

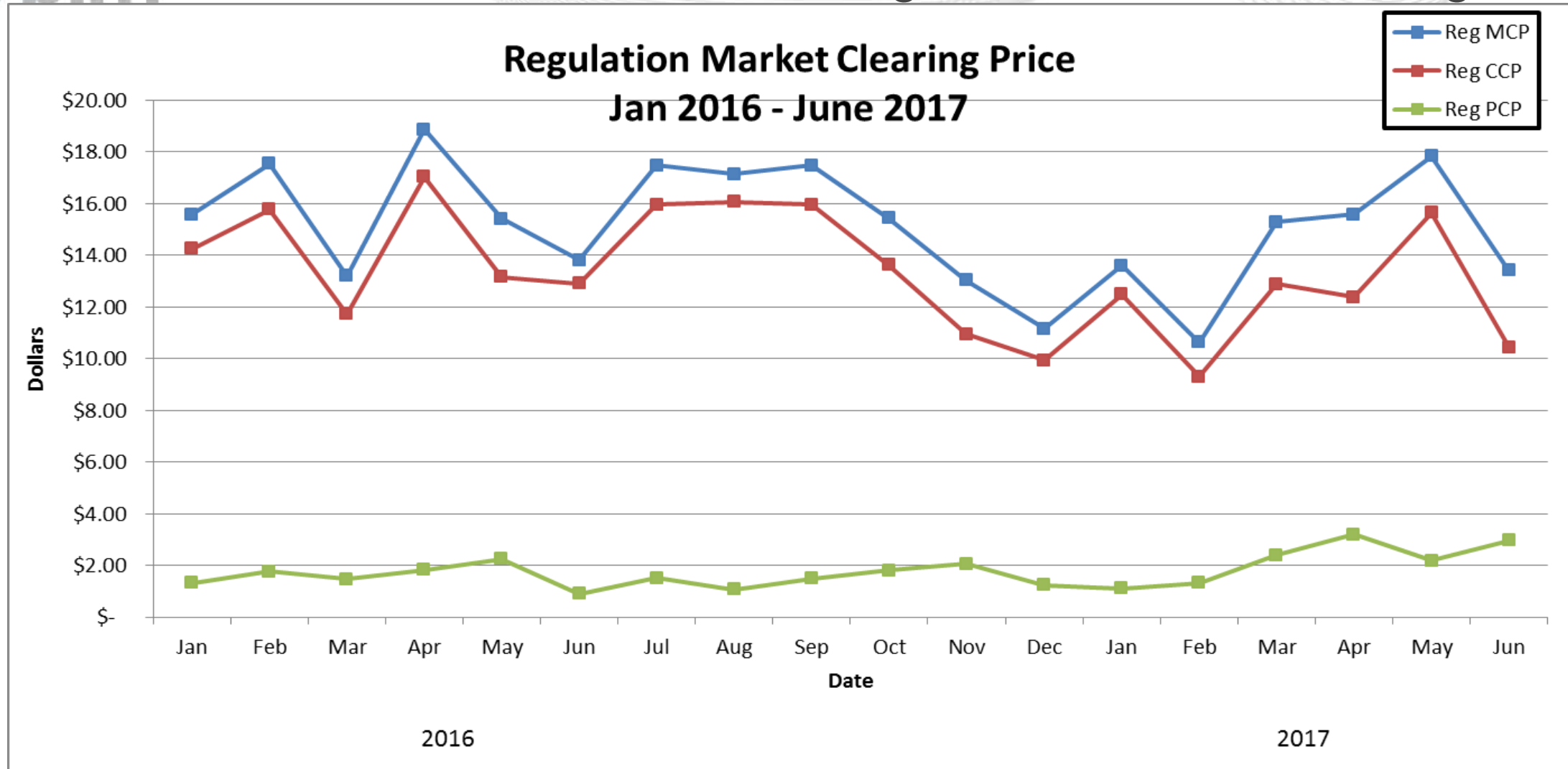


Regulation Update



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Operating Committee
July 11, 2017

- On Jan 9th 2017 PJM put new regulation signals and requirements in operations
 - Regulation Signals implemented 30 minute conditional neutrality
 - Signal tuning has occurred since implementation to enhance signal performance
 - Regulation requirement defined seasonally and as ramp/non-ramp periods
 - 800 MW Ramp Requirement, 525MW Non-Ramp Requirement
- RMISTF remaining design components approved at June MRC
 - Scheduled for July MC
 - See Appendix for design components and PJM/IMM package summary



Data up to June 28, 2017

- Mileage Ratio has increased since the new signal implementation
 - Larger Utilization of Regulation D resources
 - Regulation A signal better aligned with unit ramp

Average Mileage Ratio	
Jan-16	3.80
Feb-16	2.67
Mar-16	2.44
Apr-16	2.74
May-16	2.45
Jun-16	3.61
Jul-16	2.44
Aug-16	2.57
Sep-16	2.93
Oct-16	2.44
Nov-16	2.76
Dec-16	2.42
Jan-17	5.17
Feb-17	5.94
Mar-17	6.38
Apr-17	6.22
May-17	6.12
Jun-17	6.19

Data up to June 28, 2017

- PJM Moved to Summer Requirements on June 1

Season	Dates	Off-Ramp	On-Ramp	Excursion	Effective MW Requirement
Winter	Dec 1 – Feb 29	HE1 – HE4, HE10 – HE16	HE5 – HE9, HE17 – HE24	HE7 – HE8, HE18 – HE21	Non-Ramp = 525MW Ramp = 800MW
Spring	Mar 1 – May 31	HE1 – HE5 HE9 – HE17	HE6 – HE8 HE18- HE24	HE7 – HE8, HE18 – HE21	Non-Ramp = 525MW Ramp = 800MW
Summer	Jun 1- Aug 31	HE1 – HE5 HE15 – HE18	HE6 – HE14 HE19- HE24	HE7 – HE8, HE18 – HE21	Non-Ramp = 525MW Ramp = 800MW
Fall	Sep 1 – Nov 30	HE1 – HE5 HE9 – HE17	HE6 – HE8 HE18- HE24	HE7 – HE8, HE18 – HE21	Non-Ramp = 525MW Ramp = 800MW

MW	Steam	Hydro	CT	DSR
Regulation A				
Avg. Performance Score (1/1)	75%	86%	84%	85%
Avg. Performance Score (5/1)	76%	87%	85%	86%
Avg. Performance Score (6/1)	76%	87%	85%	86%
Regulation A Qualified MW (6/1)	3802.5	1010	1157.6	5

MW	Hydro	CT	Energy Storage	DSR
Regulation D				
Avg. Performance Score (1/1)	77%	90%	96%	85%
Avg. Performance Score (5/1)	78%	92%	88%	82%
Avg. Performance Score (6/1)	78%	91%	91%	82%
Regulation D Qualified MW (6/1)	420	121.6	286.5	16.1

- Signals are continuing to provide improvement to ACE control
 - Regulation signals are always controlling ACE

Signal Type	Date	Avg. Median Daily ACE	Avg. Daily Stdv
New Signal	Jan 2017(1/9-1/31)	34	244
	Feb 2017	32	236
	Mar 2017	38	269
	Apr 2017	38	254
	May 2017	30	245
	Jun 2017	39	247
Old Signal	Jan 2017(1/1 - 1/8)	68	285
	2016	56	274
	2015	52	284

- For the majority, RegD signal is pegged for only small durations of time, which is to be expected for ACE control
 - Occasional longer pegged due to system conditions
 - Less RegD pegging observed with signal tuning

	Jan	Feb	Mar	Apr	May	Jun
20-30 minute duration	8	11	20	13	12	4
>30 minute duration	3	2	4	1	2	0

Peg = 99% of TREG Data up to June 28, 2017



RegD Total Regulation (MW)

	Ramp, Excursion	Ramp	Non-Ramp
	AVG MW	AVG MW	AVG MW
NEW SIGNAL	202	208	200
OLD SIGNAL	195	245	218

Data up to June 28, 2017

Appendix

Total Unique Responders	29				
Total Companies	159				
Voting Members	52				
Affiliates	107				
Question	Yes	No	Abstain	#	%
1. Do you support Package E – PJM/IMM? -- Response	114	39	6	159	75%
2. Do you support Package F - Beacon? -- Response	23	118	18	159	16%
3. Do you support Package G - ESA? -- Response	33	108	18	159	23%
4. Do you support Package H – Steel Producers? -- Response	11	106	42	159	9%
5. Do you support Package I – Mosaic & A.F. Mensah? -- Response	33	108	18	159	23%
6. Do you support Package J – NextEra? -- Response	23	117	19	159	16%
7. Do you support Package K – ESA Compromise? -- Response	39	107	13	159	27%
	Make a Change	Retain the Status Quo	Abstain	#	%
8. Do you prefer to make a change to Regulation Market regarding performance score, clearing, and settlements, or retain the status quo? -- Response	126	19	14	159	87%

Benefit Factor - Application and clearing

- Replace Benefit Factor (BF) with Regulation Rate of Technical Substitution (RRTS)
- Effective MW calculation will be area under the RRTS curve

Performance Scoring

- Precision only calculation
- Minimum allowable participation threshold to be raised from status quo 40% to 50%

Settlements

- Replace Mileage Ratio from the Regulation Performance Credit with Marginal Rate of Technical Substitution
- Marginal Rate of Technical Substitution will be added to the Regulation Capability Credit

Transition Plan

- The 1st 12 months of the 24 month transition period will have a minimum (floor) RRTS value of 0.65. The last 12 months of the 24 month transition period would have a minimum (floor) RRTS value of 0.50.