

Agenda Item 2.0 – 3.0

PSPC Meeting 278

August 19, 2010

Assumptions for the Installed Capacity Requirement (ICR) Calculation for the

- 2011/12 Third Annual Reconfiguration Auction (2011/12 ARA3) &
- 2012/13 Second Annual Reconfiguration Auction (2012/13 ARA2)

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Objective of this Presentation

- Review available load, capacity and transmission assumptions to simulate the New England bulk power supply system for calculating the Installed Capacity Requirement (ICR) for the
 - 2011/12 Third Annual Reconfiguration Auction (2011/12 ARA3) &
 - 2012/13 Second Annual Reconfiguration Auction (2012/13 ARA2)

ICR Tentative Schedule

- PSPC review of all assumptions – **Aug 19, 2010**
- PSPC review of ISO recommendation of ICR values – **Sep 9, 2010**
- RC review/vote of ISO recommendation of ICR values – **Oct 20, 2010**
- PC review/vote of ISO recommendation of ICR values – **Nov 18, 2010**
- File with the FERC – by **Dec 1, 2010**
- 2011/12 3rd Annual Reconfiguration Auction – **March 3, 2011**
- 2012/13 2nd Annual Reconfiguration Auction – **May 2, 2011**

Assumptions for the ICR Calculation for 2011/12 ARA3 & 2012/13 ARA2

Modeling the New England Control Area

The New England ICR will be calculated using the Westinghouse Capacity Model

- Internal transmission constraints are not modeled. All loads and resources are assumed to be connected to a single electric bus.
- Internal transmission constraints are addressed through Local Sourcing Requirements and Maximum Capacity Limits.

Assumptions for the 2011/12 ARA3 & 2012/13 ARA2 ICR

- *Load Forecast*
 - Load Forecast distribution
- *Resource Data Based on 2011/12 ARA2 Results*
 - Generating Capacity Resources
 - Intermittent Power Capacity Resources
 - Import Capacity Resources
 - Demand Resources (DR)
- *Resource Availability*
 - Generating Resources Availability
 - Intermittent Power Resources Availability
 - Demand Resources Availability
- *Load Relief from OP 4 Actions*
 - Tie Reliability Benefits
 - HQICCs
 - Maritimes
 - New York
 - 5% Voltage Reduction

Load Forecast Data

- **Load forecast assumption from the 2010 CELT Report Load Forecast**
- **The load forecast weather related uncertainty is represented by a weekly distribution of daily peak loads for calculating system resource adequacy.**
 - Weekly distributions of daily peak loads represented by the expected value (mean), the standard deviation and the skewness.

Load Forecast Data – New England System Load Forecast

Monthly Peak Load (MW) – 50/50 Forecast

Year	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2011/12	24,575	27,660	27,660	22,370	18,000	19,485	22,225	22,225	21,390	20,046	17,581	19,724
2012/13	25,024	28,165	28,165	22,778	18,045	19,533	22,280	22,280	21,443	20,096	17,624	20,007

There is a distribution associated with each monthly peak. The distribution associated with the Summer Seasonal Peak (July & August) is show below:

Probability Distribution of Annual Peak Load (MW)

Year	10/90	20/80	30/70	40/60	50/50	60/40	70/30	80/20	90/10	95/5
2011/12	26,365	26,595	26,910	27,265	27,660	28,080	28,510	29,125	29,835	30,455
2012/13	26,845	27,080	27,400	27,765	28,165	28,595	29,030	29,655	30,390	31,025

Resource Data – Capacity to be Modeled in ICR

- Capacity Supply Obligations (CSO) resulting from the 2011/12 ARA2 will be used to simulate 2011/12 ARA3 and 2012/13 ARA2 ICRs
- One ICR dataset and model will be created for both capability years' ICR
- Resource data resulting from the 2012/13 FCA will also be presented here for comparison purposes

Resource Data – Generating Capacity Resources (MW)

Load Zone	2011/12	2012/13
MAINE	2,657.131	2,507.820
NEW HAMPSHIRE	3,702.563	3,477.433
VERMONT	824.005	764.139
CONNECTICUT	7,200.469	7,163.464
RHODE ISLAND	2,439.189	2,280.744
SOUTH EAST MASSACHUSETTS	5,300.744	5,317.348
WEST CENTRAL MASSACHUSETTS	3,658.050	3,330.168
NORTH EAST MASSACHUSETTS & BOSTON	2,853.306	2,719.432
Total New England	28,635.457	27,560.548

- Generating capacity resources with supply obligations resulting from the 2011/12 ARA2 and 2012/13 FCA

Resource Data – Intermittent Power Capacity Resources (MW)

Load Zone	2011/12		2012/13	
	Summer	Winter	Summer	Winter
MAINE	171.294	257.852	231.478	311.458
NEW HAMPSHIRE	132.241	171.663	137.590	181.697
VERMONT	66.567	113.686	74.258	116.068
CONNECTICUT	368.256	387.937	371.554	390.254
RHODE ISLAND	3.315	7.223	3.460	6.324
SOUTH EAST MASSACHUSETTS	80.512	86.140	78.381	84.742
WEST CENTRAL MASSACHUSETTS	40.475	68.342	44.419	67.102
NORTH EAST MASSACHUSETTS & BOSTON	62.293	65.659	62.078	65.441
Total New England	924.953	1,158.502	1,003.218	1,223.086

- Intermittent capacity resources with supply obligations resulting from the 2011/12 ARA2 and 2012/13 FCA
- Intermittent resources have both summer and winter values modeled

Resource Data – Import Capacity Resources for 2011/12 ARA3

ID	Import	MW	Interface	EFORd
12450	NYPA - CMR	68.800	New York AC Ties	0.0
12451	NYPA - VT	15.300	New York AC Ties	0.0
12452	VJO - Highgate	200.000	Hydro-Quebec Highgate	1.0
12453	VJO - Phase I/II	70.000	Phase I/II HQ Excess	3.0
14600	Hydro-Québec Control Area	284.000	New Brunswick	1.0
14601	Hydro-Québec Control Area - Phase I/II HQ Excess	391.930	Phase I/II HQ Excess	3.0
14602	Hydro-Québec Control Area - New York AC Ties	54.845	New York AC Ties	0.0
	Total	1084.875		1.7

- Import capacity resources with supply obligations resulting from the 2011/12 ARA2
- System-backed imports modeled as 100% available
- Hydro unit-backed imports modeled with EFORd based on NERC class average data for large Hydro
- Tie lines have 3% forced outage (FO) assumptions for Phase I/II, 1% FO for NB and Highgate and 0% FO for New York AC Ties
- Total EFORd is the weighted average using the Summer Capacity
- NYPA Imports are modeled without the Reserve Margin Gross-up

Resource Data – Import Capacity Resources for 2012/13 ARA2

ID	Import	MW	Interface	EFORd
12450	NYPA - CMR	68.800	New York AC Ties	0.0
12451	NYPA - VT	15.300	New York AC Ties	0.0
12452	VJO - Highgate	193.000	Hydro-Quebec Highgate	1.0
12453	VJO - Phase I/II	40.000	Phase I/II HQ Excess	3.0
12454	Lievre River Project - Import	59.272	Phase I/II HQ Excess	6.4
12455	Erie Boulevard Hydropower - Import	598.744	New York AC Ties	3.5
14600	Hydro-Québec Control Area	250.593	New Brunswick	1.0
14601	Hydro-Québec Control Area - Phase I/II HQ Excess	323.855	Phase I/II HQ Excess	3.0
14602	Hydro-Québec Control Area - New York AC Ties	103.084	New York AC Ties	0.0
15508	Chaffee	4.500	New York AC Ties	7.5
15589	High Acres I	3.000	New York AC Ties	7.5
15590	High Acres II	6.000	New York AC Ties	7.5
15592	Mill Seat	5.000	New York AC Ties	7.5
15613	Madison County Landfill	1.400	New York AC Ties	7.5
	Total	1672.548		2.5

- Import capacity resources with supply obligations resulting from the 2012/13 FCA
- System-backed imports modeled as 100% available
- Hydro unit-backed imports modeled with EFORd based on NERC class average data for large Hydro
- Landfill backed resources modeled with the system average for Miscellaneous resources (7.5%)
- Tie lines have 3% forced outage (FO) assumptions for Phase I/II, 1% FO for NB and Highgate and 0% FO for New York AC Ties
- Total EFORd is the weighted average using the Summer Capacity

Resource Data – Demand Resources (MW)

Load Zone	2011/12					2012/13				
	On-Peak	Seasonal Peak	RT Demand Response	RT Emergency Gen	Total	On-Peak	Seasonal Peak	RT Demand Response	RT Emergency Gen	Total
MAINE	22.536	0.000	177.229	27.180	226.945	59.082	0.000	230.107	33.498	322.687
NEW HAMPSHIRE	47.831	0.000	31.963	25.843	105.637	60.901	0.000	35.636	11.854	108.391
VERMONT	57.313	0.000	20.069	11.512	88.894	73.114	0.000	29.192	7.992	110.298
CONNECTICUT	95.724	191.117	242.113	267.617	796.570	101.565	223.416	241.084	203.474	769.539
RHODE ISLAND	49.589	1.496	47.384	62.586	161.055	59.228	1.484	42.451	79.956	183.119
SOUTH EAST MASSACHUSETTS	88.140	1.496	118.363	60.543	268.543	101.790	1.484	136.594	72.458	312.326
WEST CENTRAL MASSACHUSETTS	78.337	13.053	114.610	80.635	286.634	86.328	16.484	115.508	88.855	307.175
NORTH EAST MASSACHUSETTS & BOSTON	137.081	0.000	167.563	116.436	421.080	183.645	0.000	216.706	132.210	532.561
Total New England	576.550	207.162	919.295	652.352	2355.358	725.653	242.868	1047.278	630.297	2646.096

- The DR capacity shown is the DR supply obligation minus Reserve Margin Gross-up from the results of the 2011/12 ARA2 and the CSO from the 2012/13 FCA
- Includes the Transmission and Distribution (T&D) Loss Adjustment (Gross-up) of 8%.

Availability Assumptions - Generating Resources

- **Forced Outages Assumption**

- Each generating unit's Equivalent Forced Outage Rate on Demand (non-weighted EFORd) modeled
- Based on a 5-year average (December 2004 – November 2009) of generator submitted Generation Availability Data System (GADS) data
- NERC GADS Class average data will be used for immature units

- **Scheduled Outage Assumption**

- Each generating unit weeks of Maintenance modeled
- Based on a 5-year average (January 2005 – December 2009) of each generator's actual historical average of planned and maintenance outages scheduled at least 14 days in advance
- NERC GADS Class average data will be used for immature units

- **Same per unit values as those calculated for 2013/14 ICR**

Availability Assumptions - Generating Resources

Resource Category	Summer MW	Assumed Average EFORd Weighted by Summer Ratings	Assumed Average Maintenance Weeks Weighted by Summer Ratings
Combined Cycle	10,474	4.38	5.9
Fossil	8,646	7.41	4.1
Nuclear	4,292	1.39	3.1
Hydro (Includes Pumped Storage)	2,751	1.80	2.7
Combustion Turbine	2,175	6.64	2.0
Diesel	210	5.92	1.1
Miscellaneous	86	7.26	3.8
Total System	28,635	4.79	4.3

- Assumed summer MW weighted EFORd and Maintenance Weeks are shown by resource category for informational purposes. In the LOLE simulations, individual unit values are modeled.

Availability Assumptions - Intermittent Power Resources

- Intermittent Power Resources are modeled as 100% available since their outages have been incorporated in their 5-year historical output used in their ratings determination.

Availability Assumptions - Demand Resources (%)

Load Zone	On-Peak	Seasonal Peak	RT Demand Response	RT Emergency Gen
MAINE	100	-	100	100
NEW HAMPSHIRE	100	-	74	74
VERMONT	100	-	99	45
CONNECTICUT	100	100	76	87
RHODE ISLAND	100	100	48	17
SOUTH EAST MASSACHUSETTS	100	100	56	58
WEST CENTRAL MASSACHUSETTS	100	100	67	72
NORTH EAST MASSACHUSETTS & BOSTON	100	-	72	87

- DR performance values are those calculated for the 2013/14 ICR
- Weighted average performance of all DR is 83% for 2011/12 and 84% for 2012/13
- For more information on the DR Performance assumption calculation see: http://www.iso-ne.com/committees/comm_wkqrps/relblty_comm/pwrsuppln_comm/mtrls/2010/feb182010/dr_performance_fca4_2_18_2010.pdf

OP 4 Assumptions - Tie Reliability Benefits (MW)

Control Area	2011/12		2012/13	
	Summer	Winter	Summer	Winter
Québec - Phase II	911	911	914	914
Québec - Highgate	-	-	6	6
Maritimes	716	716	609	609
New York	173	173	136	136
Total	1,800	1,800	1,665	1,665

- **Results of the 2011/12 and 2012/13 FCA Tie Benefits studies**
- **Modeled with Forced Outage assumptions of 3% for Québec, 1% for Maritimes, and 0% for New York due to tie line unavailability**

OP 4 Assumptions - Action 6 and 8 Voltage Reduction (MW)

	Peak Load	Passive DR	Action 6 & 8 5% Voltage Reduction
2011/12 Summer	27,660	780	403
2011/12 Winter	22,225	764	322
2012/13 Summer	28,165	969	408
2012/13 Winter	22,280	950	320

- **Formula is: (50/50 Peak load – Passive DR) * 1.5%**

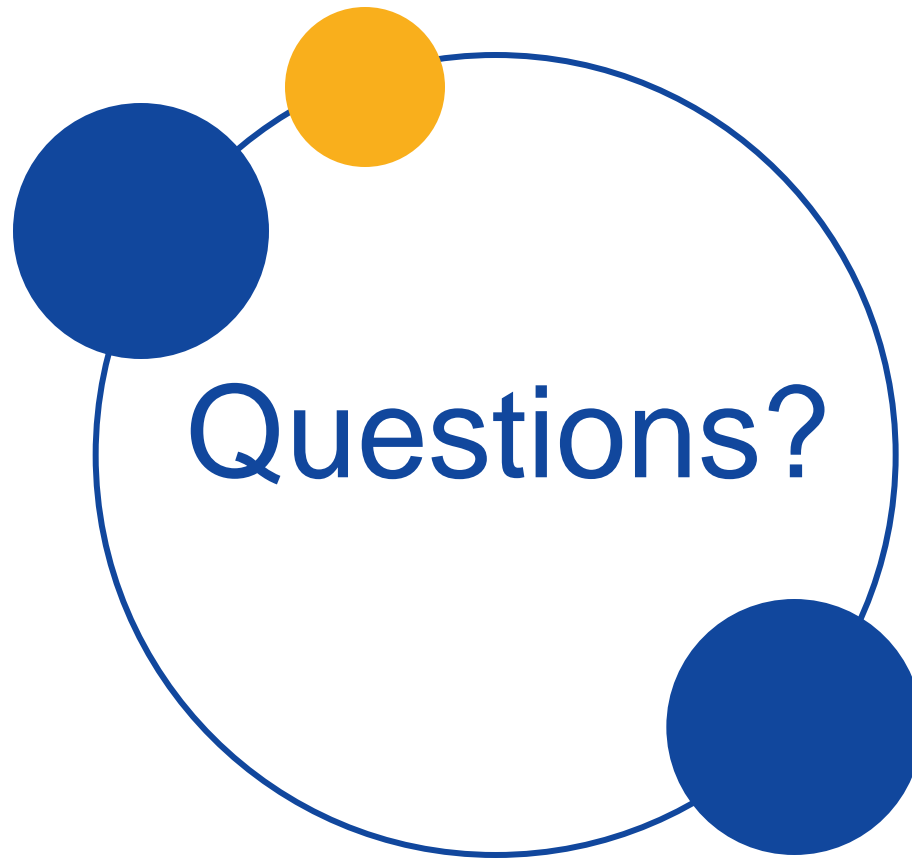
Summary of all MW

*2011/12 Data to be Modeled in the ICR Calculation

Type of Resource	2011/12	2012/13
Generating Resources	28,635.457	27,560.548
Intermittent Power Resources	924.953	1,003.218
Demand Resources	2,355.358	2,646.096
Import Resources	1,084.875	1,672.548
OP 4 Voltage Reduction	403.000	408.000
Minimum Operating Reserve	?	?
Tie Benefits (includes HQICCs)	1,800.000	1,665.000
Total MW Modeled in ICR	35,203.643	34,955.410

Notes:

- Generating Resources is the summer capacity values
- Intermittent Power Resources have both the summer and winter capacity values modeled
- Demand Resources is the summer CSO value excluding the Reserve Margin Gross-up, if applicable
- Import Resources is the summer CSO value excluding the Reserve Margin Gross-up to the NYPA imports, if applicable
- OP 4 Voltage Reduction includes both Action 6 and Action 8 MW assumptions.
- Minimum Operating Reserve is the 10-Minute minimum Operating Reserve requirement for ISO Operations



Questions?