Review of
Regulation Price Formation - "The Lottery"

Regulation Market Issues Senior Task Force

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Michael Olaleye, senior engineer – Real-Time Market Operations

- We have discussed the concern expressed in "**Regulation Price Formation - "The Lottery**" before at the January 2016 RMISTF: http://www.pjm.com/~/media/committees-groups/task-forces/rmistf/20160113/20160113-item-05-aso-real-time-regulation-mcp-differentiation.ashx

- Possible reasons for Reg MCP differentiation were discussed

  ➤ ASO solution was based on available data 60 minutes before operating hour and absolute response of resources

  ➤ RTSCED/LPC see actual data and actual resources response

LPC_LOCALMKTHOUR	INTERVAL	LPCRERUN	CASESTATE	SMP	ENERGYLMP	MAXLMP	MINLMP	RTSCED_BIAS	BFCURVEUSED	RTO_RMCP	PCP	CCP
9/25/2016 2:35:00 PM	14_08	0	6	24.71	24.75	1149.02	-277.47	-300	40	15.9	0	15.89
9/25/2016 2:30:00 PM	14_07	0	6	25.53	25.54	1154.47	-278.95	-300	40	5.45	0.14	5.3
9/25/2016 2:25:00 PM	14_06	0	6	32.29	32.28	1156.41	-269.91	1000	40	15.17	2.13	13.04
9/25/2016 2:20:00 PM	14_05	0	6	194.51	193.79	1304.68	-85.78	200	40	315.57	0.64	314.93
9/25/2016 2:15:00 PM	14_04	0	6	194.51	193.79	1304.68	-85.78	200	40	315.57	0.03	315.55
9/25/2016 2:10:00 PM	14_03	0	6	236.59	236	945.92	-66.42	300	40	383.36	0.01	383.35
9/25/2016 2:05:00 PM	14_02	0	6	206.7	206.15	668.91	-36.29	300	40	341.19	0.47	340.72
9/25/2016 2:00:00 PM	14_01	0	6	48.53	48.46	1133.34	-239.6	-200	40	46.92	0.81	46.11
9/25/2016 1:55:00 PM	13_12	0	6	23.76	23.69	39.5	-19.07	-200	40	7.46	0.69	6.77
9/25/2016 1:50:00 PM	13_11	0	6	23.76	23.69	39.5	-19.07	-200	40	7.46	0.62	6.85
9/25/2016 1:45:00 PM	13_10	0	6	23.76	23.69	39.5	-19.07	-200	40	7.46	1.37	6.09

- Change in load bias from over-forecast adjustment (-200) to under-forecast adjustment (+300 and +200) caused spike in energy price because the cheaper units could not give the needed MW in that short period of time
- Change in LMP causes change in Reg LOC

LOCALHOUR	HE	ASO	RT_HOURLY	RTOVERASO	RT_LMP	REGCCP	REGPCP
25-Sep-16	01	14.88	13.21	-1.67	16.83	13.13	0.08
9/25/2016 1:00	02	10.9	12.58	1.68	18.71	11.94	0.64
9/25/2016 2:00	03	18.38	20.07	1.69	16.83	19.56	0.51
9/25/2016 3:00	04	14.1	15.84	1.74	13.69	14.03	1.81
9/25/2016 4:00	05	5.18	12.85	7.67	12.06	11.8	1.05
9/25/2016 5:00	06	9.27	14.06	4.79	13.75	12.13	1.93
9/25/2016 6:00	07	11.51	20	8.49	15	18.43	1.57
9/25/2016 7:00	08	20.79	19.37	-1.42	16.9	18.67	0.7
9/25/2016 8:00	09	20.31	16.58	-3.73	18.81	14.13	2.45
9/25/2016 9:00	10	8.72	10.59	1.87	20.83	9.47	1.12
9/25/2016 10:00	11	17.92	18.11	0.19	20.23	10.7	7.41
9/25/2016 11:00	12	40.88	26.12	-14.76	22.27	19.5	6.62
9/25/2016 12:00	13	22.09	18.56	-3.53	24.04	11.77	6.79
9/25/2016 13:00	14	18.37	9.08	-9.29	23.84	8.05	1.03
9/25/2016 14:00	15	9.03	123.49	114.46	87.55	123.14	0.35
9/25/2016 15:00	16	6.1	10.3	4.2	38.09	9.99	0.31
9/25/2016 16:00	17	0.01	49.96	49.95	87.43	49.96	0
9/25/2016 17:00	18	22.27	60.69	38.42	59.1	59.77	0.92
9/25/2016 18:00	19	16.75	15.79	-0.96	22.43	15.79	0
9/25/2016 19:00	20	0.01	16.36	16.35	33.48	16.36	0
9/25/2016 20:00	21	24.84	40.74	15.9	41.76	34.52	6.22
9/25/2016 21:00	22	72.15	24.69	-47.46	25.9	21.34	3.35
9/25/2016 22:00	23	42.06	20	-22.06	22.53	16.24	3.76
9/25/2016 23:00	24	22.57	18.35	-4.22	20.9	13.29	5.06
Average(1-24)		18.71	25.31	6.60			
Average(less HE15)		19.13	21.04	1.91			

* Absence of LMP spike in HE15 which resulted in high RegLOC, average ASO vs RT was under $2