



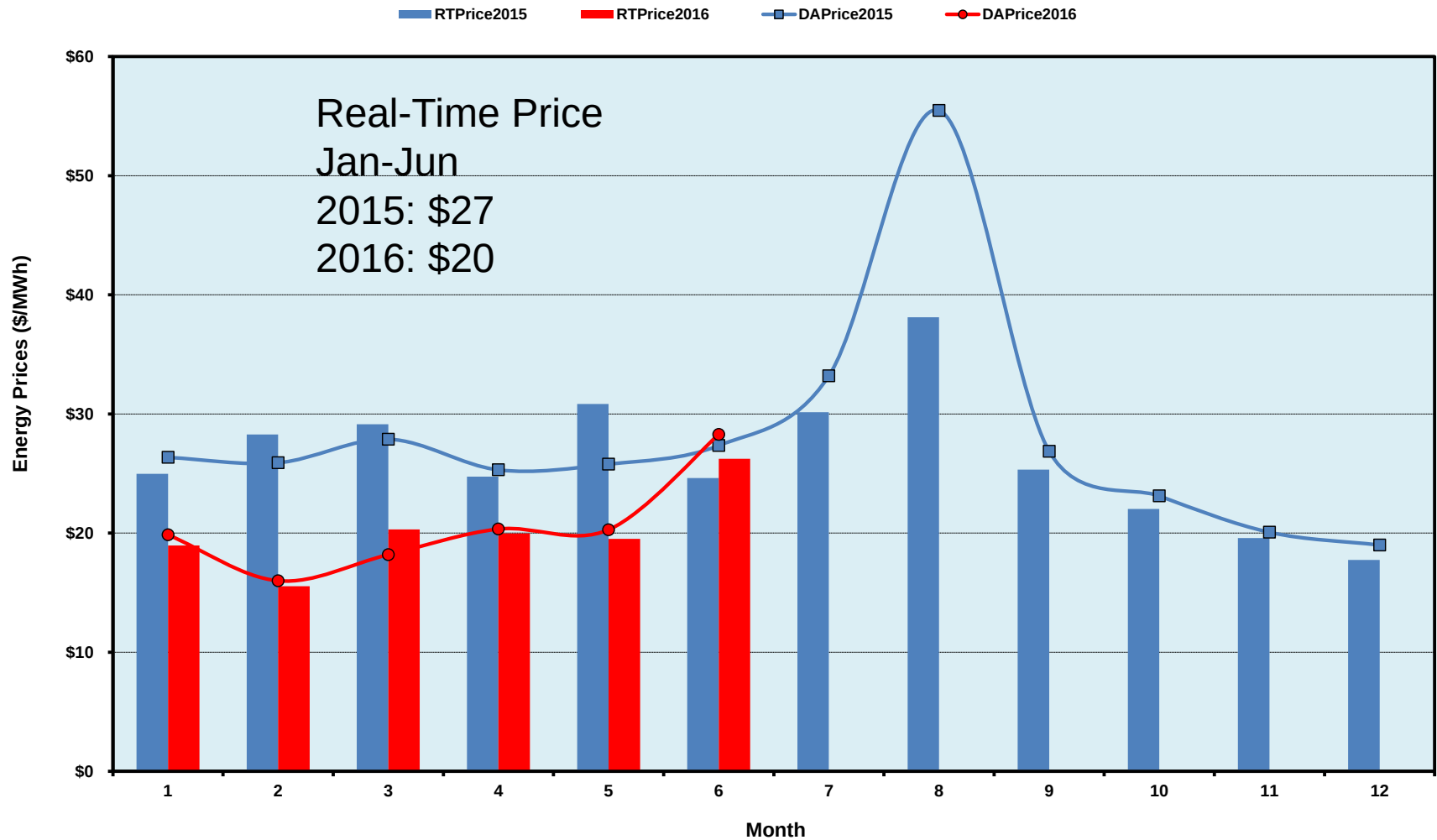
Item 5: Independent Market Monitor (IMM) Report

Beth Garza
IMM Report

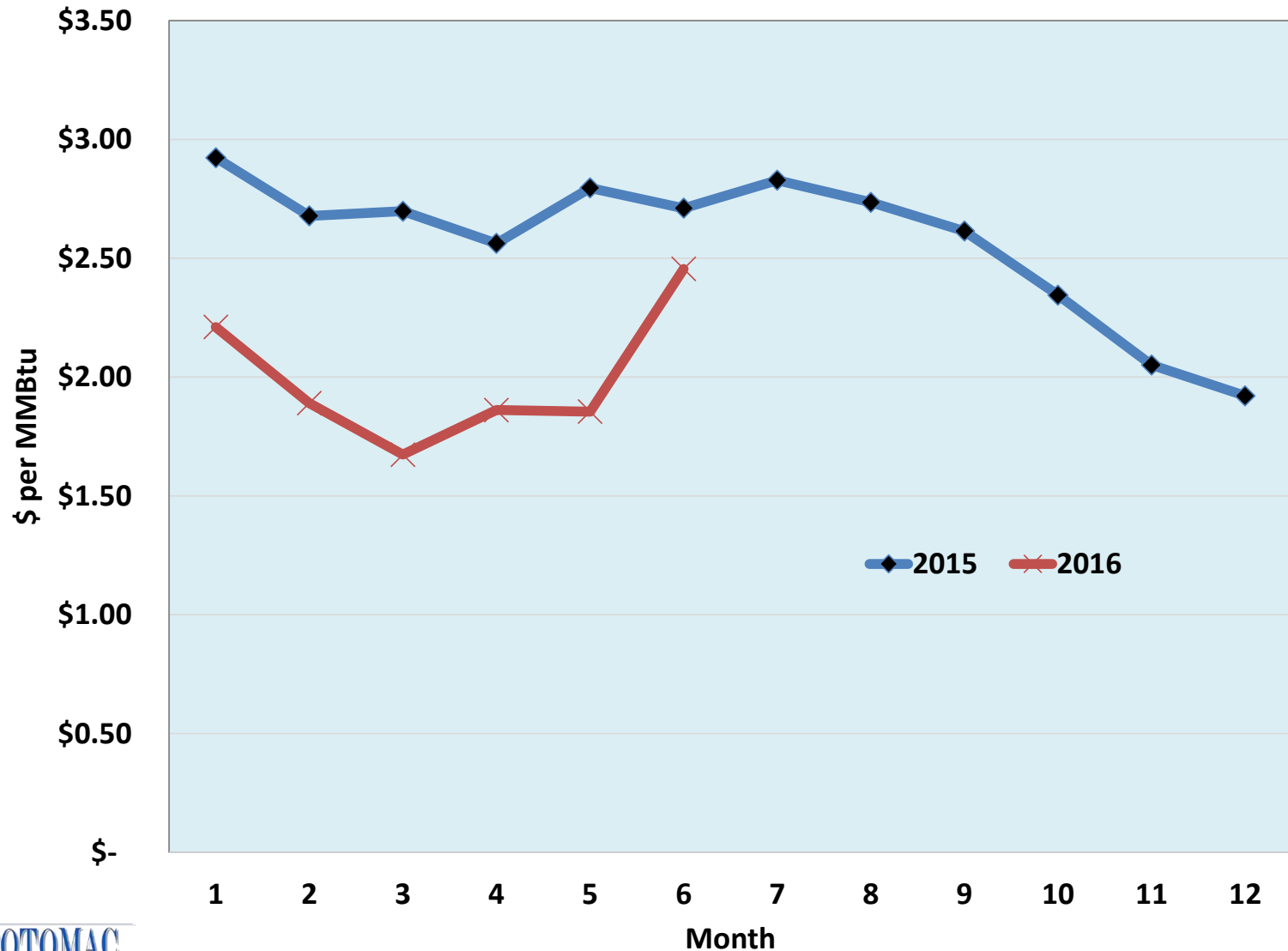
Board of Directors Meeting

ERCOT Public
August 9, 2016

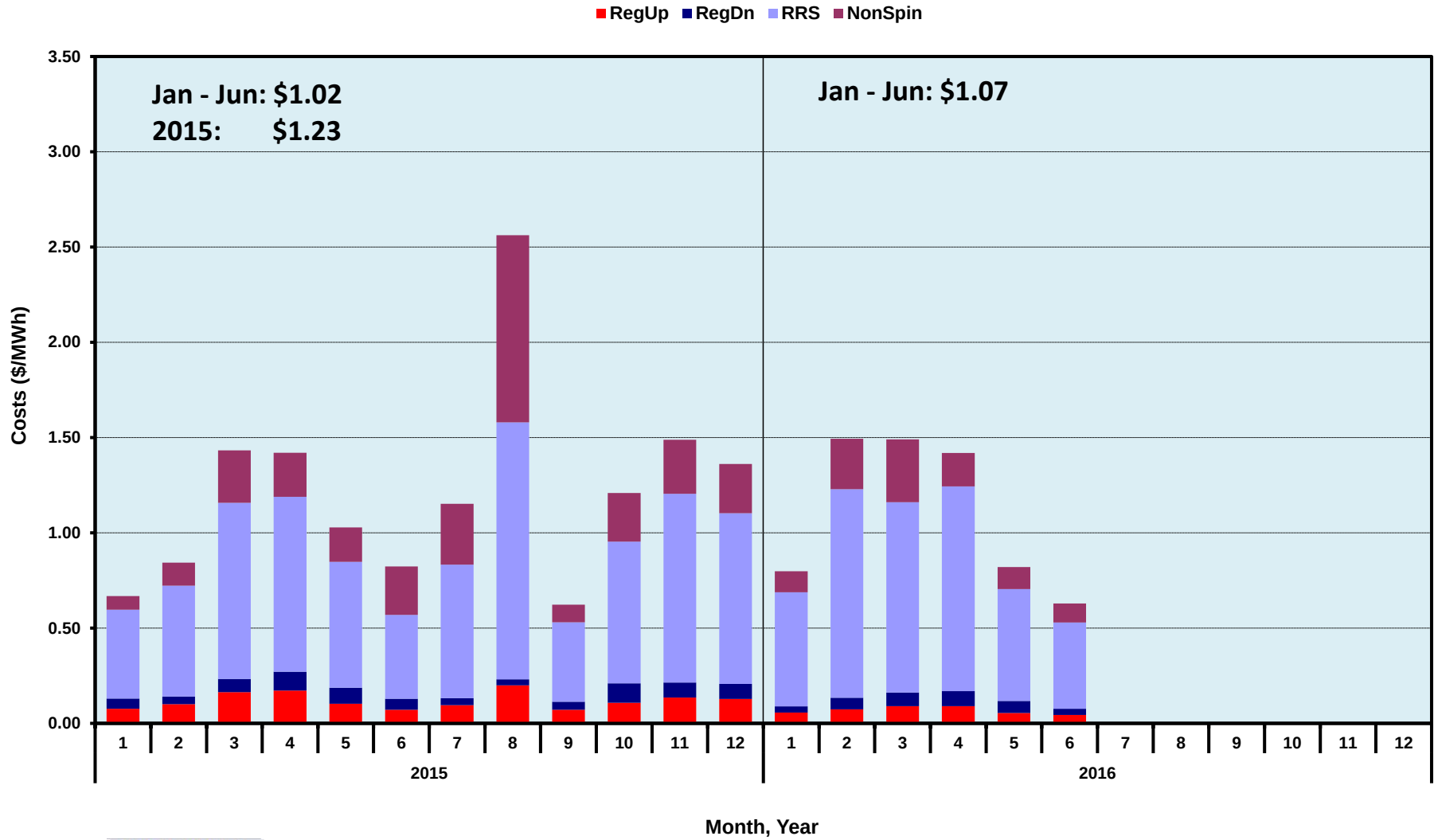
2016YTD Real-Time price average \$20 / MWh



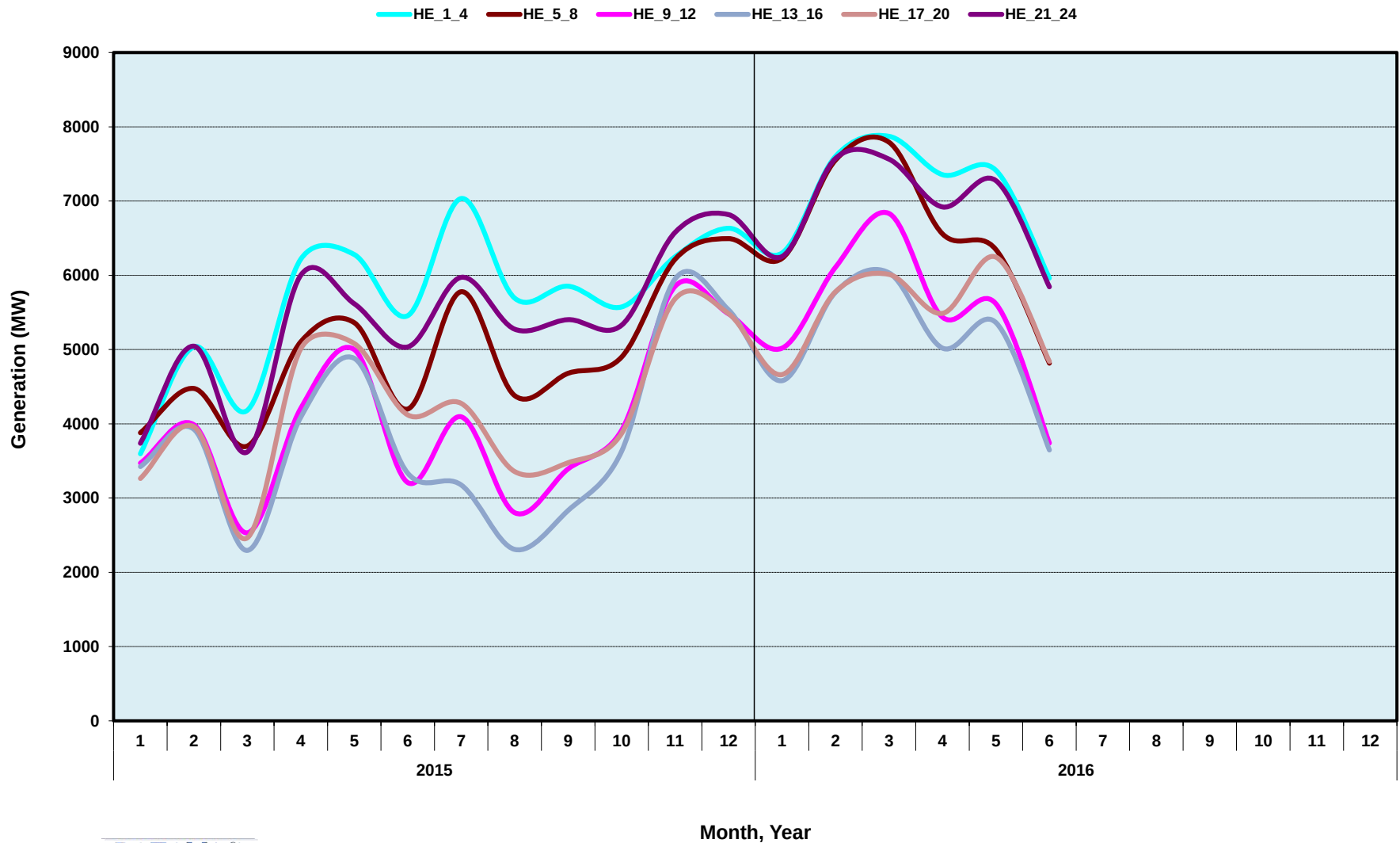
2016YTD Natural gas price average \$2 / MMBtu



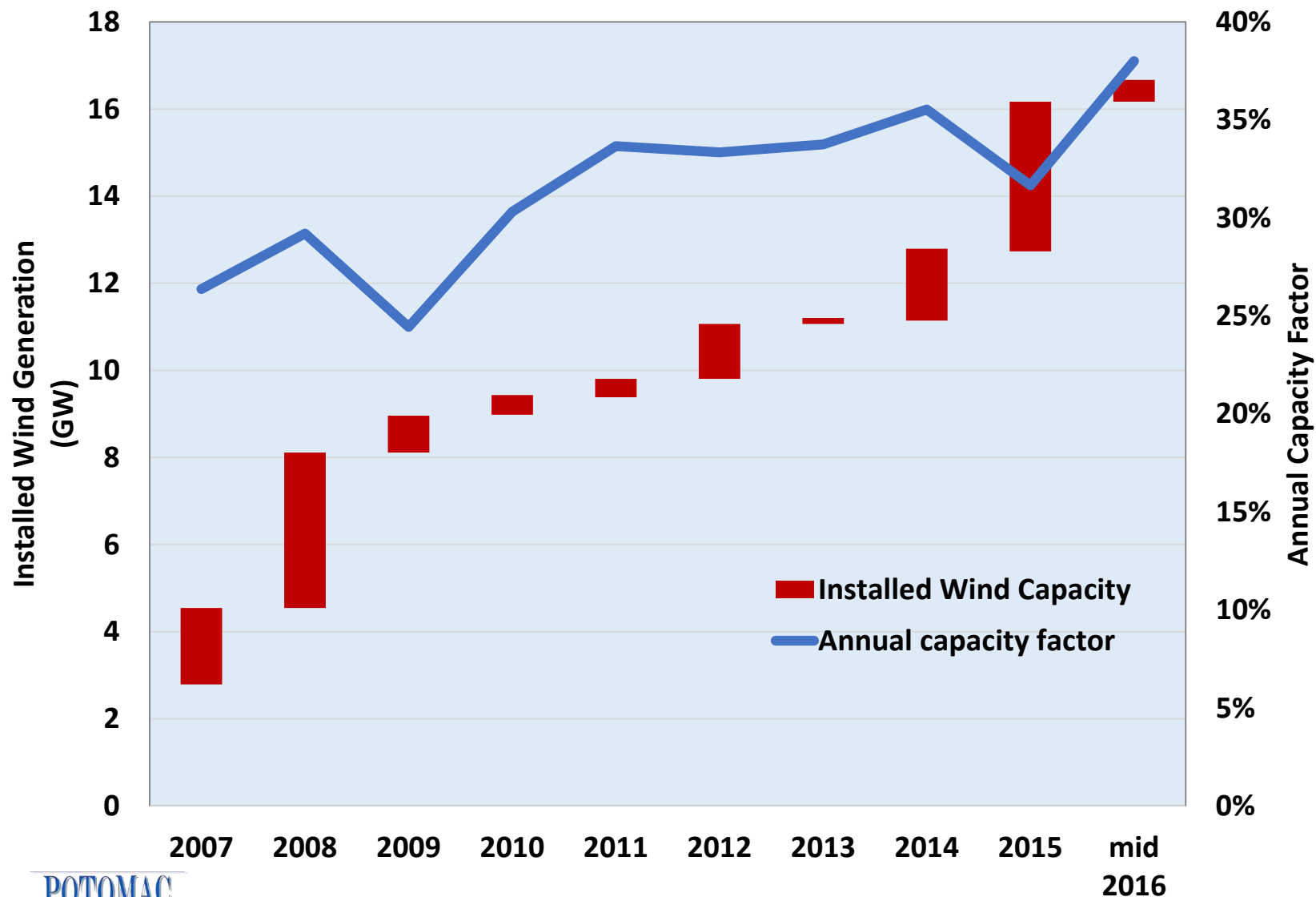
A/S costs higher, even with lower quantities



Wind output continues to increase



2016 appears to be a windier year



IMM Position on NPRR784

- The IMM supports NPRR784's objective, which is to price the energy from an RMR unit to reflect the shortage conditions that exist by the fact that there is an RMR unit.
- The mechanism put forth in NPRR784 was designed to be very simple (no cost) to implement.
- More precise mechanisms are possible but would require system changes.

To the Public Utility Commission of Texas

ERCOT Wholesale Electricity Market Monthly Report

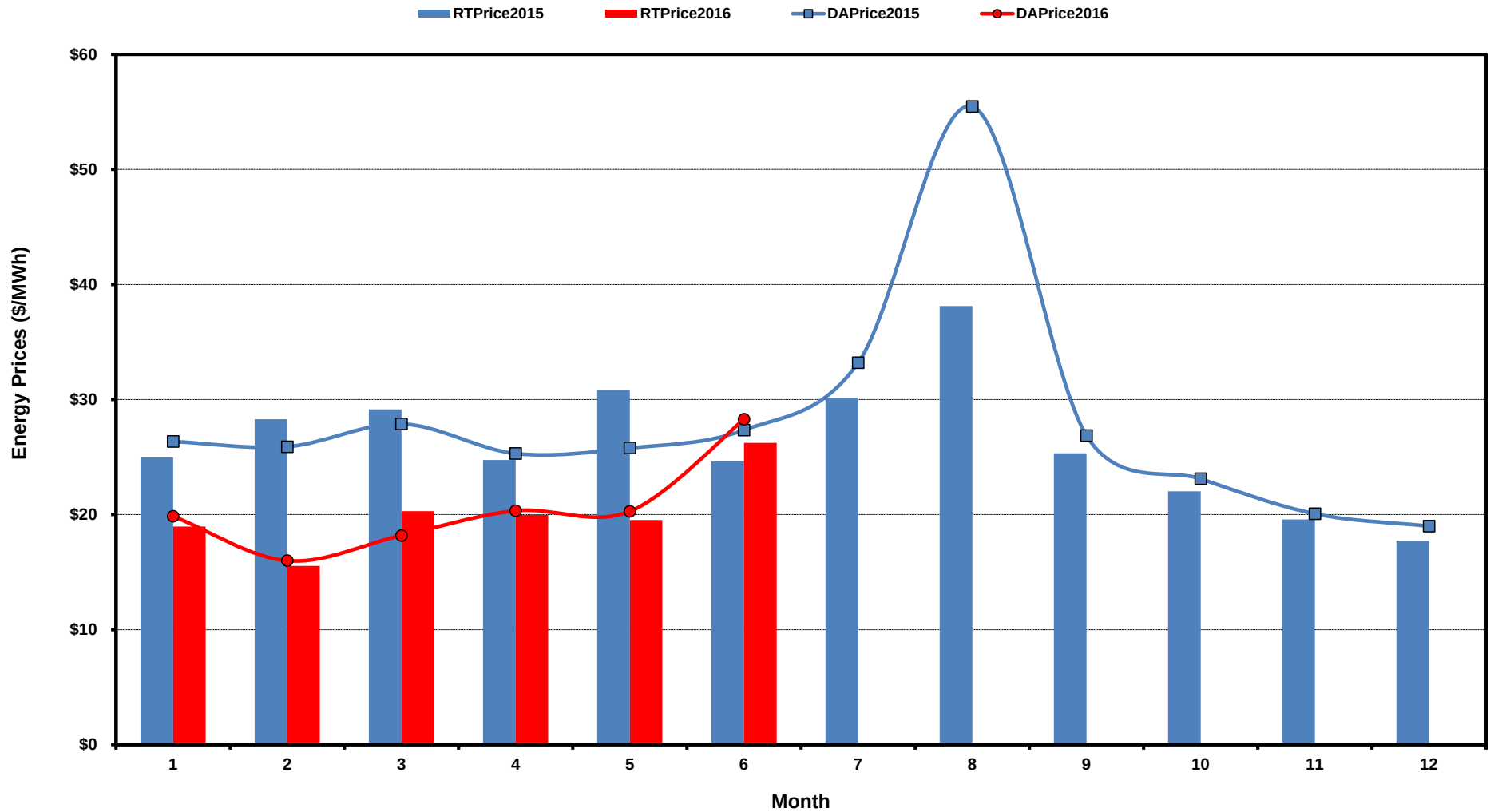
Friday, July 15, 2016

Potomac Economics, Ltd.
Independent Market Monitor

1	ERCOT-wide Average Energy Prices DA vs. RT	chart	table
2	Load Zone Load Statistics	chart	table
3	Load Zone Monthly Average Energy Prices DA vs RT	chart	table
4	ERCOT-wide Monthly Implied Heat Rates DA vs RT	chart	table
5	Load Zone Monthly Implied Heat Rates DA vs RT	chart	table
6	Daily ORDC Reserve Adder Avg. Value and Duration	chart	table
7	Monthly Ancillary Services Required MW	chart	table
8	Hourly Average of Ancillary Services Required MW	chart	table
9	Monthly Average Ancillary Services Price	chart	table
10	Monthly Average A/S Cost per MWh Load	chart	table
11	Ercot-wide Cumulative Peaker Net Margin	chart	table
12	DA vs. RT Load Forecast Error by Hour Ending	chart	table
13	Monthly Average of Wind Generation by Hour Ending	chart	table
14	RT Constraint Rankings		table
	- Top 10 Constraints by Total Congestion Rent	chart	
	- Top 10 Constraints by Binding Frequency	chart	
15	DA Constraint Rankings		table
	- Top 10 Constraints by Total Congestion Rent	chart	
	- Top 10 Constraints by Binding Frequency	chart	
16	CRR Pairs by Monthly Auction Value Rankings		table
	- Top 10 PTP Obligations by Total Transaction Value	chart	
	- Top 10 PTP Options by Total Transaction Value	chart	

ERCOT-wide Average Energy Prices DA vs RT

(avg. DA & RT SPPs weighted by Real Time Settlement Loads)



[Home <<](#)

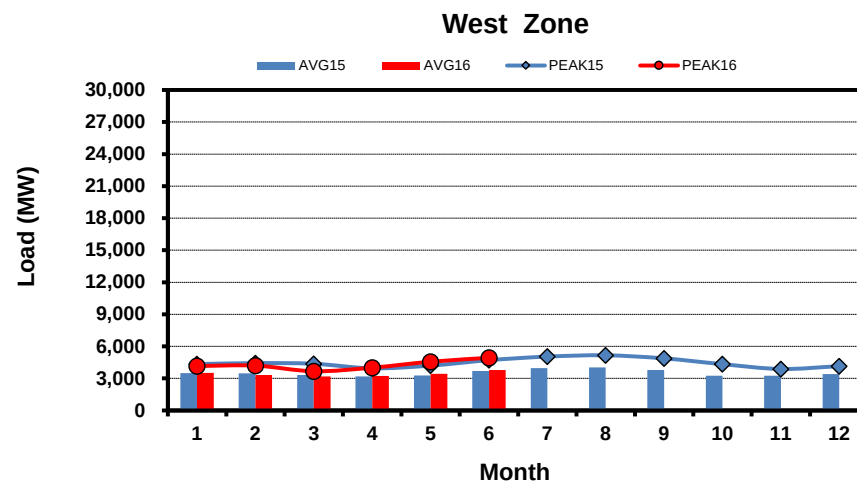
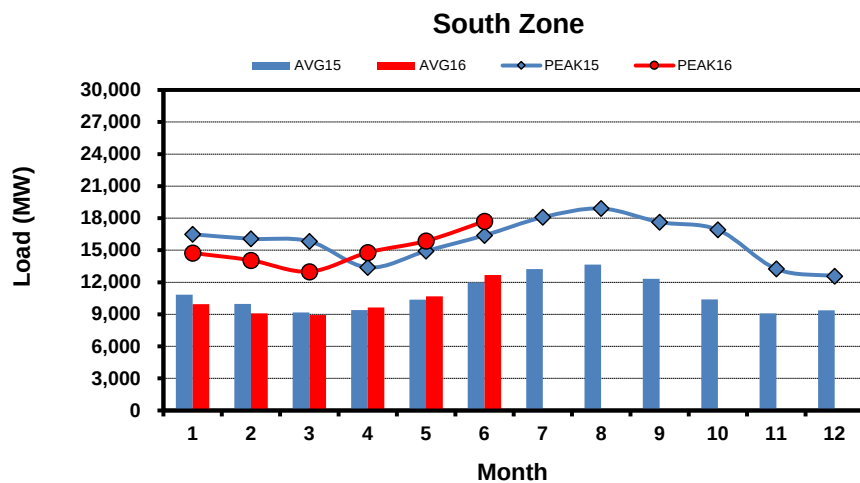
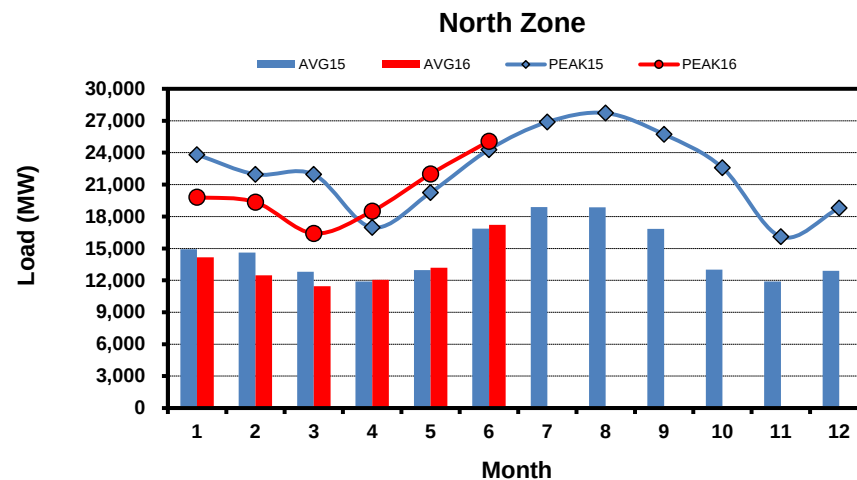
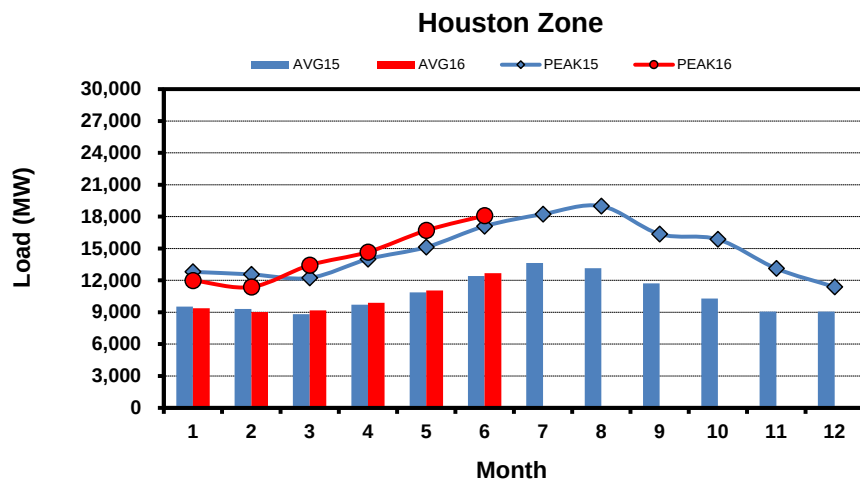
[previous <<](#)

[next >>](#)

[data](#)

Load Zone Load Statistics

(Nodal load zone made comparable to zonal sytem Load Zone definitions*)



[Home <<](#)

[previous <<](#)

[next >>](#)

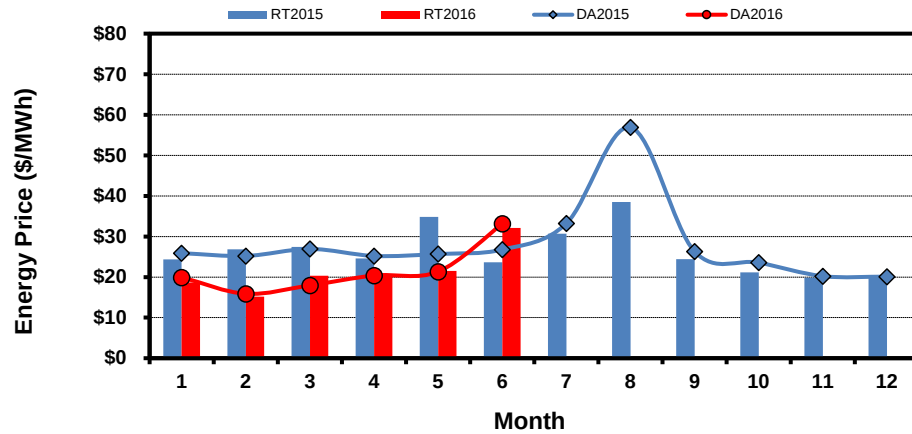
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Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

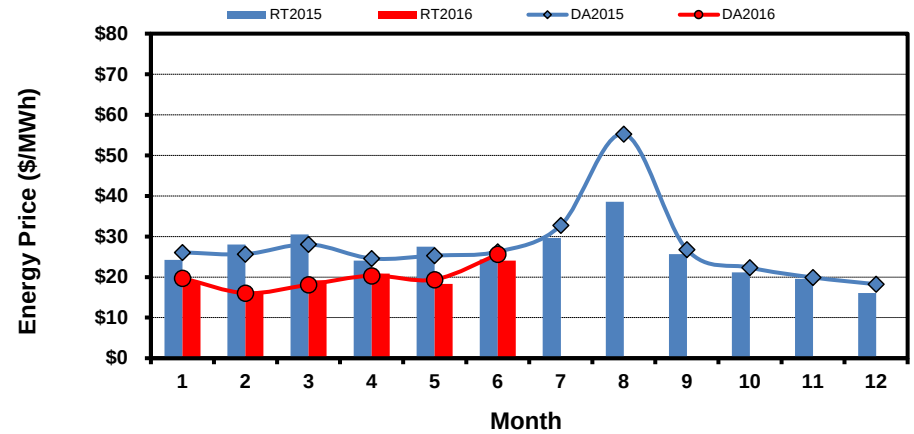
Load Zone Monthly Average Energy Price DA vs RT

(avg. DA & RT SPPs weighted by Real Time Settlement Loads)
(Nodal load zone made comparable to zonal sytem Load Zone definitions*)

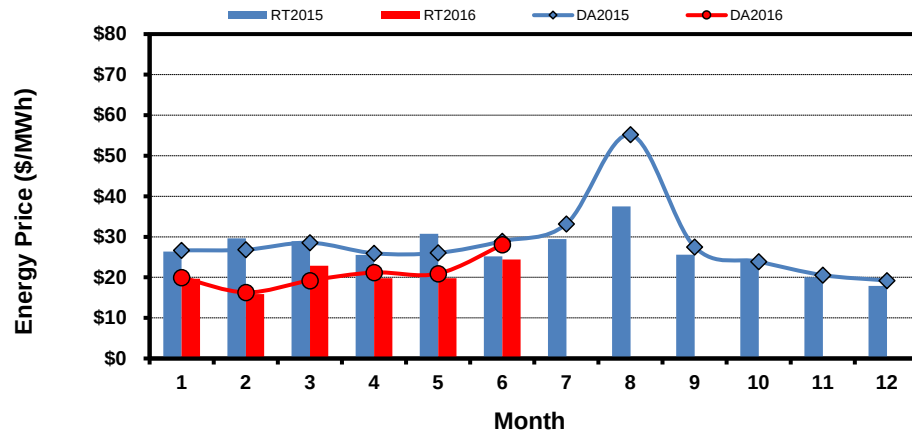
Houston Zone



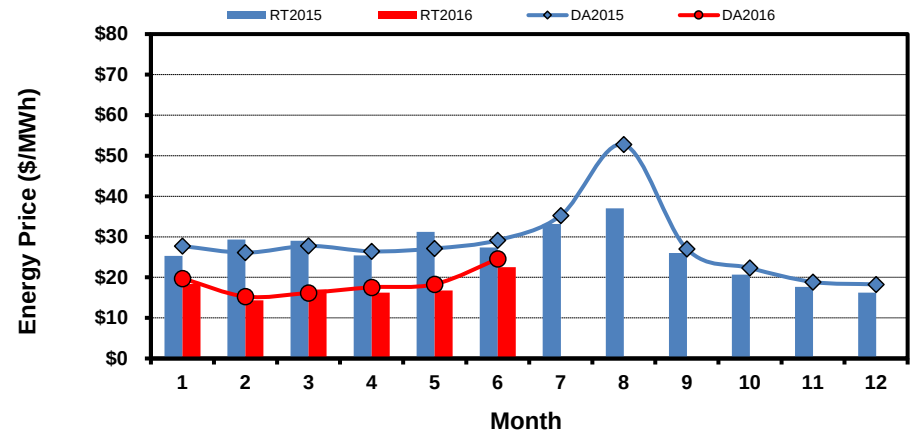
North Zone



South Zone



West Zone



[Home <<](#)

[previous <<](#)

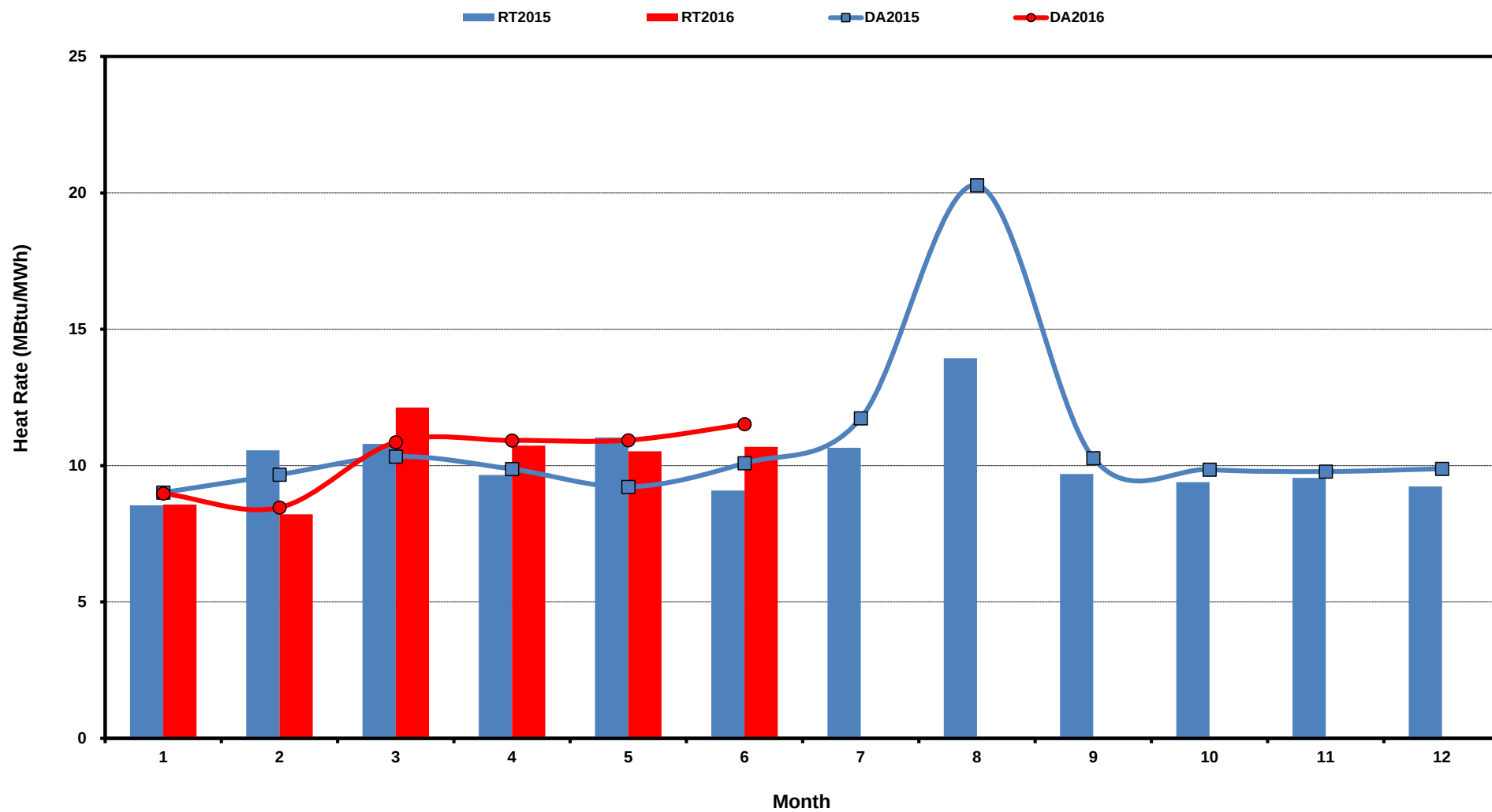
[next >>](#)

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Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

ERCOT-wide Monthly Implied Heat Rate DA vs RT

(avg. heat rates weighted by Real Time Settlement Loads)



[Home <<](#)

[previous <<](#)

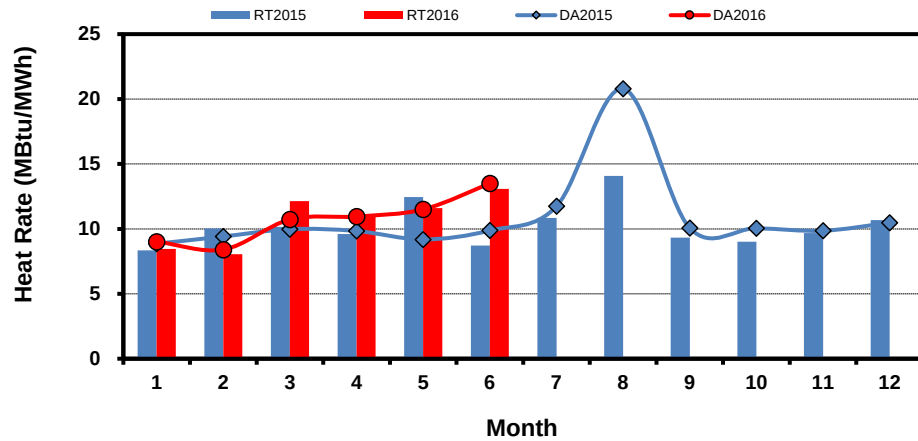
[next >>](#)

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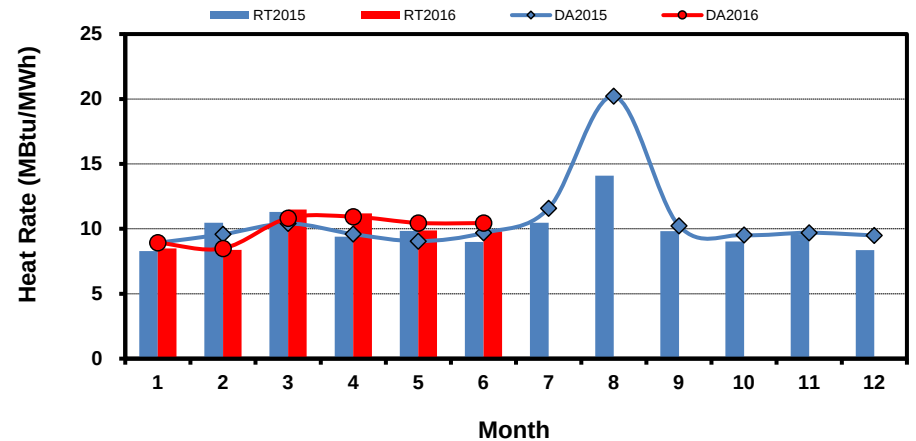
Load Zone Monthly Implied Heat Rate DA vs RT

(avg. heat rates weighted by Real Time Settlement Loads)
(Nodal load zone made comparable to zonal sytem Load Zone definitions*)

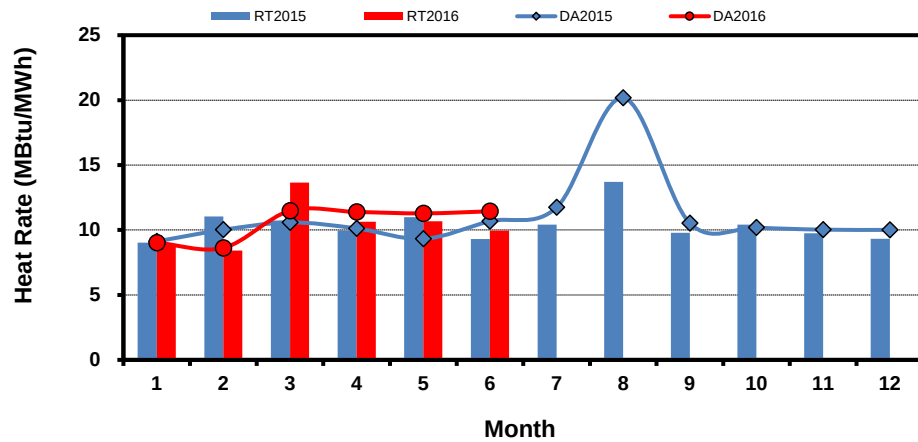
Houston Zone



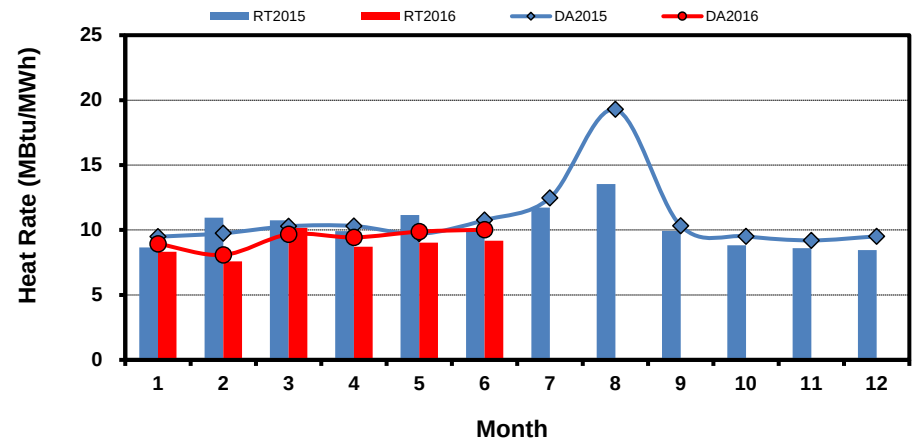
North Zone



South Zone



West Zone



[Home <<](#)

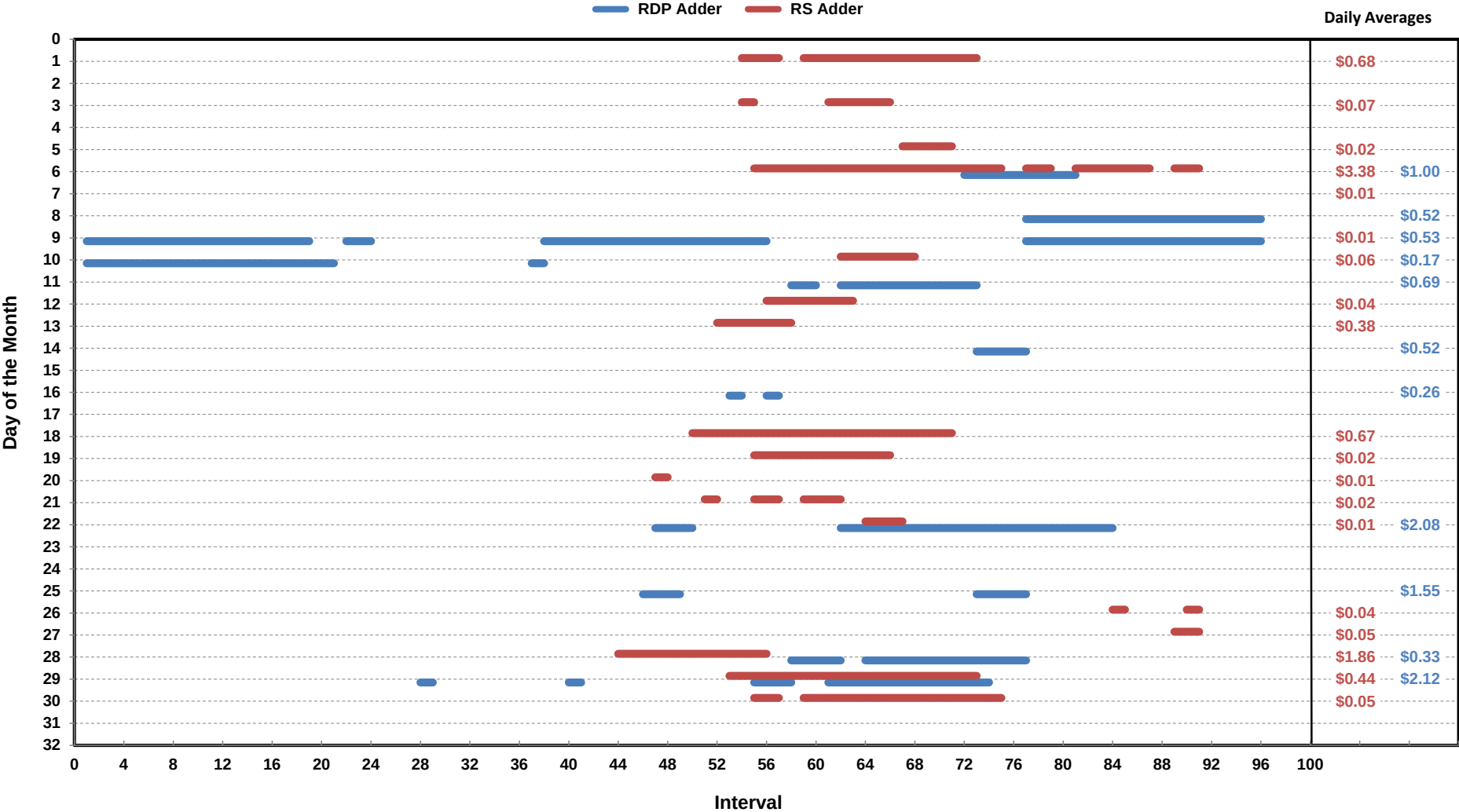
[previous <<](#)

[next >>](#)

[data](#)

Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

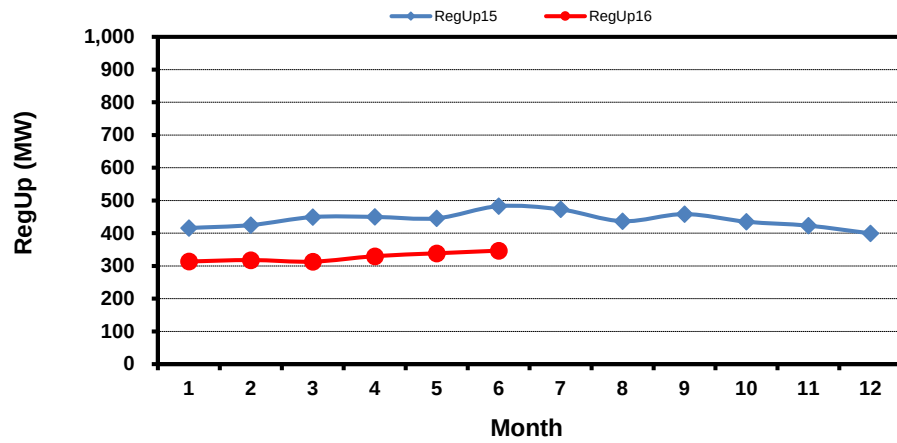
Daily ORDC Adders Average Values and Interval Duration
Jun-2016



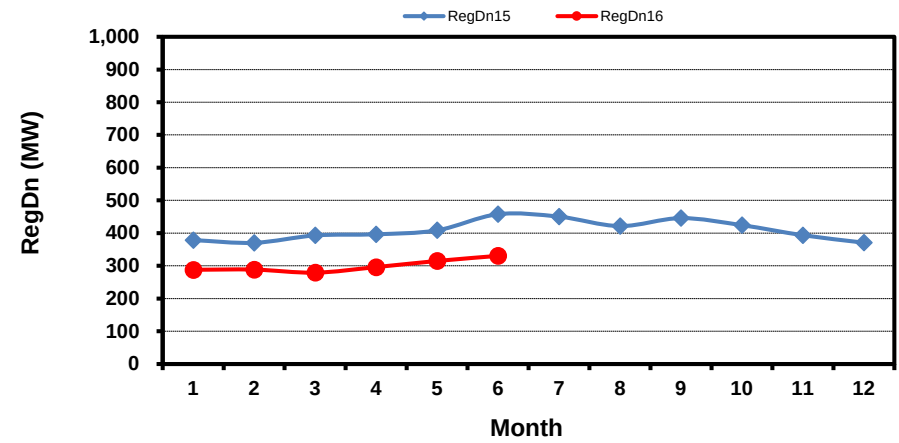
[Home <<](#) [previous <<](#) [next >>](#)
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Monthly Average of Ancillary Services Required MW

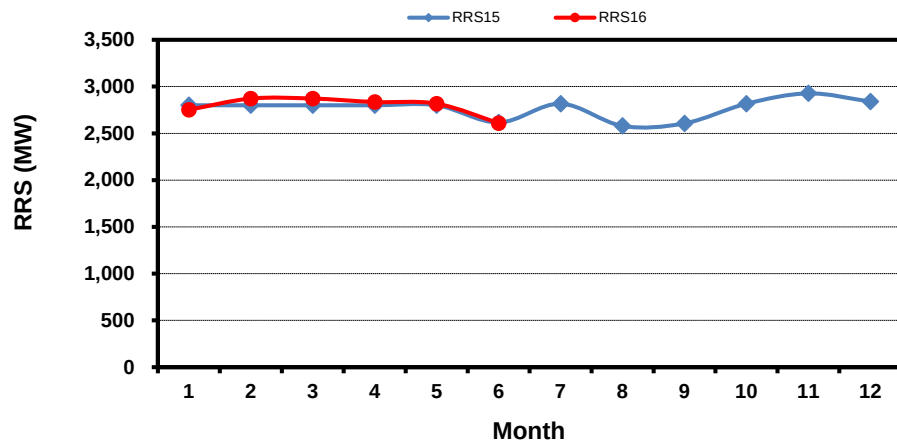
Regulation Up



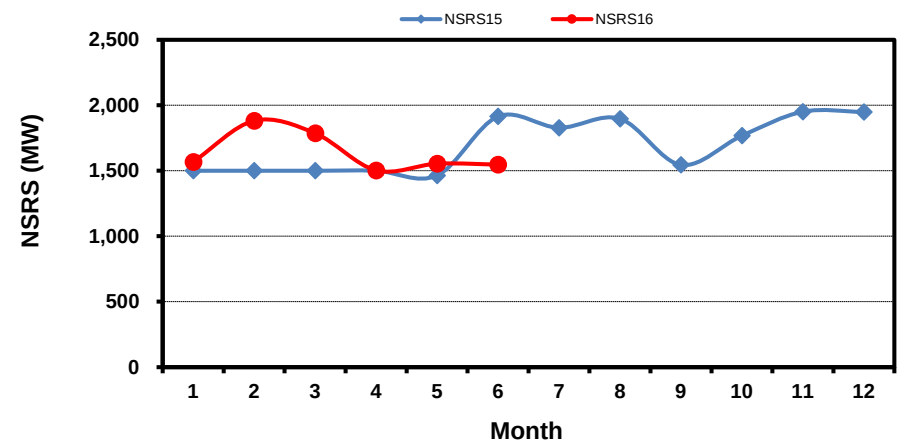
Regulation Down



Responsive Reserve



Non-Spin Reserve



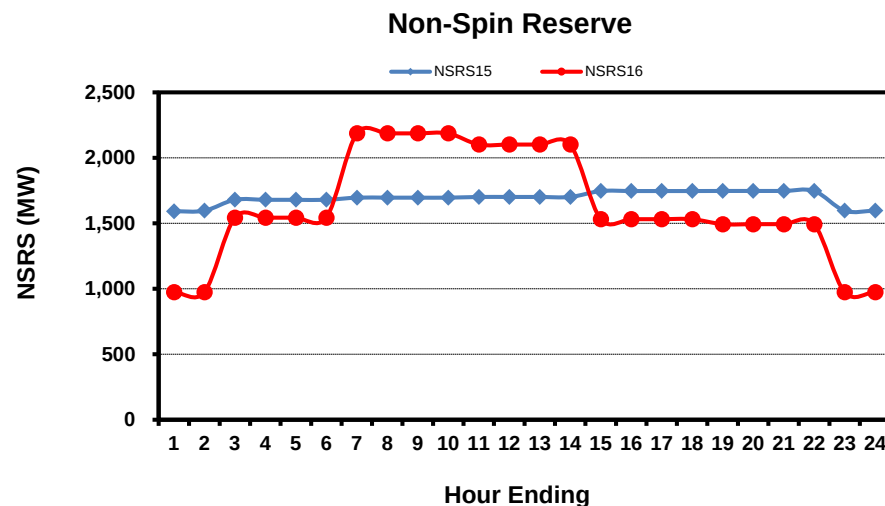
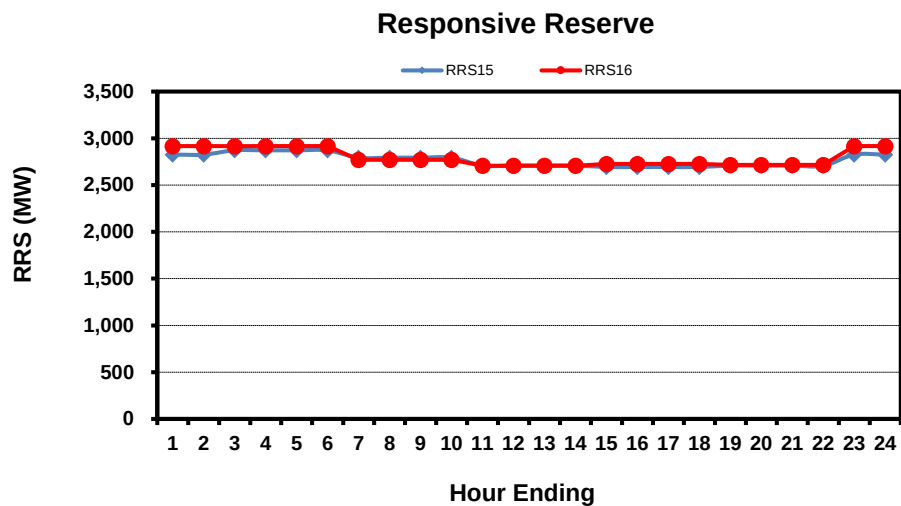
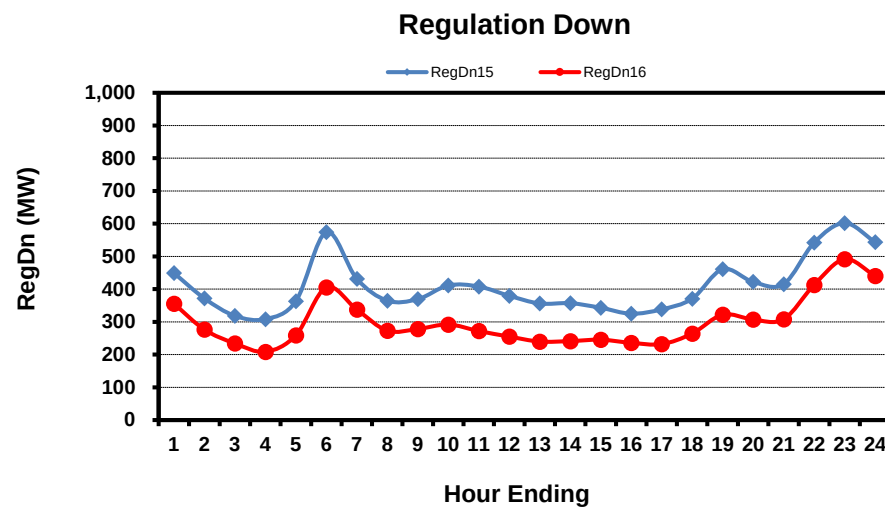
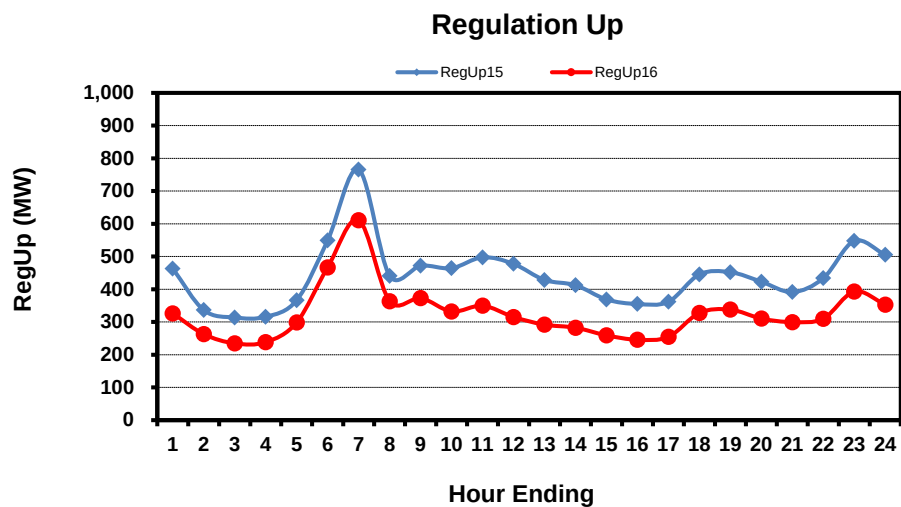
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

Hourly Average of Ancillary Services Required MW



[Home <<](#)

[previous <<](#)

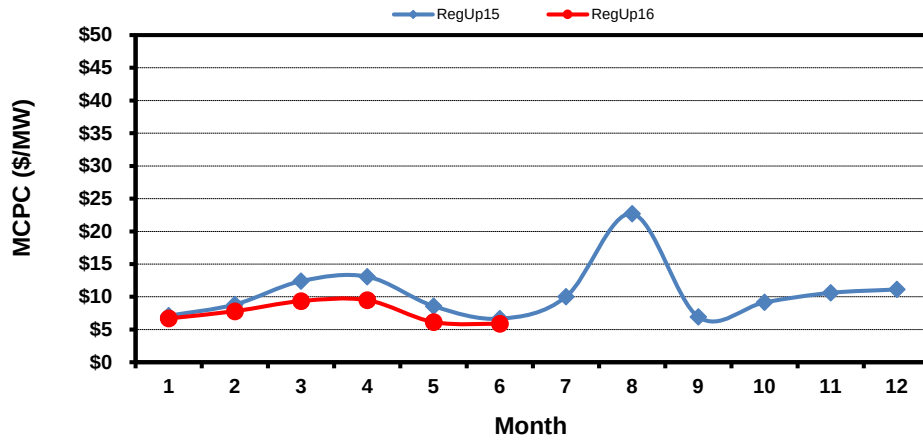
[next >>](#)

[data](#)

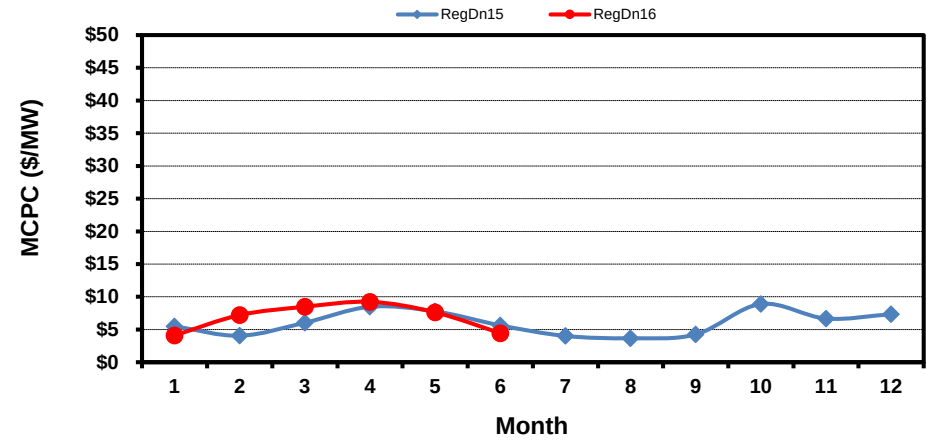
Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

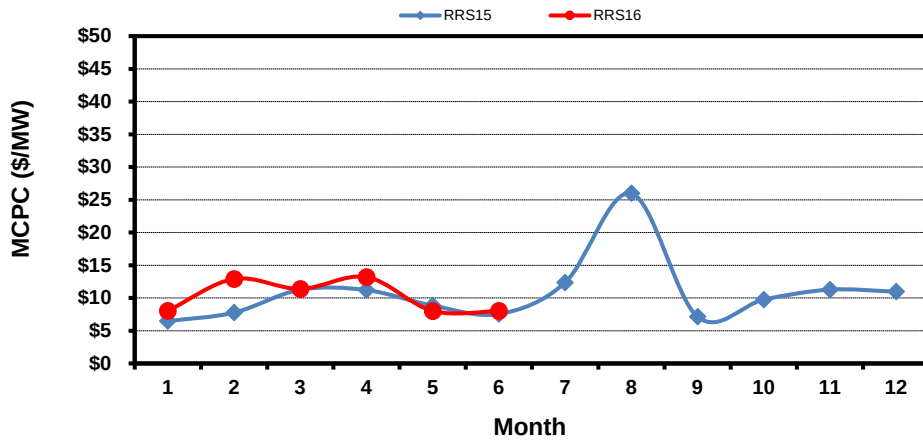
Regulation Up



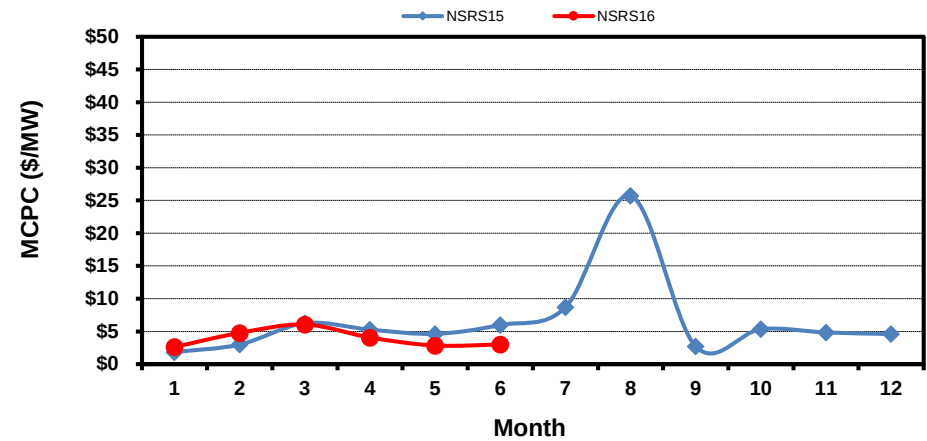
Regulation Down



Responsive Reserve



Non-Spin Reserve



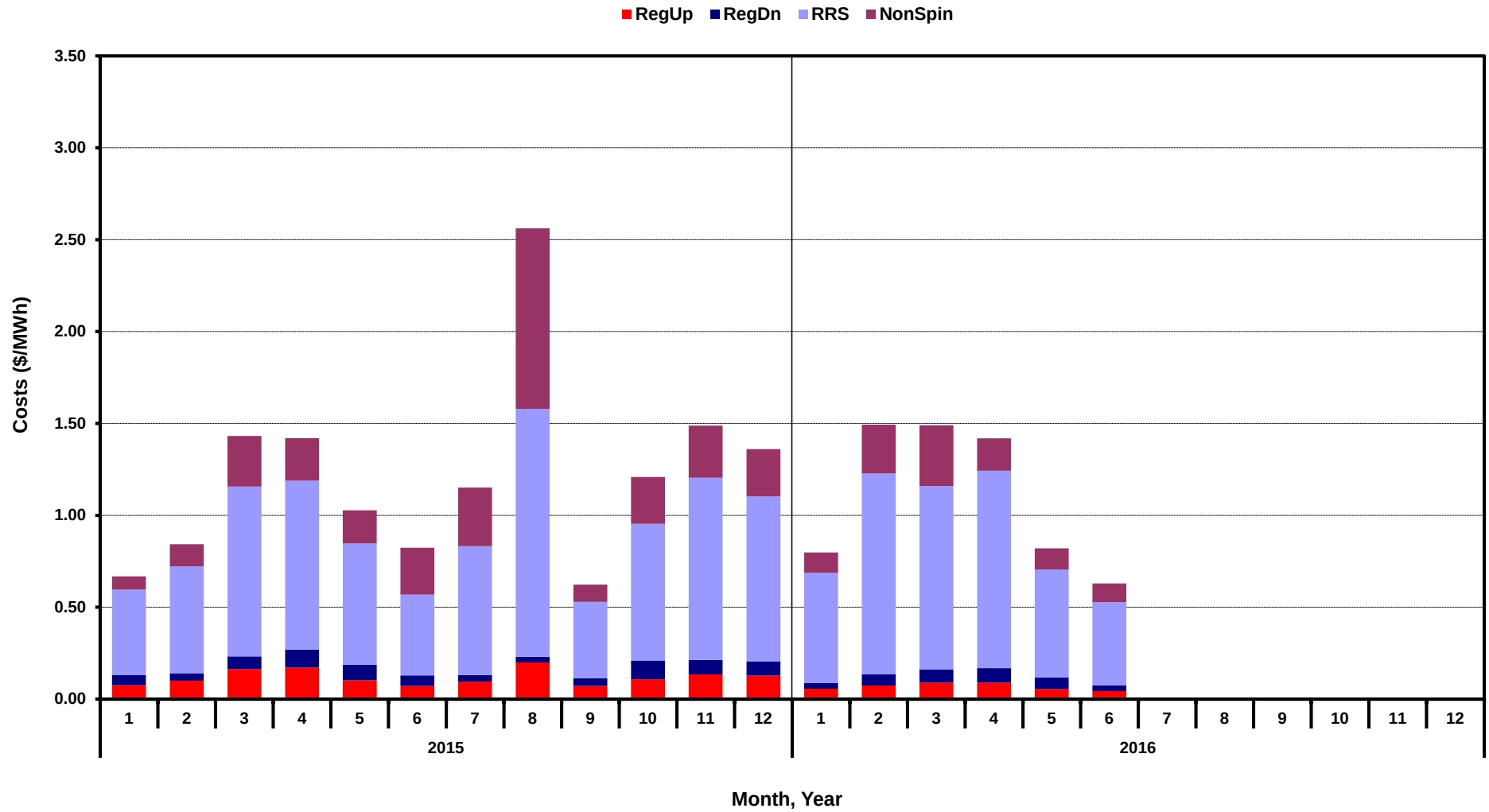
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

Monthly Average A/S Cost per MWh Load



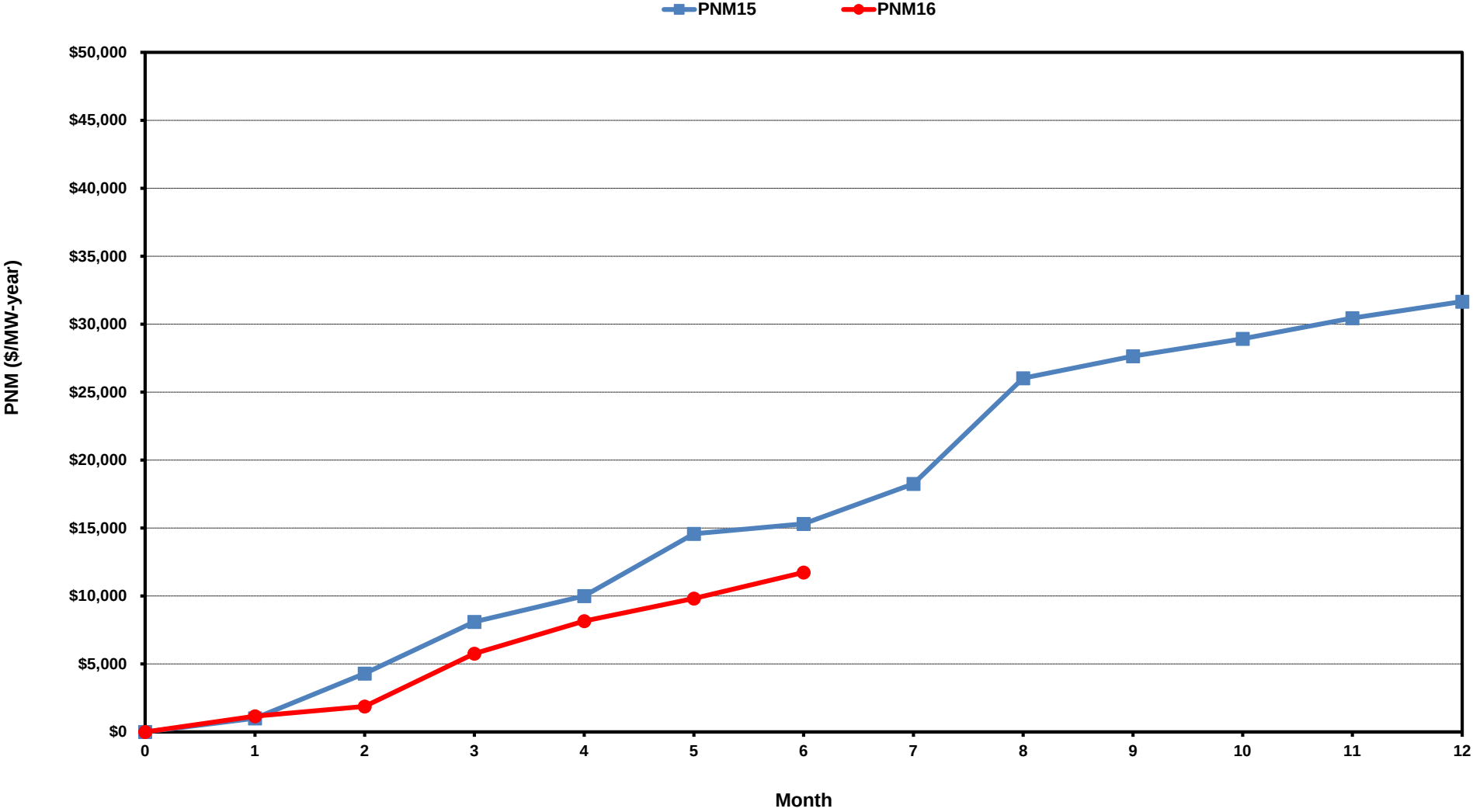
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

ERCOT-wide Cumulative Peaker Net Margin



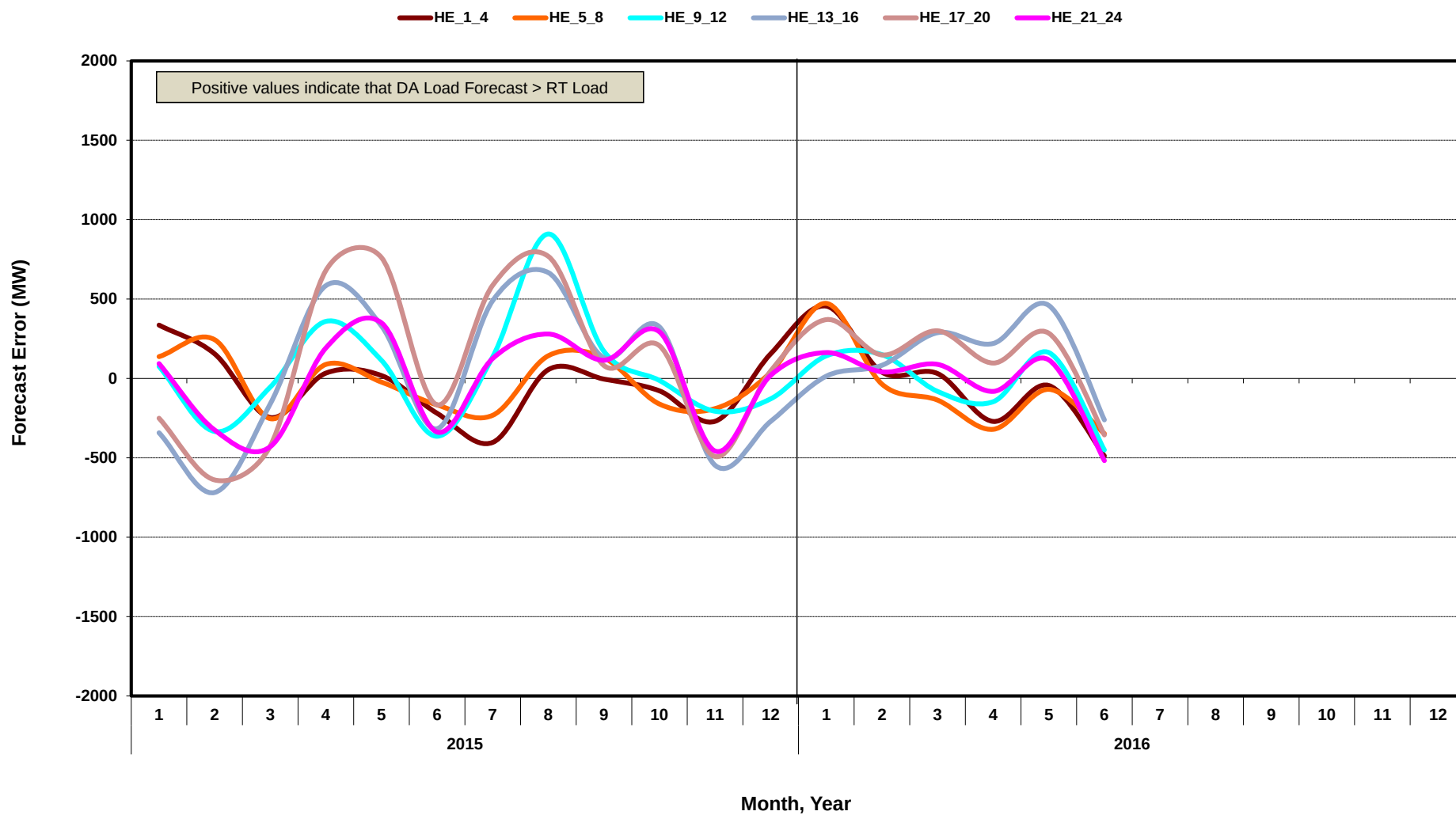
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

DA vs. RT Load Forecast Error by Hour Ending



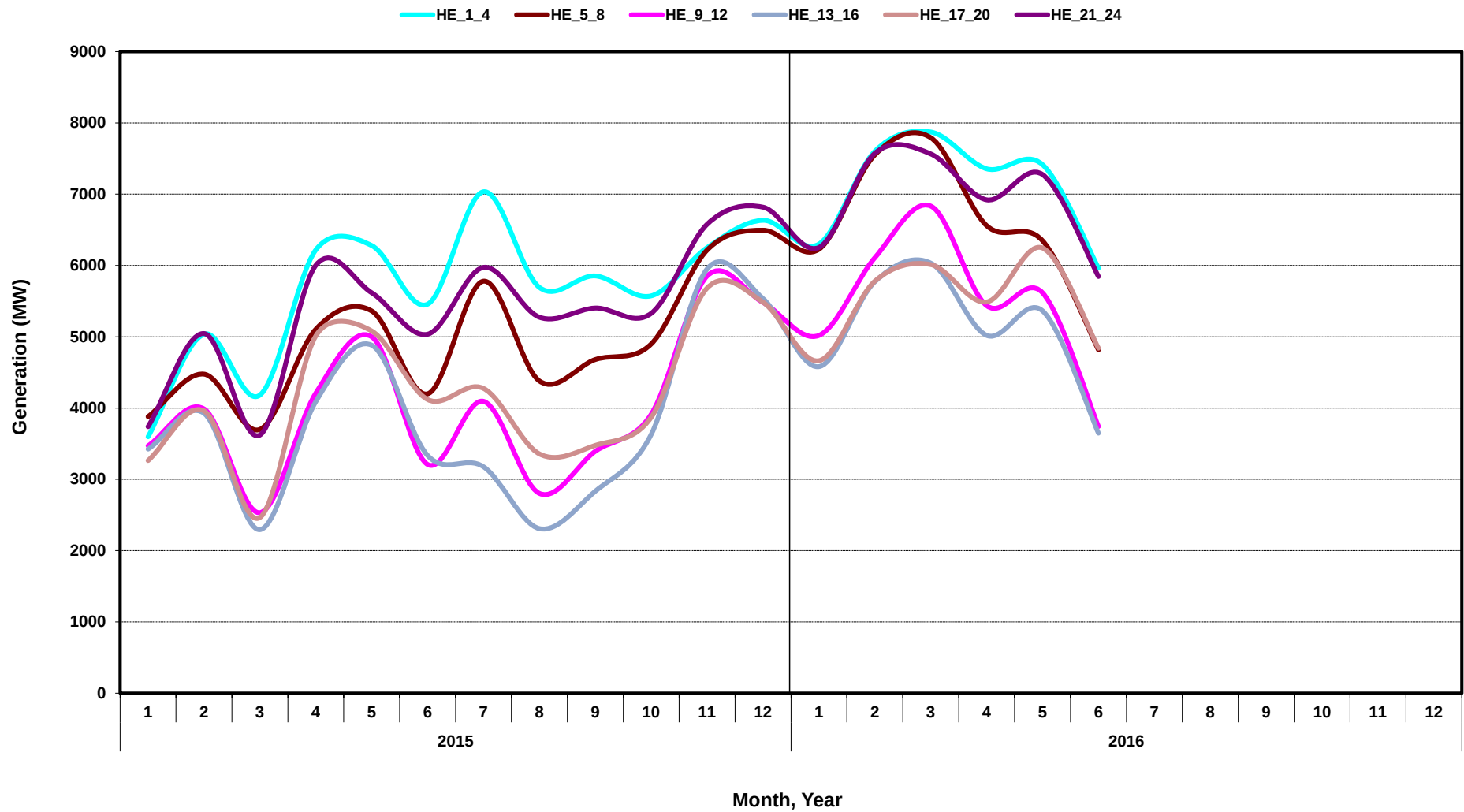
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

Monthly Average of Wind Generation by Hour Ending



[Home <<](#)

[previous <<](#)

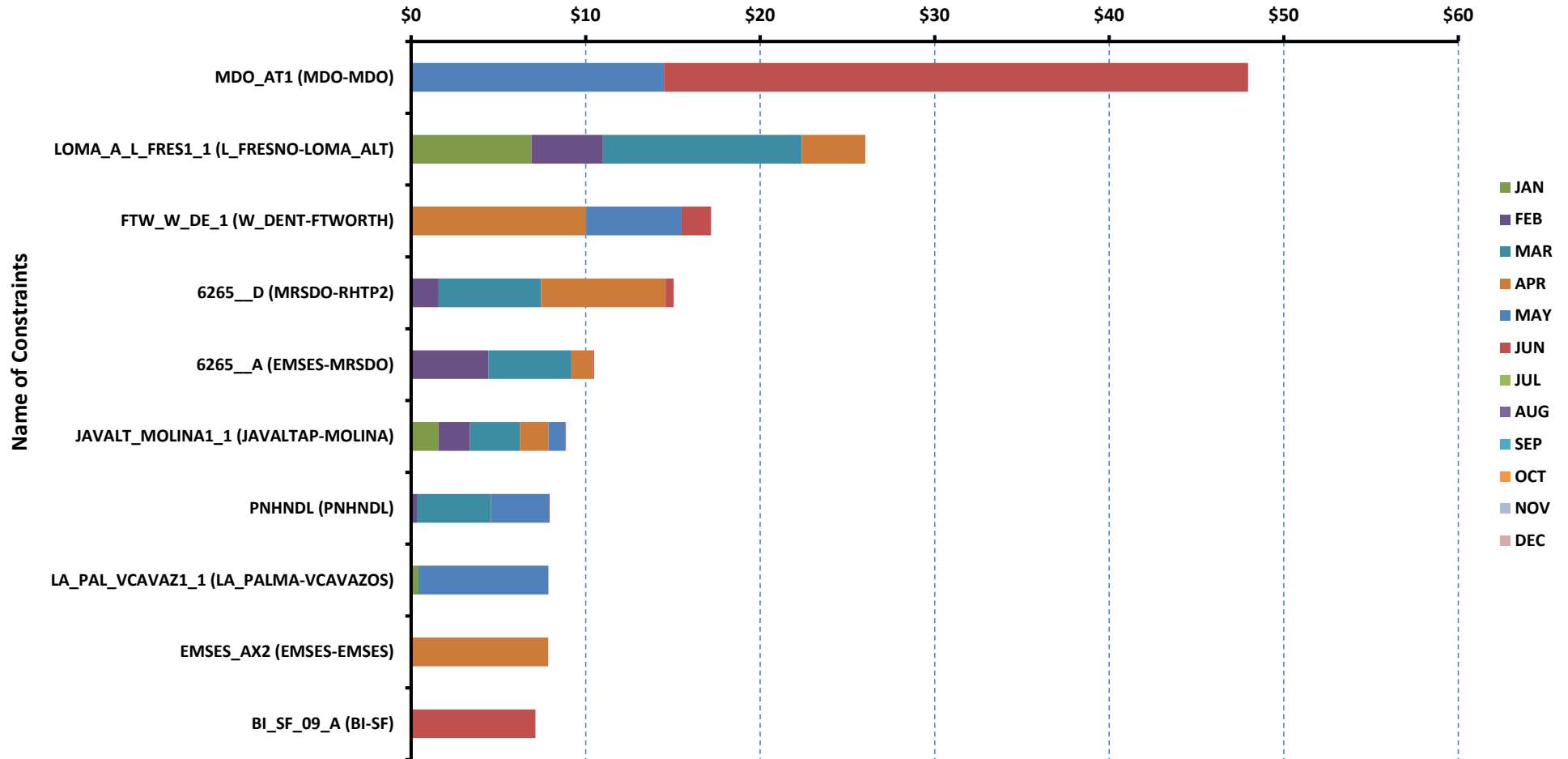
[next >>](#)

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RT Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Rent

Congestion Rent in \$ million



[Home <<](#)

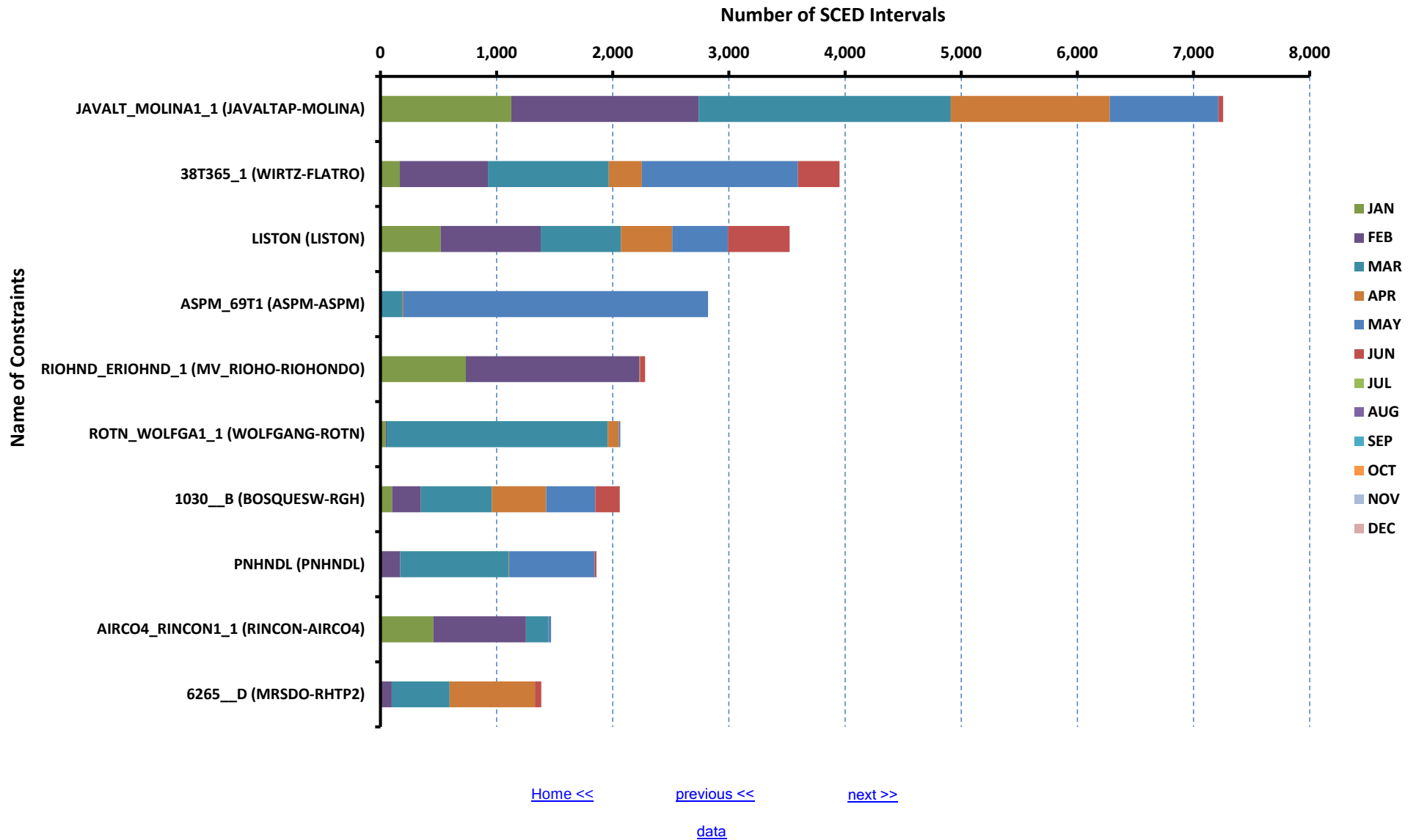
[previous <<](#)

[next >>](#)

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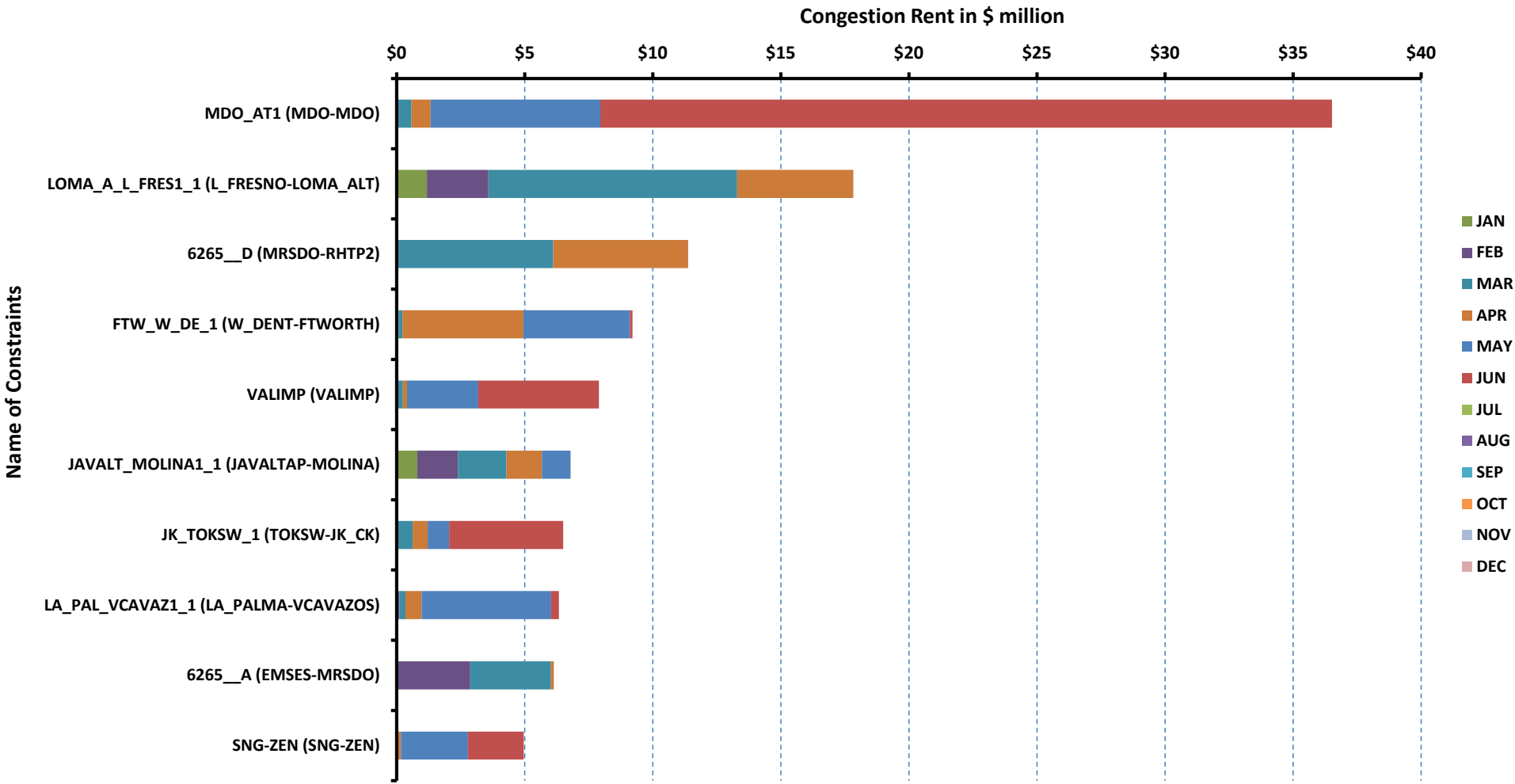
RT Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency



DA Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Rent



[Home <<](#)

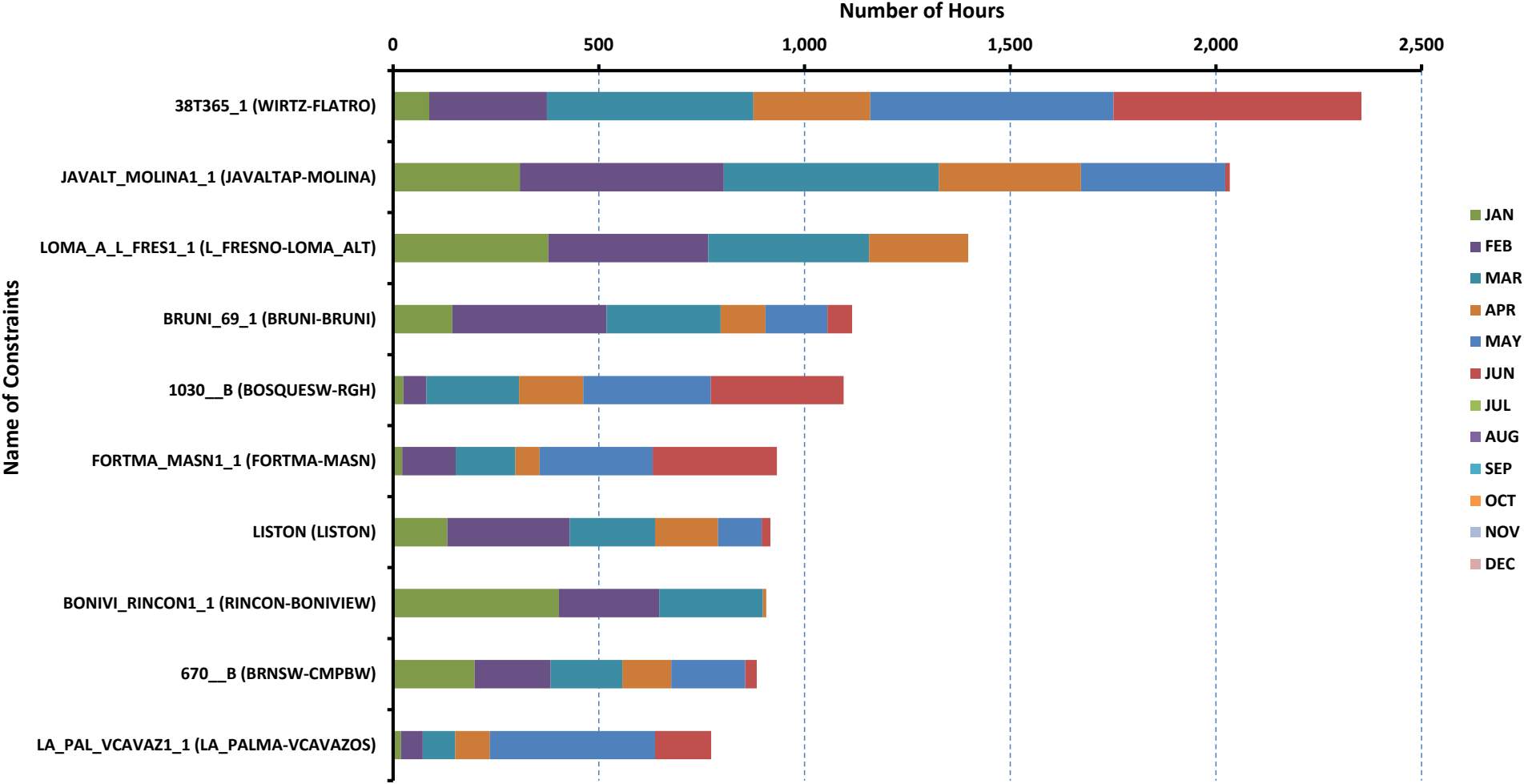
[previous <<](#)

[next >>](#)

[data](#)

DA Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency



[Home <<](#)

[previous <<](#)

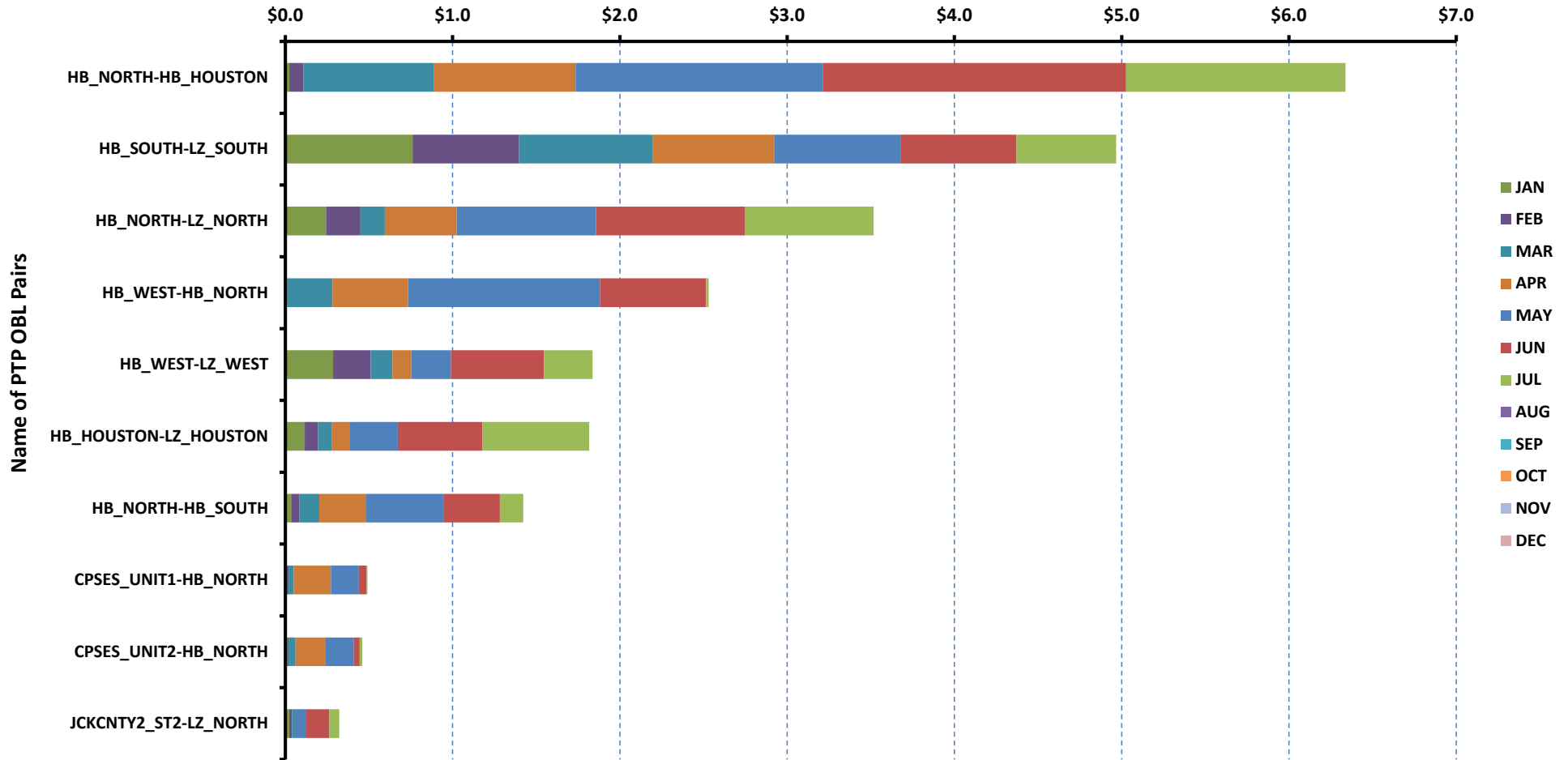
[next >>](#)

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Top 10 CRR Pairs Ranked by Monthly Auction Values - 1

Top 10 PTP Obligations by Total Transaction Value

Total Transaction Value in \$ million



[Home <<](#)

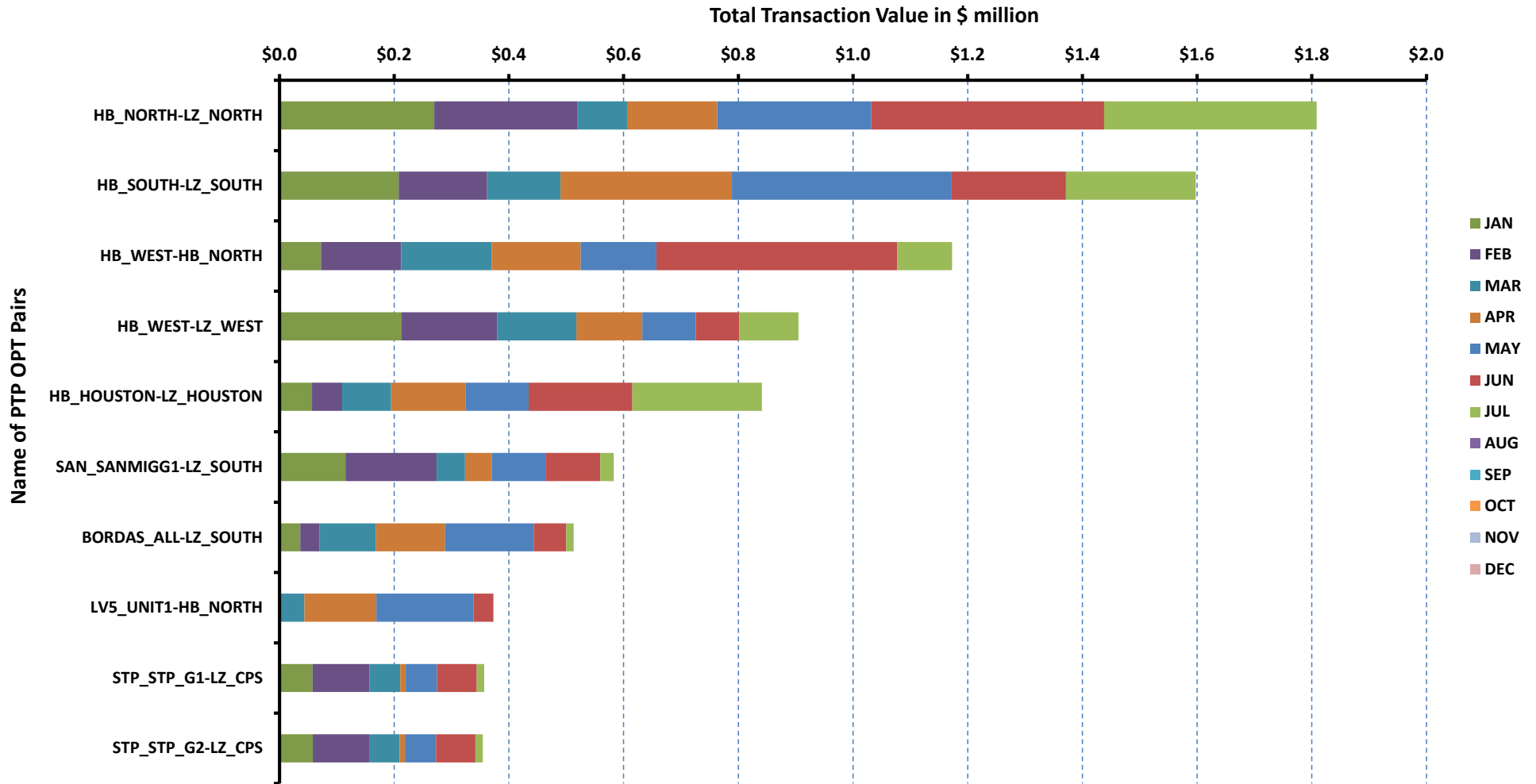
[previous <<](#)

[next >>](#)

[data](#)

Top 10 CRR Pairs Ranked by Monthly Auction Values - 2

Top 10 PTP Options by Total Transaction Value



[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

ERCOT-wide Avg. Energy Price - DA vs. RT			
year	month	dam_spp	rtm_spp
2015	1	\$ 26.35	\$ 24.97
	2	\$ 25.90	\$ 28.28
	3	\$ 27.88	\$ 29.14
	4	\$ 25.30	\$ 24.74
	5	\$ 25.78	\$ 30.84
	6	\$ 27.35	\$ 24.63
	7	\$ 33.20	\$ 30.14
	8	\$ 55.48	\$ 38.12
	9	\$ 26.87	\$ 25.33
	10	\$ 23.11	\$ 22.02
	11	\$ 20.07	\$ 19.58
	12	\$ 18.99	\$ 17.74
2016	1	\$ 19.85	\$ 18.96
	2	\$ 16.00	\$ 15.54
	3	\$ 18.18	\$ 20.30
	4	\$ 20.34	\$ 19.98
	5	\$ 20.28	\$ 19.52
	6	\$ 28.28	\$ 26.24
	7	\$ -	\$ -
	8	\$ -	\$ -
	9	\$ -	\$ -
	10	\$ -	\$ -
	11	\$ -	\$ -
	12	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Load Zone Load Statistics										
year	month	loadPEAK_Houston	loadPEAK_North	loadPEAK_South	loadPEAK_West	loadAVG_Houston	loadAVG_North	loadAVG_South	loadAVG_West	
2015	1	12,803	23,814	16,491	4,339	9,538	14,918	10,830	3,496	
	2	12,561	21,965	16,070	4,433	9,308	14,612	9,980	3,477	
	3	12,235	21,950	15,837	4,372	8,827	12,810	9,182	3,318	
	4	14,001	16,971	13,386	3,944	9,708	11,901	9,397	3,177	
	5	15,128	20,253	14,926	4,199	10,879	12,956	10,381	3,265	
	6	17,100	24,285	16,392	4,708	12,402	16,870	11,974	3,702	
	7	18,236	26,878	18,084	5,043	13,643	18,882	13,232	3,958	
	8	18,994	27,717	18,902	5,164	13,139	18,853	13,665	4,029	
	9	16,361	25,718	17,631	4,876	11,726	16,837	12,322	3,782	
	10	15,857	22,580	16,908	4,335	10,302	13,015	10,387	3,250	
	11	13,116	16,108	13,252	3,884	9,076	11,891	9,089	3,255	
	12	11,380	18,800	12,571	4,146	9,059	12,889	9,377	3,412	
2016	1	11,994	19,817	14,739	4,162	9,366	14,159	9,956	3,529	
	2	11,378	19,345	14,059	4,200	9,029	12,475	9,080	3,319	
	3	13,432	16,409	12,996	3,670	9,184	11,446	8,933	3,179	
	4	14,669	18,504	14,782	4,006	9,890	12,058	9,635	3,238	
	5	16,703	21,994	15,869	4,561	11,060	13,186	10,676	3,431	
	6	18,087	25,076	17,713	4,931	12,681	17,205	12,677	3,791	
	7	-	-	-	-	-	-	-	-	
	8	-	-	-	-	-	-	-	-	
	9	-	-	-	-	-	-	-	-	
	10	-	-	-	-	-	-	-	-	
	11	-	-	-	-	-	-	-	-	
	12	-	-	-	-	-	-	-	-	

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Load Zone Monthly Average Energy Price - DA vs. RT									
year	month	avgRTMp_Houston	avgRTMp_North	avgRTMp_South	avgRTMp_West	avgDAMp_Houston	avgDAMp_North	avgDAMp_South	avgDAMp_West
2015	1	\$ 24.37	\$ 24.24	\$ 26.39	\$ 25.32	\$ 25.89	\$ 26.09	\$ 26.67	\$ 27.72
	2	\$ 26.86	\$ 28.03	\$ 29.60	\$ 29.35	\$ 25.21	\$ 25.66	\$ 26.83	\$ 26.10
	3	\$ 27.42	\$ 30.50	\$ 28.93	\$ 29.01	\$ 26.93	\$ 28.08	\$ 28.55	\$ 27.76
	4	\$ 24.59	\$ 24.08	\$ 25.53	\$ 25.39	\$ 25.21	\$ 24.58	\$ 25.94	\$ 26.41
	5	\$ 34.82	\$ 27.49	\$ 30.72	\$ 31.20	\$ 25.68	\$ 25.30	\$ 26.05	\$ 27.14
	6	\$ 23.61	\$ 24.36	\$ 25.20	\$ 27.36	\$ 26.76	\$ 26.26	\$ 28.92	\$ 29.18
	7	\$ 30.68	\$ 29.60	\$ 29.44	\$ 33.16	\$ 33.21	\$ 32.75	\$ 33.20	\$ 35.27
	8	\$ 38.50	\$ 38.54	\$ 37.49	\$ 37.05	\$ 56.90	\$ 55.28	\$ 55.18	\$ 52.76
	9	\$ 24.39	\$ 25.66	\$ 25.57	\$ 25.98	\$ 26.30	\$ 26.75	\$ 27.52	\$ 27.00
	10	\$ 21.14	\$ 21.16	\$ 24.41	\$ 20.69	\$ 23.57	\$ 22.33	\$ 23.89	\$ 22.31
	11	\$ 19.86	\$ 19.57	\$ 20.01	\$ 17.64	\$ 20.22	\$ 19.89	\$ 20.57	\$ 18.87
	12	\$ 20.50	\$ 16.07	\$ 17.91	\$ 16.24	\$ 20.10	\$ 18.23	\$ 19.22	\$ 18.27
2016	1	\$ 18.68	\$ 18.77	\$ 19.69	\$ 18.39	\$ 19.93	\$ 19.74	\$ 19.95	\$ 19.76
	2	\$ 15.20	\$ 15.83	\$ 15.89	\$ 14.35	\$ 15.89	\$ 16.05	\$ 16.30	\$ 15.28
	3	\$ 20.30	\$ 19.22	\$ 22.84	\$ 17.04	\$ 17.95	\$ 18.12	\$ 19.22	\$ 16.18
	4	\$ 20.33	\$ 20.84	\$ 19.79	\$ 16.22	\$ 20.39	\$ 20.35	\$ 21.20	\$ 17.56
	5	\$ 21.52	\$ 18.32	\$ 19.81	\$ 16.75	\$ 21.33	\$ 19.39	\$ 20.92	\$ 18.31
	6	\$ 32.12	\$ 24.07	\$ 24.42	\$ 22.52	\$ 33.16	\$ 25.64	\$ 28.09	\$ 24.60
	7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

ERCOT-wide Monthly Implied Heat Rate - DA vs. RT						
year	month	gasprice	rtm_spp	HR_rtm	dam_spp	HR_dam
2015	1	\$ 2.92	\$ 24.97	8.54	\$ 26.35	9.01
	2	\$ 2.68	\$ 28.28	10.56	\$ 25.90	9.67
	3	\$ 2.70	\$ 29.14	10.80	\$ 27.88	10.33
	4	\$ 2.56	\$ 24.74	9.66	\$ 25.30	9.87
	5	\$ 2.80	\$ 30.84	11.03	\$ 25.78	9.22
	6	\$ 2.71	\$ 24.63	9.09	\$ 27.35	10.09
	7	\$ 2.83	\$ 30.14	10.66	\$ 33.20	11.74
	8	\$ 2.74	\$ 38.12	13.94	\$ 55.48	20.28
	9	\$ 2.61	\$ 25.33	9.69	\$ 26.87	10.28
	10	\$ 2.35	\$ 22.02	9.39	\$ 23.11	9.86
	11	\$ 2.05	\$ 19.58	9.55	\$ 20.07	9.78
	12	\$ 1.92	\$ 17.74	9.23	\$ 18.99	9.89
2016	1	\$ 2.21	\$ 18.96	8.58	\$ 19.85	8.98
	2	\$ 1.89	\$ 15.54	8.22	\$ 16.00	8.46
	3	\$ 1.67	\$ 20.30	12.13	\$ 18.18	10.86
	4	\$ 1.86	\$ 19.98	10.73	\$ 20.34	10.93
	5	\$ 1.85	\$ 19.52	10.52	\$ 20.28	10.93
	6	\$ 2.46	\$ 26.24	10.69	\$ 28.28	11.52
	7	\$ -	\$ -	-	\$ -	-
	8	\$ -	\$ -	-	\$ -	-
	9	\$ -	\$ -	-	\$ -	-
	10	\$ -	\$ -	-	\$ -	-
	11	\$ -	\$ -	-	\$ -	-
	12	\$ -	\$ -	-	\$ -	-

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Load Zone Monthly Implied Heat Rate - DA vs. RT									
year	month	HRdam_Houston	HRdam_South	HRdam_North	HRdam_West	HRrtm_Houston	HRrtm_South	HRrtm_North	HRrtm_West
2015	1	8.86	9.12	8.92	9.48	8.34	9.03	8.29	8.66
	2	9.41	10.02	9.58	9.75	10.03	11.05	10.47	10.96
	3	9.98	10.58	10.41	10.29	10.16	10.72	11.30	10.75
	4	9.84	10.12	9.59	10.31	9.60	9.96	9.40	9.91
	5	9.19	9.32	9.05	9.70	12.45	10.99	9.83	11.16
	6	9.87	10.67	9.69	10.76	8.71	9.30	8.99	10.09
	7	11.74	11.74	11.58	12.47	10.85	10.41	10.47	11.72
	8	20.80	20.17	20.21	19.29	14.08	13.70	14.09	13.55
	9	10.06	10.53	10.23	10.33	9.33	9.78	9.82	9.94
	10	10.05	10.19	9.52	9.51	9.02	10.41	9.02	8.82
	11	9.86	10.03	9.70	9.20	9.68	9.75	9.54	8.60
	12	10.47	10.01	9.49	9.51	10.67	9.32	8.36	8.46
2016	1	9.02	9.02	8.93	8.94	8.45	8.91	8.49	8.32
	2	8.41	8.62	8.49	8.08	8.04	8.41	8.38	7.59
	3	10.73	11.48	10.82	9.67	12.13	13.65	11.48	10.18
	4	10.95	11.39	10.93	9.43	10.92	10.63	11.20	8.71
	5	11.50	11.28	10.45	9.87	11.60	10.68	9.88	9.03
	6	13.51	11.44	10.44	10.02	13.08	9.95	9.81	9.17
	7	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-
	9	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Daily ORDC Adders Average Values and Interval Duration								
YEAR	MONTH	DAY	PRICE_RS	PRICE_RDP	RS_CNT	RDP_CNT	RS_POS	RDP_POS
2016	6	1	\$ 0.68	\$ -	20	0	80	90
2016	6	2	\$ -	\$ -	0	0	80	90
2016	6	3	\$ 0.07	\$ -	9	0	80	90
2016	6	4	\$ -	\$ -	0	0	80	90
2016	6	5	\$ 0.02	\$ -	5	0	80	90
2016	6	6	\$ 3.38	\$ 1.00	34	10	80	90
2016	6	7	\$ 0.01	\$ -	1	0	80	90
2016	6	8	\$ -	\$ 0.52	0	20	80	90
2016	6	9	\$ 0.01	\$ 0.53	1	61	80	90
2016	6	10	\$ 0.06	\$ 0.17	7	24	80	90
2016	6	11	\$ -	\$ 0.69	0	15	80	90
2016	6	12	\$ 0.04	\$ -	8	0	80	90
2016	6	13	\$ 0.38	\$ -	7	0	80	90
2016	6	14	\$ -	\$ 0.52	0	5	80	90
2016	6	15	\$ -	\$ -	0	0	80	90
2016	6	16	\$ -	\$ 0.26	0	5	80	90
2016	6	17	\$ -	\$ -	0	0	80	90
2016	6	18	\$ 0.67	\$ -	22	0	80	90
2016	6	19	\$ 0.02	\$ -	12	0	80	90
2016	6	20	\$ 0.01	\$ -	2	0	80	90
2016	6	21	\$ 0.02	\$ -	9	0	80	90
2016	6	22	\$ 0.01	\$ 2.08	5	28	80	90
2016	6	23	\$ -	\$ -	0	0	80	90
2016	6	24	\$ -	\$ -	0	0	80	90
2016	6	25	\$ -	\$ 1.55	0	10	80	90
2016	6	26	\$ 0.04	\$ -	4	0	80	90
2016	6	27	\$ 0.05	\$ -	4	0	80	90
2016	6	28	\$ 1.86	\$ 0.33	14	19	80	90
2016	6	29	\$ 0.44	\$ 2.12	21	24	80	90
2016	6	30	\$ 0.05	\$ -	20	0	80	90
0	0	0	\$ -	\$ -	0	0	0	0

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Monthly Average of Ancillary Services Required MW					
year	month	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2015	1	379	1,500	2,800	416
	2	370	1,500	2,800	425
	3	393	1,500	2,800	449
	4	396	1,500	2,800	450
	5	409	1,464	2,800	446
	6	458	1,915	2,616	483
	7	450	1,828	2,817	473
	8	422	1,897	2,579	437
	9	446	1,545	2,607	458
	10	424	1,768	2,817	435
	11	394	1,951	2,927	423
	12	371	1,949	2,840	400
2016	1	288	1,568	2,752	314
	2	289	1,882	2,872	318
	3	279	1,787	2,872	313
	4	296	1,503	2,835	330
	5	315	1,554	2,817	339
	6	331	1,547	2,608	347
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	-	-	-
	12	-	-	-	-

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Hourly Average of Ancillary Services Required MW					
year	DELIVERY_HOUR	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2015	1	449	1,592	2,826	463
	2	372	1,596	2,826	336
	3	318	1,680	2,872	314
	4	308	1,680	2,872	316
	5	363	1,680	2,872	367
	6	574	1,680	2,872	549
	7	432	1,696	2,793	766
	8	365	1,696	2,793	441
	9	369	1,696	2,793	472
	10	411	1,696	2,793	464
	11	408	1,701	2,709	498
	12	380	1,701	2,709	478
	13	356	1,701	2,709	428
	14	357	1,701	2,709	412
	15	343	1,746	2,693	369
	16	325	1,746	2,693	355
	17	338	1,746	2,693	362
	18	371	1,746	2,693	445
	19	461	1,747	2,709	452
	20	422	1,747	2,709	423
	21	415	1,747	2,709	391
	22	542	1,747	2,706	434
	23	602	1,596	2,826	547
	24	544	1,596	2,826	505
2016	1	356	975	2,917	326
	2	276	975	2,917	263
	3	234	1,543	2,917	235
	4	209	1,543	2,917	238
	5	259	1,543	2,917	299
	6	405	1,543	2,917	467
	7	338	2,187	2,771	611
	8	273	2,187	2,771	364
	9	278	2,187	2,771	373
	10	292	2,187	2,771	332
	11	272	2,102	2,707	350
	12	255	2,102	2,707	315
	13	240	2,102	2,707	292
	14	241	2,102	2,707	283
	15	245	1,532	2,727	259
	16	236	1,532	2,727	246
	17	232	1,532	2,727	255
	18	264	1,532	2,727	328
	19	322	1,494	2,716	338
	20	307	1,494	2,716	310
	21	308	1,494	2,716	300
	22	413	1,494	2,716	310
	23	492	975	2,917	393
	24	441	975	2,917	353

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Monthly Average Ancillary Services Price					
year	month	MCPC_REGDN	MCPC_NSPIN	MCPC_RRS	MCPC_REGUP
2015	1	\$ 5.49	\$ 1.84	\$ 6.47	\$ 7.10
	2	\$ 4.05	\$ 3.00	\$ 7.77	\$ 8.83
	3	\$ 6.04	\$ 6.26	\$ 11.27	\$ 12.39
	4	\$ 8.47	\$ 5.27	\$ 11.21	\$ 13.08
	5	\$ 7.78	\$ 4.63	\$ 8.84	\$ 8.58
	6	\$ 5.63	\$ 5.98	\$ 7.56	\$ 6.65
	7	\$ 4.01	\$ 8.69	\$ 12.37	\$ 10.00
	8	\$ 3.67	\$ 25.73	\$ 25.98	\$ 22.70
	9	\$ 4.25	\$ 2.70	\$ 7.13	\$ 6.93
	10	\$ 8.90	\$ 5.34	\$ 9.76	\$ 9.15
	11	\$ 6.67	\$ 4.84	\$ 11.28	\$ 10.60
	12	\$ 7.33	\$ 4.59	\$ 10.97	\$ 11.12
2016	1	\$ 4.10	\$ 2.62	\$ 8.05	\$ 6.69
	2	\$ 7.21	\$ 4.77	\$ 12.91	\$ 7.80
	3	\$ 8.47	\$ 6.06	\$ 11.39	\$ 9.34
	4	\$ 9.23	\$ 4.07	\$ 13.20	\$ 9.48
	5	\$ 7.63	\$ 2.84	\$ 8.01	\$ 6.14
	6	\$ 4.43	\$ 3.02	\$ 8.05	\$ 5.89
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Monthly Average A/S Cost per MWh Load					
year	month	AScost_REGDN	AScost_NSPIN	AScost_RRS	AScost_REGUP
2015	1	\$ 0.05	\$ 0.07	\$ 0.47	\$ 0.08
	2	\$ 0.04	\$ 0.12	\$ 0.58	\$ 0.10
	3	\$ 0.07	\$ 0.28	\$ 0.92	\$ 0.16
	4	\$ 0.10	\$ 0.23	\$ 0.92	\$ 0.17
	5	\$ 0.08	\$ 0.18	\$ 0.66	\$ 0.10
	6	\$ 0.06	\$ 0.25	\$ 0.44	\$ 0.07
	7	\$ 0.04	\$ 0.32	\$ 0.70	\$ 0.10
	8	\$ 0.03	\$ 0.98	\$ 1.35	\$ 0.20
	9	\$ 0.04	\$ 0.09	\$ 0.42	\$ 0.07
	10	\$ 0.10	\$ 0.26	\$ 0.74	\$ 0.11
	11	\$ 0.08	\$ 0.28	\$ 0.99	\$ 0.13
	12	\$ 0.08	\$ 0.26	\$ 0.90	\$ 0.13
2016	1	\$ 0.03	\$ 0.11	\$ 0.60	\$ 0.06
	2	\$ 0.06	\$ 0.26	\$ 1.09	\$ 0.07
	3	\$ 0.07	\$ 0.33	\$ 1.00	\$ 0.09
	4	\$ 0.08	\$ 0.18	\$ 1.07	\$ 0.09
	5	\$ 0.06	\$ 0.12	\$ 0.59	\$ 0.05
	6	\$ 0.03	\$ 0.10	\$ 0.45	\$ 0.04
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

ERCOT-wide Cumulative PNM			
year	month	pnm	pnm_accum
2015	0	\$ -	\$ -
	1	\$ 1,009.59	\$ 1,009.59
	2	\$ 3,289.14	\$ 4,298.73
	3	\$ 3,800.54	\$ 8,099.27
	4	\$ 1,900.94	\$ 10,000.21
	5	\$ 4,578.64	\$ 14,578.85
	6	\$ 738.37	\$ 15,317.22
	7	\$ 2,945.67	\$ 18,262.89
	8	\$ 7,767.43	\$ 26,030.32
	9	\$ 1,612.54	\$ 27,642.86
	10	\$ 1,283.56	\$ 28,926.42
	11	\$ 1,529.59	\$ 30,456.01
	12	\$ 1,209.77	\$ 31,665.78
2016	0	\$ -	\$ -
	1	\$ 1,160.69	\$ 1,160.69
	2	\$ 720.57	\$ 1,881.26
	3	\$ 3,883.41	\$ 5,764.67
	4	\$ 2,389.99	\$ 8,154.66
	5	\$ 1,661.50	\$ 9,816.16
	6	\$ 1,922.76	\$ 11,738.92
	7	\$ -	\$ -
	8	\$ -	\$ -
	9	\$ -	\$ -
	10	\$ -	\$ -
	11	\$ -	\$ -
	12	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

DA vs. RT Load Forecast Error by Hour Ending							
year	month	HE_1_4	HE_13_16	HE_17_20	HE_21_24	HE_5_8	HE_9_12
2015	1	336	(342)	(251)	93	137	75
	2	155	(718)	(639)	(325)	244	(334)
	3	(246)	(160)	(425)	(430)	(253)	(54)
	4	34	585	680	192	88	359
	5	18	330	761	350	(23)	114
	6	(219)	(317)	(166)	(338)	(167)	(364)
	7	(403)	490	587	126	(232)	136
	8	55	667	769	280	143	910
	9	(4)	130	81	114	129	171
	10	(78)	324	206	294	(161)	(13)
	11	(270)	(547)	(492)	(457)	(190)	(207)
	12	156	(270)	47	20	38	(128)
2016	1	455	14	371	163	473	142
	2	39	83	148	42	(36)	150
	3	31	288	300	89	(136)	(82)
	4	(271)	220	97	(82)	(320)	(147)
	5	(44)	460	285	117	(69)	163
	6	(488)	(261)	(356)	(518)	(348)	(451)
	7	-	-	-	-	-	-
	8	-	-	-	-	-	-
	9	-	-	-	-	-	-
	10	-	-	-	-	-	-
	11	-	-	-	-	-	-
	12	-	-	-	-	-	-

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Monthly Average of Wind Generation by Hour Ending							
year	month	HE_1_4	HE_13_16	HE_17_20	HE_21_24	HE_5_8	HE_9_12
2015	1	3,597	3,424	3,264	3,738	3,879	3,471
	2	5,036	3,927	3,961	5,045	4,476	3,988
	3	4,182	2,295	2,465	3,622	3,701	2,532
	4	6,218	4,090	5,011	6,002	5,105	4,209
	5	6,280	4,882	5,081	5,617	5,362	5,000
	6	5,457	3,335	4,120	5,036	4,199	3,209
	7	7,034	3,176	4,275	5,973	5,779	4,094
	8	5,692	2,309	3,357	5,275	4,380	2,803
	9	5,853	2,834	3,476	5,403	4,681	3,394
	10	5,574	3,631	3,871	5,329	4,899	3,913
	11	6,250	5,952	5,683	6,578	6,216	5,852
	12	6,634	5,535	5,484	6,817	6,494	5,481
2016	1	6,300	4,581	4,663	6,253	6,228	5,019
	2	7,602	5,772	5,779	7,573	7,552	6,109
	3	7,872	6,033	6,013	7,565	7,793	6,833
	4	7,356	5,020	5,488	6,921	6,559	5,437
	5	7,414	5,363	6,245	7,275	6,347	5,617
	6	5,963	3,648	4,840	5,845	4,816	3,741
	7	-	-	-	-	-	-
	8	-	-	-	-	-	-
	9	-	-	-	-	-	-
	10	-	-	-	-	-	-
	11	-	-	-	-	-	-
	12	-	-	-	-	-	-

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

RT Congestion Constraint Rankings - Top 10 Constraints by Binding Frequency and Top 10 Constraints by Total Congestion Rent																
category	year	item	rankvar	rank	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
FREQ_EXIST	2016	JAVALT_MOLINA1_1 (JAVALTAP-MOLINA)	7,255	1	1,127	1,613	2,170	1,369	935	41	-	-	-	-	-	-
FREQ_EXIST	2016	38T365_1 (WIRTZ-FLATRO)	3,952	2	167	759	1,039	286	1,344	357	-	-	-	-	-	-
FREQ_EXIST	2016	LISTON (LISTON)	3,523	3	518	862	690	442	479	532	-	-	-	-	-	-
FREQ_EXIST	2016	ASPM_69T1 (ASPM-ASPM)	2,821	4	-	-	186	8	2,627	-	-	-	-	-	-	-
FREQ_EXIST	2016	RIOHND_ERIOHND_1 (MV_RIOHO-RIOHONDO)	2,278	5	736	1,495	-	7	-	40	-	-	-	-	-	-
FREQ_EXIST	2016	ROTN_WOLFGA1_1 (WOLFGANG-ROTN)	2,065	6	46	7	1,904	96	12	-	-	-	-	-	-	-
FREQ_EXIST	2016	1030_B (BOSQUESW-RGH)	2,060	7	100	248	612	467	424	209	-	-	-	-	-	-
FREQ_EXIST	2016	PNHNDL (PNHNDL)	1,859	8	5	165	934	3	737	15	-	-	-	-	-	-
FREQ_EXIST	2016	AIRCO4_RINCON1_1 (RINCON-AIRCO4)	1,469	9	456	796	192	2	23	-	-	-	-	-	-	-
FREQ_EXIST	2016	6265_D (MRSDO-RHTP2)	1,385	10	-	97	499	735	-	54	-	-	-	-	-	-
TOP10_RENT	2016	MDO_AT1 (MDO-MDO)	\$ 47.96	1	\$ -	\$ -	\$ -	\$ -	\$ 14.49	\$ 33.47	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	LOMA_A_L_FRES1_1 (L_FRESNO-LOMA_ALT)	\$ 26.03	2	\$ 6.90	\$ 4.08	\$ 11.39	\$ 3.65	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	FTW_W_DE_1 (W_DENT-FTWORTH)	\$ 17.19	3	\$ -	\$ -	\$ -	\$ 10.03	\$ 5.46	\$ 1.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	6265_D (MRSDO-RHTP2)	\$ 15.05	4	\$ -	\$ 1.58	\$ 5.86	\$ 7.14	\$ -	\$ 0.46	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	6265_A (EMSES-MRSDO)	\$ 10.48	5	\$ 0.00	\$ 4.43	\$ 4.75	\$ 1.24	\$ -	\$ 0.07	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	JAVALT_MOLINA1_1 (JAVALTAP-MOLINA)	\$ 8.87	6	\$ 1.57	\$ 1.81	\$ 2.86	\$ 1.63	\$ 0.97	\$ 0.04	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	PNHNDL (PNHNDL)	\$ 7.94	7	\$ 0.01	\$ 0.31	\$ 4.26	\$ 0.01	\$ 3.29	\$ 0.05	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	LA_PAL_VCAVAZI_1 (LA_PALMA-VCAVAZOS)	\$ 7.87	8	\$ 0.43	\$ -	\$ 0.13	\$ -	\$ 7.31	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	EMSES_AX2 (EMSES-EMSES)	\$ 7.86	9	\$ -	\$ -	\$ -	\$ 7.86	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	BI_SF_09_A (BI-SF)	\$ 7.12	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7.12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

[Home <<](#)
[previous <<](#)
[next >>](#)
[chart 1](#)
[chart 2](#)

DA Congestion Constraint Rankings - Top 10 Constraints by Binding Frequency and Top 10 Constraints by Total Congestion Rent																
category	year	item	rankvar	rank	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
FREQ_EXIST	2016	38T365_1 (WIRTZ-FLATRO)	2,354	1	88	286	502	284	591	603	-	-	-	-	-	-
FREQ_EXIST	2016	JAVALT_MOLINA1_1 (JAVALTAP-MOLINA)	2,034	2	308	496	523	345	351	11	-	-	-	-	-	-
FREQ_EXIST	2016	LOMA_A_L_FRES1_1 (L_FRESNO-LOMA_ALT)	1,398	3	377	389	391	241	-	-	-	-	-	-	-	-
FREQ_EXIST	2016	BRUNI_69_1 (BRUNI-BRUNI)	1,116	4	144	375	277	109	151	80	-	-	-	-	-	-
FREQ_EXIST	2016	1030_B (BOSQUESW-RGH)	1,095	5	25	56	225	156	310	323	-	-	-	-	-	-
FREQ_EXIST	2016	FORTMA_MASN1_1 (FORTMA-MASN)	933	6	22	130	145	59	275	302	-	-	-	-	-	-
FREQ_EXIST	2016	LISTON (LISTON)	917	7	132	297	208	153	106	21	-	-	-	-	-	-
FREQ_EXIST	2016	BONIVI_RINCON1_1 (RINCON-BONIVIEW)	907	8	403	244	252	8	-	-	-	-	-	-	-	-
FREQ_EXIST	2016	670_B (BRNSW-CMPBW)	884	9	198	185	174	119	180	28	-	-	-	-	-	-
FREQ_EXIST	2016	LA_PAL_VCAVAZ1_1 (LA_PALMA-VCAVAZOS)	773	10	19	53	79	84	402	136	-	-	-	-	-	-
TOP10_RENT	2016	MDO_AT1 (MDO-MDO)	\$ 36.52	1	\$ 0.00	\$ -	\$ 0.58	\$ 0.75	\$ 6.62	\$ 28.57	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	LOMA_A_L_FRES1_1 (L_FRESNO-LOMA_ALT)	\$ 17.83	2	\$ 1.18	\$ 2.40	\$ 9.71	\$ 4.53	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	6265_D (MRSDO-RHTP2)	\$ 11.38	3	\$ -	\$ 0.02	\$ 6.10	\$ 5.25	\$ -	\$ 0.02	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	FTW_W_DE_1 (W_DENT-FTWORTH)	\$ 9.21	4	\$ -	\$ 0.08	\$ 0.15	\$ 4.72	\$ 4.16	\$ 0.10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	VALIMP (VALIMP)	\$ 7.89	5	\$ -	\$ 0.04	\$ 0.20	\$ 0.16	\$ 2.78	\$ 4.71	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	JAVALT_MOLINA1_1 (JAVALTAP-MOLINA)	\$ 6.79	6	\$ 0.81	\$ 1.58	\$ 1.90	\$ 1.39	\$ 1.11	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	JK_TOKSW_1 (TOKSW-JK_CK)	\$ 6.50	7	\$ 0.05	\$ -	\$ 0.58	\$ 0.58	\$ 0.84	\$ 4.45	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	LA_PAL_VCAVAZ1_1 (LA_PALMA-VCAVAZOS)	\$ 6.34	8	\$ 0.01	\$ 0.10	\$ 0.23	\$ 0.63	\$ 5.06	\$ 0.31	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	6265_A (EMSES-MRSDO)	\$ 6.13	9	\$ 0.02	\$ 2.85	\$ 3.15	\$ 0.11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TOP10_RENT	2016	SNG-ZEN (SNG-ZEN)	\$ 4.96	10	\$ -	\$ 0.01	\$ 0.02	\$ 0.14	\$ 2.62	\$ 2.18	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart 1](#)

[chart 2](#)

Top 10 CRR Pairs Ranked by Monthly Auction Values - Top 10 PTP Obligations by Total Transaction Values and Top 10 PTP Options by Total Transaction Values																	
ftir_option	year	pair	total_value	rank	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
N	2016	HB NORTH-HB HOUSTON	\$ 6.34	1	\$ 0.02	\$ 0.08	\$ 0.78	\$ 0.85	\$ 1.48	\$ 1.81	\$ 1.31	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB SOUTH-LZ SOUTH	\$ 4.97	2	\$ 0.76	\$ 0.64	\$ 0.80	\$ 0.72	\$ 0.76	\$ 0.69	\$ 0.60	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB NORTH-LZ NORTH	\$ 3.52	3	\$ 0.24	\$ 0.21	\$ 0.15	\$ 0.43	\$ 0.83	\$ 0.89	\$ 0.77	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB WEST-HB NORTH	\$ 2.53	4	\$ 0.01	\$ 0.00	\$ 0.27	\$ 0.45	\$ 1.15	\$ 0.63	\$ 0.02	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB WEST-LZ WEST	\$ 1.84	5	\$ 0.29	\$ 0.23	\$ 0.13	\$ 0.11	\$ 0.24	\$ 0.56	\$ 0.29	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB HOUSTON-LZ HOUSTON	\$ 1.82	6	\$ 0.12	\$ 0.08	\$ 0.08	\$ 0.11	\$ 0.28	\$ 0.51	\$ 0.64	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	HB NORTH-HB SOUTH	\$ 1.42	7	\$ 0.03	\$ 0.05	\$ 0.12	\$ 0.28	\$ 0.47	\$ 0.33	\$ 0.14	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	CPSES UNIT1-HB NORTH	\$ 0.49	8	\$ 0.01	\$ 0.01	\$ 0.03	\$ 0.22	\$ 0.17	\$ 0.05	\$ 0.00	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	CPSES UNIT2-HB NORTH	\$ 0.46	9	\$ 0.01	\$ 0.01	\$ 0.04	\$ 0.18	\$ 0.17	\$ 0.04	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2016	JCKCNTY2_ST2-LZ NORTH	\$ 0.32	10	\$ 0.02	\$ 0.02	\$ 0.01	\$ -	\$ 0.07	\$ 0.14	\$ 0.06	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	HB NORTH-LZ NORTH	\$ 1.81	1	\$ 0.27	\$ 0.25	\$ 0.09	\$ 0.16	\$ 0.27	\$ 0.41	\$ 0.37	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	HB SOUTH-LZ SOUTH	\$ 1.60	2	\$ 0.21	\$ 0.15	\$ 0.13	\$ 0.30	\$ 0.38	\$ 0.20	\$ 0.23	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	HB WEST-HB NORTH	\$ 1.17	3	\$ 0.07	\$ 0.14	\$ 0.16	\$ 0.16	\$ 0.13	\$ 0.42	\$ 0.10	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	HB WEST-LZ WEST	\$ 0.90	4	\$ 0.21	\$ 0.17	\$ 0.14	\$ 0.11	\$ 0.09	\$ 0.08	\$ 0.10	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	HB HOUSTON-LZ HOUSTON	\$ 0.84	5	\$ 0.06	\$ 0.05	\$ 0.09	\$ 0.13	\$ 0.11	\$ 0.18	\$ 0.23	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	SAN_SANMIGG1-LZ SOUTH	\$ 0.58	6	\$ 0.11	\$ 0.16	\$ 0.05	\$ 0.05	\$ 0.09	\$ 0.10	\$ 0.02	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	BORDAS ALL-LZ SOUTH	\$ 0.51	7	\$ 0.04	\$ 0.03	\$ 0.10	\$ 0.12	\$ 0.15	\$ 0.06	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	LV5 UNIT1-HB NORTH	\$ 0.37	8	\$ -	\$ -	\$ 0.04	\$ 0.13	\$ 0.17	\$ 0.03	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	STP_STP_G1-LZ CPS	\$ 0.36	9	\$ 0.06	\$ 0.10	\$ 0.05	\$ 0.01	\$ 0.05	\$ 0.07	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2016	STP_STP_G2-LZ CPS	\$ 0.35	10	\$ 0.06	\$ 0.10	\$ 0.05	\$ 0.01	\$ 0.05	\$ 0.07	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	

[Home <<](#)

[previous <<](#)

[chart 1](#)

[chart 2](#)