Item 5: Independent Market Monitor (IMM) Report

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Board of Directors Meeting

ERCOT Public
December 11, 2018

Today's topics

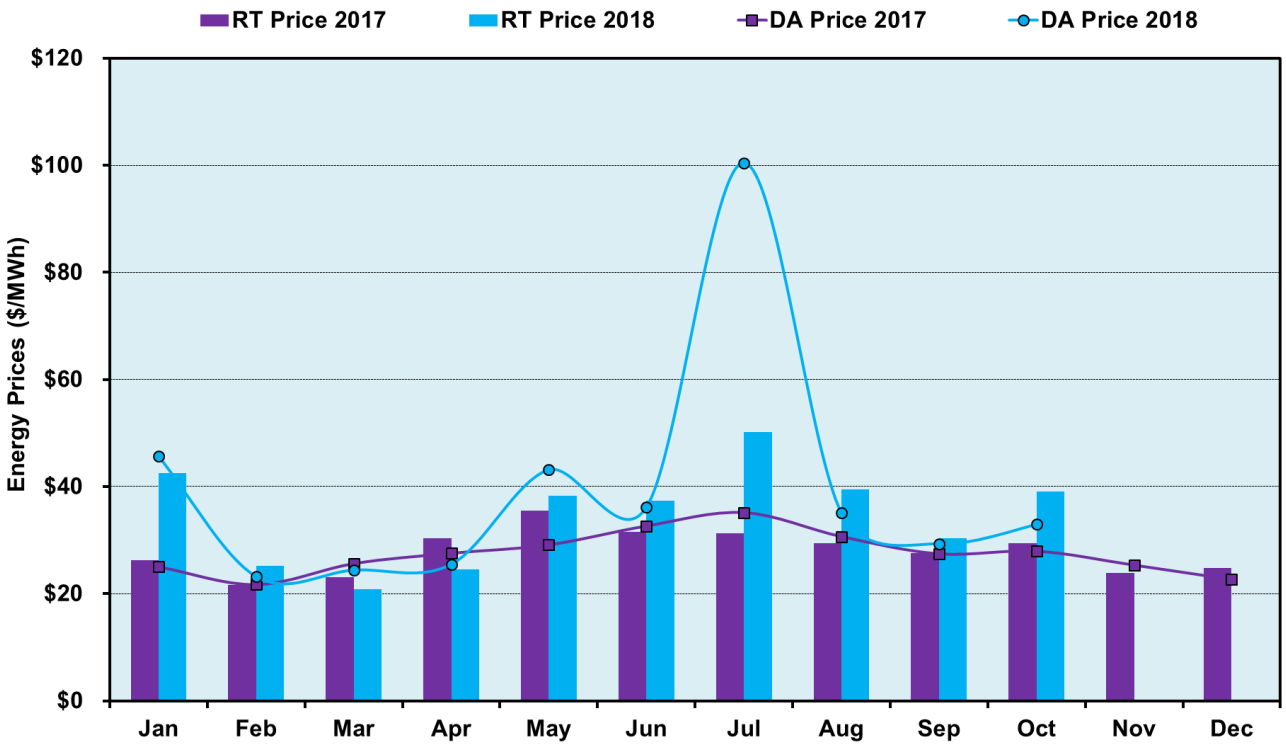
- Natural Gas Prices
- Peaker Net Margin
- Summer 19 price expectations

Higher Prices have continued into the Fall

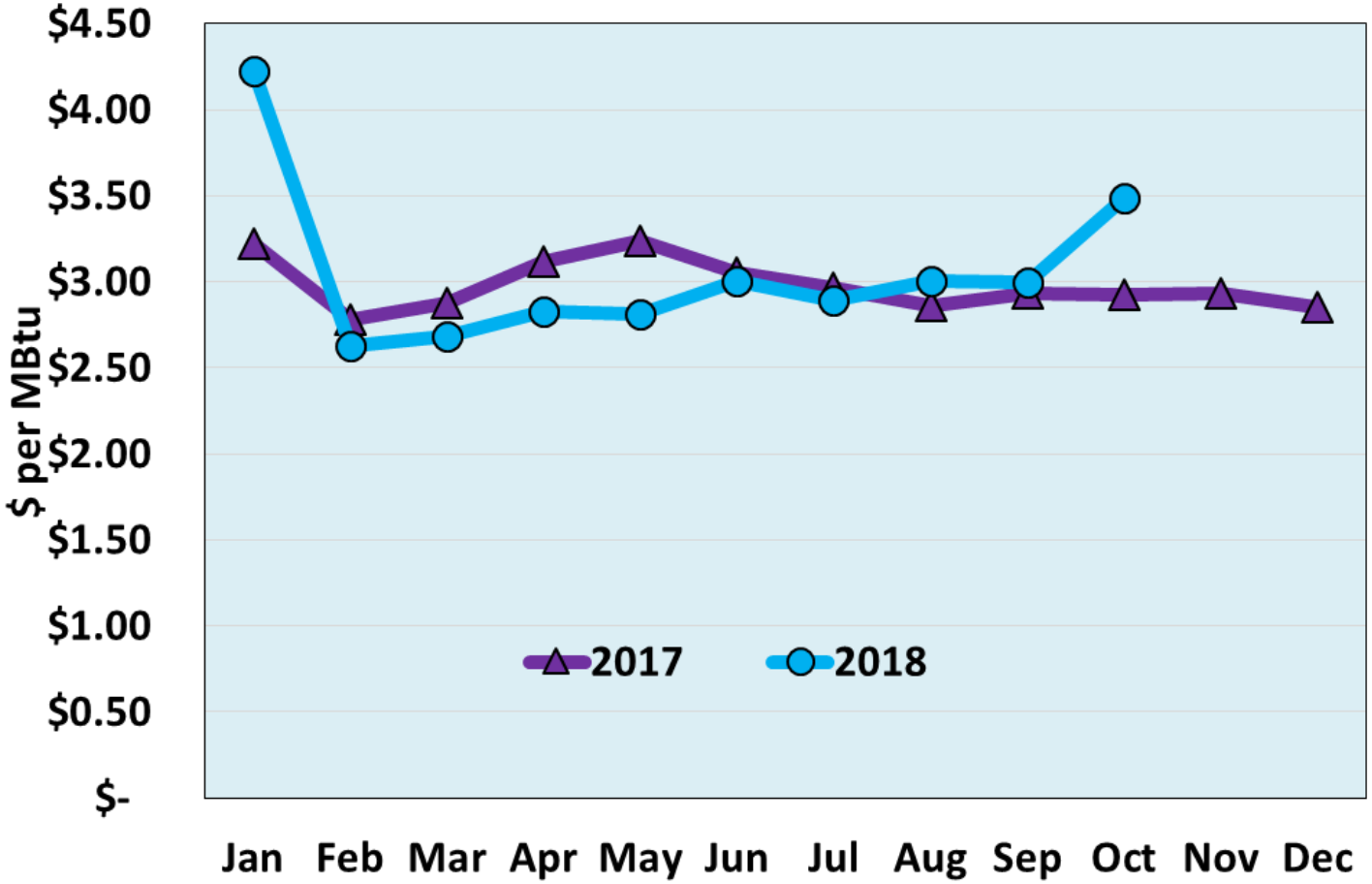
Real Time Prices
10M17: $29.0/MWh
2017: $28.3/MWh

10M18: $35.9/MWh
~ 24% increase

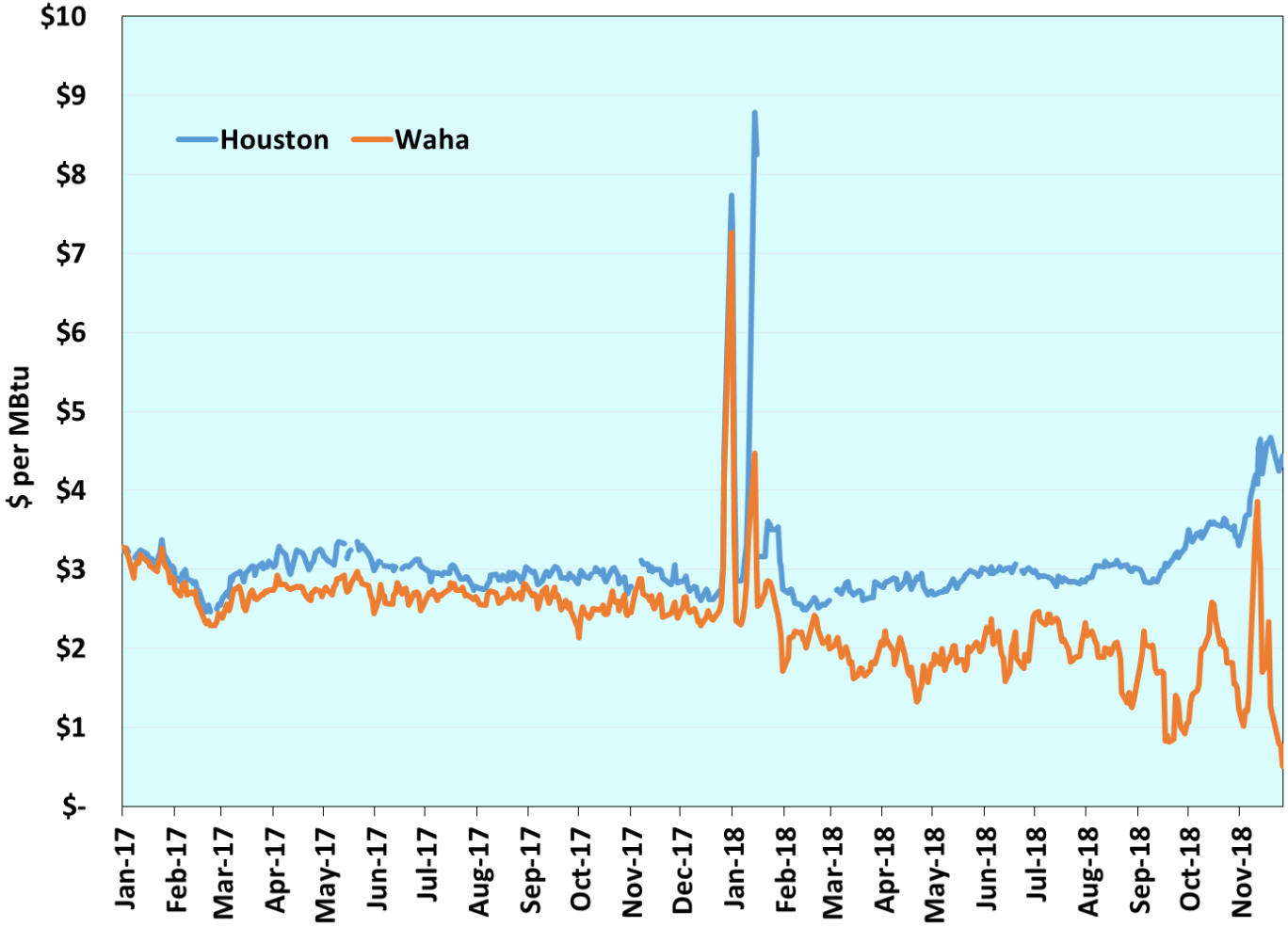
Natural Gas Prices
Starting to see a noticeable increase



Natural Gas Prices (FIP – Houston Ship Channel)



Houston and Waha Gas Prices Diverging



Difference

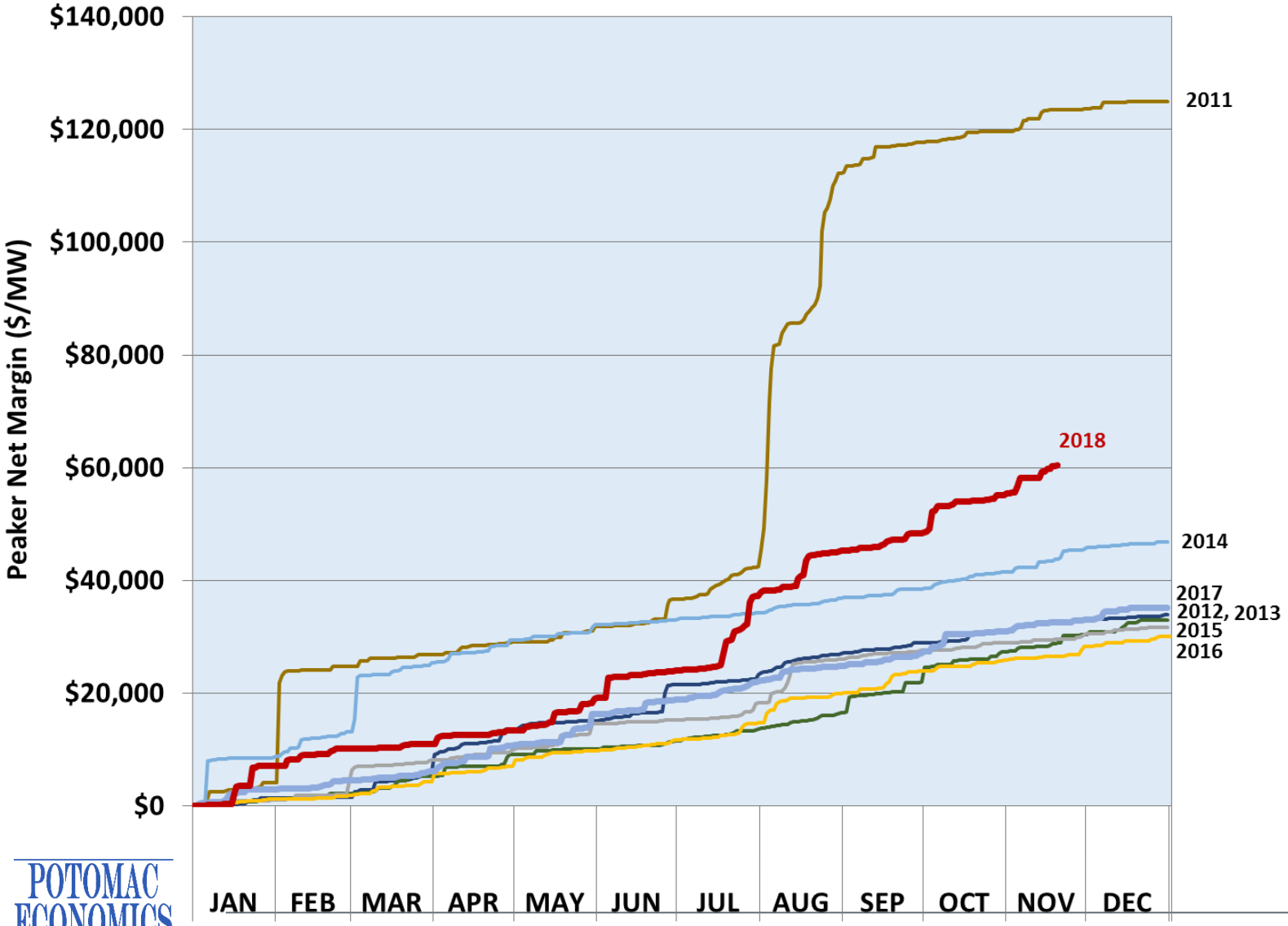
2017: $0.28/MBtu

10M18: $1.11/MBtu

> 4GW of natural gas fueled Resources located in the West

POTOMAC ECONOMICS

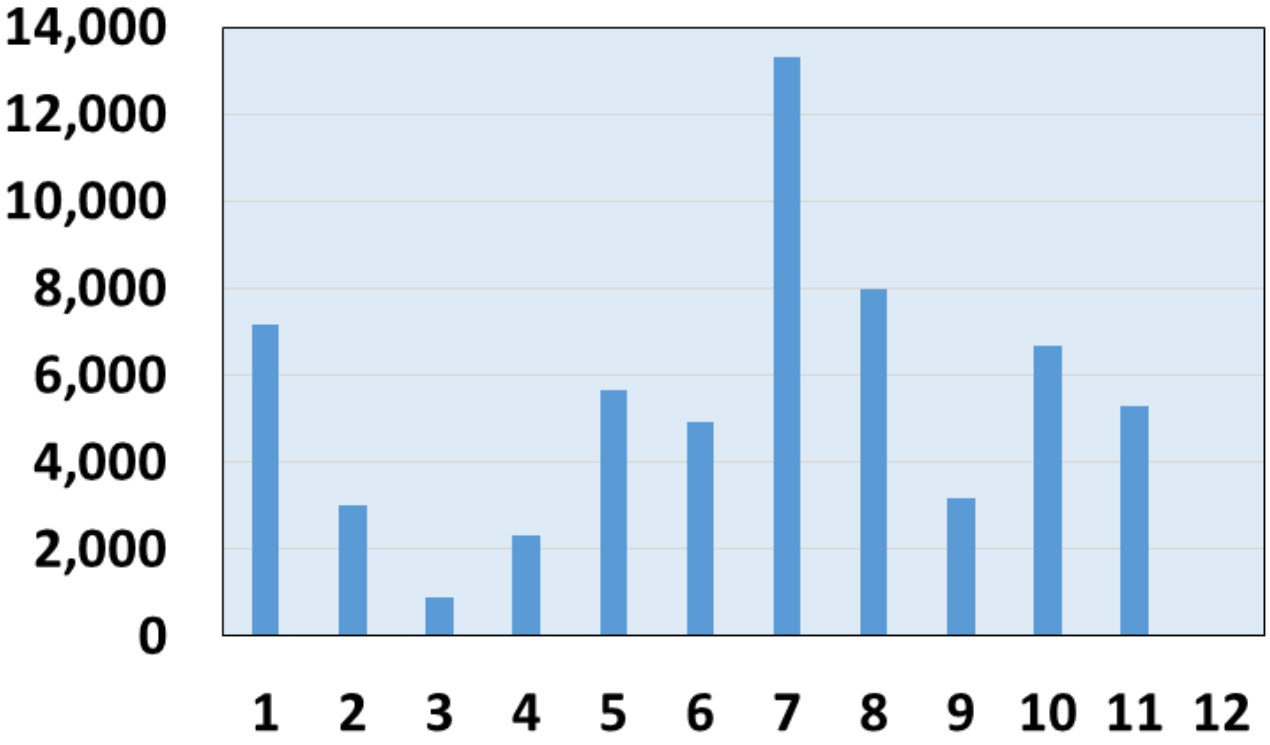
Peaker Net Margin continues to accumulate



POTOMAC ECONOMICS

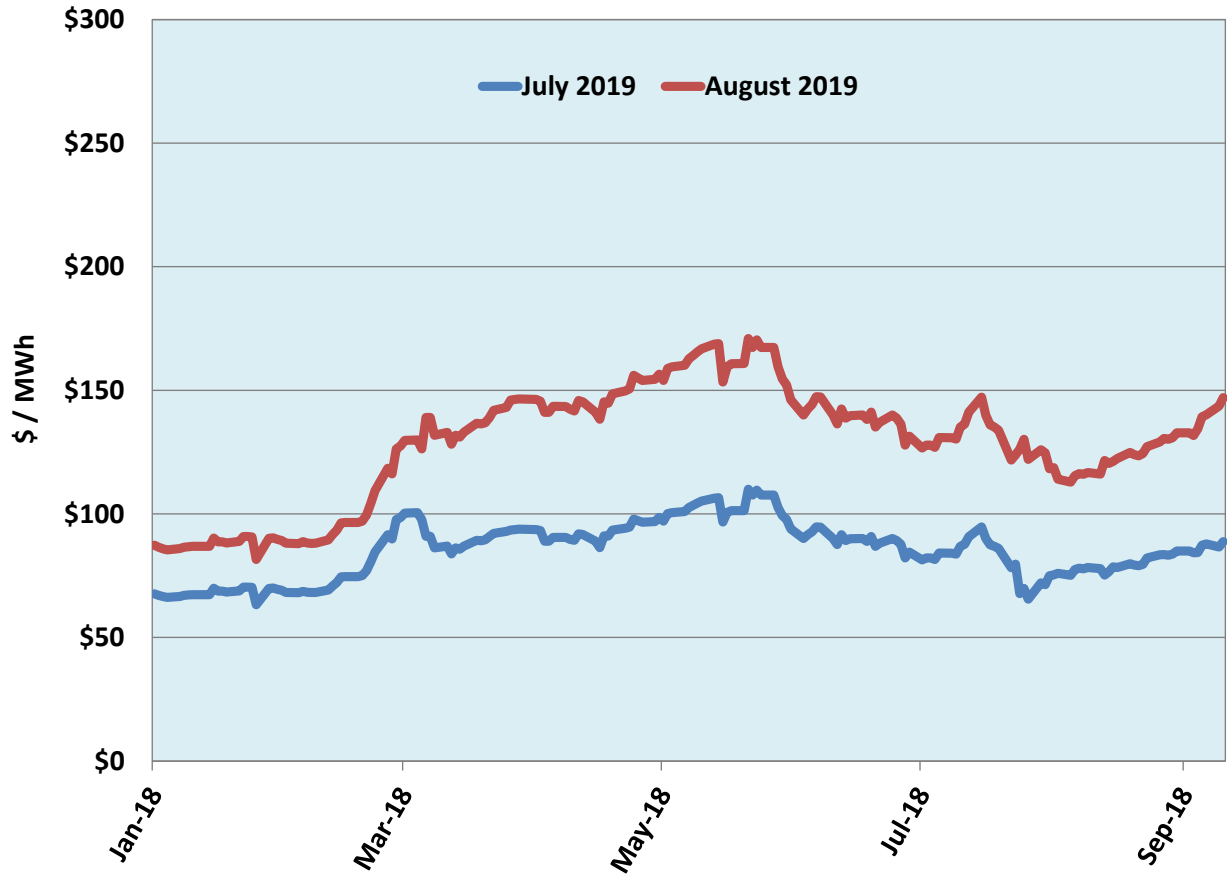
Through November 20, 2018

Peaker Net Margin contribution by month



Through November 20, 2018

Forward prices for Summer 2019 have continued to rise



November 23, 2018

July19: $106

Aug19: $173

North Hub - Peak

POTOMAC ECONOMICS

To the Public Utility Commission of Texas

ERCOT Wholesale Electricity Market Monthly Report

Monday, November 19, 2018

Potomac Economics, Ltd.
Independent Market Monitor

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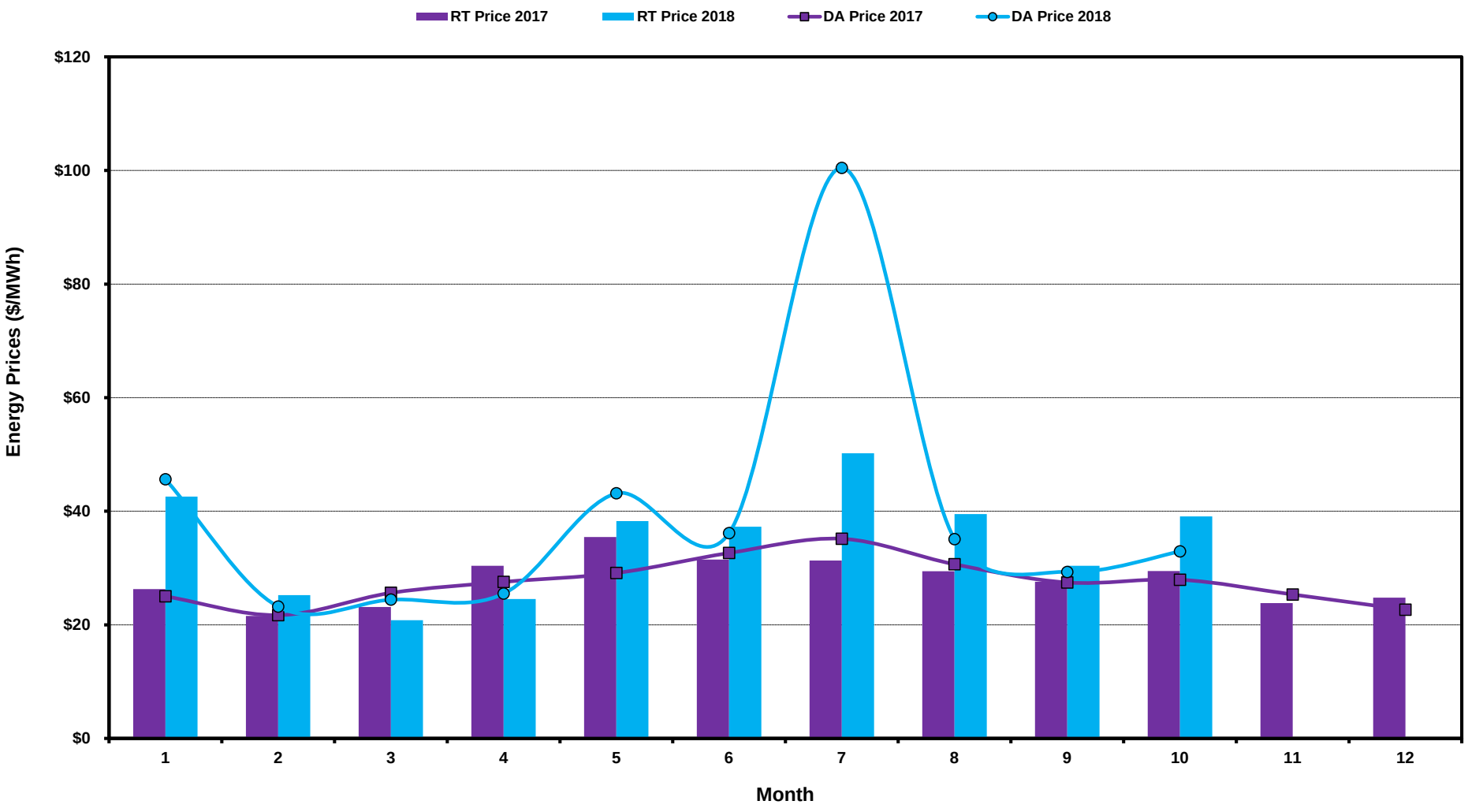
ERCOT-wide Average Energy Prices DA vs RT

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



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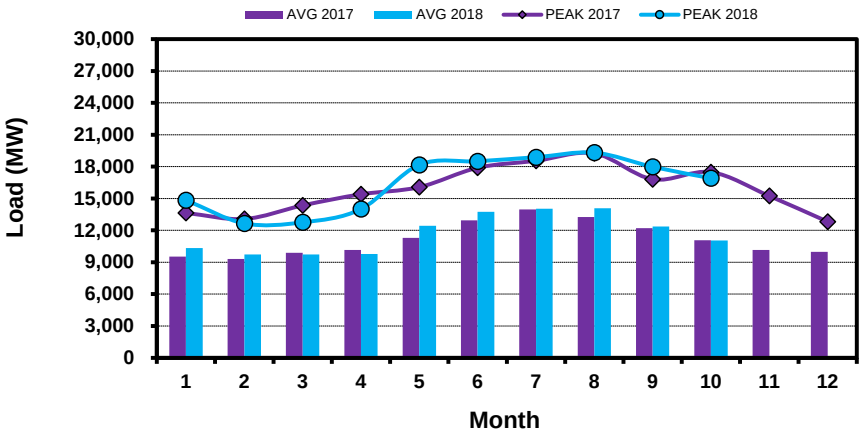
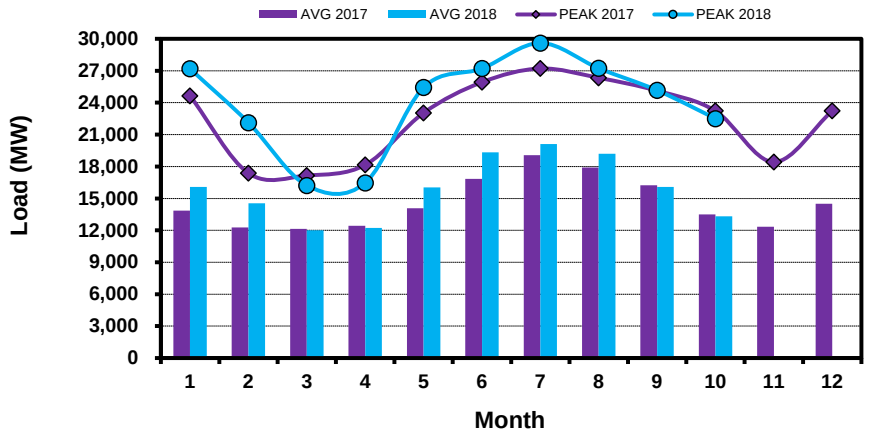
Load Zone Load Statistics

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

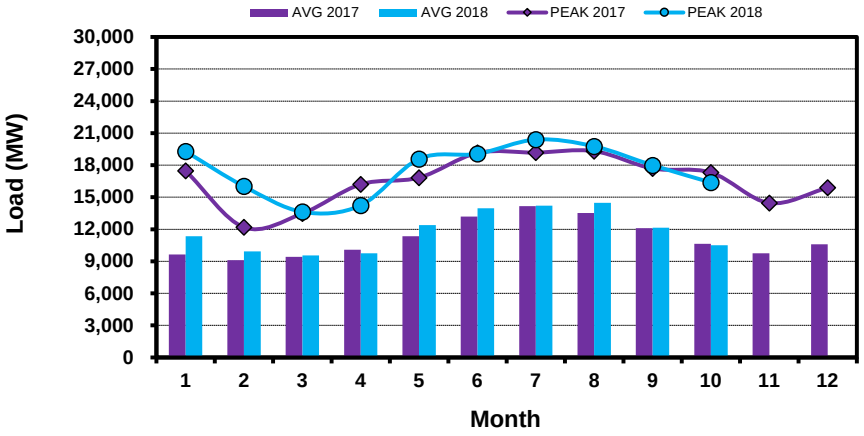
Houston Zone



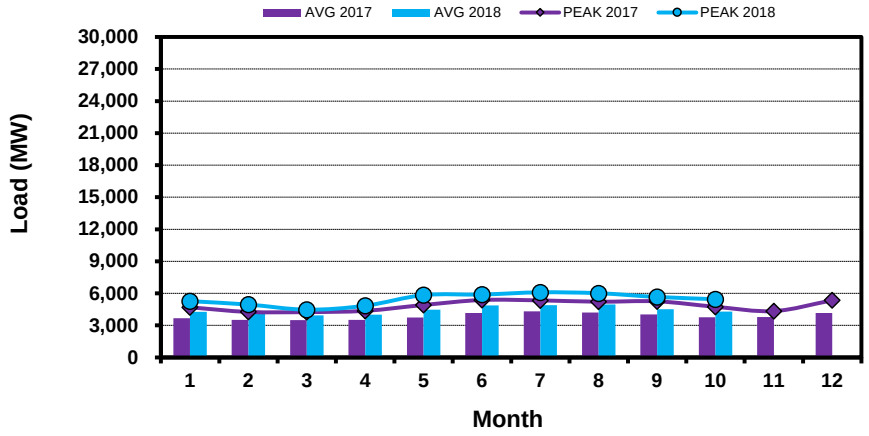
North Zone



South Zone



West Zone



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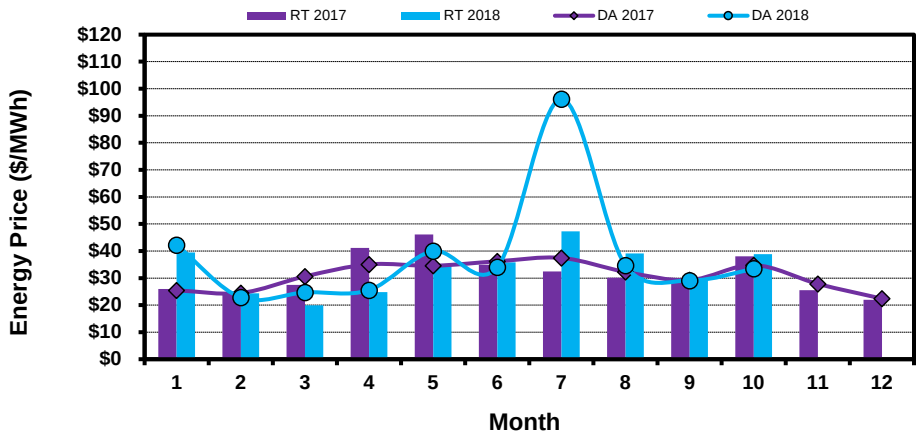
data

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)

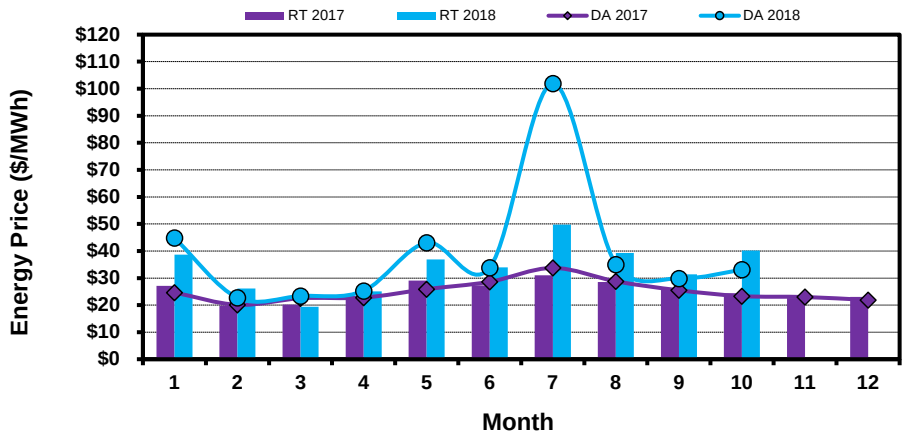
Load Zone Monthly Average Energy Price DA vs RT

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

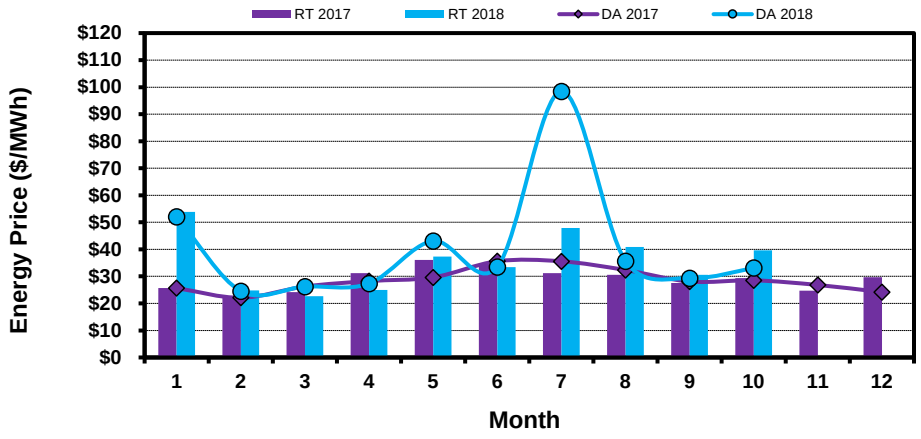
Houston Zone



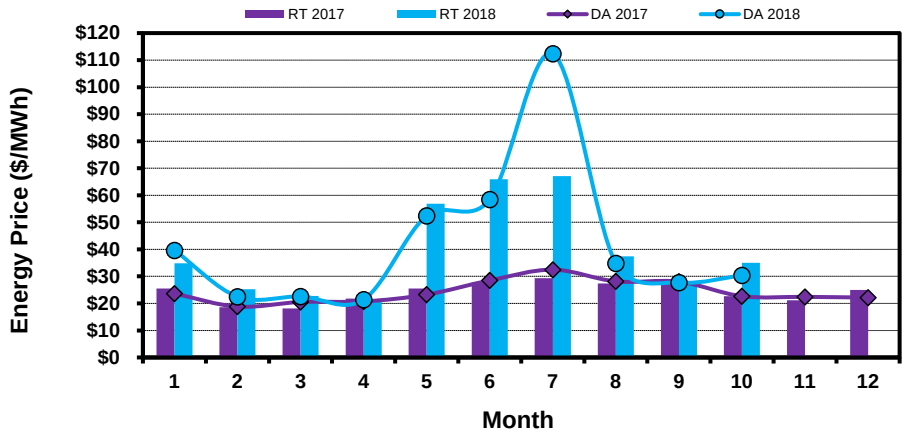
North Zone



South Zone



West Zone



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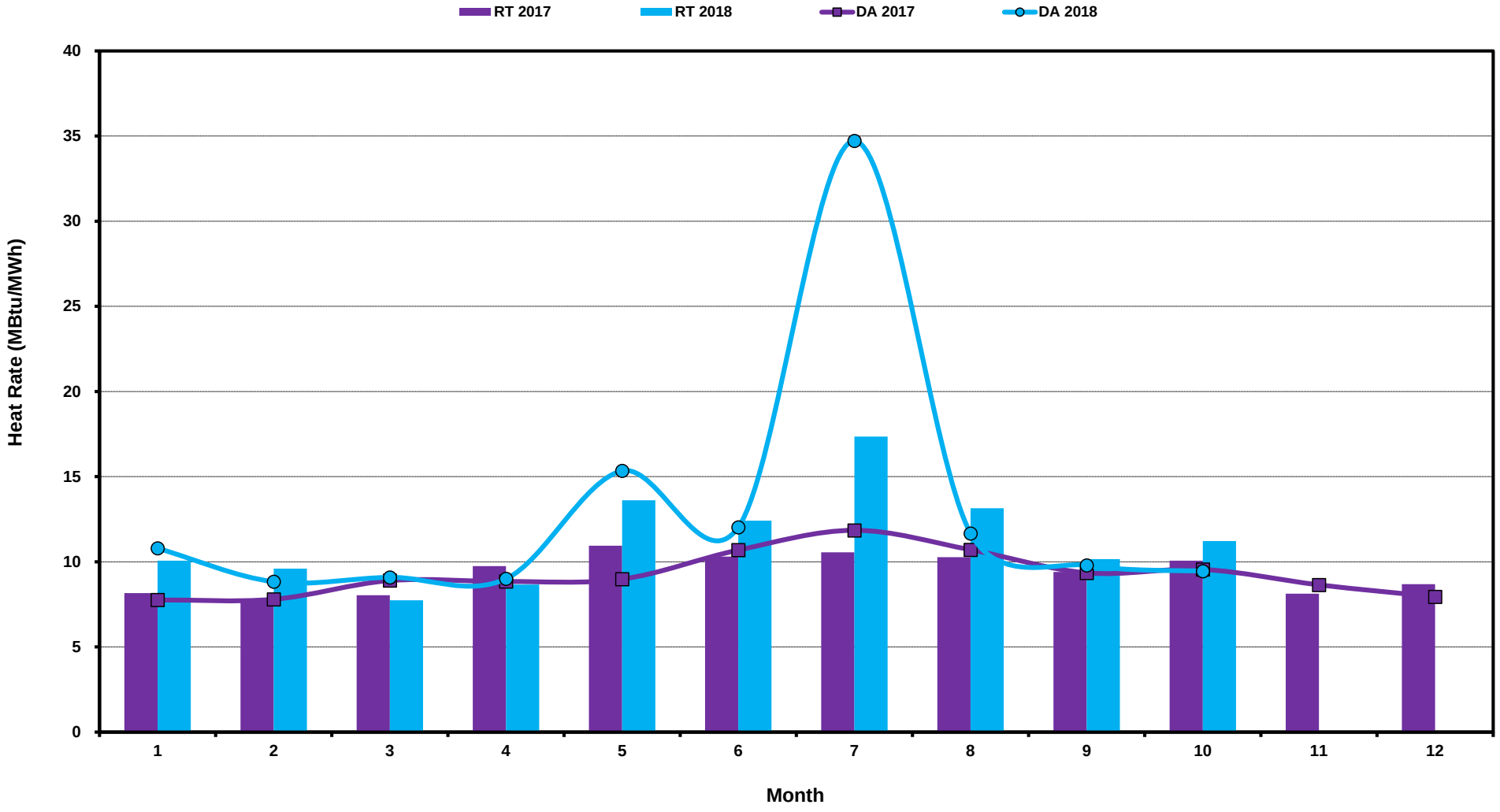
ERCOT-wide Monthly Implied Heat Rate DA vs RT

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



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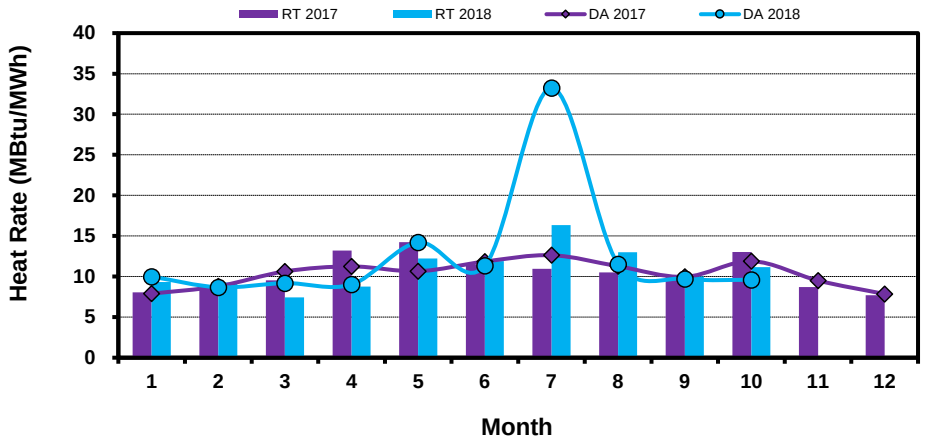
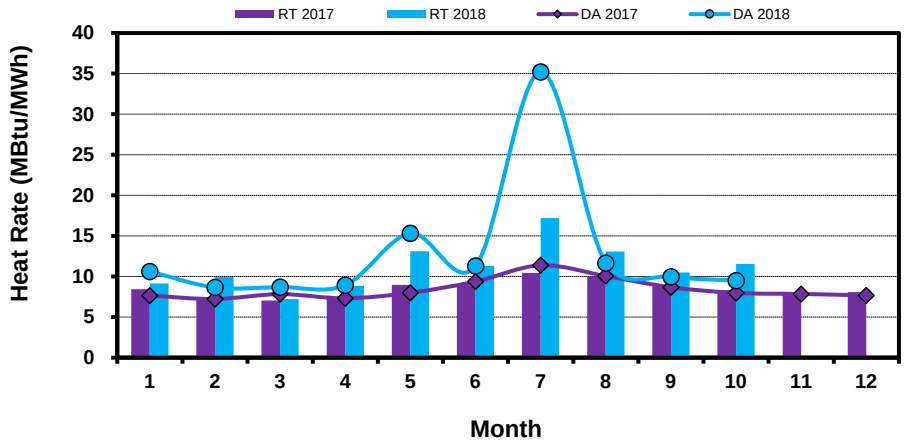
Load Zone Monthly Implied Heat Rate DA vs RT

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

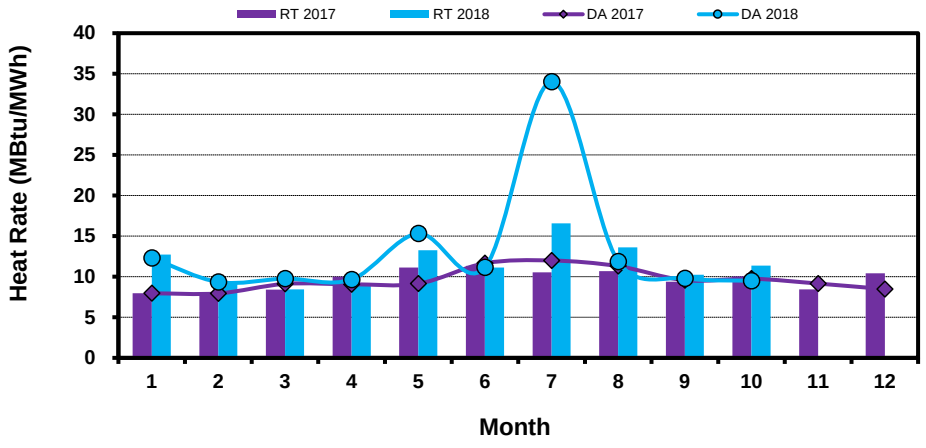
Houston Zone



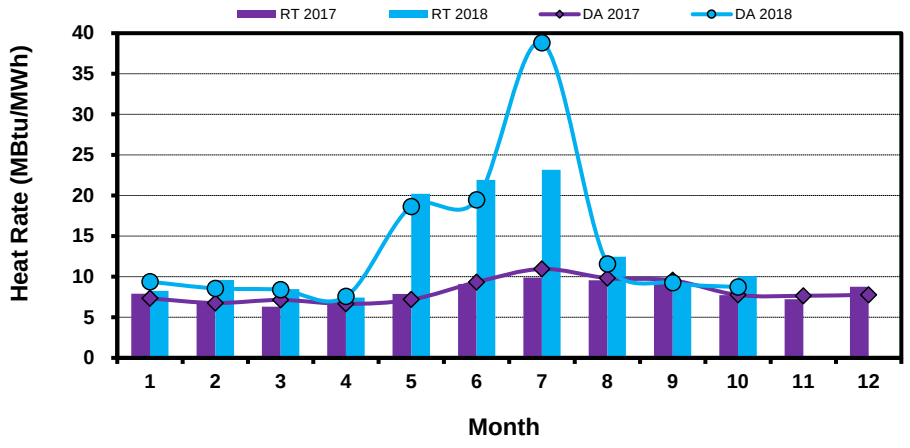
North Zone



South Zone



West Zone



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data

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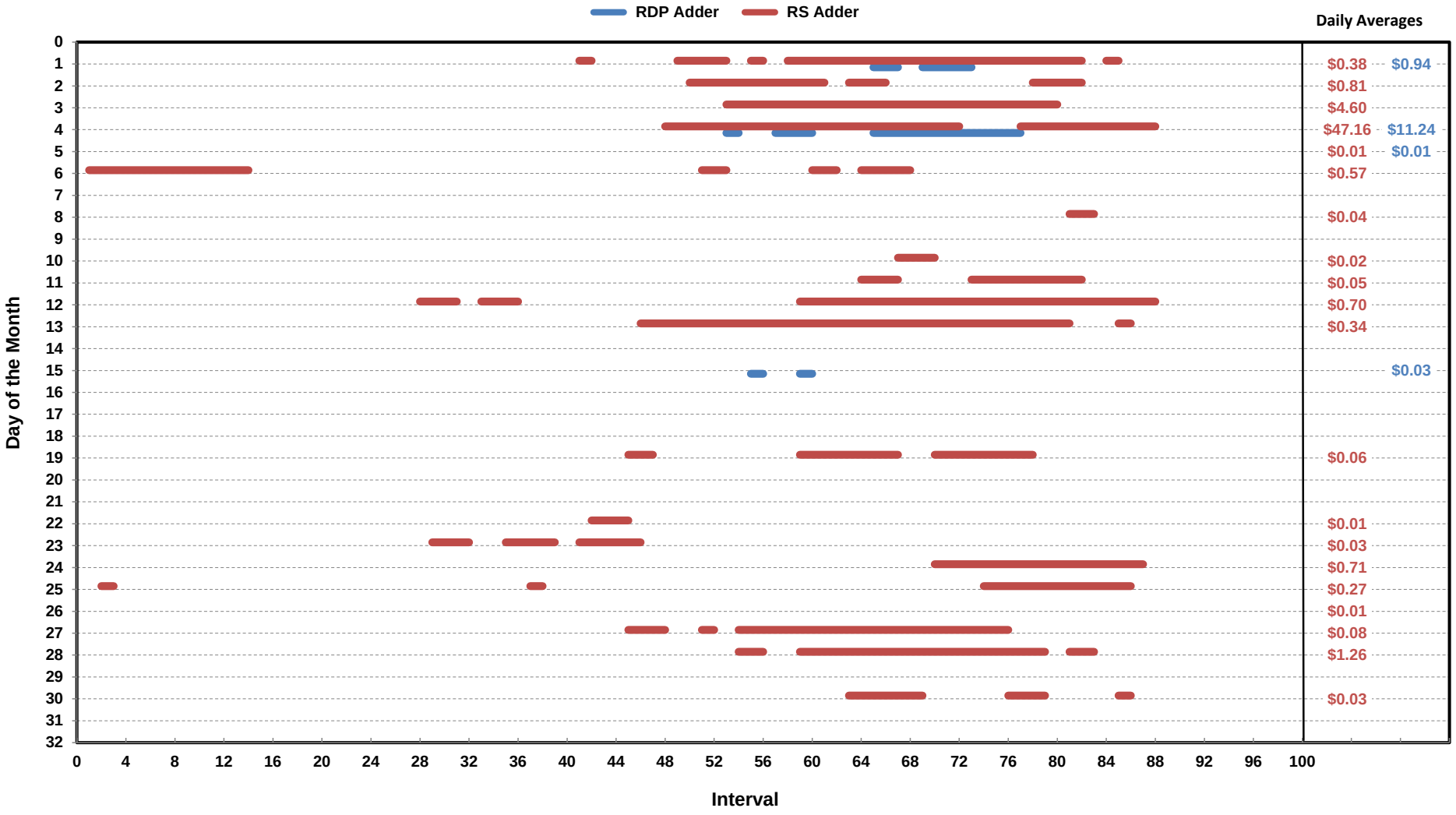
Daily ORDC Adders Average Values and Interval Duration

Oct-2018



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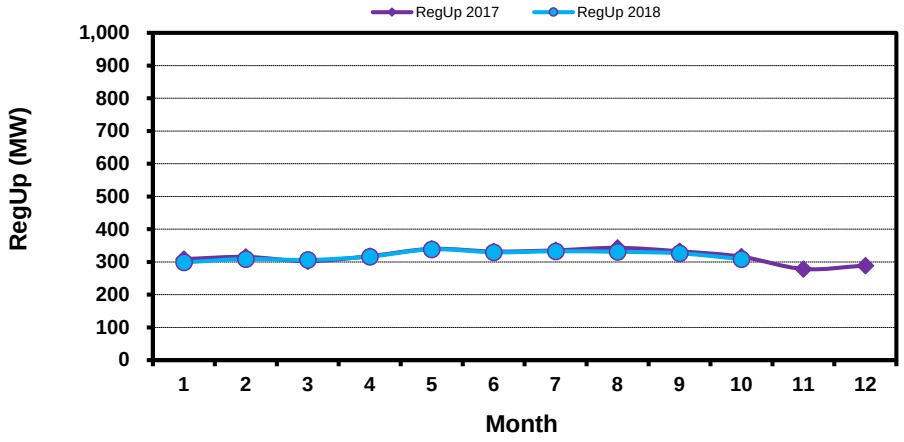
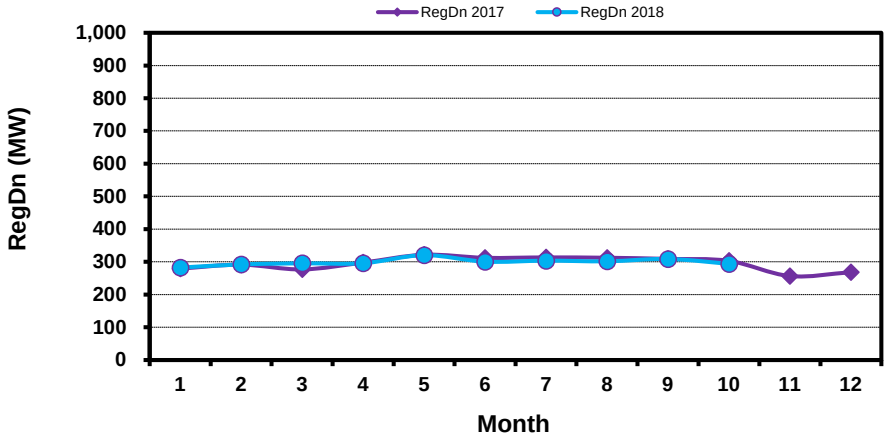
data

Monthly Average of Ancillary Services Required MW

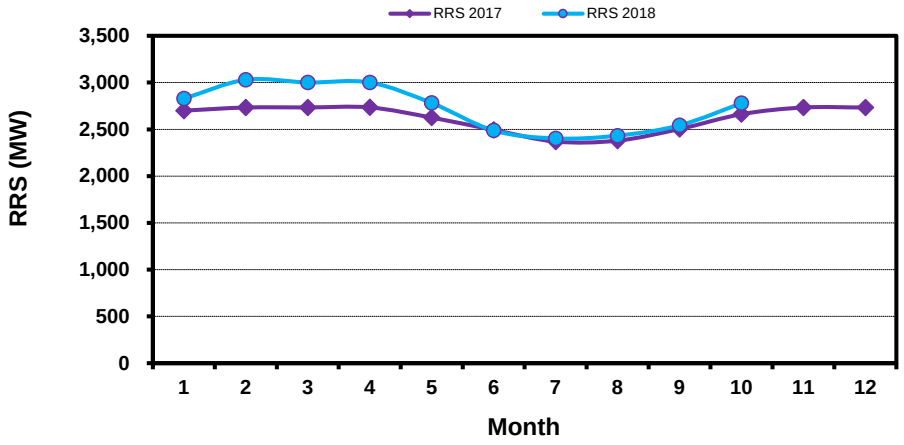
Regulation Up



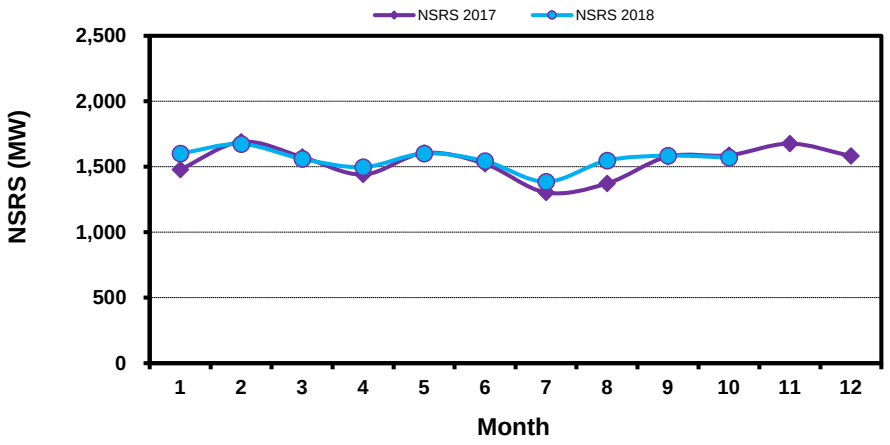
Regulation Down



Responsive Reserve



Non-Spin Reserve



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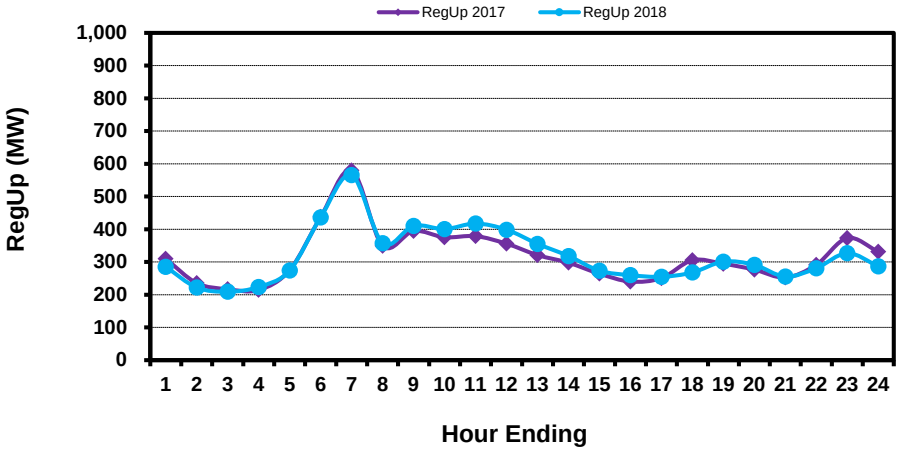
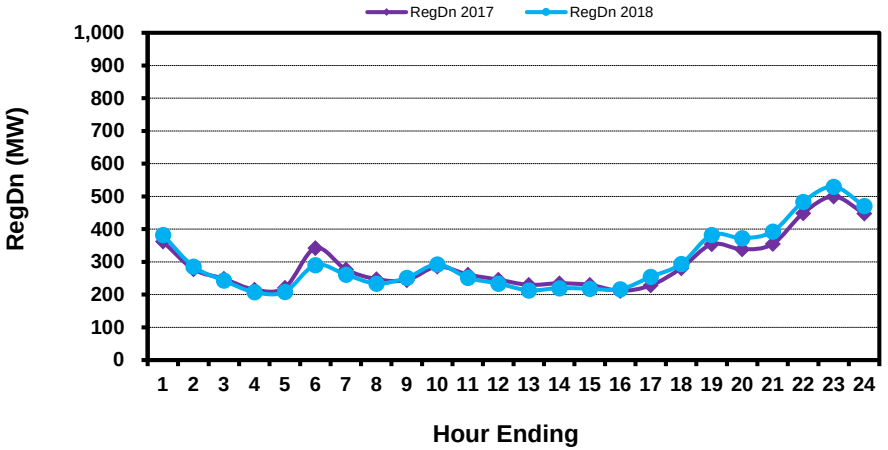
data

Hourly Average of Ancillary Services Required MW

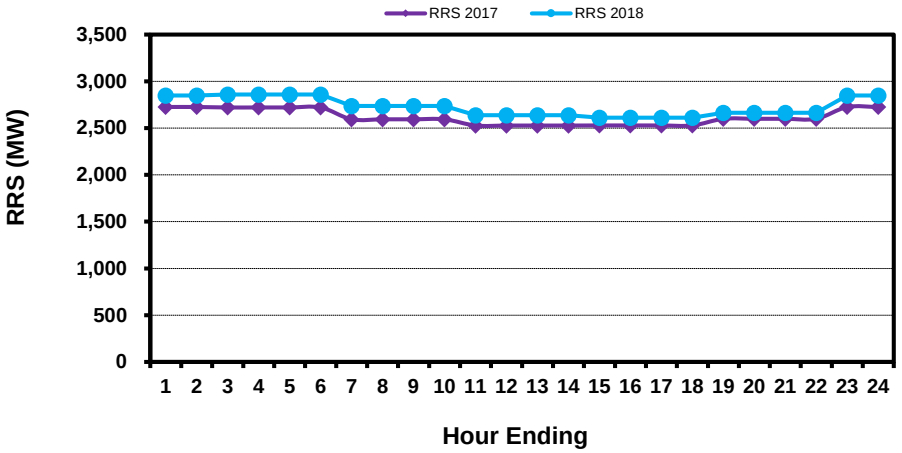
Regulation Up



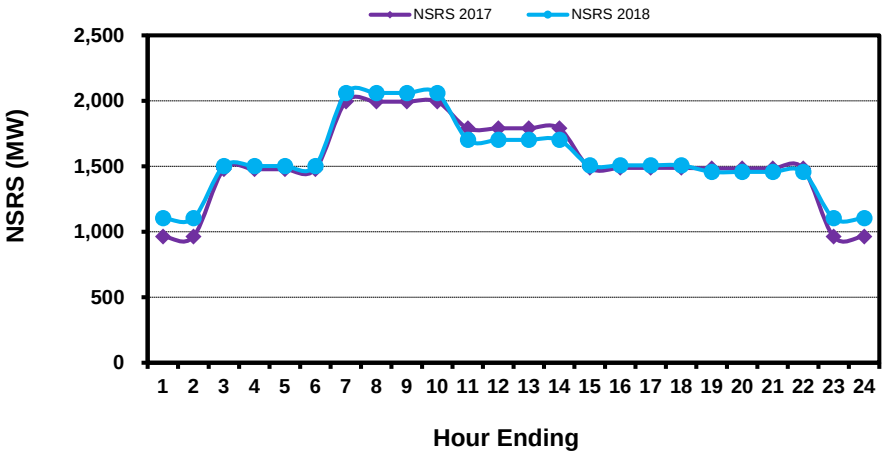
Regulation Down



Responsive Reserve



Non-Spin Reserve



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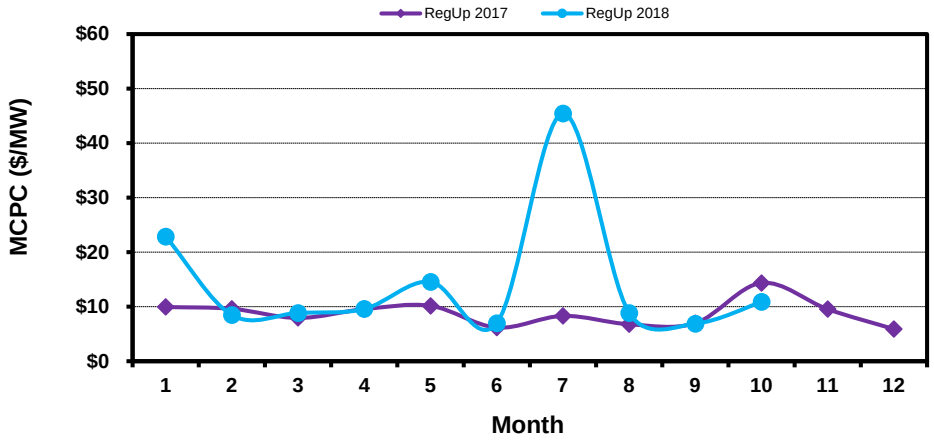
data

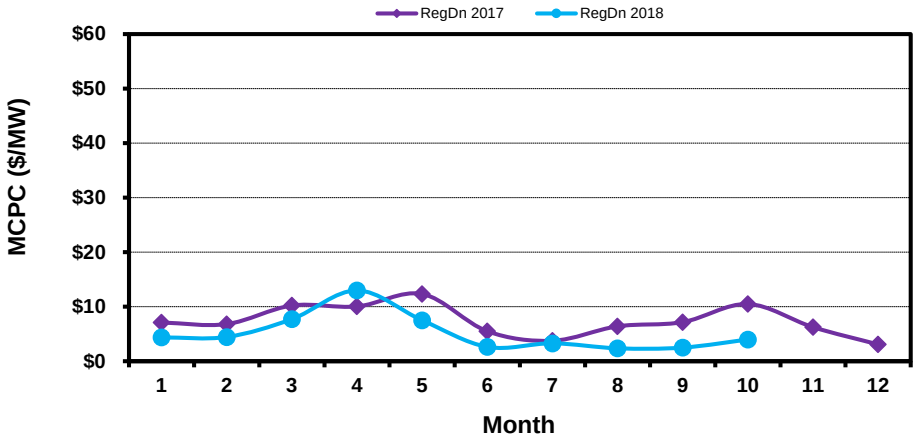
Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

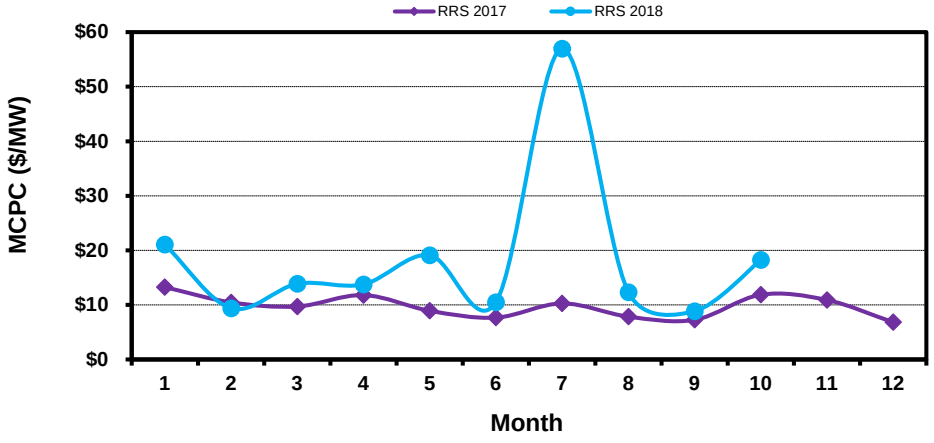
Regulation Up



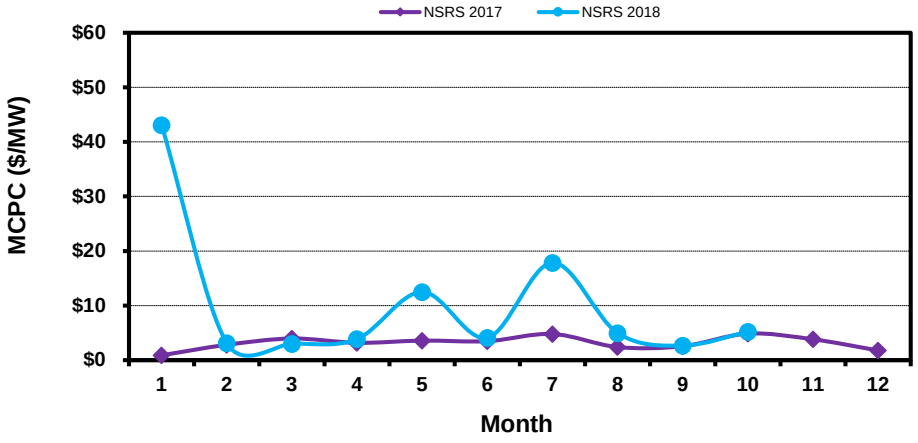
Regulation Down



Responsive Reserve



Non-Spin Reserve



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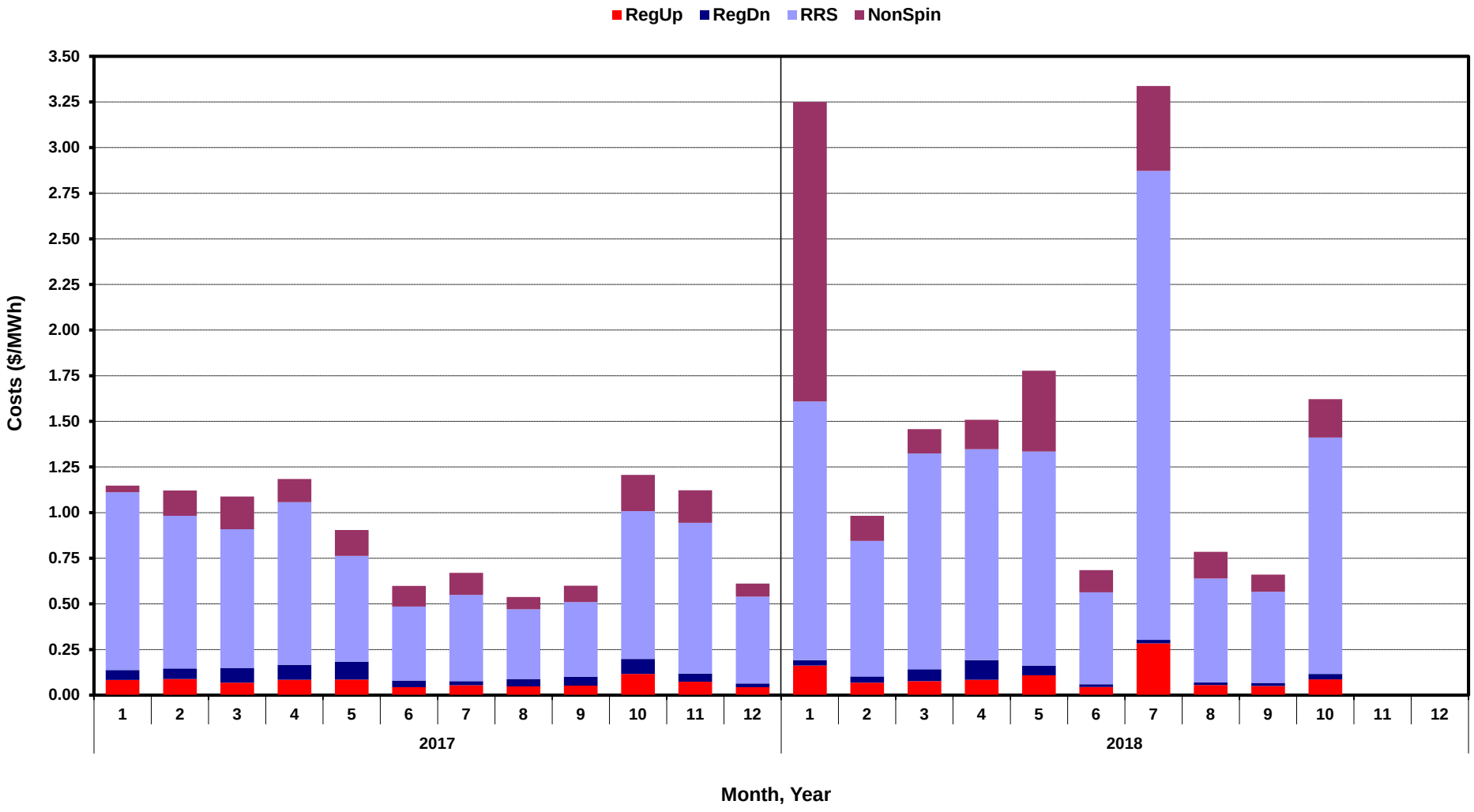
data

Monthly Average A/S Cost per MWh Load



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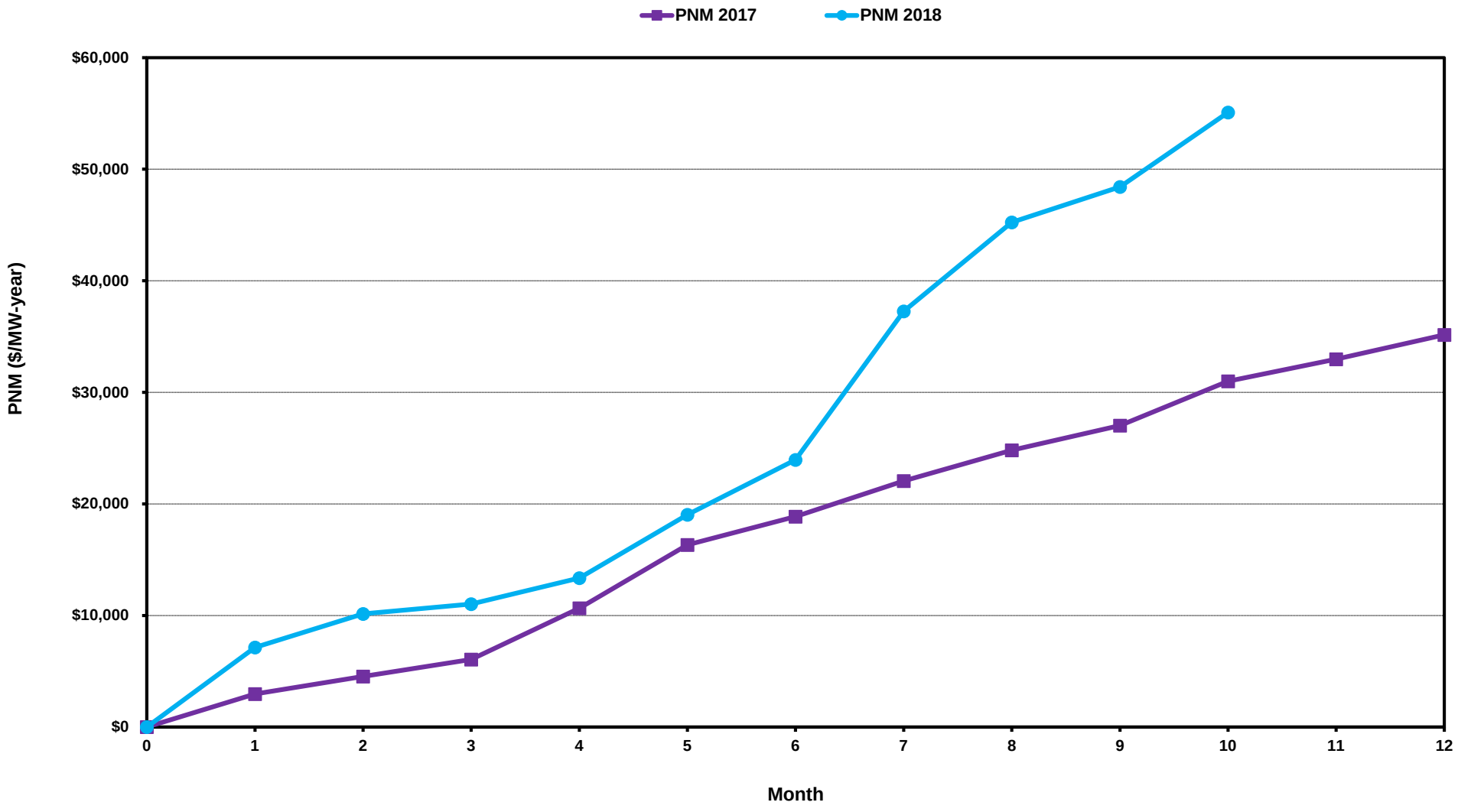
ERCOT-wide Cumulative Peaker Net Margin



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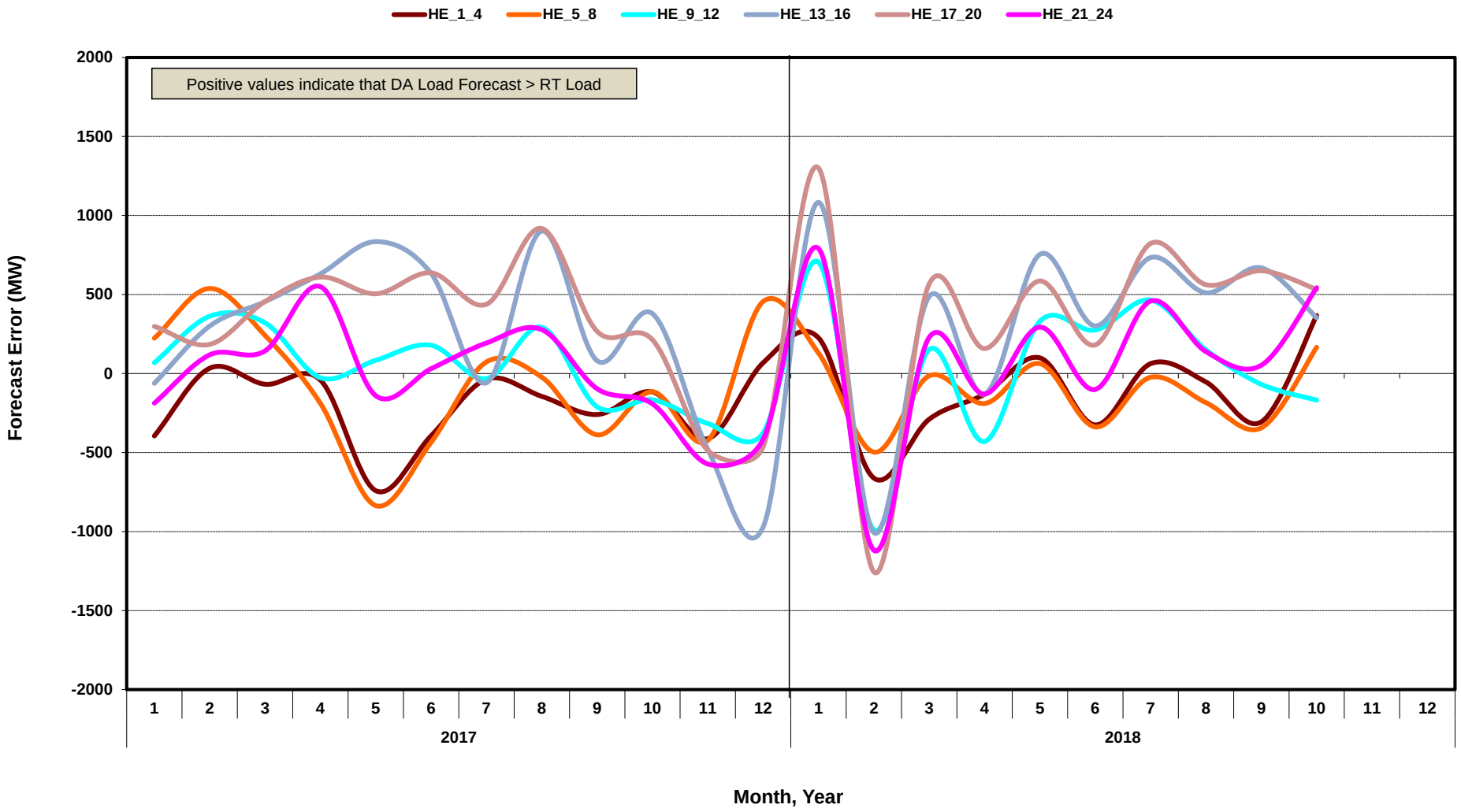
data

DA vs. RT Load Forecast Error by Hour Ending



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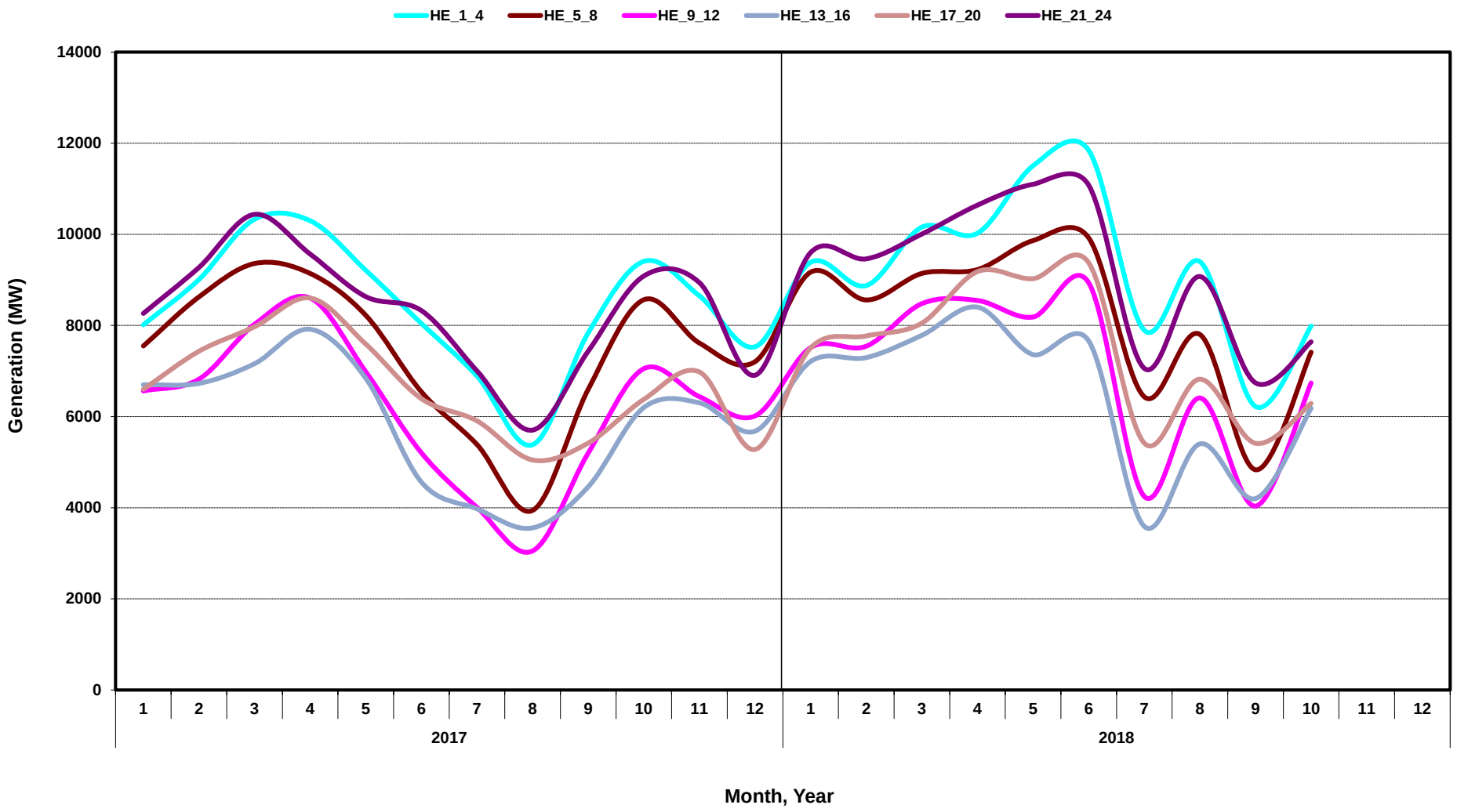
data

Monthly Average of Wind Generation by Hour Ending



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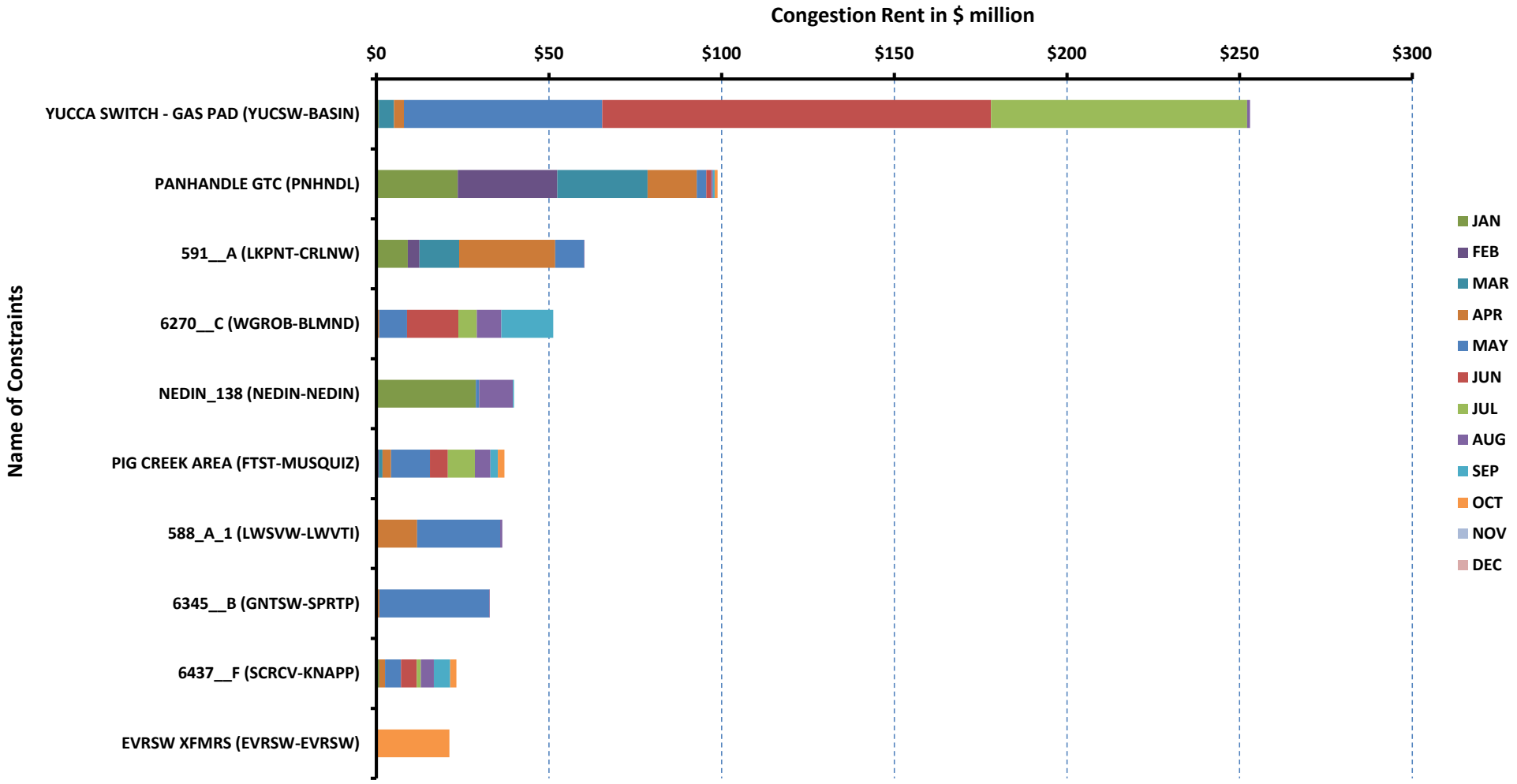
data

RT Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Value - 2018



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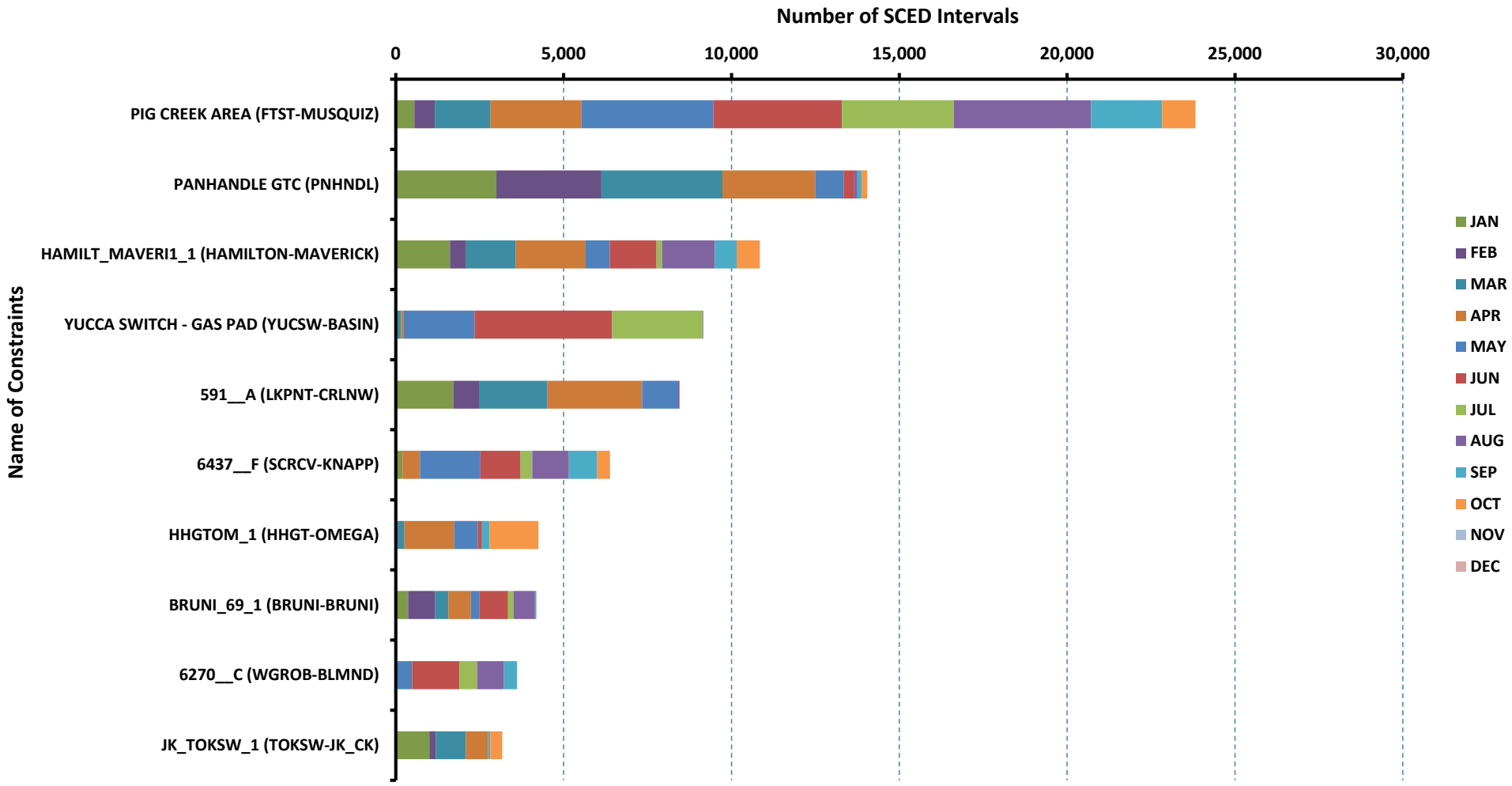
data

RT Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency - 2018



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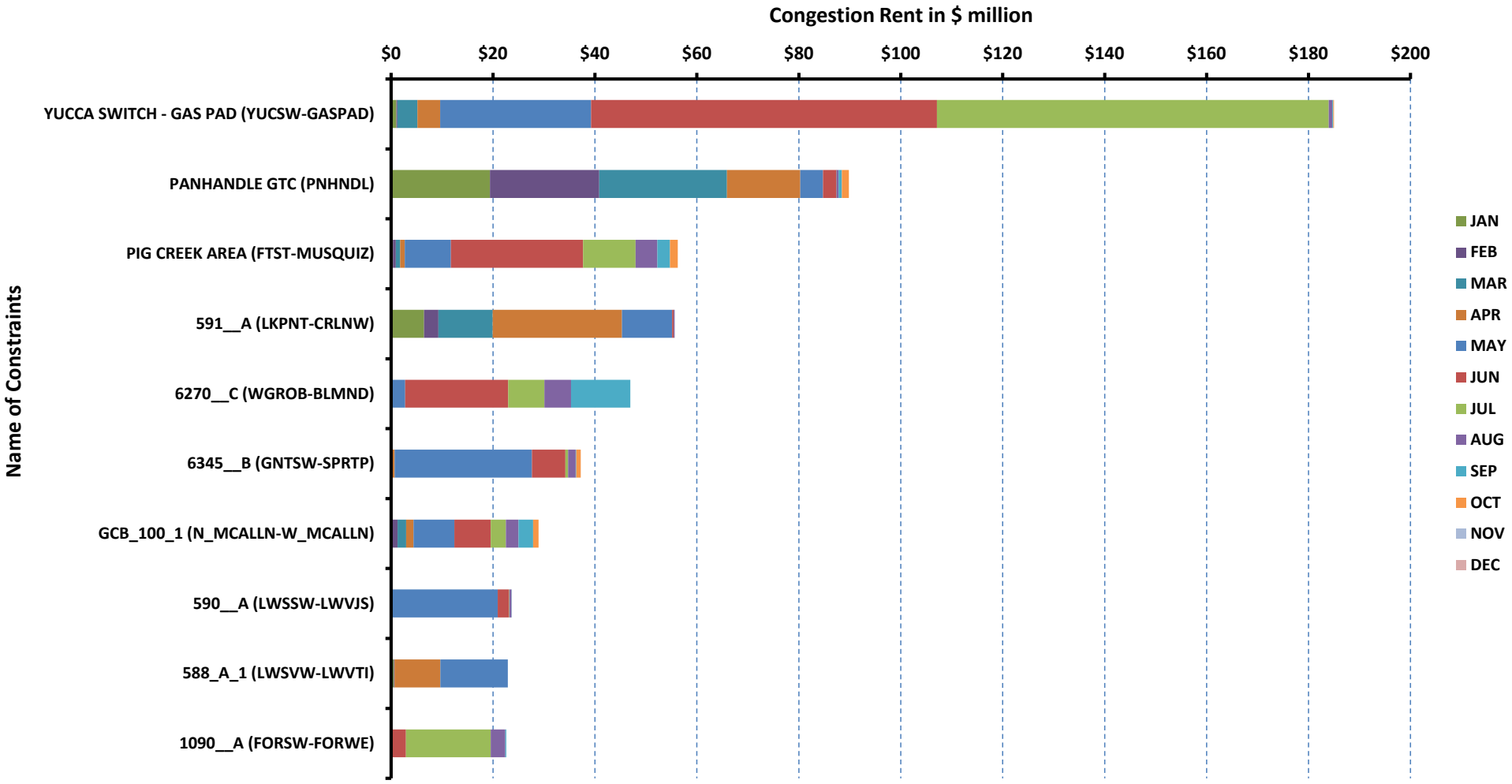
data

DA Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Value - 2018



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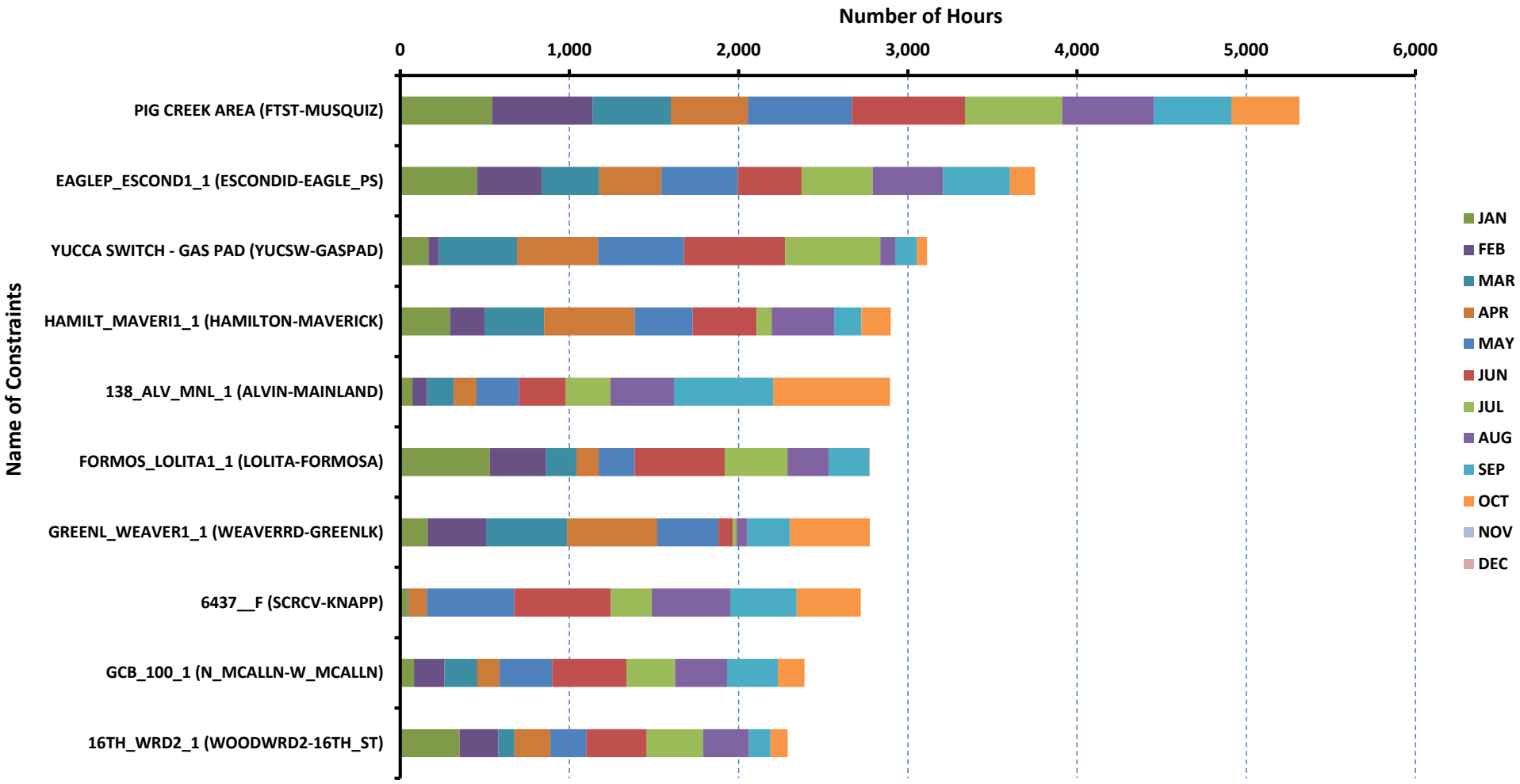
data

DA Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency - 2018



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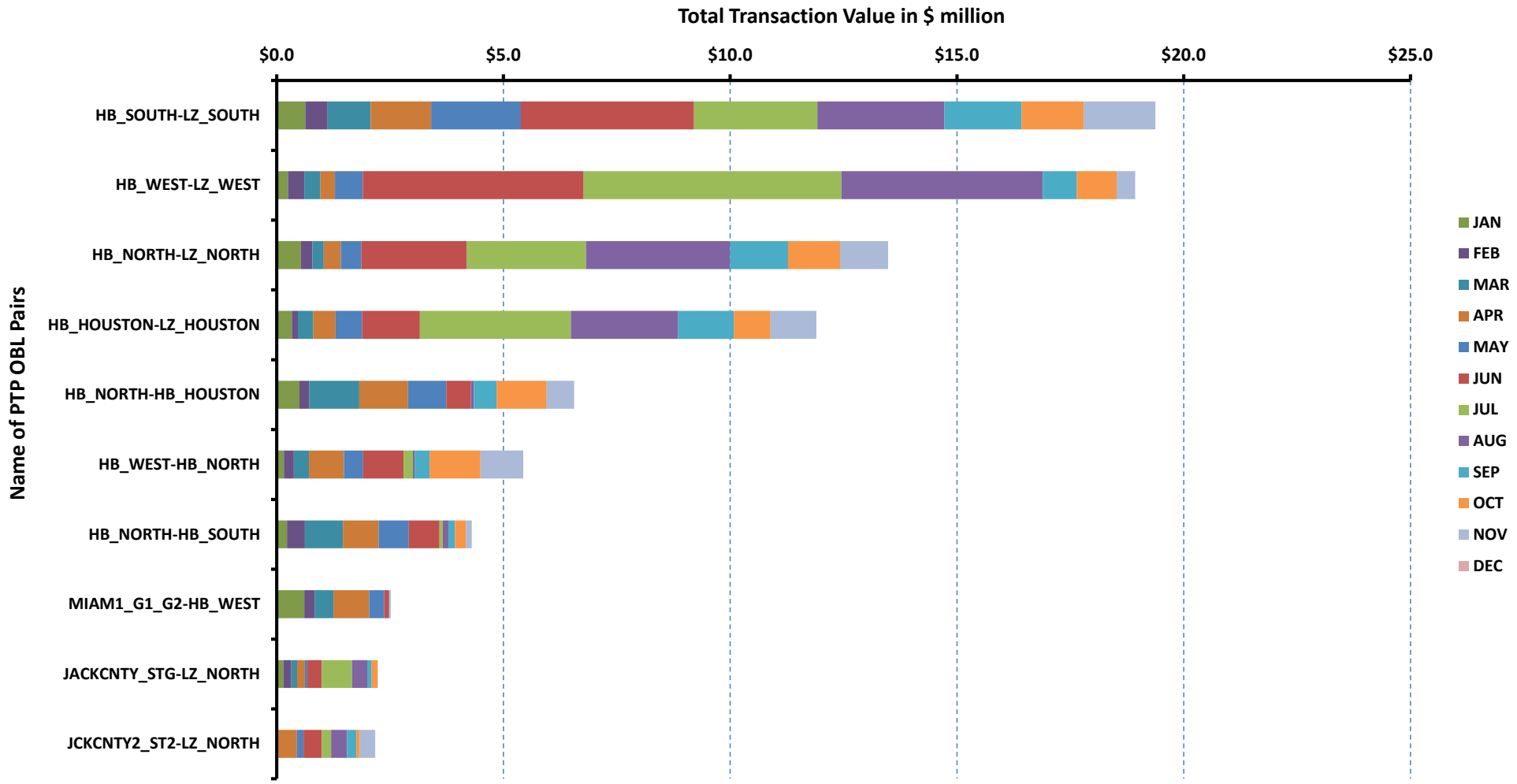
data

Top 10 CRR Pairs Ranked by Monthly Auction Values - 1

Top 10 PTP Obligations by Total Transaction Value - 2018



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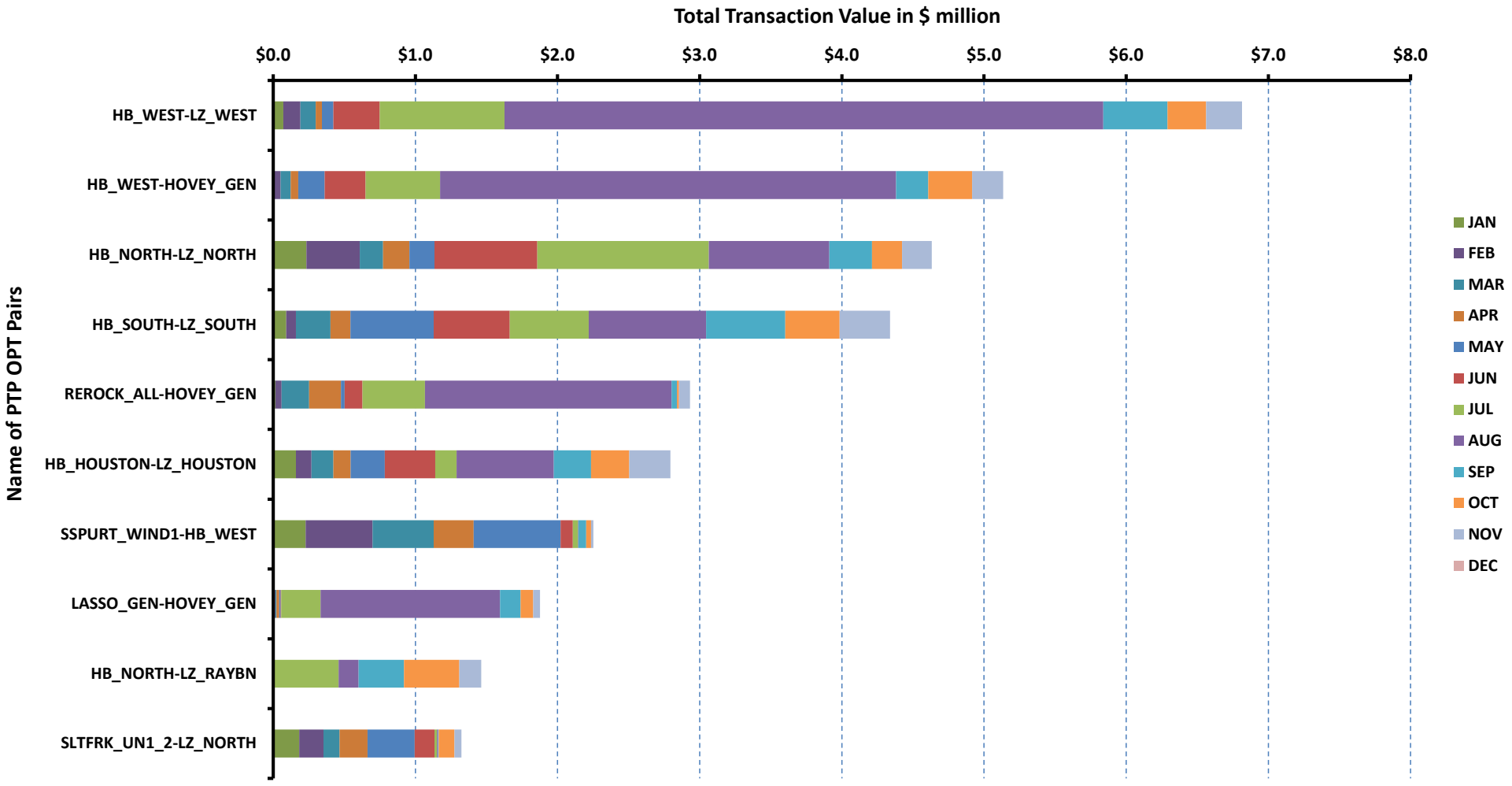
data

Top 10 CRR Pairs Ranked by Monthly Auction Values - 2

Top 10 PTP Options by Total Transaction Value - 2018



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data

ERCOT-wide Avg. Energy Price - DA vs. RT			
year	month	dam_spp	rtm_spp
2017	1	$ 25.01	$ 26.30
	2	$ 21.70	$ 21.57
	3	$ 25.62	$ 23.14
	4	$ 27.56	$ 30.40
	5	$ 29.12	$ 35.47
	6	$ 32.64	$ 31.47
	7	$ 35.15	$ 31.32
	8	$ 30.67	$ 29.43
	9	$ 27.45	$ 27.61
	10	$ 27.94	$ 29.46
	11	$ 25.34	$ 23.84
	12	$ 22.66	$ 24.77
2018	1	$ 45.63	$ 42.56
	2	$ 23.21	$ 25.24
	3	$ 24.42	$ 20.80
	4	$ 25.49	$ 24.54
	5	$ 43.15	$ 38.28
	6	$ 36.14	$ 37.29
	7	$ 100.46	$ 50.21
	8	$ 35.08	$ 39.51
	9	$ 29.31	$ 30.40
	10	$ 32.93	$ 39.07
	11	$ -	$ -
	12	$ -	$ -

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chart

Load Zone Load Statistics									
year	month	loadPEAK_Houston	loadPEAK_North	loadPEAK_South	loadPEAK_West	loadAVG_Houston	loadAVG_North	loadAVG_South	loadAVG_West
2017	1	13,640	24,641	17,476	4,693	9,533	13,862	9,650	3,682
	2	13,074	17,377	12,186	4,263	9,319	12,279	9,105	3,517
	3	14,350	17,155	13,474	4,247	9,894	12,145	9,426	3,489
	4	15,397	18,149	16,208	4,366	10,155	12,424	10,090	3,526
	5	16,071	23,038	16,835	4,912	11,298	14,082	11,344	3,734
	6	17,892	25,922	19,144	5,380	12,950	16,838	13,184	4,159
	7	18,546	27,206	19,176	5,343	13,970	19,060	14,172	4,325
	8	19,245	26,332	19,315	5,219	13,249	17,905	13,516	4,199
	9	16,810	25,120	17,691	5,254	12,212	16,242	12,107	4,029
	10	17,482	23,221	17,309	4,746	11,078	13,497	10,632	3,757
	11	15,238	18,420	14,459	4,342	10,159	12,346	9,753	3,795
	12	12,819	23,226	15,888	5,349	9,986	14,509	10,592	4,168
2018	1	14,841	27,183	19,284	5,270	10,346	16,082	11,354	4,263
	2	12,660	22,124	16,019	4,952	9,740	14,553	9,933	4,101
	3	12,755	16,224	13,632	4,474	9,738	12,000	9,549	3,934
	4	14,008	16,467	14,236	4,842	9,773	12,219	9,759	4,009
	5	18,173	25,422	18,587	5,840	12,434	16,042	12,383	4,477
	6	18,505	27,210	19,060	5,893	13,748	19,325	13,975	4,868
	7	18,887	29,603	20,396	6,098	14,048	20,116	14,209	4,888
	8	19,315	27,228	19,763	6,013	14,084	19,189	14,465	4,951
	9	17,979	25,162	17,990	5,663	12,362	16,076	12,143	4,525
	10	16,911	22,503	16,383	5,455	11,043	13,313	10,502	4,285
	11	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-

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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
2017	1	$ 25.97	$ 27.15	$ 25.69	$ 25.52	$ 25.45	$ 24.65	$ 25.65	$ 23.62
	2	$ 24.14	$ 19.84	$ 22.43	$ 18.59	$ 24.48	$ 20.12	$ 22.10	$ 18.81
	3	$ 27.46	$ 20.23	$ 24.18	$ 18.15	$ 30.61	$ 22.53	$ 26.24	$ 20.54
	4	$ 41.17	$ 23.37	$ 31.21	$ 21.80	$ 35.06	$ 22.79	$ 28.27	$ 20.73
	5	$ 46.16	$ 29.05	$ 36.05	$ 25.54	$ 34.55	$ 25.91	$ 29.64	$ 23.27
	6	$ 34.90	$ 27.27	$ 34.65	$ 27.77	$ 36.20	$ 28.63	$ 35.60	$ 28.49
	7	$ 32.45	$ 31.01	$ 31.24	$ 29.34	$ 37.45	$ 33.75	$ 35.58	$ 32.49
	8	$ 30.09	$ 28.53	$ 30.59	$ 27.37	$ 32.27	$ 28.79	$ 32.36	$ 28.14
	9	$ 29.74	$ 25.89	$ 27.59	$ 28.11	$ 29.25	$ 25.48	$ 28.08	$ 28.05
	10	$ 38.08	$ 24.35	$ 29.37	$ 22.64	$ 34.79	$ 23.32	$ 28.53	$ 22.66
	11	$ 25.52	$ 22.59	$ 24.71	$ 21.14	$ 27.86	$ 22.99	$ 26.83	$ 22.42
	12	$ 21.95	$ 23.05	$ 29.70	$ 24.99	$ 22.39	$ 21.88	$ 24.16	$ 22.17
2018	1	$ 39.47	$ 38.65	$ 53.81	$ 34.86	$ 42.24	$ 44.85	$ 52.06	$ 39.65
	2	$ 24.34	$ 26.14	$ 24.82	$ 25.22	$ 22.81	$ 22.74	$ 24.57	$ 22.50
	3	$ 19.97	$ 19.38	$ 22.64	$ 22.79	$ 24.70	$ 23.37	$ 26.22	$ 22.58
	4	$ 24.84	$ 25.06	$ 25.02	$ 21.02	$ 25.55	$ 25.28	$ 27.35	$ 21.42
	5	$ 34.38	$ 36.88	$ 37.31	$ 56.83	$ 39.95	$ 43.08	$ 43.09	$ 52.45
	6	$ 35.79	$ 33.96	$ 33.39	$ 65.89	$ 34.05	$ 33.91	$ 33.53	$ 58.47
	7	$ 47.28	$ 49.79	$ 47.92	$ 67.06	$ 96.22	$ 101.92	$ 98.48	$ 112.38
	8	$ 39.07	$ 39.32	$ 40.89	$ 37.45	$ 34.63	$ 35.04	$ 35.67	$ 34.80
	9	$ 29.92	$ 31.41	$ 30.61	$ 27.57	$ 29.11	$ 29.87	$ 29.36	$ 27.71
	10	$ 38.85	$ 40.15	$ 39.60	$ 35.03	$ 33.47	$ 33.12	$ 33.13	$ 30.43
	11	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

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chart

ERCOT-wide Monthly Implied Heat Rate - DA vs. RT						
year	month	gasprice	rtm_spp	HR_rtm	dam_spp	HR_dam
2017	1	$ 3.22	$ 26.30	8.16	$ 25.01	7.76
	2	$ 2.78	$ 21.57	7.75	$ 21.70	7.80
	3	$ 2.88	$ 23.14	8.04	$ 25.62	8.90
	4	$ 3.12	$ 30.40	9.75	$ 27.56	8.84
	5	$ 3.24	$ 35.47	10.94	$ 29.12	8.99
	6	$ 3.05	$ 31.47	10.31	$ 32.64	10.69
	7	$ 2.97	$ 31.32	10.56	$ 35.15	11.85
	8	$ 2.86	$ 29.43	10.28	$ 30.67	10.71
	9	$ 2.94	$ 27.61	9.40	$ 27.45	9.35
	10	$ 2.93	$ 29.46	10.07	$ 27.94	9.55
	11	$ 2.93	$ 23.84	8.13	$ 25.34	8.65
	12	$ 2.85	$ 24.77	8.68	$ 22.66	7.94
2018	1	$ 4.23	$ 42.56	10.07	$ 45.63	10.79
	2	$ 2.63	$ 25.24	9.61	$ 23.21	8.83
	3	$ 2.69	$ 20.80	7.74	$ 24.42	9.09
	4	$ 2.83	$ 24.54	8.67	$ 25.49	9.00
	5	$ 2.81	$ 38.28	13.61	$ 43.15	15.34
	6	$ 3.00	$ 37.29	12.41	$ 36.14	12.03
	7	$ 2.89	$ 50.21	17.35	$ 100.46	34.71
	8	$ 3.01	$ 39.51	13.14	$ 35.08	11.67
	9	$ 2.99	$ 30.40	10.16	$ 29.31	9.79
	10	$ 3.48	$ 39.07	11.22	$ 32.93	9.45
	11	$ -	$ -	-	$ -	-
	12	$ -	$ -	-	$ -	-

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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
2017	1	7.89	7.96	7.65	7.33	8.06	7.97	8.42	7.92
	2	8.80	7.94	7.23	6.76	8.68	8.06	7.13	6.68
	3	10.63	9.12	7.83	7.13	9.54	8.40	7.03	6.30
	4	11.25	9.07	7.31	6.65	13.21	10.01	7.50	7.00
	5	10.66	9.14	7.99	7.18	14.24	11.12	8.96	7.88
	6	11.85	11.66	9.37	9.33	11.43	11.35	8.93	9.09
	7	12.63	12.00	11.38	10.95	10.94	10.53	10.45	9.89
	8	11.27	11.30	10.06	9.83	10.51	10.68	9.96	9.56
	9	9.96	9.57	8.68	9.55	10.13	9.40	8.82	9.57
	10	11.90	9.75	7.97	7.75	13.02	10.04	8.33	7.74
	11	9.51	9.15	7.85	7.65	8.71	8.43	7.71	7.21
	12	7.85	8.47	7.67	7.77	7.70	10.41	8.08	8.76
2018	1	9.99	12.31	10.61	9.38	9.34	12.73	9.14	8.25
	2	8.68	9.35	8.65	8.56	9.26	9.44	9.95	9.60
	3	9.19	9.76	8.70	8.40	7.43	8.42	7.21	8.48
	4	9.02	9.66	8.93	7.57	8.77	8.84	8.85	7.42
	5	14.20	15.32	15.32	18.65	12.22	13.27	13.11	20.21
	6	11.34	11.16	11.29	19.47	11.92	11.12	11.31	21.94
	7	33.25	34.03	35.22	38.83	16.34	16.56	17.21	23.17
	8	11.52	11.86	11.65	11.58	13.00	13.60	13.08	12.46
	9	9.73	9.81	9.98	9.26	10.00	10.23	10.50	9.21
	10	9.61	9.51	9.51	8.74	11.15	11.37	11.53	10.06
	11	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-

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chart

Daily ORDC Adders Average Values and Interval Duration								
YEAR	MONTH	DAY	PRICE_RS	PRICE_RDP	RS_CNT	RDP_CNT	RS_POS	RDP_POS
2018	10	1	$ 0.38	$ 0.94	37	8	80	90
2018	10	2	$ 0.81	$ -	21	0	80	90
2018	10	3	$ 4.60	$ -	29	0	80	90
2018	10	4	$ 47.16	$ 11.24	38	19	80	90
2018	10	5	$ 0.01	$ 0.01	3	1	80	90
2018	10	6	$ 0.57	$ -	27	0	80	90
2018	10	7	$ -	$ -	0	0	80	90
2018	10	8	$ 0.04	$ -	3	0	80	90
2018	10	9	$ -	$ -	0	0	80	90
2018	10	10	$ 0.02	$ -	6	0	80	90
2018	10	11	$ 0.05	$ -	15	0	80	90
2018	10	12	$ 0.70	$ -	38	0	80	90
2018	10	13	$ 0.34	$ -	39	0	80	90
2018	10	14	$ -	$ -	0	0	80	90
2018	10	15	$ -	$ 0.03	0	4	80	90
2018	10	16	$ -	$ -	0	0	80	90
2018	10	17	$ -	$ -	0	0	80	90
2018	10	18	$ -	$ -	0	0	80	90
2018	10	19	$ 0.06	$ -	21	0	80	90
2018	10	20	$ -	$ -	0	0	80	90
2018	10	21	$ -	$ -	0	0	80	90
2018	10	22	$ 0.01	$ -	4	0	80	90
2018	10	23	$ 0.03	$ -	16	0	80	90
2018	10	24	$ 0.71	$ -	18	0	80	90
2018	10	25	$ 0.27	$ -	17	0	80	90
2018	10	26	$ 0.01	$ -	2	0	80	90
2018	10	27	$ 0.08	$ -	30	0	80	90
2018	10	28	$ 1.26	$ -	29	0	80	90
2018	10	29	$ -	$ -	0	0	80	90
2018	10	30	$ 0.03	$ -	13	0	80	90
2018	10	31	$ -	$ -	0	0	80	90

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chart

Monthly Average of Ancillary Services Required MW					
year	month	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2017	1	279	1,479	2,700	309
	2	291	1,690	2,733	315
	3	277	1,575	2,734	302
	4	298	1,441	2,734	318
	5	322	1,605	2,626	340
	6	312	1,522	2,494	332
	7	314	1,304	2,370	335
	8	313	1,372	2,379	343
	9	309	1,578	2,504	333
	10	303	1,588	2,662	316
	11	257	1,677	2,733	279
	12	268	1,583	2,733	289
2018	1	283	1,601	2,829	299
	2	292	1,674	3,030	309
	3	296	1,560	3,001	306
	4	296	1,497	3,001	316
	5	320	1,601	2,782	339
	6	301	1,543	2,488	330
	7	304	1,386	2,403	333
	8	302	1,548	2,433	331
	9	309	1,585	2,543	326
	10	294	1,570	2,780	309
	11	-	-	-	-
	12	-	-	-	-

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chart

Hourly Average of Ancillary Services Required MW					
year	DELIVERY_HOUR	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2017	1	362	963	2,726	310
	2	278	963	2,726	235
	3	248	1,478	2,720	217
	4	215	1,478	2,721	214
	5	221	1,478	2,721	275
	6	342	1,478	2,721	437
	7	277	1,994	2,594	580
	8	247	1,994	2,594	349
	9	244	1,994	2,594	395
	10	286	1,994	2,594	376
	11	261	1,790	2,527	379
	12	246	1,790	2,527	356
	13	230	1,790	2,527	321
	14	234	1,790	2,527	298
	15	230	1,488	2,528	264
	16	212	1,488	2,528	240
	17	228	1,488	2,528	251
	18	281	1,488	2,528	305
	19	354	1,484	2,599	295
	20	338	1,484	2,599	277
	21	355	1,484	2,599	253
	22	448	1,484	2,599	291
	23	500	963	2,726	373
	24	448	963	2,726	331
2018	1	382	1,103	2,850	285
	2	286	1,103	2,850	222
	3	243	1,502	2,858	209
	4	208	1,502	2,859	224
	5	209	1,502	2,859	274
	6	290	1,502	2,859	437
	7	261	2,060	2,736	565
	8	234	2,060	2,736	358
	9	251	2,060	2,736	411
	10	292	2,060	2,736	401
	11	252	1,702	2,637	417
	12	234	1,702	2,637	399
	13	213	1,702	2,637	356
	14	220	1,702	2,637	318
	15	218	1,508	2,611	273
	16	216	1,508	2,611	260
	17	254	1,508	2,611	255
	18	294	1,508	2,611	268
	19	382	1,457	2,664	301
	20	373	1,457	2,664	291
	21	392	1,457	2,664	255
	22	483	1,457	2,664	281
	23	530	1,103	2,850	327
	24	471	1,103	2,850	287

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chart

Monthly Average Ancillary Services Price					
year	month	MCPC_REGDN	MCPC_NSPIN	MCPC_RRS	MCPC_REGUP
2017	1	$ 7.10	$ 0.89	$ 13.26	$ 9.94
	2	$ 6.81	$ 2.81	$ 10.47	$ 9.62
	3	$ 10.21	$ 3.96	$ 9.71	$ 7.94
	4	$ 10.04	$ 3.18	$ 11.80	$ 9.55
	5	$ 12.33	$ 3.58	$ 8.92	$ 10.16
	6	$ 5.50	$ 3.48	$ 7.67	$ 6.18
	7	$ 3.75	$ 4.79	$ 10.27	$ 8.31
	8	$ 6.40	$ 2.40	$ 7.85	$ 6.78
	9	$ 7.17	$ 2.55	$ 7.26	$ 6.98
	10	$ 10.49	$ 4.86	$ 11.87	$ 14.36
	11	$ 6.25	$ 3.82	$ 10.89	$ 9.54
	12	$ 3.08	$ 1.78	$ 6.82	$ 5.89
2018	1	$ 4.36	$ 43.10	$ 21.06	$ 22.87
	2	$ 4.45	$ 3.14	$ 9.40	$ 8.48
	3	$ 7.71	$ 3.01	$ 13.87	$ 8.86
	4	$ 12.98	$ 3.86	$ 13.76	$ 9.59
	5	$ 7.51	$ 12.51	$ 19.12	$ 14.58
	6	$ 2.62	$ 4.10	$ 10.51	$ 6.98
	7	$ 3.28	$ 17.86	$ 56.96	$ 45.45
	8	$ 2.37	$ 4.98	$ 12.34	$ 8.85
	9	$ 2.49	$ 2.67	$ 8.86	$ 6.90
	10	$ 3.99	$ 5.24	$ 18.25	$ 10.91
	11	$ -	$ -	$ -	$ -
	12	$ -	$ -	$ -	$ -

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chart

Monthly Average A/S Cost per MWh Load					
year	month	AScost_REGDN	AScost_NSPIN	AScost_RRS	AScost_REGUP
2017	1	$ 0.05	$ 0.04	$ 0.97	$ 0.08
	2	$ 0.06	$ 0.14	$ 0.84	$ 0.09
	3	$ 0.08	$ 0.18	$ 0.76	$ 0.07
	4	$ 0.08	$ 0.13	$ 0.89	$ 0.08
	5	$ 0.10	$ 0.14	$ 0.58	$ 0.09
	6	$ 0.04	$ 0.11	$ 0.41	$ 0.04
	7	$ 0.02	$ 0.12	$ 0.47	$ 0.05
	8	$ 0.04	$ 0.07	$ 0.38	$ 0.05
	9	$ 0.05	$ 0.09	$ 0.41	$ 0.05
	10	$ 0.08	$ 0.20	$ 0.81	$ 0.12
	11	$ 0.04	$ 0.18	$ 0.83	$ 0.07
	12	$ 0.02	$ 0.07	$ 0.48	$ 0.04
2018	1	$ 0.03	$ 1.64	$ 1.42	$ 0.16
	2	$ 0.03	$ 0.14	$ 0.74	$ 0.07
	3	$ 0.06	$ 0.13	$ 1.18	$ 0.08
	4	$ 0.11	$ 0.16	$ 1.16	$ 0.08
	5	$ 0.05	$ 0.44	$ 1.17	$ 0.11
	6	$ 0.02	$ 0.12	$ 0.50	$ 0.04
	7	$ 0.02	$ 0.46	$ 2.57	$ 0.28
	8	$ 0.01	$ 0.15	$ 0.57	$ 0.06
	9	$ 0.02	$ 0.09	$ 0.50	$ 0.05
	10	$ 0.03	$ 0.21	$ 1.30	$ 0.09
	11	$ -	$ -	$ -	$ -
	12	$ -	$ -	$ -	$ -

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chart

ERCOT-wide Cumulative PNM			
year	month	pnm	pnm_accum
2017	0	$ -	$ -
	1	$ 2,964.83	$ 2,964.83
	2	$ 1,573.68	$ 4,538.51
	3	$ 1,520.94	$ 6,059.45
	4	$ 4,590.29	$ 10,649.74
	5	$ 5,673.67	$ 16,323.41
	6	$ 2,542.93	$ 18,866.34
	7	$ 3,189.82	$ 22,056.16
	8	$ 2,749.34	$ 24,805.50
	9	$ 2,220.00	$ 27,025.50
	10	$ 3,969.18	$ 30,994.68
	11	$ 1,974.12	$ 32,968.80
	12	$ 2,188.63	$ 35,157.43
2018	0	$ -	$ -
	1	$ 7,139.99	$ 7,139.99
	2	$ 3,011.86	$ 10,151.85
	3	$ 870.03	$ 11,021.88
	4	$ 2,333.76	$ 13,355.64
	5	$ 5,671.10	$ 19,026.74
	6	$ 4,930.69	$ 23,957.43
	7	$ 13,313.16	$ 37,270.59
	8	$ 7,965.15	$ 45,235.74
	9	$ 3,181.93	$ 48,417.67
	10	$ 6,676.58	$ 55,094.25
	11	$ -	$ -
	12	$ -	$ -

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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
2017	1	(395)	(62)	298	(188)	224	69
	2	34	300	185	118	538	363
	3	(68)	455	456	143	241	321
	4	(41)	631	611	550	(189)	(27)
	5	(741)	835	505	(140)	(836)	84
	6	(394)	634	637	30	(435)	179
	7	(36)	(59)	438	193	73	(32)
	8	(145)	902	918	278	(23)	293
	9	(259)	81	267	(96)	(388)	(210)
	10	(117)	379	213	(192)	(115)	(167)
	11	(412)	(481)	(487)	(572)	(423)	(316)
	12	68	(971)	(462)	(416)	456	(375)
2018	1	226	1,083	1,300	791	129	705
	2	(662)	(1,007)	(1,256)	(1,119)	(497)	(990)
	3	(289)	489	568	229	(14)	152
	4	(131)	(131)	158	(130)	(190)	(430)
	5	99	754	586	294	63	331
	6	(325)	302	181	(100)	(338)	275
	7	62	734	823	459	(23)	465
	8	(54)	511	562	138	(184)	150
	9	(306)	669	650	52	(344)	(68)
	10	367	352	532	543	166	(168)
	11	-	-	-	-	-	-
	12	-	-	-	-	-	-

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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
2017	1	8,014	6,700	6,599	8,265	7,550	6,562
	2	9,009	6,729	7,434	9,274	8,627	6,821
	3	10,332	7,161	7,971	10,439	9,360	8,027
	4	10,299	7,917	8,602	9,566	9,141	8,602
	5	9,211	6,841	7,592	8,633	8,222	6,984
	6	8,043	4,563	6,393	8,327	6,543	5,205
	7	6,890	3,976	5,906	7,002	5,387	4,007
	8	5,383	3,558	5,047	5,704	3,942	3,052
	9	7,838	4,460	5,419	7,437	6,599	5,200
	10	9,408	6,198	6,379	9,086	8,565	7,053
	11	8,650	6,302	6,979	8,939	7,614	6,438
	12	7,532	5,681	5,279	6,908	7,205	6,015
2018	1	9,387	7,209	7,508	9,601	9,171	7,514
	2	8,876	7,295	7,771	9,462	8,559	7,545
	3	10,159	7,784	8,052	10,006	9,143	8,480
	4	10,025	8,403	9,183	10,641	9,227	8,549
	5	11,505	7,360	9,027	11,099	9,863	8,186
	6	11,843	7,661	9,377	11,080	9,922	8,937
	7	7,895	3,590	5,418	7,058	6,434	4,248
	8	9,401	5,402	6,821	9,075	7,803	6,410
	9	6,222	4,201	5,415	6,741	4,833	4,036
	10	7,988	6,184	6,290	7,640	7,413	6,738
	11	-	-	-	-	-	-
	12	-	-	-	-	-	-

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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	2018	PIG CREEK AREA (FTST-MUSQUIZ)	23,826	1	555	606	1,661	2,711	3,928	3,830	3,337	4,087	2,116	995	-	-
FREQ_EXIST	2018	PANHANDLE GTC (PNHNDL)	14,044	2	2,999	3,126	3,607	2,763	846	319	-	90	133	161	-	-
FREQ_EXIST	2018	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	10,847	3	1,614	481	1,473	2,085	724	1,390	171	1,573	644	692	-	-
FREQ_EXIST	2018	YUCCA SWITCH - GAS PAD (YUCSW-BASIN)	9,162	4	47	1	109	85	2,102	4,101	2,696	21	-	-	-	-
FREQ_EXIST	2018	591__A (LKPNT-CRLNW)	8,454	5	1,714	781	2,025	2,818	1,077	-	-	39	-	-	-	-
FREQ_EXIST	2018	6437__F (SCRCV-KNAPP)	6,378	6	197	-	-	524	1,801	1,197	344	1,090	837	388	-	-
FREQ_EXIST	2018	HHGTOM_1 (HHGT-OMEGA)	4,252	7	-	73	183	1,487	703	121	-	-	229	1,456	-	-
FREQ_EXIST	2018	BRUNI_69_1 (BRUNI-BRUNI)	4,189	8	365	807	398	665	253	856	170	633	42	-	-	-
FREQ_EXIST	2018	6270__C (WGROB-BLMND)	3,613	9	-	-	-	43	444	1,409	528	799	390	-	-	-
FREQ_EXIST	2018	JK_TOKSW_1 (TOKSW-JK_CK)	3,170	10	999	199	892	654	-	6	-	-	65	355	-	-
TOP10_RENT	2018	YUCCA SWITCH - GAS PAD (YUCSW-BASIN)	$ 253.00	1	$ 0.68	$ 0.04	$ 4.36	$ 2.89	$ 57.44	$ 112.58	$ 74.16	$ 0.85	$ -	$ -	$ -	$ -
TOP10_RENT	2018	PANHANDLE GTC (PNHNDL)	$ 98.79	2	$ 23.59	$ 28.83	$ 26.11	$ 14.27	$ 2.77	$ 1.45	$ -	$ 0.42	$ 0.54	$ 0.80	$ -	$ -
TOP10_RENT	2018	591__A (LKPNT-CRLNW)	$ 60.30	3	$ 9.11	$ 3.37	$ 11.47	$ 27.87	$ 8.34	$ -	$ -	$ 0.14	$ -	$ -	$ -	$ -
TOP10_RENT	2018	6270__C (WGROB-BLMND)	$ 51.21	4	$ -	$ -	$ -	$ 0.81	$ 8.09	$ 14.85	$ 5.33	$ 7.11	$ 15.01	$ -	$ -	$ -
TOP10_RENT	2018	NEDIN_138 (NEDIN-NEDIN)	$ 39.83	5	$ 28.83	$ -	$ -	$ -	$ 0.99	$ 0.08	$ -	$ 9.59	$ 0.34	$ -	$ -	$ -
TOP10_RENT	2018	PIG CREEK AREA (FTST-MUSQUIZ)	$ 37.10	6	$ 0.29	$ 0.44	$ 1.07	$ 2.46	$ 11.27	$ 5.17	$ 7.84	$ 4.49	$ 2.15	$ 1.91	$ -	$ -
TOP10_RENT	2018	588_A_1 (LWSVW-LWVTI)	$ 36.47	7	$ -	$ -	$ -	$ 11.81	$ 24.03	$ -	$ -	$ 0.63	$ -	$ -	$ -	$ -
TOP10_RENT	2018	6345__B (GNTSW-SPRTP)	$ 32.85	8	$ -	$ -	$ -	$ 0.88	$ 31.88	$ 0.01	$ -	$ 0.08	$ -	$ -	$ -	$ -
TOP10_RENT	2018	6437__F (SCRCV-KNAPP)	$ 23.18	9	$ 0.89	$ -	$ -	$ 1.62	$ 4.61	$ 4.55	$ 1.20	$ 3.77	$ 4.74	$ 1.79	$ -	$ -
TOP10_RENT	2018	EVRSW XFMRS (EVRSW-EVRSW)	$ 21.15	10	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 21.15	$ -	$ -

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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	2018	PIG CREEK AREA (FTST-MUSQUIZ)	5,314	1	542	596	461	455	615	669	574	541	460	401	-	-
FREQ_EXIST	2018	EAGLEP_ESCOND1_1 (ESCONDID-EAGLE_PS)	3,751	2	454	385	337	368	450	378	421	416	394	148	-	-
FREQ_EXIST	2018	YUCCA SWITCH - GAS PAD (YUCSW-GASPAD)	3,114	3	167	62	461	479	508	598	563	87	128	61	-	-
FREQ_EXIST	2018	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	2,899	4	294	204	352	535	344	377	89	370	161	173	-	-
FREQ_EXIST	2018	138_ALV_MNL_1 (ALVIN-MAINLAND)	2,895	5	72	86	158	135	252	276	263	376	587	690	-	-
FREQ_EXIST	2018	FORMOS_LOLITA1_1 (LOLITA-FORMOSA)	2,776	6	529	333	179	132	213	532	371	242	242	3	-	-
FREQ_EXIST	2018	GREENL_WEAVER1_1 (WEAVERRD-GREENLK)	2,775	7	162	346	478	534	361	86	21	64	252	471	-	-
FREQ_EXIST	2018	6437__F (SCRCV-KNAPP)	2,722	8	45	6	-	106	517	571	242	463	393	379	-	-
FREQ_EXIST	2018	GCB_100_1 (N_MCALLN-W_MCALLN)	2,389	9	81	180	194	131	312	439	287	308	300	157	-	-
FREQ_EXIST	2018	16TH_WRD2_1 (WOODWRD2-16TH_ST)	2,290	10	351	229	95	212	214	356	333	271	127	102	-	-
TOP10_RENT	2018	YUCCA SWITCH - GAS PAD (YUCSW-GASPAD)	$ 184.99	1	$ 1.03	$ 0.19	$ 3.95	$ 4.46	$ 29.60	$ 67.86	$ 76.87	$ 0.70	$ 0.18	$ 0.15	$ -	$ -
TOP10_RENT	2018	PANHANDLE GTC (PNHNDL)	$ 89.81	2	$ 19.37	$ 21.44	$ 25.06	$ 14.39	$ 4.48	$ 2.63	$ 0.00	$ 0.43	$ 0.63	$ 1.38	$ -	$ -
TOP10_RENT	2018	PIG CREEK AREA (FTST-MUSQUIZ)	$ 56.26	3	$ 0.37	$ 0.57	$ 0.83	$ 0.91	$ 9.04	$ 25.97	$ 10.27	$ 4.30	$ 2.45	$ 1.56	$ -	$ -
TOP10_RENT	2018	591__A (LKPNT-CRLNW)	$ 55.63	4	$ 6.45	$ 2.83	$ 10.65	$ 25.37	$ 9.85	$ 0.28	$ 0.00	$ 0.19	$ -	$ -	$ -	$ -
TOP10_RENT	2018	6270__C (WGROB-BLMND)	$ 46.93	5	$ -	$ 0.03	$ 0.00	$ -	$ 2.71	$ 20.25	$ 7.09	$ 5.20	$ 11.65	$ -	$ -	$ -
TOP10_RENT	2018	6345__B (GNTSW-SPRTP)	$ 37.21	6	$ -	$ 0.02	$ 0.05	$ 0.64	$ 26.92	$ 6.57	$ 0.53	$ 1.48	$ 0.10	$ 0.89	$ -	$ -
TOP10_RENT	2018	GCB_100_1 (N_MCALLN-W_MCALLN)	$ 28.92	7	$ 0.21	$ 1.04	$ 1.69	$ 1.45	$ 8.02	$ 7.12	$ 2.99	$ 2.47	$ 2.87	$ 1.05	$ -	$ -
TOP10_RENT	2018	590__A (LWSSW-LWVJS)	$ 23.62	8	$ -	$ -	$ 0.08	$ -	$ 20.85	$ 2.21	$ 0.07	$ 0.41	$ 0.00	$ -	$ -	$ -
TOP10_RENT	2018	588_A_1 (LWSVW-LWVTI)	$ 22.89	9	$ 0.52	$ 0.09	$ 0.04	$ 9.00	$ 13.24	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOP10_RENT	2018	1090__A (FORSW-FORWE)	$ 22.58	10	$ -	$ -	$ -	$ -	$ 0.00	$ 2.91	$ 16.63	$ 2.84	$ 0.19	$ -	$ -	$ -

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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																
ftr_option	year	pair	total_value	rank	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
N	2018	HB_SOUTH-LZ_SOUTH	$ 19.37	1	$ 0.63	$ 0.49	$ 0.95	$ 1.34	$ 1.98	$ 3.82	$ 2.72	$ 2.80	$ 1.70	$ 1.37	$ 1.58	$ -
N	2018	HB_WEST-LZ_WEST	$ 18.93	2	$ 0.25	$ 0.36	$ 0.35	$ 0.32	$ 0.62	$ 4.87	$ 5.68	$ 4.44	$ 0.75	$ 0.88	$ 0.41	$ -
N	2018	HB_NORTH-LZ_NORTH	$ 13.48	3	$ 0.53	$ 0.26	$ 0.25	$ 0.38	$ 0.45	$ 2.33	$ 2.62	$ 3.18	$ 1.28	$ 1.15	$ 1.06	$ -
N	2018	HB_HOUSTON-LZ_HOUSTON	$ 11.90	4	$ 0.33	$ 0.13	$ 0.34	$ 0.49	$ 0.59	$ 1.27	$ 3.33	$ 2.36	$ 1.23	$ 0.81	$ 1.01	$ -
N	2018	HB_NORTH-HB_HOUSTON	$ 6.56	5	$ 0.50	$ 0.22	$ 1.10	$ 1.07	$ 0.84	$ 0.54	$ -	$ 0.07	$ 0.50	$ 1.10	$ 0.60	$ -
N	2018	HB_WEST-HB_NORTH	$ 5.43	6	$ 0.16	$ 0.22	$ 0.33	$ 0.77	$ 0.43	$ 0.89	$ 0.20	$ 0.04	$ 0.33	$ 1.12	$ 0.94	$ -
N	2018	HB_NORTH-HB_SOUTH	$ 4.30	7	$ 0.23	$ 0.40	$ 0.84	$ 0.79	$ 0.67	$ 0.68	$ 0.07	$ 0.12	$ 0.15	$ 0.24	$ 0.13	$ -
N	2018	MIAM1_G1_G2-HB_WEST	$ 2.51	8	$ 0.61	$ 0.23	$ 0.41	$ 0.79	$ 0.33	$ 0.10	$ 0.00	$ 0.01	$ 0.00	$ 0.00	$ 0.03	$ -
N	2018	JACKCNTY_STG-LZ_NORTH	$ 2.23	9	$ 0.15	$ 0.17	$ 0.13	$ 0.17	$ 0.05	$ 0.32	$ 0.67	$ 0.33	$ 0.10	$ 0.13	$ -	$ -
N	2018	JCKCNTY2_ST2-LZ_NORTH	$ 2.17	10	$ -	$ -	$ 0.03	$ 0.41	$ 0.14	$ 0.40	$ 0.21	$ 0.35	$ 0.21	$ 0.08	$ 0.34	$ -
Y	2018	HB_WEST-LZ_WEST	$ 6.81	1	$ 0.07	$ 0.12	$ 0.11	$ 0.04	$ 0.08	$ 0.33	$ 0.88	$ 4.21	$ 0.45	$ 0.27	$ 0.25	$ -
Y	2018	HB_WEST-HOVEY_GEN	$ 5.14	2	$ 0.01	$ 0.04	$ 0.07	$ 0.05	$ 0.19	$ 0.29	$ 0.52	$ 3.21	$ 0.23	$ 0.31	$ 0.22	$ -
Y	2018	HB_NORTH-LZ_NORTH	$ 4.63	3	$ 0.23	$ 0.38	$ 0.16	$ 0.19	$ 0.18	$ 0.72	$ 1.21	$ 0.85	$ 0.30	$ 0.21	$ 0.21	$ -
Y	2018	HB_SOUTH-LZ_SOUTH	$ 4.34	4	$ 0.09	$ 0.07	$ 0.24	$ 0.14	$ 0.59	$ 0.53	$ 0.56	$ 0.83	$ 0.56	$ 0.38	$ 0.36	$ -
Y	2018	REROCK_ALL-HOVEY_GEN	$ 2.93	5	$ 0.01	$ 0.04	$ 0.19	$ 0.22	$ 0.03	$ 0.13	$ 0.44	$ 1.74	$ 0.04	$ 0.01	$ 0.08	$ -
Y	2018	HB_HOUSTON-LZ_HOUSTON	$ 2.79	6	$ 0.16	$ 0.11	$ 0.15	$ 0.12	$ 0.24	$ 0.35	$ 0.15	$ 0.68	$ 0.26	$ 0.27	$ 0.29	$ -
Y	2018	SSPURT_WIND1-HB_WEST	$ 2.25	7	$ 0.23	$ 0.47	$ 0.43	$ 0.28	$ 0.61	$ 0.09	$ 0.04	$ 0.00	$ 0.05	$ 0.03	$ 0.02	$ -
Y	2018	LASSO_GEN-HOVEY_GEN	$ 1.88	8	$ 0.00	$ 0.01	$ 0.01	$ 0.02	$ 0.01	$ 0.00	$ 0.28	$ 1.26	$ 0.14	$ 0.09	$ 0.05	$ -
Y	2018	HB_NORTH-LZ_RAYBN	$ 1.46	9	$ 0.00	$ -	$ -	$ -	$ -	$ -	$ 0.46	$ 0.14	$ 0.32	$ 0.39	$ 0.15	$ -
Y	2018	SLTFRK_UN1_2-LZ_NORTH	$ 1.32	10	$ 0.18	$ 0.17	$ 0.11	$ 0.20	$ 0.33	$ 0.14	$ 0.02	$ 0.01	$ 0.00	$ 0.11	$ 0.05	$ -

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