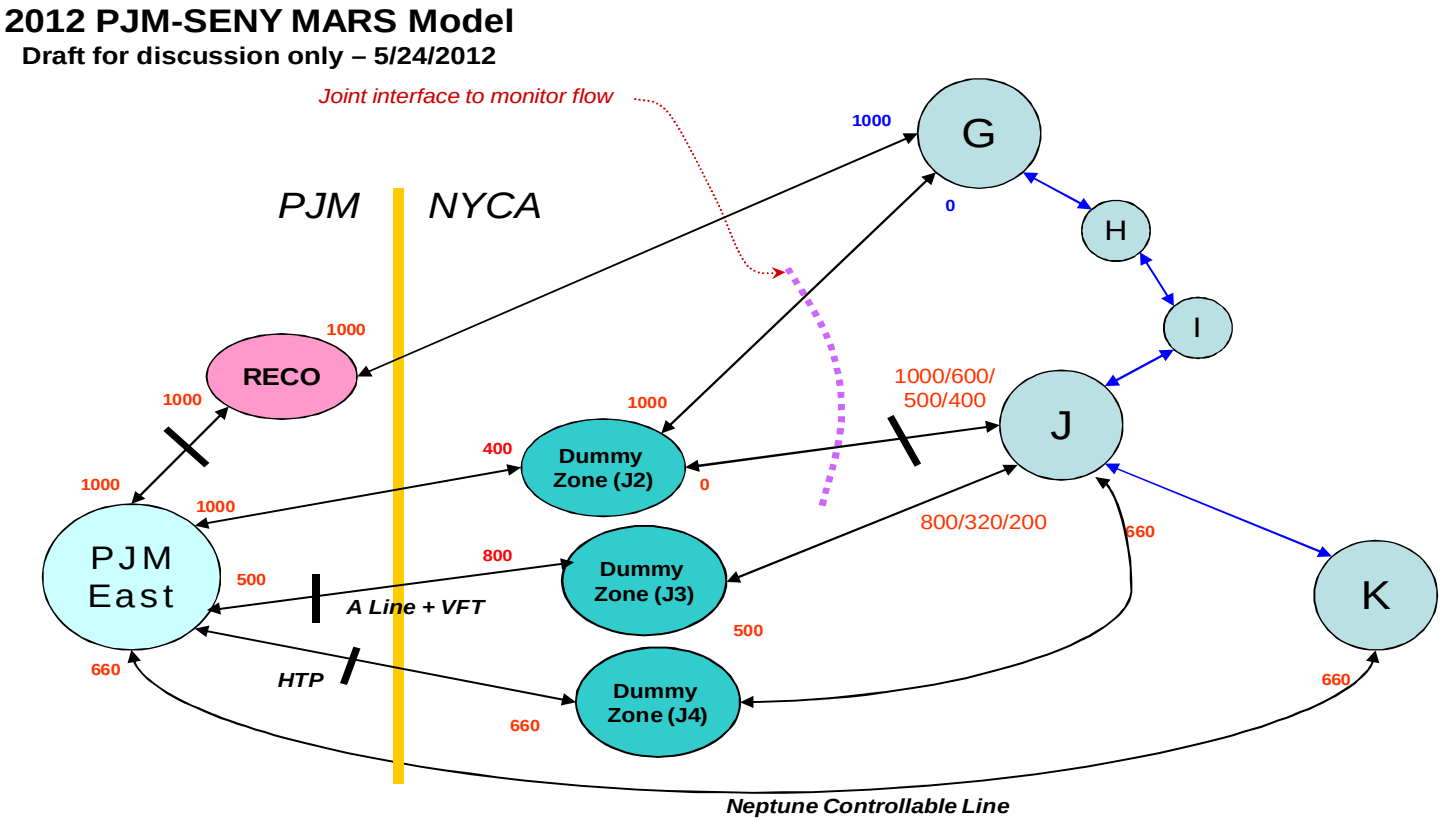
Attachment E1(needs update)

*(-) indicates a reduction in IRM while (+) indicates an increase. Range: Low < 0.5%, Medium 0.5% - 1%, High > 1%

Transmission System Representation changes for 2013 IRM Study/2012 RNA - Summer Emergency Ratings (MW)



(PJM East to RECO) + (J2 to J) + (PJM East to J3) + (PJM East to J4) = 2000 MW

With the retirement of Hudson 1 and other changes in 2011 PJM RTEP, it was determined that this total interface can be supported to a flow of 2000 MW. This interface grouping contains those interfaces with the Bold hash mark. MARS will distribute this flow accordingly. This will change when additional transmission and generation comes into service in 2014 and 2015 up to 2340.

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Attachment F (needs update)
SCR Determinations

SCR Performance

	A	B	C	D	E	F
		=A*(1.75%)		=B*C		=D*E
Zones	July 2012 Registrations	2013 Forecast[1]	Performance Factor[2]	2012 UCAP	Derate Factor[3]	In Model Value
A-E	1034.4	1052.5	0.976	1027	0.857	881
F-I	184.2	187.4	0.912	171	0.857	147
J	418.2	425.5	0.920	392	0.857	336
K	99.3	101.0	0.858	87	0.857	74
Total	1736.2	**1766.5**		1677		1437

1. These values represent a growth rate of 1.75% from July 2012 ICAP based registrations
2. Based on ACL
3. This SCR Derate factor captures three different performance derates. These are; 1) the translation factor between ACL and CBL values (=0.95), 2) the Effective Capacity Value (ECU)(=0.95), and 3) the fatique factor (=0.95).

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