

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
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: yy MW NYCzz MW Long Island: aa MW	This peak load forecast is utilized for the parametric results.	N
Peak Load	October 1 , 2012 forecast NYCA: TBD-33,278 MW NYC: TBD-11,532 MW Long Island: TBD-5,553 MW	October 1 , 2013 forecast NYCA: TBD -bbMW NYC: TBD -cc.MW Long Island: TBD -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 EC	Y
Load Forecast Uncertainty	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

2014-2015 IRM Study Assumption Matrix

Capacity Parameters - Generation

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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
Proposed New Non-Wind Units	See Attachment B		Units built since the 2013 Gold Book and those non-renewable units with Interconnection Agreements signed by August 1.	N
Retirements	924 MW of retirements See Attachment B2	fff MW of retirements See Attachment B2	Newly adopted Policy 5 guidelines on retirement disposition in IRM studies	N
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
EFORd	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods from APA method using GADS Open Source software	Recommend dropping this row as it is covered above	T. Rates representing the Equivalent Forced Outage Rates (EFORd) during demand periods	N

2014-2015 IRM Study Assumption Matrix

Capacity Parameters – Generation (continued)

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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 LL MWs – divided equally between upstate and downstate	Review of most recent data	N
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	215 MW of new wind See Attachment B1	mm MW of new wind See Attachment B1	Renewable units based on RPS agreements and ICS input	N
Wind Resources	Wind Capacity – 1584 MWs Derived from hourly wind data resulting in an average Summer Peak Hour availability of ~11%	Wind Capacity – nnnn MWs Derived from modified hourly wind data resulting in an average Summer Peak Hour availability of ~pp%	Based on Summer Peak Hour capacity factor during the period June 1 – Aug 31, hours HB14 – HB18	N
Wind Shape	2002 Wind Generation Profile	Ssss Wind Generation profile modified by model to randomize wind output	Testing results and White Paper.	Y

2014-2015 IRM Study Assumption Matrix

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		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%		Review of unit production and hydrological conditions including recognized forecasts (i.e. NOAA)	N

Capacity Parameters – Import and Exports

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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	Grandfathered Rights, ETCNL, and other FERC identified rights	N
Capacity Sales	Long Term firm sales (283 MW)	Long Term firm sales (ttt MW)	These are long term federally monitored contracts	N

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

2014-2015 IRM Study Assumption Matrix

New UDRs	HTP line used for emergency assistance.	?	UDRs awarded to Hudson Transmission Project (HTP). HTP elected to use the line for emergency assistance.	N
Capacity Wheels	None modeled. Sensitivity Case to be run	None modeled.	The ISO Tariff is silent about capacity wheels though NYCA	N

Topology Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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 2013 Operating 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
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

2014-2015 IRM Study Assumption Matrix

Emergency Operating Procedure Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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
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
Other EOPs	765 MW of non-SCR/non-EDRP	eee MW of non-SCR/non-EDRP resources	Based on TO information, measured data, and NYISO	N

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2014-2015 IRM Study Assumption Matrix

	resources See Attachment D	See Attachment D	forecasts	
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External Control Areas Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
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
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
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
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

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2014-2015 IRM Study Assumption Matrix

2014-2015 IRM Study Assumption Matrix

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
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Miscellaneous Parameters

Parameter	2013 Model Assumptions	2014 Model Assumptions Recommended	Basis for Recommendation	Model Change
MARS Model Version	Version 3.14	Version 3.ss	Per benchmark testing and ICS recommendation	N
Environmental Initiatives	No estimated impacts based on review of existing rules and retirement trends	Impacts as described in Attachment W	An analysis of air and water pollution rules, Retirement trends, and Economic conditions	N

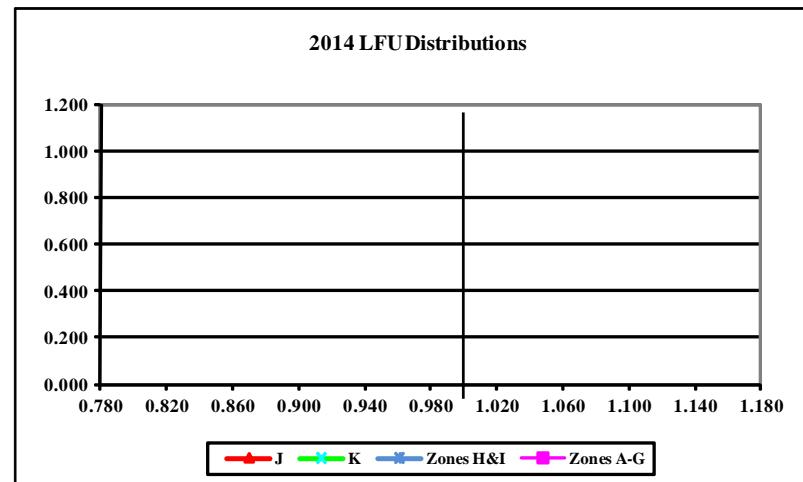
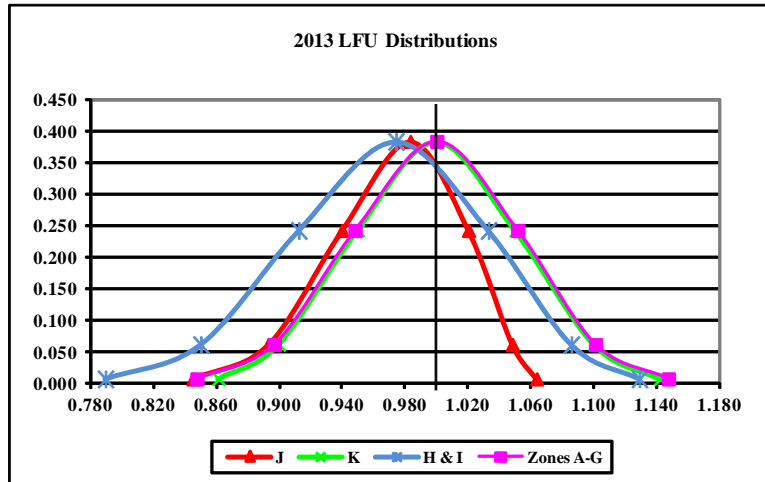
2014-2015 IRM Study Assumption Matrix

Attachment A NYCA Load Forecast Uncertainty

2012 and 2013 LFU 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

Multiplier	Zones H&I	Con Ed (J)	LIPA (K)	Zones A-G
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2014-2015 IRM Study Assumption Matrix

Attachment B
List¹ of Proposed Units
(To be in-service by summer of 2014)

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

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

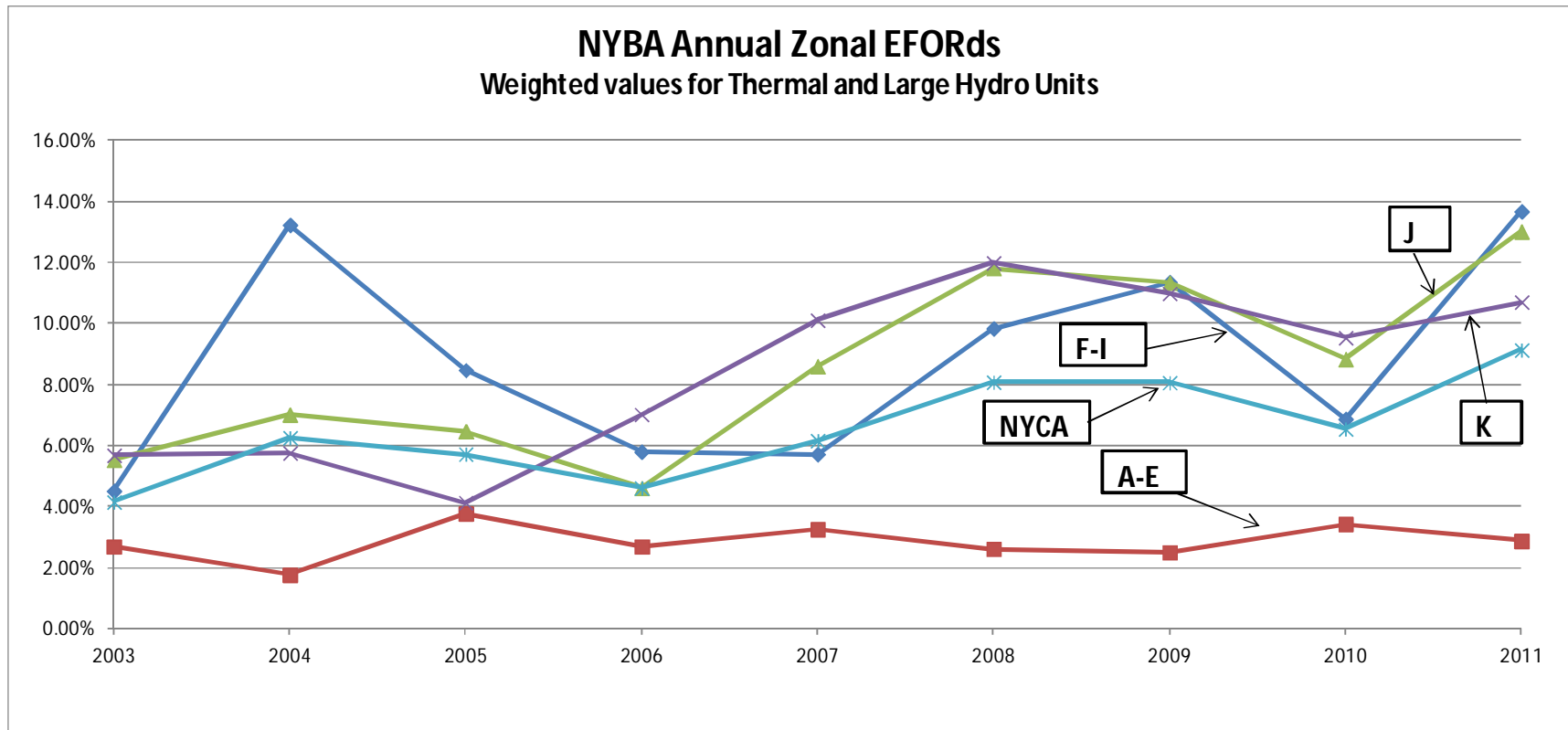
Attachment B1
Renewable Generating Wind Projects for Inclusion in the
2014-2015 Installed Reserve Margin Study

2014-2015 IRM Study Assumption Matrix

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		57.4
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
Marble River Wind Farm 1 and 2	D	NYPA	161 & 171	2012 Oct		215.0
Proposed Units						
TOTAL CAPACITY - ALL CATEGORIES					0.0	1,583.6

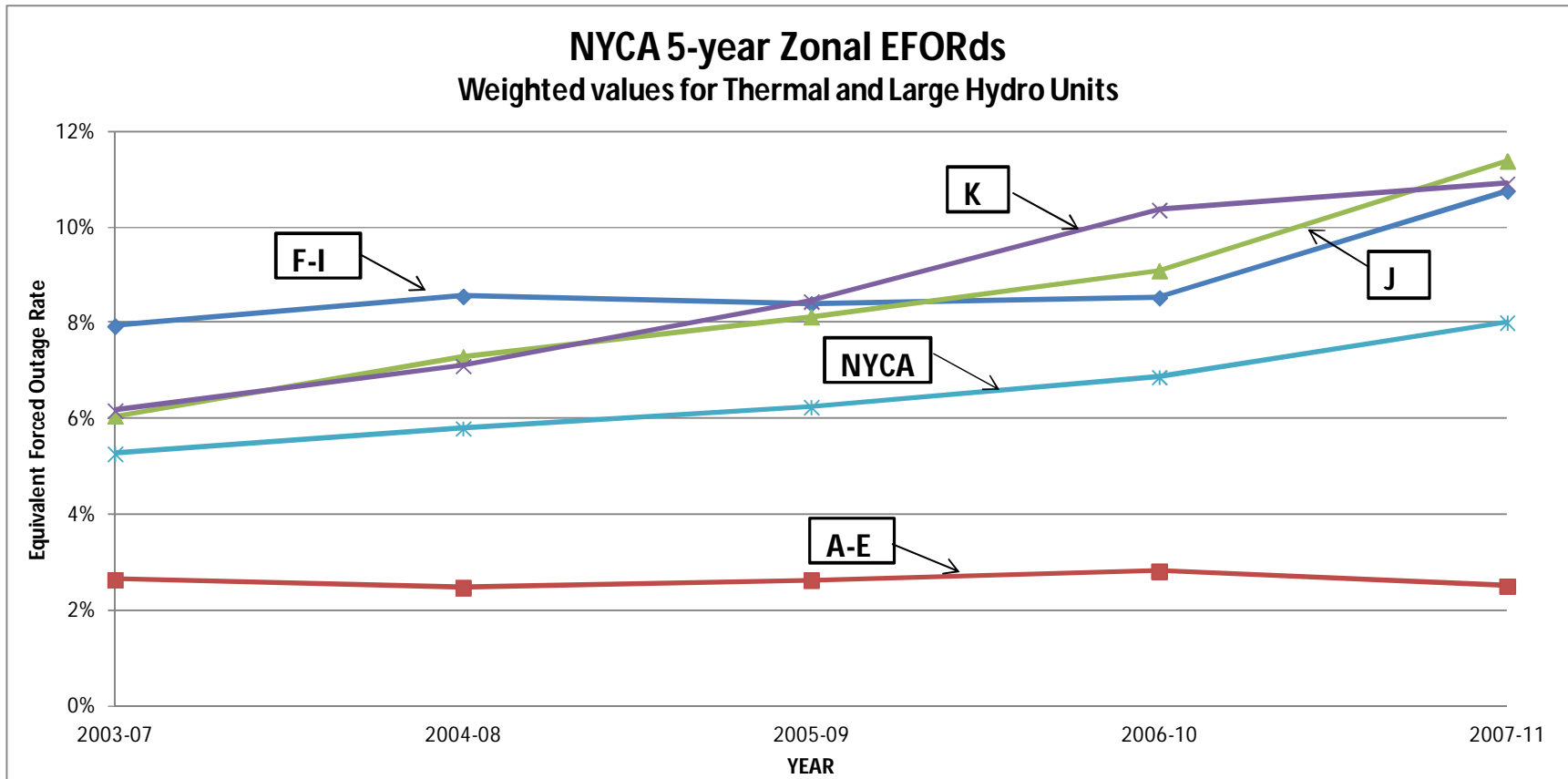
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2014-2015 IRM Study Assumption Matrix



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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%

2014-2015 IRM Study Assumption Matrix

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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2014-2015 IRM Study Assumption Matrix

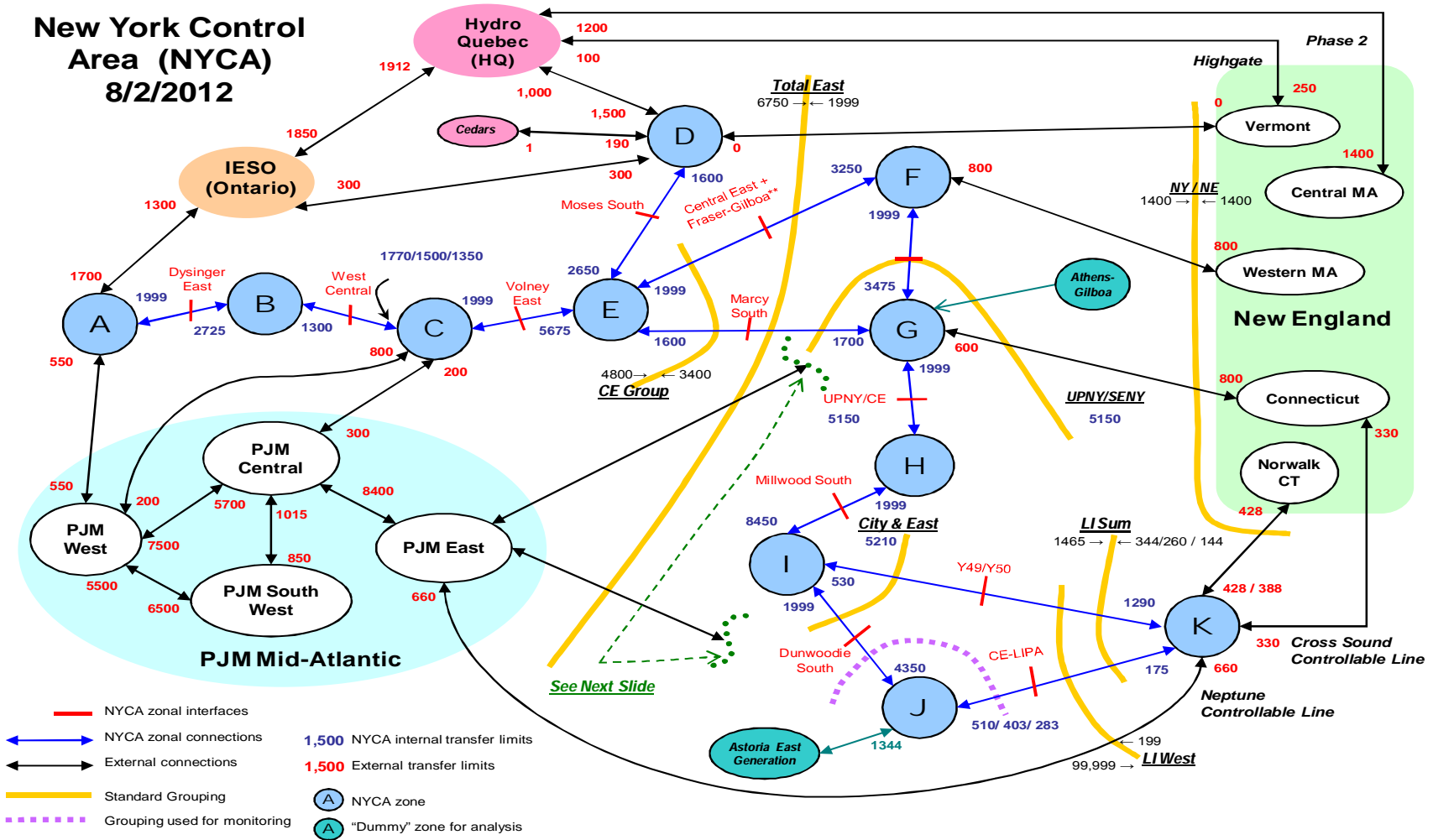
* *The reserves have increased from 1800 MW to 1965 MW as a result of the power uprate on Nine Mile 2.

Attachment E (needs update)

2014-2015 IRM Study Assumption Matrix

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

New York Control Area (NYCA) 8/2/2012



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2014-2015 IRM Study Assumption Matrix

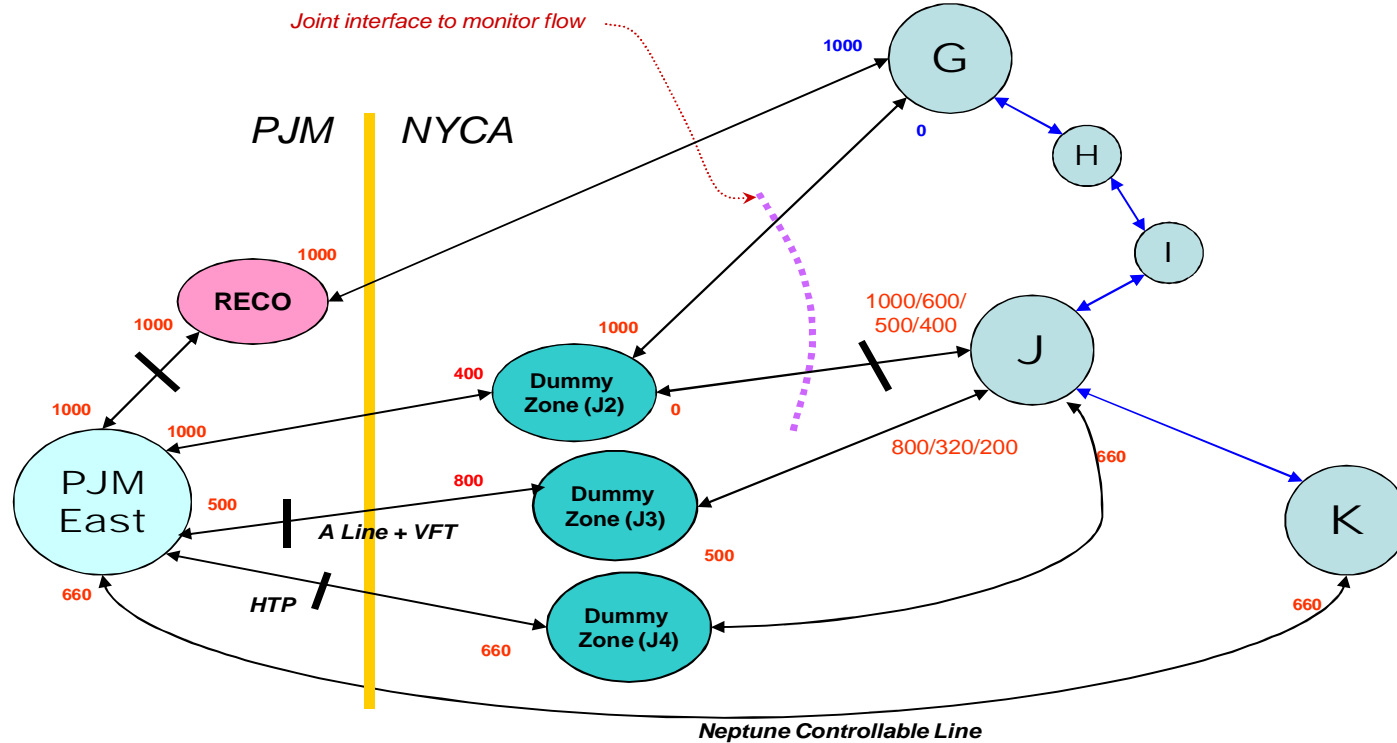
[Attachment E1 \(needs update\)](#)

2014-2015 IRM Study Assumption Matrix

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

2012 PJM-SENY MARS Model

Draft for discussion only – 5/24/2012



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

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.

2014-2015 IRM Study Assumption Matrix

Attachment F (needs update) SCR Determinations

SCR Performance

	A	B	C	D	E	F
		=A*(1.75%)		=B*C		=D*E
	July 2012	2013	Performance	2012	Derate	In Model
Zones	Registrations	Forecast¹	Factor²	UCAP	Factor³	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 fatigue factor (=0.95).