Update on Net Energy and AS Revenues

April 30, 2013
Presentation to ICAP WG

Nodal to Zonal Factors

- Use 12 X 24 methodology described at March 11, ICAP WG meeting. Average factors are shown below.

- Zone J – Rainey – 0.9750 – Is being considered in deliverability analysis being conducted for the DCR and has a nodal/zonal ratio very similar to other locations being considered.

- Zone G – Bowline – 0.9970 – Is being considered in deliverability analysis being conducted for the DCR and is reasonably similar to other locations used in study.

- Zone F – Bethlehem – 0.9776 – Recent addition with nodal/zonal ratio nearly identical to Empire (another recent addition) – data is not available for Rotterdam where deliverability is being examined.

- Zone C – No deliverability study – Use Sithe-Independence with factor of 0.9643 excluding 2012 anomalies in data.

- Zone K – No data for Ruland Road site in deliverability study – Use Holtsville with a factor of 0.9865.

Adjust the Econometric Results to the Objectives for the Resources

- CARIS 2 Objective Case (Case 1)

  IN
  - Athens SPS, HTP, NMP2, BEC, AE2

  OUT
  - Danskammer, Dunkirk 3&4, Astoria 2&4, FR4, GL 4&5

- CARIS 2 Matching History Case (Case 2)

  IN
  - Athens SPS, BEC, AE2, Danskammer, Astoria 3&4, FR4, GL 4&5

  OUT
  - HTP

Adjust Econometric LBMP Forecasts by Ratio of LBMP between Case 1 and Case 2 to Arrive at Econometric Forecasts Consistent with the Objectives—Use Monthly/Hourly Adjustment Method

MAPS Factors Used to Adjust Econometric Model Results

- Case 2: Prices from MAPS run matching history

- Case 1: Prices from MAPS run matching objective

- Use multiplicative factors to go from econometric results (matching history) to objective adjusted econometric results

- Average Factors:

Zone	2 to 1 Factor (1/2)
CNTR	1.0058
CPTL	0.9977
LHV	1.0047
LI	1.0045
NYC	1.0109

As a Result of Retirements the Forecast Excesses Are Relatively Modest

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Excess Capacity Percentages for the Objective Case			
	2014 – 2015	**2015 – 2016**	**2016 – 2017**
NYCA	6.55%	5.81%	5.21%
Zones G to J	4.74%	3.52%	2.60%
Zone J	5.86%	4.49%	3.59%
Zone K	7.37%	6.56%	6.32%

Excess values are stated relative to the LCR/IRM

Adjustment Factors to 190MW Excess Level

- Case 1: MAPS Prices with objective resource mix and historic capacity levels.

- Case 3: MAPS Prices based on +190MW over ICAP requirement for each locality and objective resource mix.

- Case 3: Use MAPS derived multiplicative factors to go from econometric prices adjusted to objective mix to prices adjusted to objective mix and Case 3 excess level.

- Average Factors:

Zone	1 to 3 Factor (3/1)
CNTR	1.0593
CPTL	1.0383
LHV	1.0321
LI	1.0273
NYC	1.0290

Basis and Case Scaling Factors - Summary

- Additionally, MAPS scaling factors are calculated at various excess levels.

- Excess level results are not disproportional to the reserve margin coefficient from 2010 DCR

Zone	Nodal Basis Factor	2 to 1 Factor	1 to 3 Factor	-6% Excess	-4% Excess	-2% Excess	2% Excess	4% Excess	6% Excess	10% Excess
CNTR	0.9643	1.0058	1.0593	1.0459	1.0088	1.0054	0.9792	0.9730	0.9556	0.9471
CPTL	0.9776	0.9977	1.0383	1.0370	1.0082	1.0091	0.9867	0.9804	0.9672	0.9603
LHV	0.9970	1.0047	1.0321	1.0420	1.0172	1.0135	0.9883	0.9832	0.9683	0.9592
LI	0.9865	1.0045	1.0273	1.0641	1.0350	1.0286	1.0011	0.9925	0.9769	0.9650
NYC	0.9750	1.0109	1.0290	1.0558	1.0227	1.0227	0.9954	0.9840	0.9715	0.9558

Note: Cases for varying excess levels are subject to refinement.

Net Energy Revenues

- Net energy revenues ($/kW-year) by region and case for the LMS100 and Siemens combined cycle units are shown in the table below.
- Energy revenues for all cases reflect zonal to nodal adjustments.

	LMS100					CCGT				
	LI	NYC	LHV	CPTL	CNTR	LI	NYC	LHV	CPTL	CNTR
	Based on Actual LBMPs									
2010	85.25	50.39	39.73	29.02	18.14	161.18	101.45	85.53	70.84	47.39
2011	88.86	43.84	38.63	29.16	21.07	173.16	108.05	91.90	67.19	52.57
2012	111.39	36.40	28.70	16.88	18.58	177.91	92.67	70.83	46.22	67.34
Average	*95.17*	*43.54*	*35.69*	*25.02*	*19.26*	*170.75*	*100.72*	*82.75*	*61.42*	*55.77*
	Based on Regression Prior to Any MAPS Adjustments									
2014-2015	95.75	39.72	32.50	23.74	18.95	165.31	77.97	60.74	48.89	45.49
2015-2016	98.50	40.38	33.54	24.10	19.32	168.71	79.31	62.33	49.79	45.62
2016-2017	101.69	41.86	34.82	24.68	19.79	175.00	83.07	65.56	52.02	47.75
Average	*98.65*	*40.65*	*33.62*	*24.18*	*19.35*	*169.67*	*80.12*	*62.88*	*50.23*	*46.29*
	Estimates by MMU									
2010/11/12 Average	*98.16*	*40.61*	*38.53*	*9.98*	*na*	*164.65*	*88.49*	*90.72*	*73.73*	*na*
	Based on Regression Adjusted by MAPS Factor for Resource Mix and 190MW Excess									
2014-2015	114.71	52.21	44.30	30.90	28.96	188.09	97.40	78.40	63.16	66.58
2015-2016	118.00	53.76	45.78	31.63	29.36	192.06	98.91	79.97	64.03	66.82
2016-2017	121.90	55.39	47.38	32.40	30.25	198.51	103.15	83.82	66.75	69.39
Average	*118.20*	*53.79*	*45.82*	*31.64*	*29.53*	*192.89*	*99.82*	*80.73*	*64.65*	*67.60*

Notes:

- Results for LI exclude adjustment for BEC. The BEC impact in LI appears to be unduly affected by a greater than $40 per MWH average LBMP differential between Zone K and J in July 2012.
- MMU results shown for LMS100 are actually based on Frame 7 technology.

Net Energy Revenues – Using Gas Future Prices

- Net energy revenues by region for the LMS100 and Siemens combined cycle units are shown in the table below using gas future prices and historic gas prices for comparison.

	LMS100					CCGT				
	LI	NYC	LHV	CPTL	CNTR	LI	NYC	LHV	CPTL	CNTR
				Based on Historical Gas Prices						
2014-2015	114.71	52.21	44.30	30.90	28.96	188.09	97.40	78.40	63.16	66.58
2015-2016	118.00	53.76	45.78	31.63	29.36	192.06	98.91	79.97	64.03	66.82
2016-2017	121.90	55.39	47.38	32.40	30.25	198.51	103.15	83.82	66.75	69.39
Average	*118.20*	*53.79*	*45.82*	*31.64*	*29.53*	*192.89*	*99.82*	*80.73*	*64.65*	*67.60*
				Based on Using Gas Future Prices						
2014-2015	116.46	51.16	41.79	26.75	25.38	186.15	92.08	70.08	50.38	50.45
2015-2016	120.16	52.58	43.38	27.40	25.61	190.28	93.74	71.65	51.25	50.72
2016-2017	123.50	54.23	45.02	28.02	26.13	197.30	97.80	75.10	53.56	52.57
Average	*120.04*	*52.66*	*43.40*	*27.39*	*25.71*	*191.25*	*94.54*	*72.27*	*51.73*	*51.25*

Postings

- Stata files that contain all historical data, regression equations and net revenue program instructions

- Zonal to nodal adjustment factor analyses in Excel workbook

Ancillary Services - Methodology

- **Methodology**
  - Calculated historic ancillary services revenues over the period Nov. 2009 through Oct. 2012 for select units.
    - Oct. 28-31, 2012 excluded due to Hurricane Sandy
    - Negative daily payments from the balancing market were excluded, under the assumption that the unit received margin assurance payments for buying out of its day-ahead position in these days.
  - 47 units provided 10-minute non-synchronous reserves in the Eastern reserves market
    - Sargent & Lundy states that the LMS100 unit being studied will be capable of providing 10-minute non-synchronous reserves.
    - The units studied did not receive revenues for 10-minute synchronous reserves or 30-minute reserves, nor were they capable of providing regulation service.
    - Voltage support service was included; black start service was not.
    - A separate estimate will be calculated for the combined cycle proxy unit.

Ancillary Services - Results

Zone	Summer CRIS MW, GB'13	10-min NS, 3-year Total, only positive daily $ in RT Market	$/kW-year	Voltage Support, VSS	$/kW-year with VSS
EAST	1,762.9	$58,778,918.45	$11.11	$5,118,444.64	$12.08

- Results will overstate the 10-minute non-spin revenues for more efficient units including the LMS 100, as these units are operating more than less efficient units examined and will obtain less revenue.
- Results will be adjusted by zone based on how the LMS 100 would operate.