

Market Monitor Report

Members Committee
Webinar
June 24, 2013

Joseph Bowring

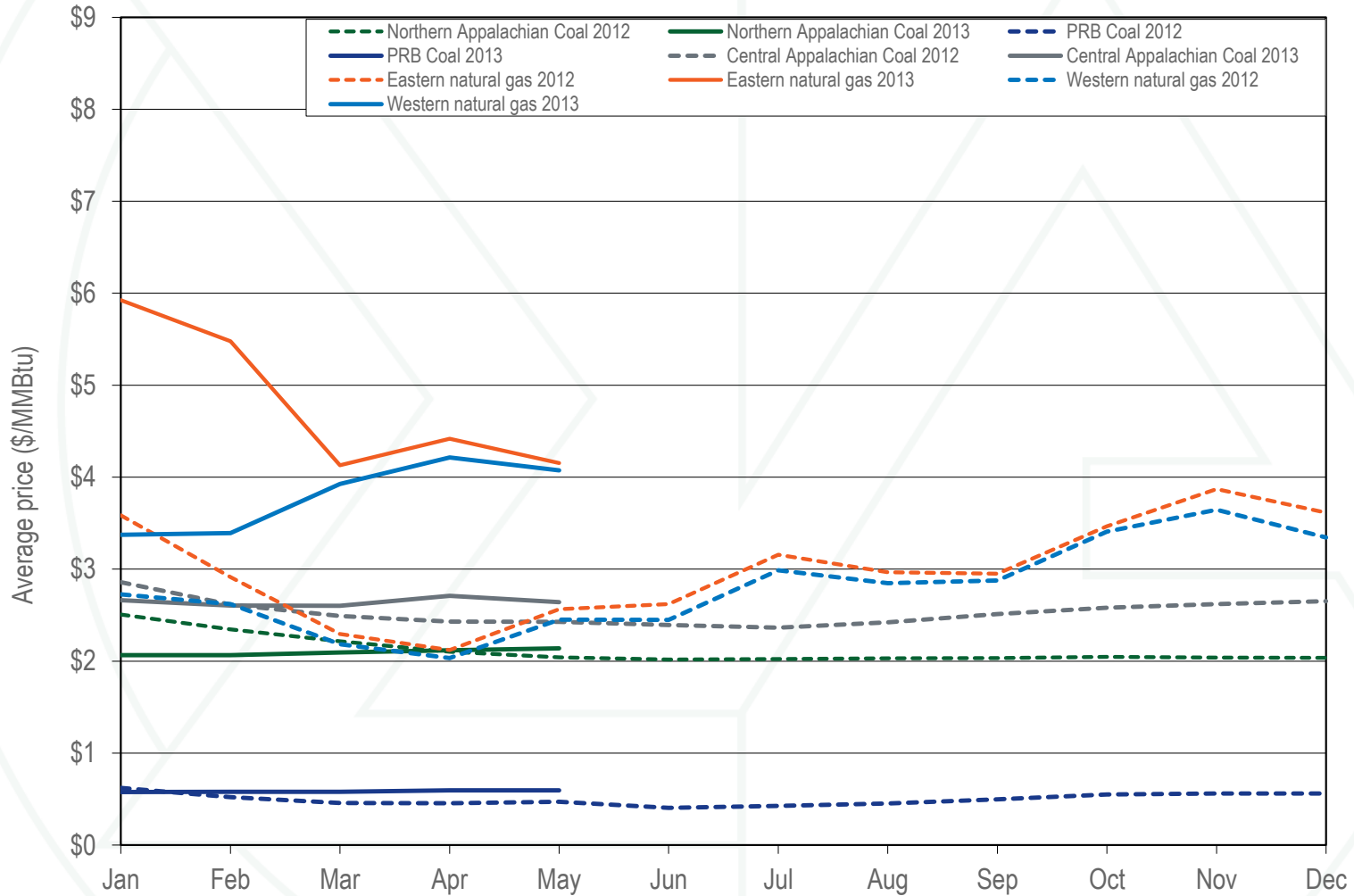


Monitoring Analytics

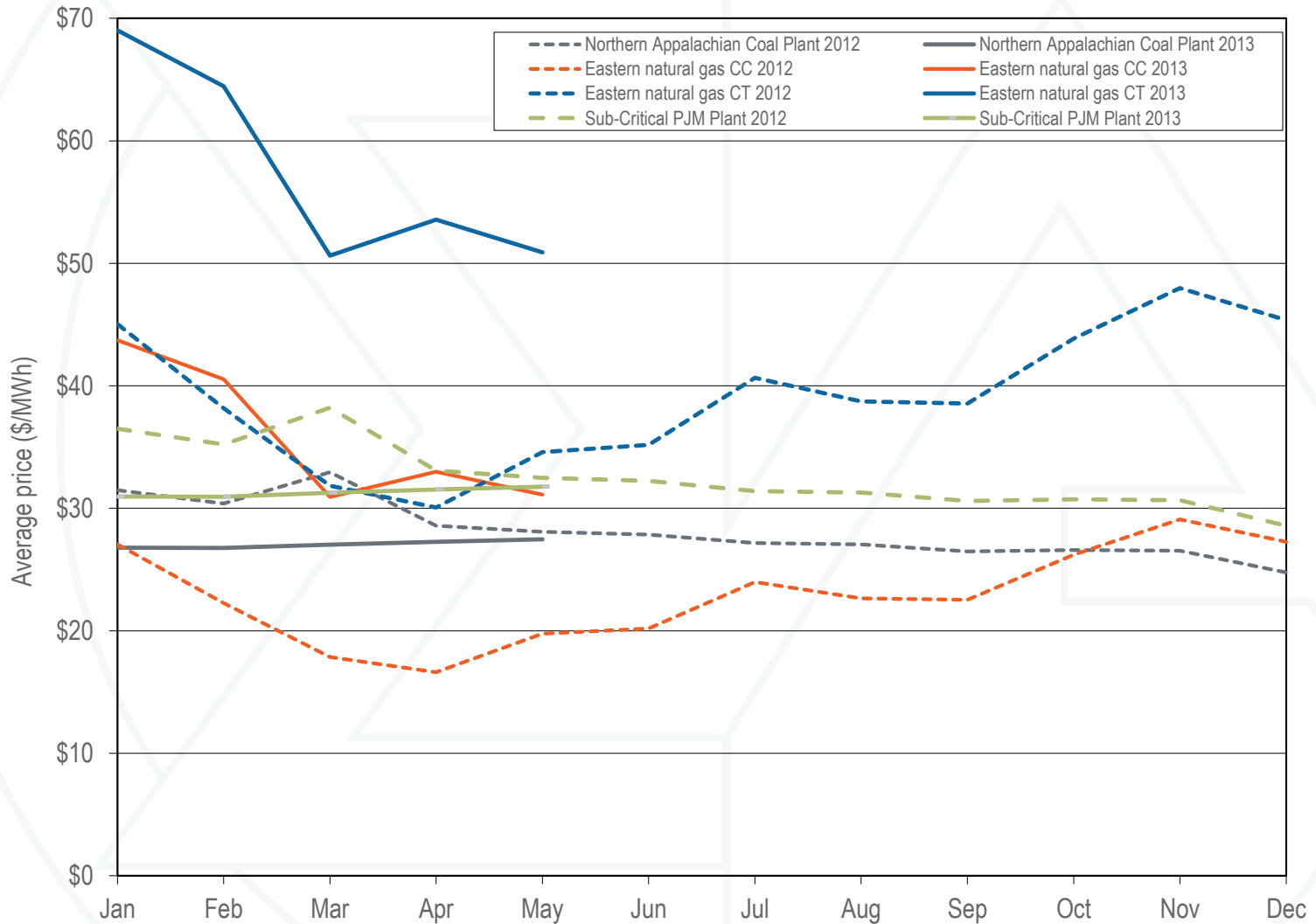
PJM installed capacity (By fuel source): January 1 and May 31, 2013

	1-Jan-13		31-May-13	
	MW	Percent	MW	Percent
Coal	75,989.2	41.7%	76,055.6	41.8%
Gas	52,003.2	28.6%	52,106.1	28.6%
Hydroelectric	7,879.8	4.3%	7,880.4	4.3%
Nuclear	33,024.0	18.1%	33,024.0	18.1%
Oil	11,531.2	6.3%	11,361.2	6.2%
Solar	47.0	0.0%	47.0	0.0%
Solid waste	757.1	0.4%	756.4	0.4%
Wind	779.6	0.4%	805.6	0.4%
Total	182,011.1	100.0%	182,036.3	100.0%

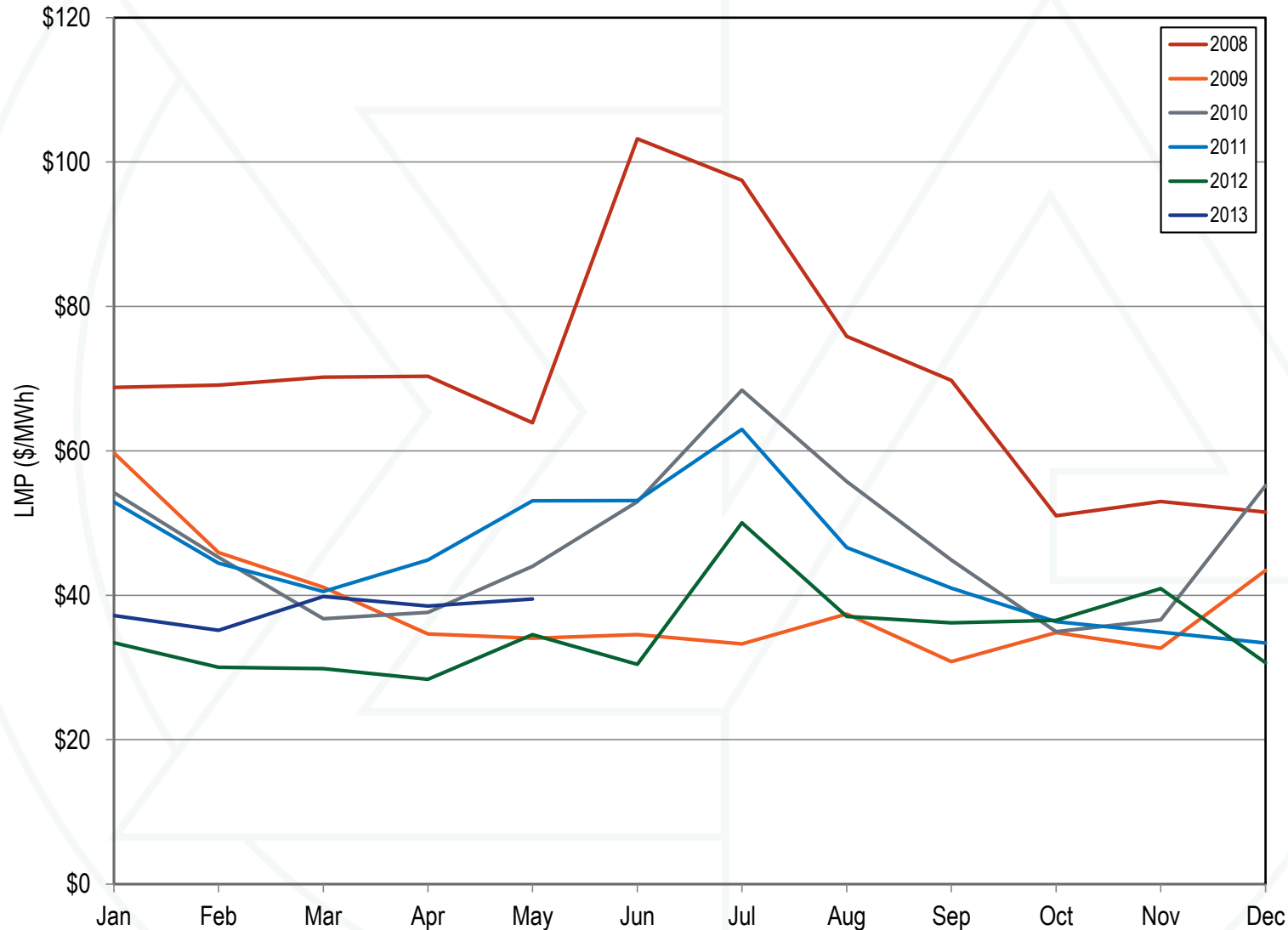
Spot average fuel price comparison: 2012 and January through May 2013 (\$/MMBtu)



Average Cost of Generation for New Entrant CC, CT, CP, and average PJM coal unit: 2012 and 2013



PJM real-time, monthly, load-weighted, average LMP: January 2008 through May of 2013



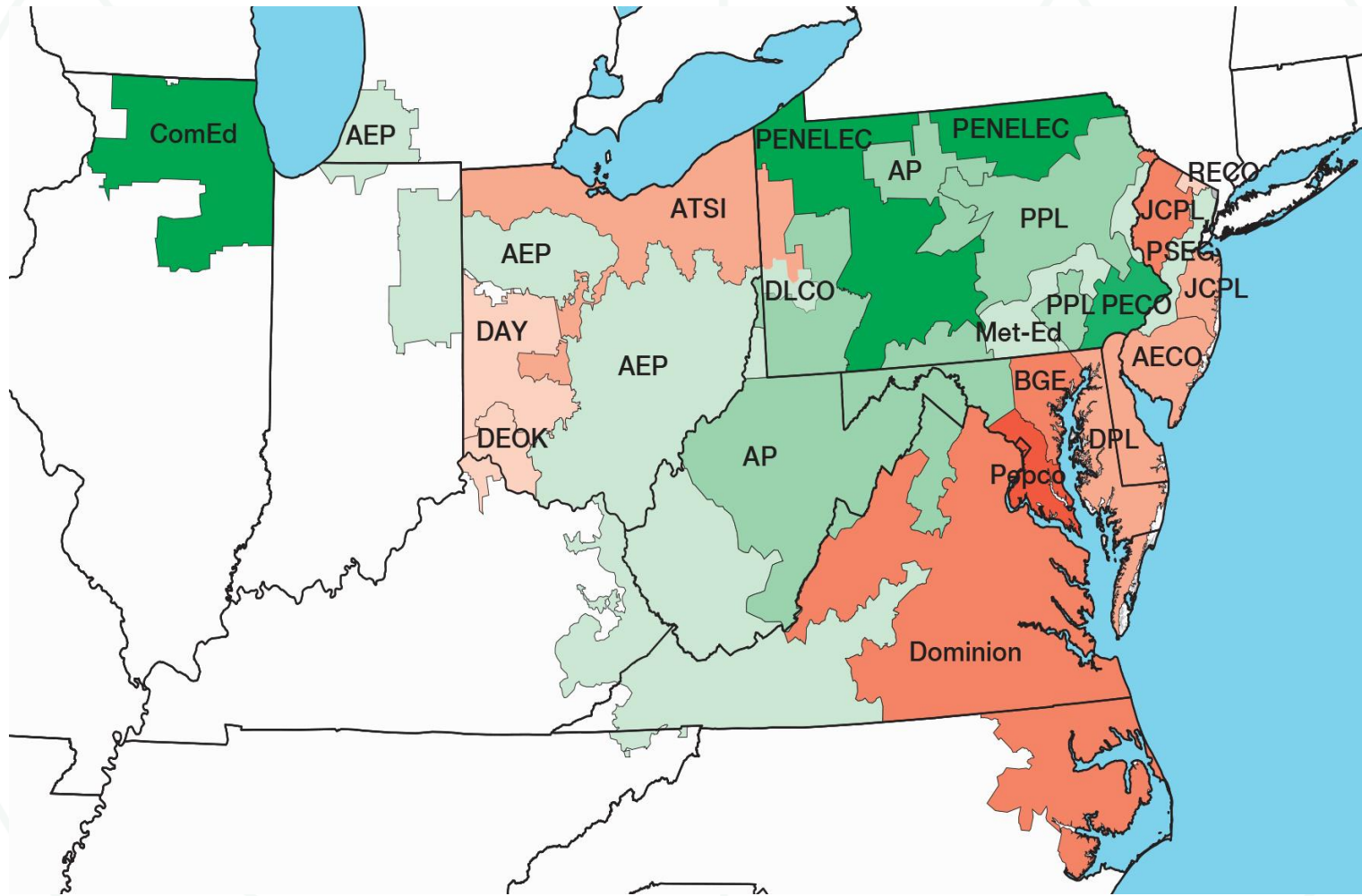
PJM generation (By fuel source (GWh)): January through May 2012 and 2013

	Jan-May 2012		Jan-May 2013		Change in Output
	GWh	Percent	GWh	Percent	
Coal	125,126.8	39.8%	140,718.4	44.0%	12.5%
Standard Coal	121,234.4	38.6%	136,610.3	42.7%	12.3%
Waste Coal	3,892.4	1.2%	4,108.1	1.3%	0.2%
Nuclear	112,368.0	35.8%	112,749.5	35.2%	0.3%
Gas	60,309.1	19.2%	50,152.9	15.7%	(16.8%)
Natural Gas	59,363.4	18.9%	49,219.0	15.4%	(17.1%)
Landfill Gas	945.5	0.3%	933.9	0.3%	(1.2%)
Biomass Gas	0.2	0.0%	0.0	0.0%	(99.5%)
Hydroelectric	5,712.0	1.8%	6,100.5	1.9%	6.8%
Wind	6,422.9	2.0%	7,698.9	2.4%	19.9%
Waste	2,087.5	0.7%	1,970.5	0.6%	(5.6%)
Solid Waste	1,663.4	0.5%	1,625.3	0.5%	(2.3%)
Miscellaneous	424.1	0.1%	345.2	0.1%	(18.6%)
Oil	1,941.9	0.6%	435.9	0.1%	(77.6%)
Heavy Oil	1,870.1	0.6%	378.4	0.1%	(79.8%)
Light Oil	67.4	0.0%	48.3	0.0%	(28.3%)
Diesel	3.6	0.0%	2.3	0.0%	(37.4%)
Kerosene	0.8	0.0%	6.9	0.0%	814.2%
Jet Oil	0.0	0.0%	0.0	0.0%	14.2%
Solar	92.8	0.0%	137.5	0.0%	48.1%
Battery	0.1	0.0%	0.2	0.0%	186.2%
Total	314,061.0	100.0%	319,964.5	100.0%	1.9%

Monthly PJM Generation (By fuel source (GWh)): January through May 2013

	Jan	Feb	Mar	Apr	May	Total
Coal	31,689.2	28,886.8	29,680.4	24,637.5	25,824.6	140,718.4
Standard Coal	30,814.3	28,102.4	28,670.2	24,060.8	24,962.6	136,610.3
Waste Coal	874.9	784.4	1,010.2	576.7	862.0	4,108.1
Nuclear	25,610.7	22,563.1	23,854.9	19,614.0	21,106.9	112,749.5
Gas	10,261.4	10,319.8	10,055.6	9,276.0	10,240.2	50,152.9
Natural Gas	10,072.4	10,143.6	9,859.7	9,096.1	10,047.2	49,219.0
Landfill Gas	189.0	176.2	195.9	179.9	193.0	933.9
Biomass Gas	0.0	0.0	0.0	0.0	0.0	0.0
Hydroelectric	1,234.0	1,127.0	1,215.8	1,273.0	1,250.7	6,100.5
Wind	1,784.4	1,397.5	1,606.2	1,639.6	1,271.3	7,698.9
Waste	414.4	385.2	391.5	358.2	421.3	1,970.5
Solid Waste	324.8	301.5	325.2	323.9	349.9	1,625.3
Miscellaneous	89.6	83.7	66.2	34.3	71.4	345.2
Oil	62.5	23.8	50.3	79.1	220.3	435.9
Heavy Oil	55.8	21.9	27.9	66.8	206.1	378.4
Light Oil	4.2	1.5	17.7	11.7	13.2	48.3
Diesel	0.6	0.1	0.0	0.5	1.1	2.3
Kerosene	1.9	0.3	4.7	0.1	0.0	6.9
Jet Oil	0.0	0.0	0.0	0.0	0.0	0.0
Solar	15.6	17.6	26.7	38.1	39.6	137.5
Battery	0.1	0.0	0.0	0.0	0.1	0.2
Total	71,072.0	64,720.7	66,881.4	56,915.4	60,374.9	319,964.5

PJM real-time generation less real-time load by zone (GWh): January through May of 2013



RPM Imports Summary 2007/2008 BRA through 2016/2017 BRA

Base Residual Auction	MISO		UCAP (MW) Non-MISO		Total Imports	
	Offered	Cleared	Offered	Cleared	Offered	Cleared
2007/2008	1,073.0	1,072.9	547.9	547.9	1,620.9	1,620.8
2008/2009	1,149.4	1,109.0	517.6	516.8	1,667.0	1,625.8
2009/2010	1,189.2	1,151.0	518.8	518.1	1,708.0	1,669.1
2010/2011	1,194.2	1,186.6	539.8	539.5	1,734.0	1,726.1
2011/2012	1,862.7	1,198.6	3,560.0	3,557.5	5,422.7	4,756.1
2012/2013	1,415.9	1,298.8	1,036.7	1,036.7	2,452.6	2,335.5
2013/2014	1,895.1	1,895.1	1,358.9	1,358.9	3,254.0	3,254.0
2014/2015	2,104.5	2,104.5	1,948.8	1,948.8	4,053.3	4,053.3
2015/2016	1,538.7	1,538.7	2,396.6	2,396.6	3,935.3	3,935.3
2016/2017	4,723.1	4,723.1	2,770.6	2,759.6	7,493.7	7,482.7

Impact of capacity imports: 2016/2017 RPM Base Residual Auction

LDA	Product Type	Actual Auction Results		Reduce Imports by 25 Percent	
		Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)	Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)
RTO	Limited	\$59.37	9,849.5	\$77.51	10,399.5
	Extended Summer	\$59.37	2,470.0	\$77.82	2,712.4
	Annual	\$59.37	156,840.2	\$77.82	155,799.8
MAAC	Limited	\$119.13	4,264.3	\$119.12	4,238.1
	Extended Summer	\$119.13	1,053.4	\$119.43	1,078.4
	Annual	\$119.13	61,228.7	\$119.43	61,229.6
PSEG	Limited	\$219.00	550.4	\$218.69	550.4
	Extended Summer	\$219.00	61.8	\$219.00	61.8
	Annual	\$219.00	5,686.4	\$219.00	5,686.9
ATSI	Limited	\$94.45	1,004.1	\$95.71	1,001.6
	Extended Summer	\$114.23	799.3	\$114.23	799.1
	Annual	\$114.23	6,868.8	\$114.23	6,869.0

Impact of capacity imports: 2016/2017 RPM Base Residual Auction

LDA	Product Type	Actual Auction Results		Reduce Imports by 50 Percent	
		Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)	Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)
RTO	Limited	\$59.37	9,849.5	\$104.49	9,812.9
	Extended Summer	\$59.37	2,470.0	\$106.00	3,697.7
	Annual	\$59.37	156,840.2	\$106.00	154,814.5
MAAC	Limited	\$119.13	4,264.3	\$118.49	3,665.4
	Extended Summer	\$119.13	1,053.4	\$120.00	1,630.8
	Annual	\$119.13	61,228.7	\$120.00	61,256.0
PSEG	Limited	\$219.00	550.4	\$217.49	483.8
	Extended Summer	\$219.00	61.8	\$219.00	128.4
	Annual	\$219.00	5,686.4	\$219.00	5,688.9
ATSI	Limited	\$94.45	1,004.1	\$104.49	1,163.8
	Extended Summer	\$114.23	799.3	\$115.00	650.2
	Annual	\$114.23	6,868.8	\$115.00	7,017.9

Impact of capacity imports: 2016/2017 RPM Base Residual Auction

LDA	Product Type	Actual Auction Results		Reduce Imports by 75 Percent	
		Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)	Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)
RTO	Limited	\$59.37	9,849.5	\$117.18	9,537.9
	Extended Summer	\$59.37	2,470.0	\$124.00	4,063.0
	Annual	\$59.37	156,840.2	\$124.00	154,449.2
MAAC	Limited	\$119.13	4,264.3	\$117.18	3,441.8
	Extended Summer	\$119.13	1,053.4	\$124.00	1,854.1
	Annual	\$119.13	61,228.7	\$124.00	61,417.4
PSEG	Limited	\$219.00	550.4	\$212.18	443.6
	Extended Summer	\$219.00	61.8	\$219.00	168.6
	Annual	\$219.00	5,686.4	\$219.00	5,697.9
ATSI	Limited	\$94.45	1,004.1	\$117.18	1,207.2
	Extended Summer	\$114.23	799.3	\$124.00	623.1
	Annual	\$114.23	6,868.8	\$124.00	8,366.9

Impact of capacity imports: 2016/2017 RPM Base Residual Auction

LDA	Product Type	Actual Auction Results		Exclude Imports without Firm Transmission	
		Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)	Clearing Prices (\$ per MW-day)	Cleared UCAP (MW)
RTO	Limited	\$59.37	9,849.5	\$89.68	10,134.5
	Extended Summer	\$59.37	2,470.0	\$90.23	3,034.5
	Annual	\$59.37	156,840.2	\$90.23	155,477.7
MAAC	Limited	\$119.13	4,264.3	\$119.01	4,134.1
	Extended Summer	\$119.13	1,053.4	\$119.56	1,162.1
	Annual	\$119.13	61,228.7	\$119.56	61,250.8
PSEG	Limited	\$219.00	550.4	\$218.45	529.6
	Extended Summer	\$219.00	61.8	\$219.00	82.6
	Annual	\$219.00	5,686.4	\$219.00	5,687.3
ATSI	Limited	\$94.45	1,004.1	\$95.56	1,001.9
	Extended Summer	\$114.23	799.3	\$114.23	799.1
	Annual	\$114.23	6,868.8	\$114.23	6,869.0

PJM Analysis of UTC Impacts

- **Determine whether or not UTC improve price convergence between DA and RT**
 - **PJM conclusion: improves convergence**
- **Determine whether or not UTC contribute to FTR underfunding**
 - **PJM conclusion: analysis not practical**
- **Determine whether UTC affects uplift charges**
 - **PJM conclusion: inconclusive**



Issues with PJM Analysis of UTC and Price Convergence

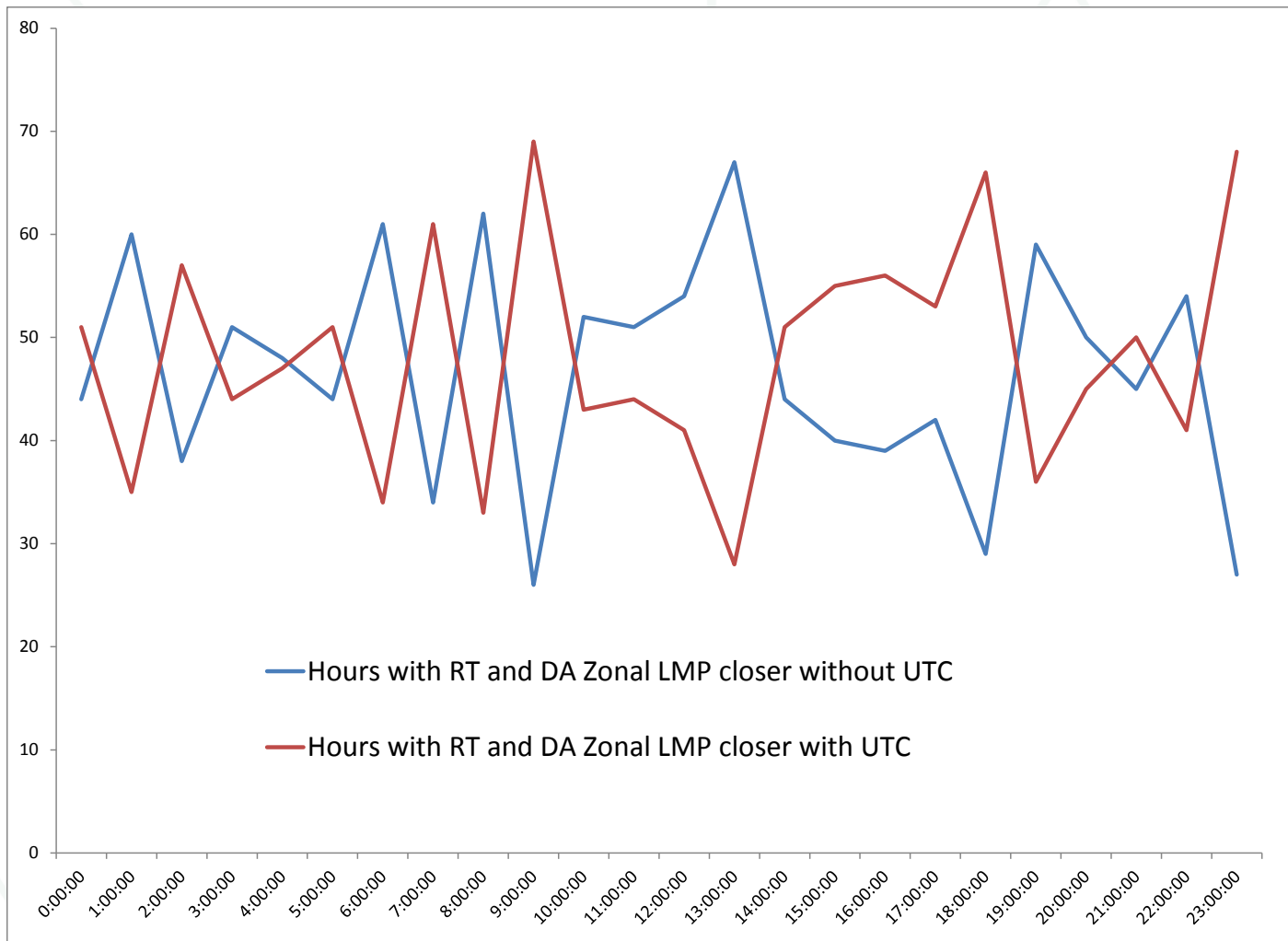
- **PJM analysis compares PJM average daily prices.**
 - **Averages across all buses in PJM do not provide the basis for a conclusion about convergence**
 - **Hourly nodal comparisons provide a basis for a conclusion**
- **PJM convergence analysis does not account for unit commitment impacts on real time prices**
 - **UTC affects unit commitment**
 - **Changes in DA unit commitment will change RT market solution**
- **Zonal price differences do not show convergence**
 - **One step toward nodal comparisons**



Zonal RT-DA Price Differences with and without UTCs

Zone	Hours with RT-DA Zonal LMP Difference Smaller without UTC	Hours with RT-DA Zonal LMP Difference Smaller with UTC
AECO	49	71
AEP	70	50
APS	70	50
ATSI	66	54
BGE	65	55
COMED	34	86
DAY	62	58
DEOK	54	66
DOM	80	40
DPL	57	63
DUQ	57	63
JCPL	57	63
METED	56	64
PECO	48	72
PENELEC	60	60
PEPCO	64	56
PPL	54	66
PSEG	59	61
RECO	59	61
Total	1121	1159

Zonal RT-DA Price Differences with and without UTCs



PJM Analysis of UTC effect on uplift charges

- **PJM found no correlation between total UTC profit and total east deviation balancing operating reserve charges**
- **Correlation of UTC profit with BOR charges is not relevant to whether UTCs affect uplift charges.**
- **UTC impact on day ahead unit commitment should be a focus**



Issues with PJM Analysis of UTC and Uplift

- **The PJM Alstom-only cases show UTC unit commitment effects**
 - **May 4th and May 27th no commitment effects**
 - **May 2nd, May 22 and May 23 commitment effects**
- **MMU PROBE cases show UTC unit commitment effects for all five days**



Monitoring Analytics, LLC
2621 Van Buren Avenue
Suite 160
Eagleville, PA
19403

(610) 271-8050

MA@monitoringanalytics.com

www.MonitoringAnalytics.com

