

To the Public Utility Commission of Texas

# ERCOT Wholesale Electricity Market Monthly Report

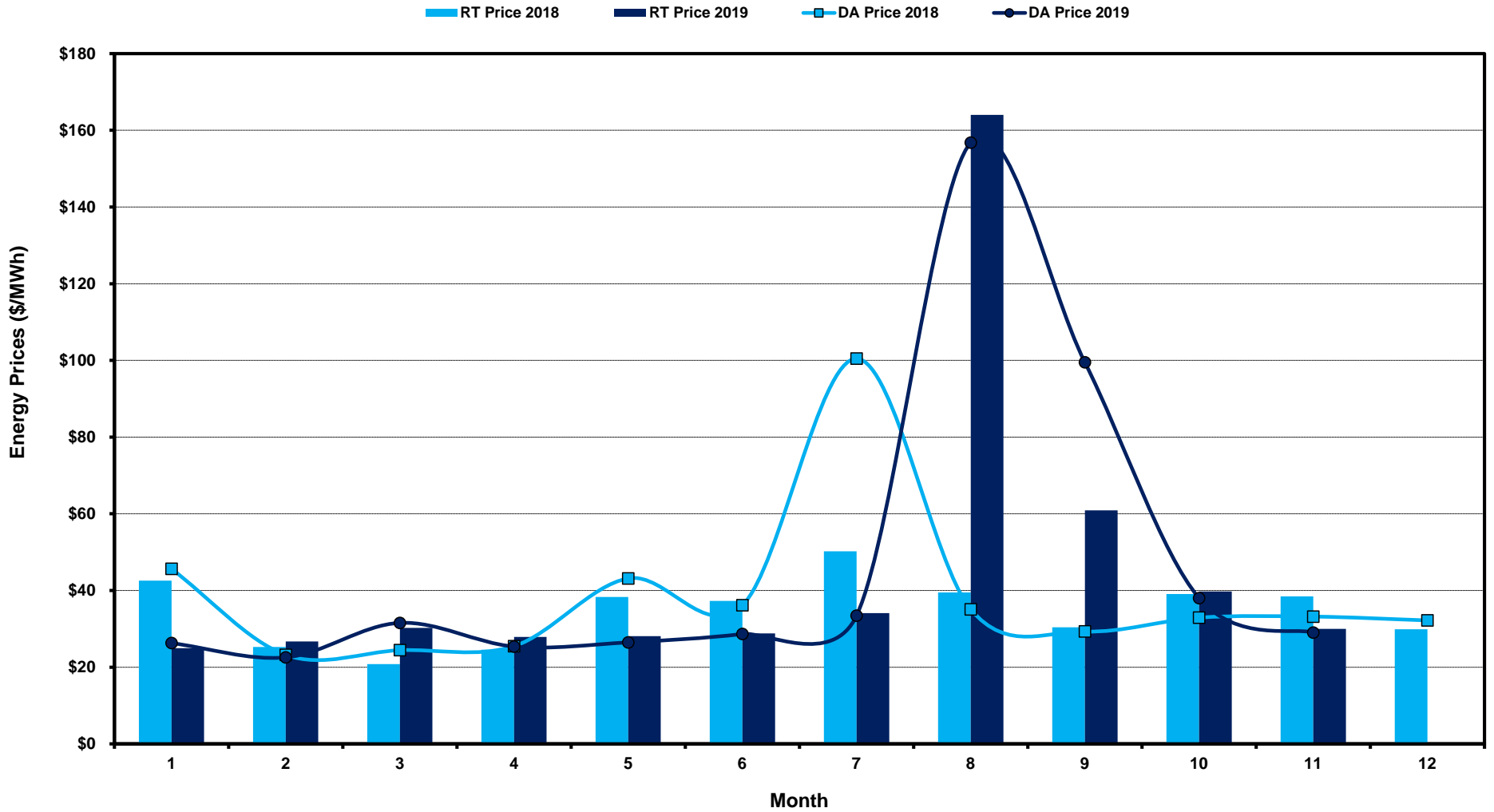
Tuesday, December 10, 2019

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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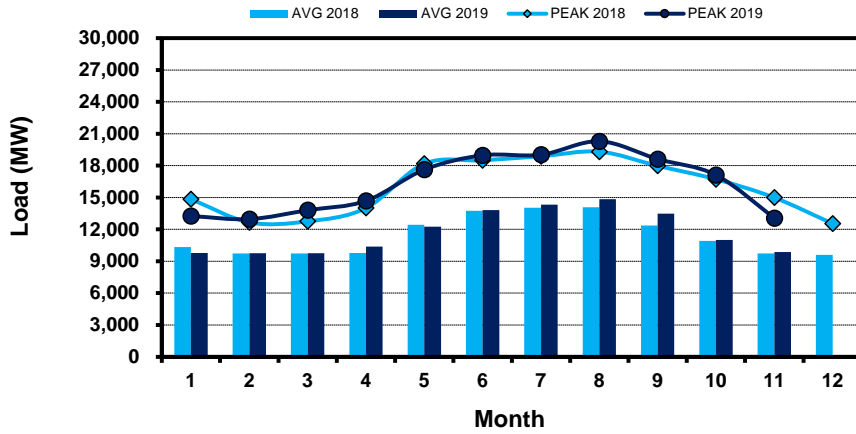
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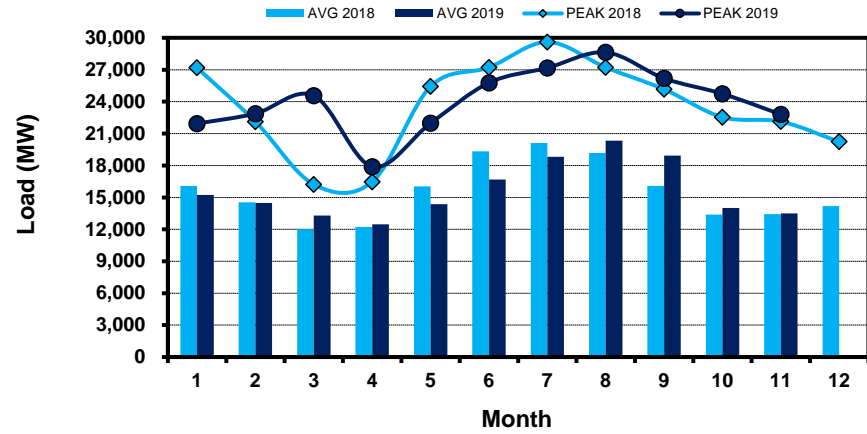
# Load Zone Load Statistics

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

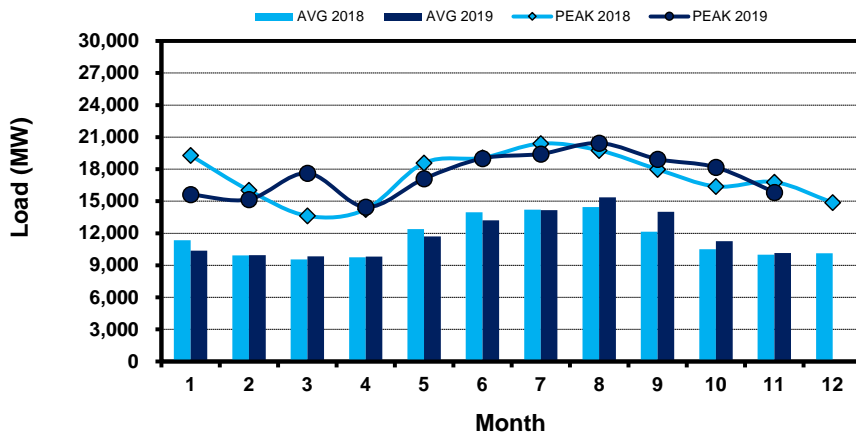
### Houston Zone



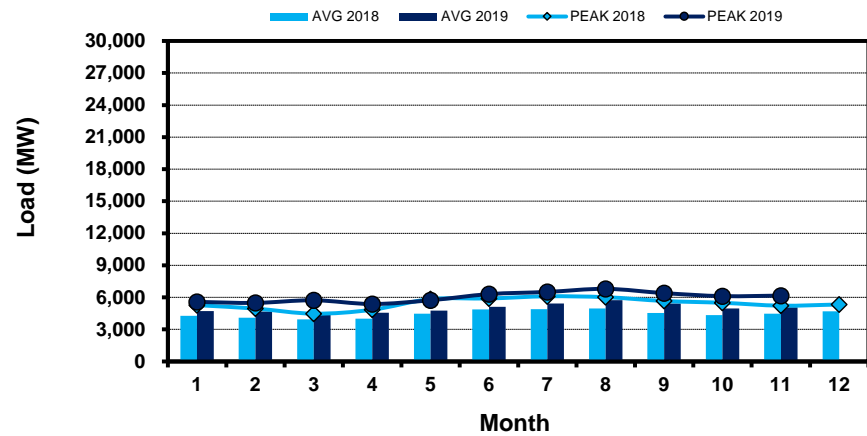
### North Zone



### South Zone



### West Zone



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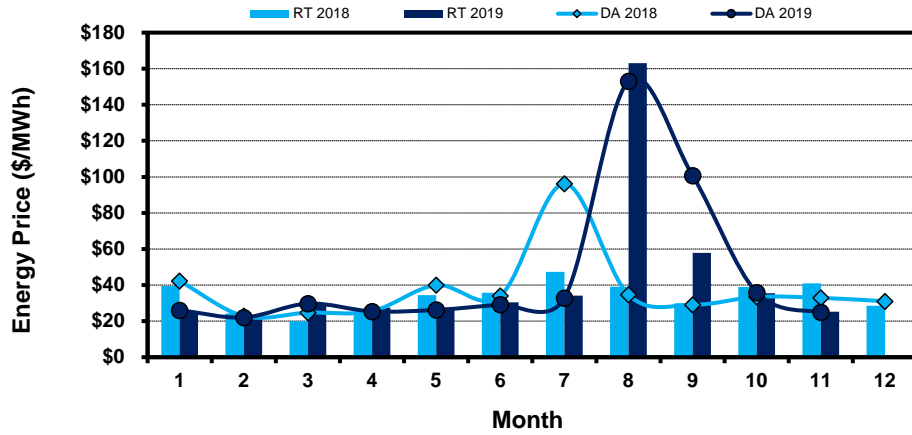
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

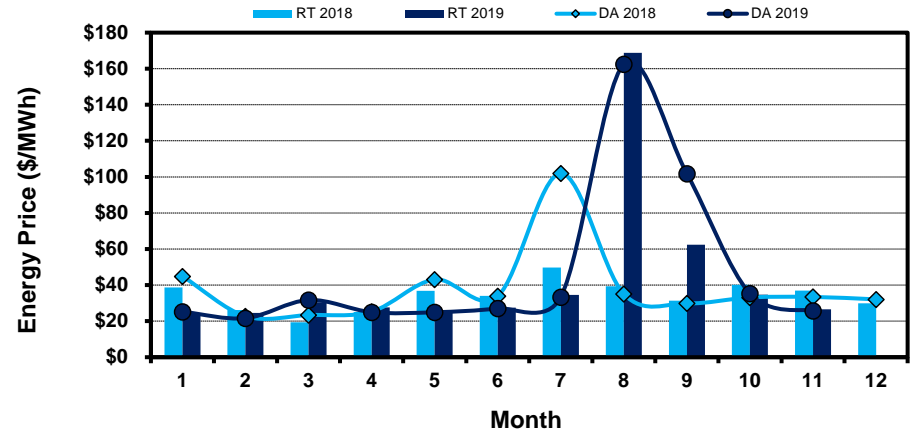
# Load Zone Monthly Average Energy Price DA vs RT

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

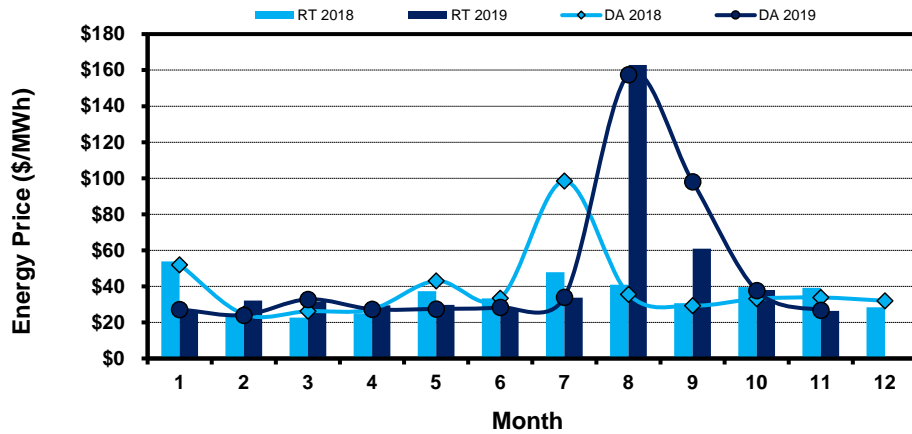
### Houston Zone



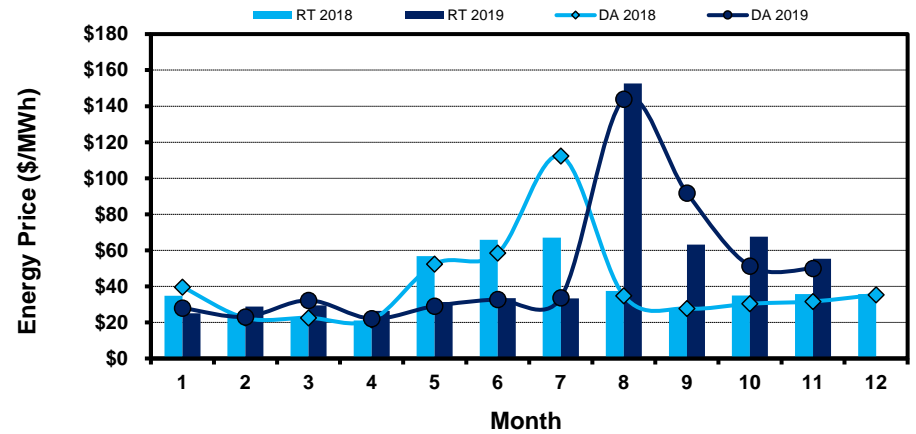
### North Zone



### South Zone



### West Zone



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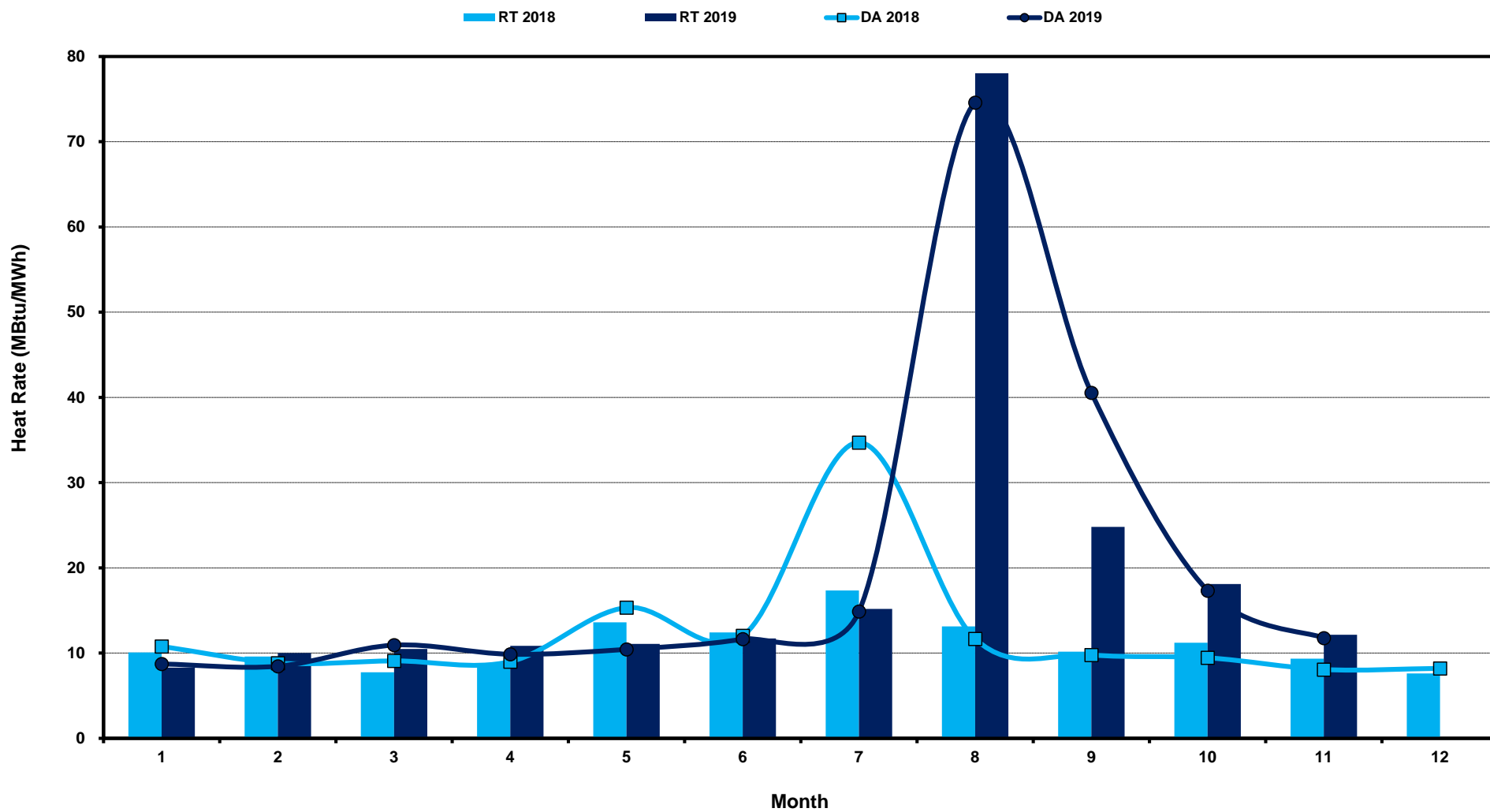
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

# ERCOT-wide Monthly Implied Heat Rate DA vs RT

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



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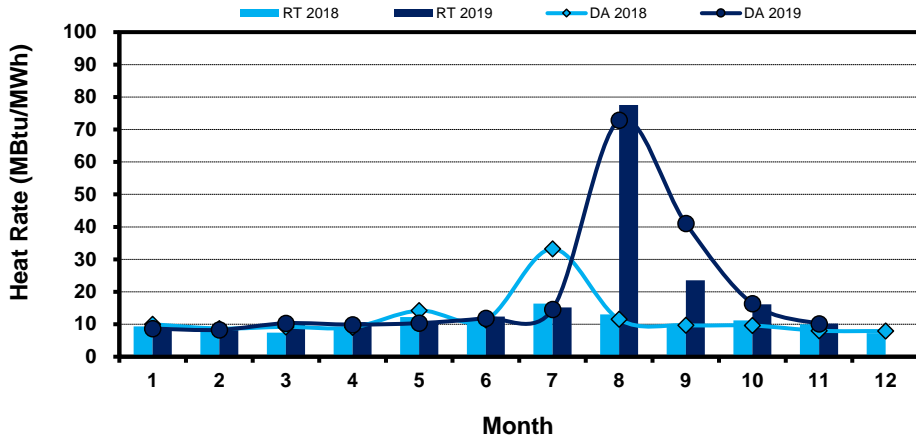
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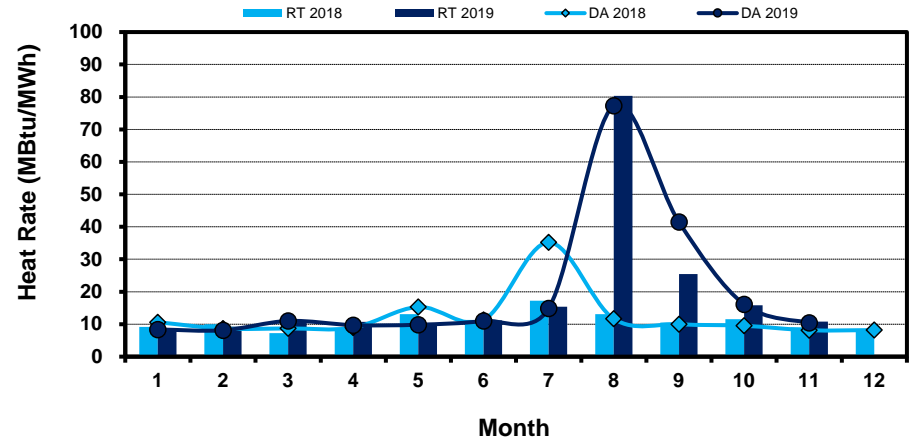
# Load Zone Monthly Implied Heat Rate DA vs RT

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

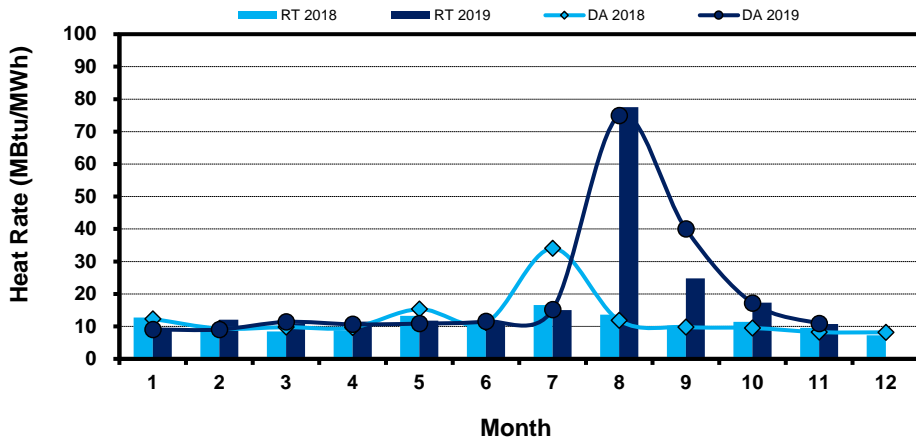
### Houston Zone



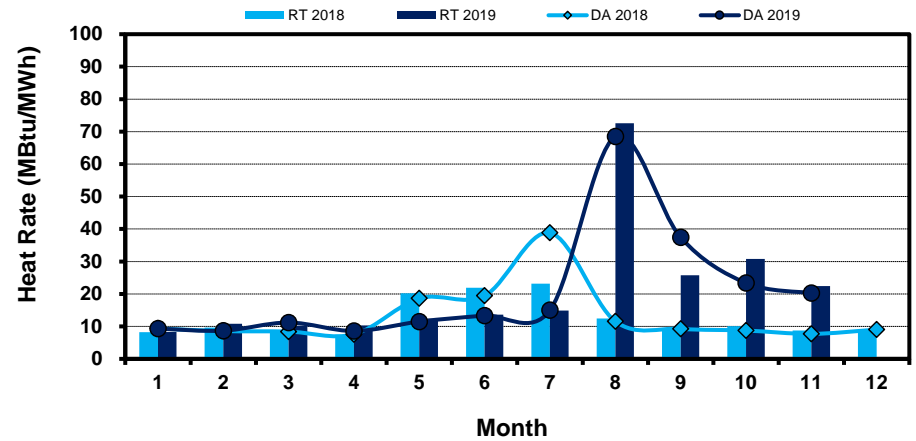
### North Zone



### South Zone



### West Zone



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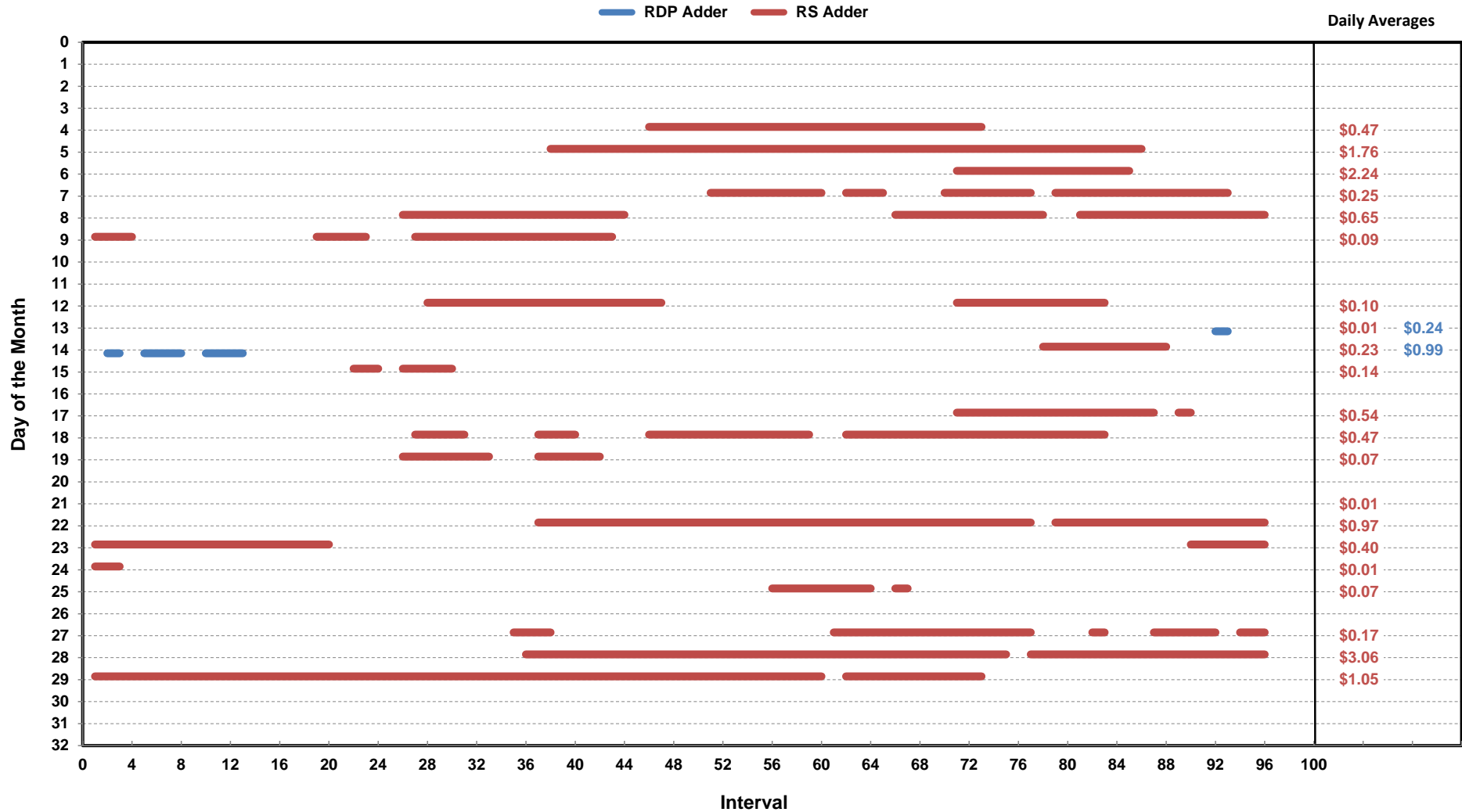
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

# Daily ORDC Adders Average Values and Interval Duration

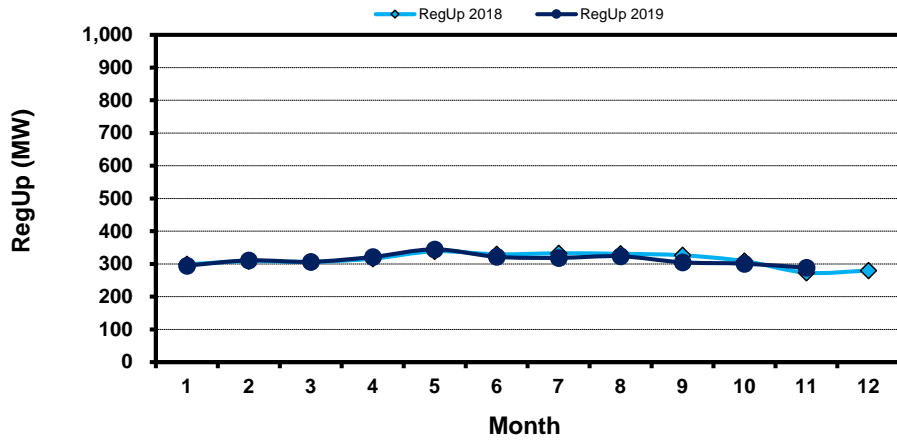
## Nov-2019



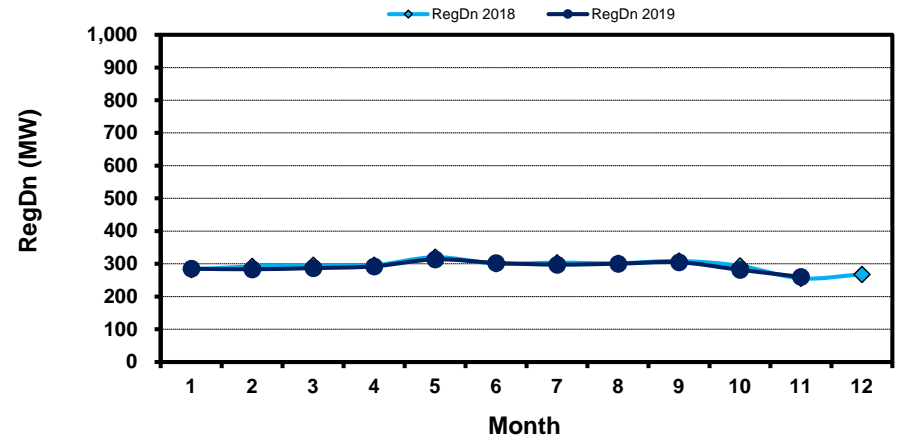
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# Monthly Average of Ancillary Services Required MW

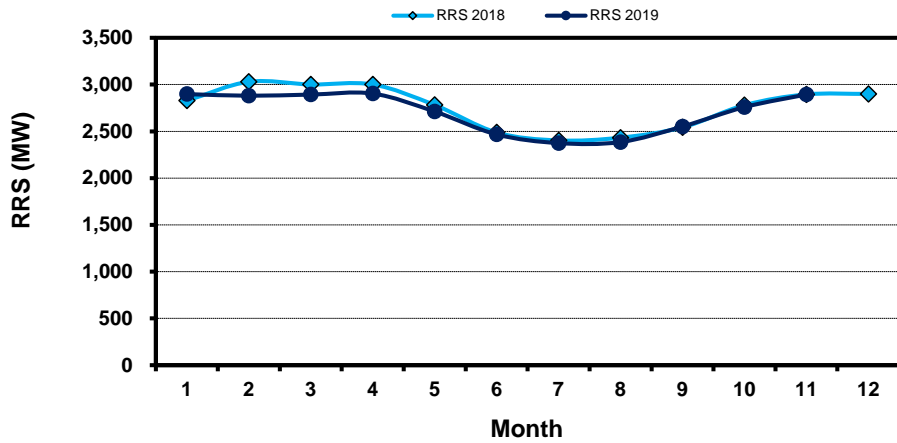
## Regulation Up



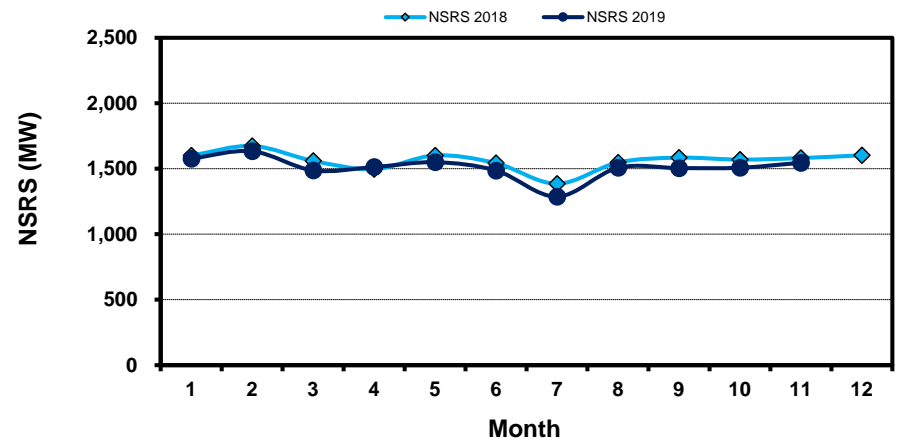
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



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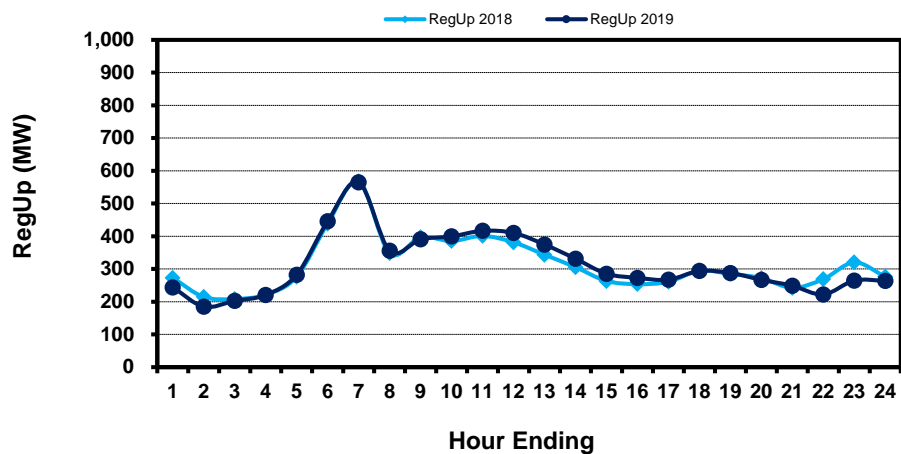
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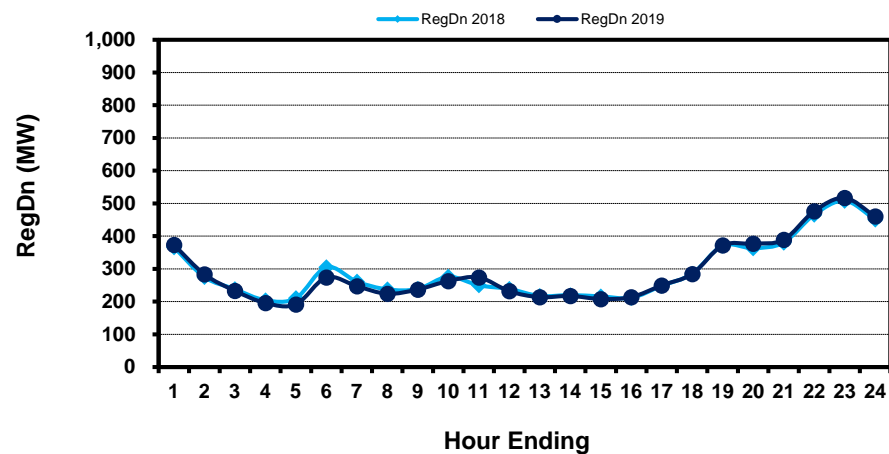


# Hourly Average of Ancillary Services Required MW

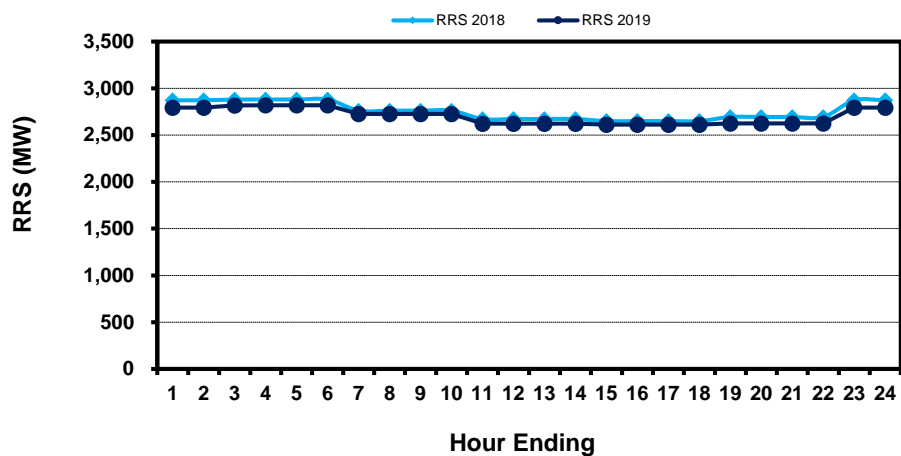
## Regulation Up



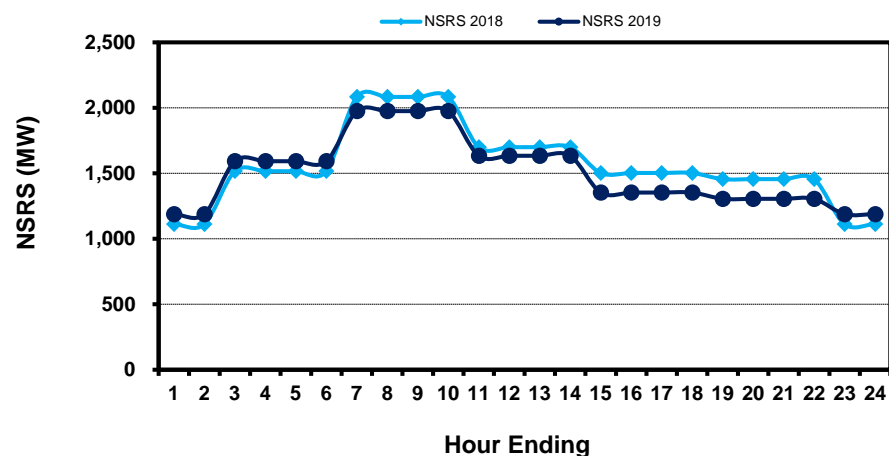
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



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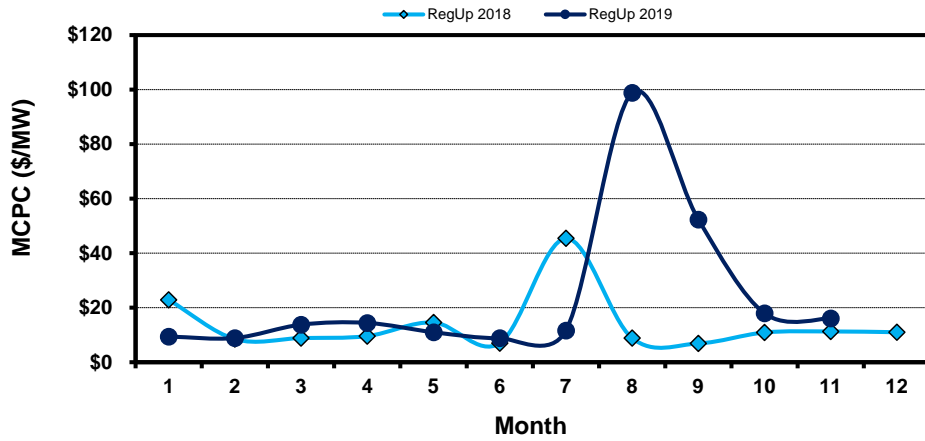
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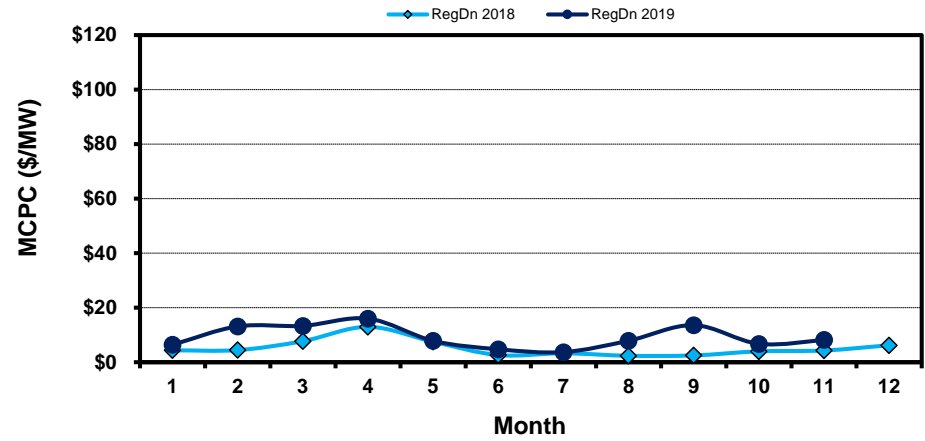
# Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

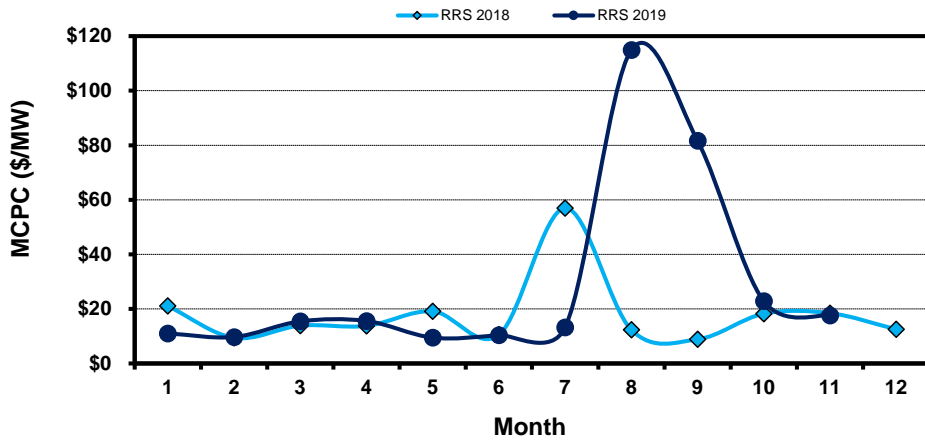
### Regulation Up



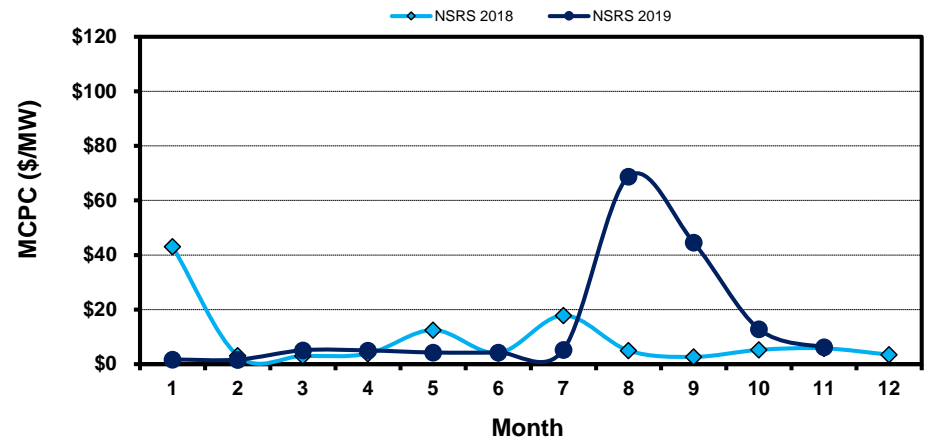
### Regulation Down



### Responsive Reserve



### Non-Spin Reserve



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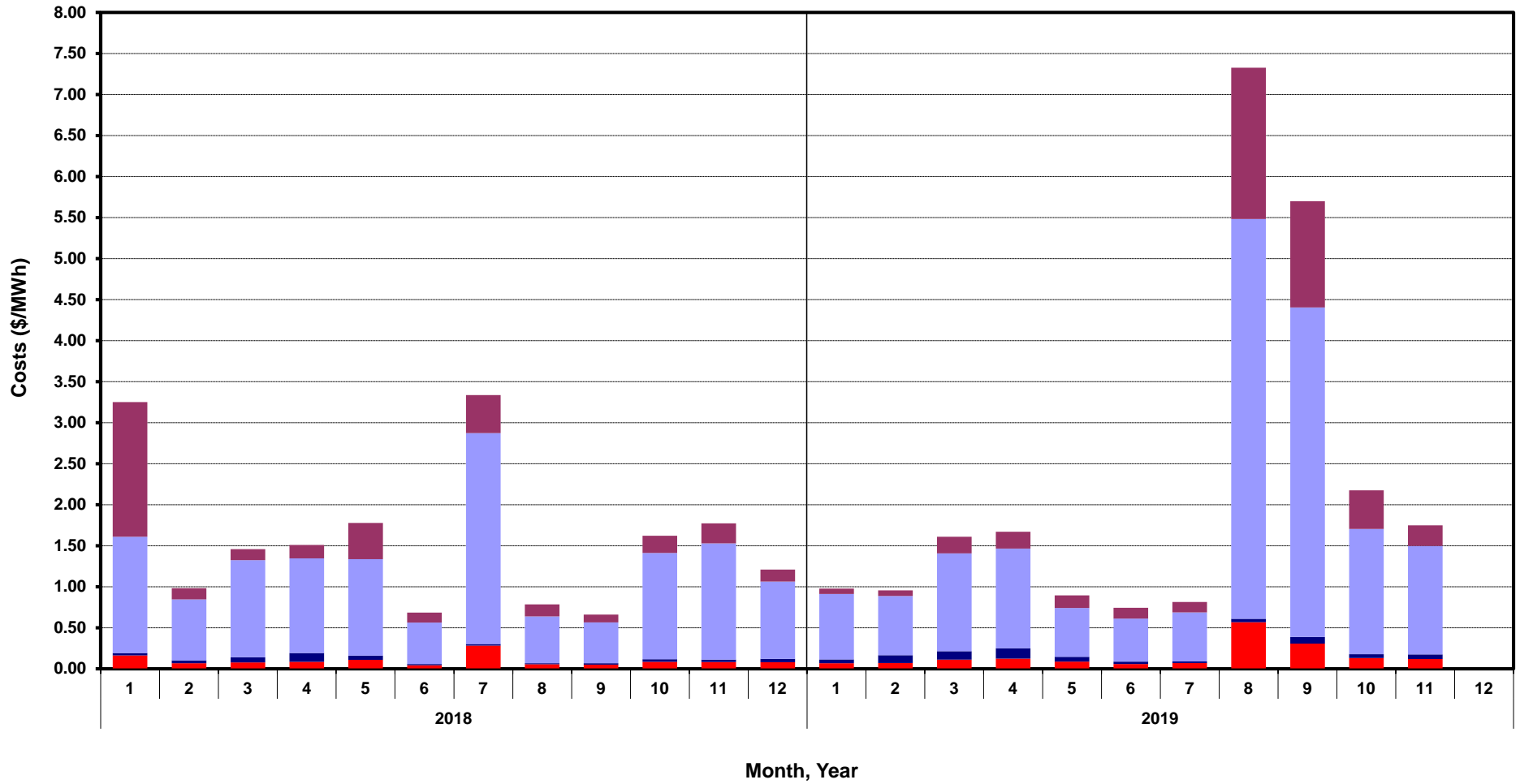
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# Monthly Average A/S Cost per MWh Load

RegUp RegDn RRS NonSpin



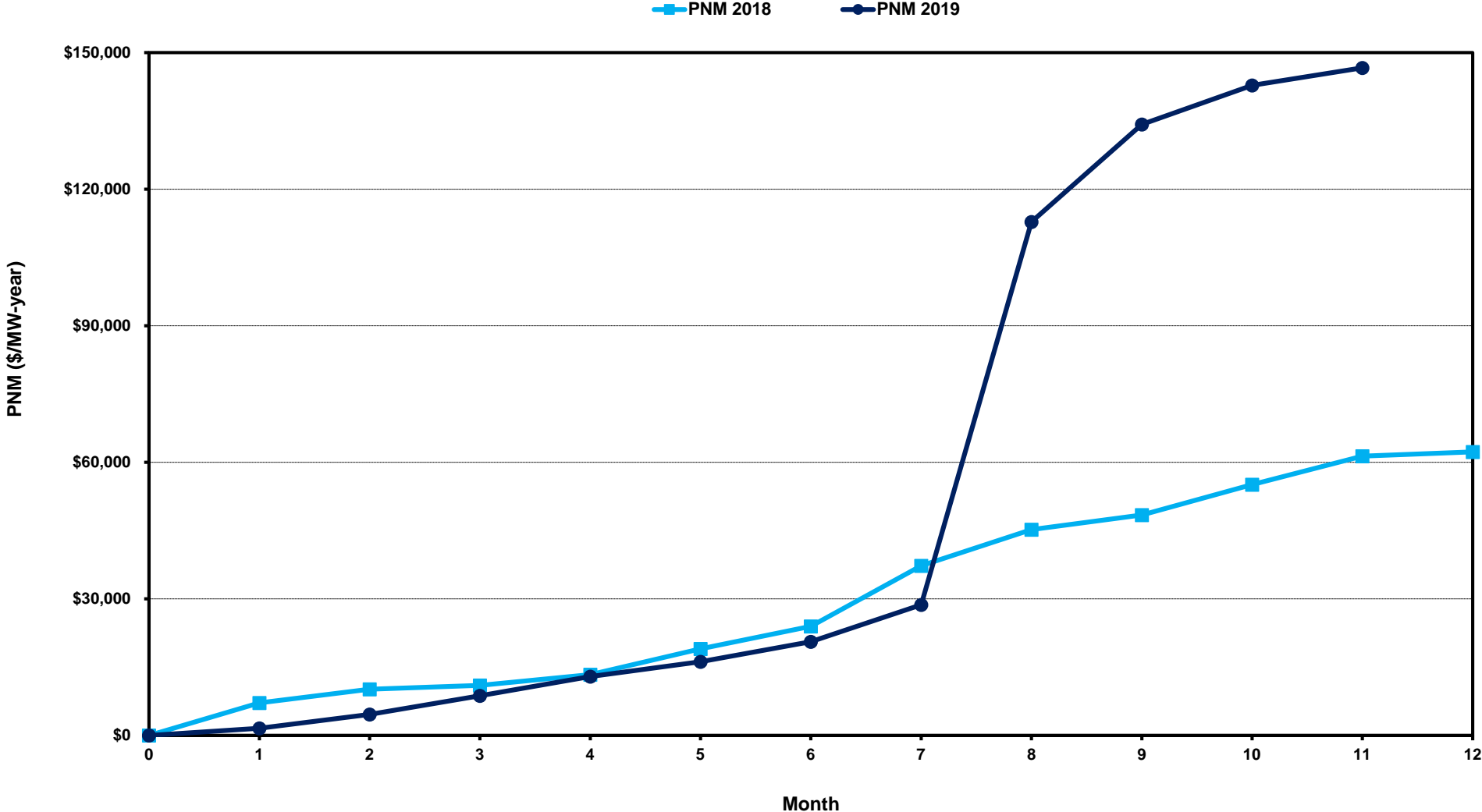
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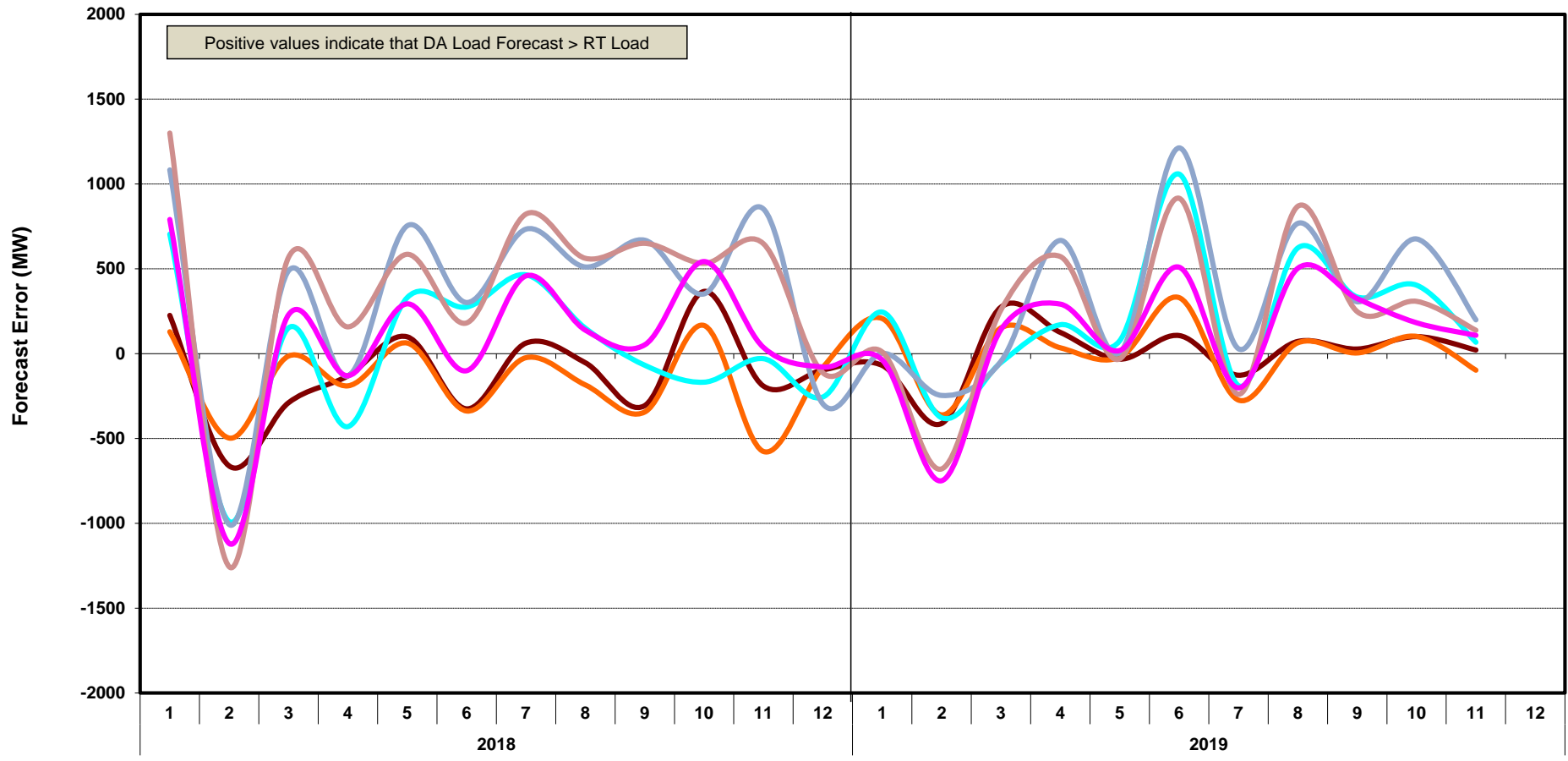
# ERCOT-wide Cumulative Peaker Net Margin



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# DA vs. RT Load Forecast Error by Hour Ending

HE\_1\_4   HE\_5\_8   HE\_9\_12   HE\_13\_16   HE\_17\_20   HE\_21\_24



Month, Year

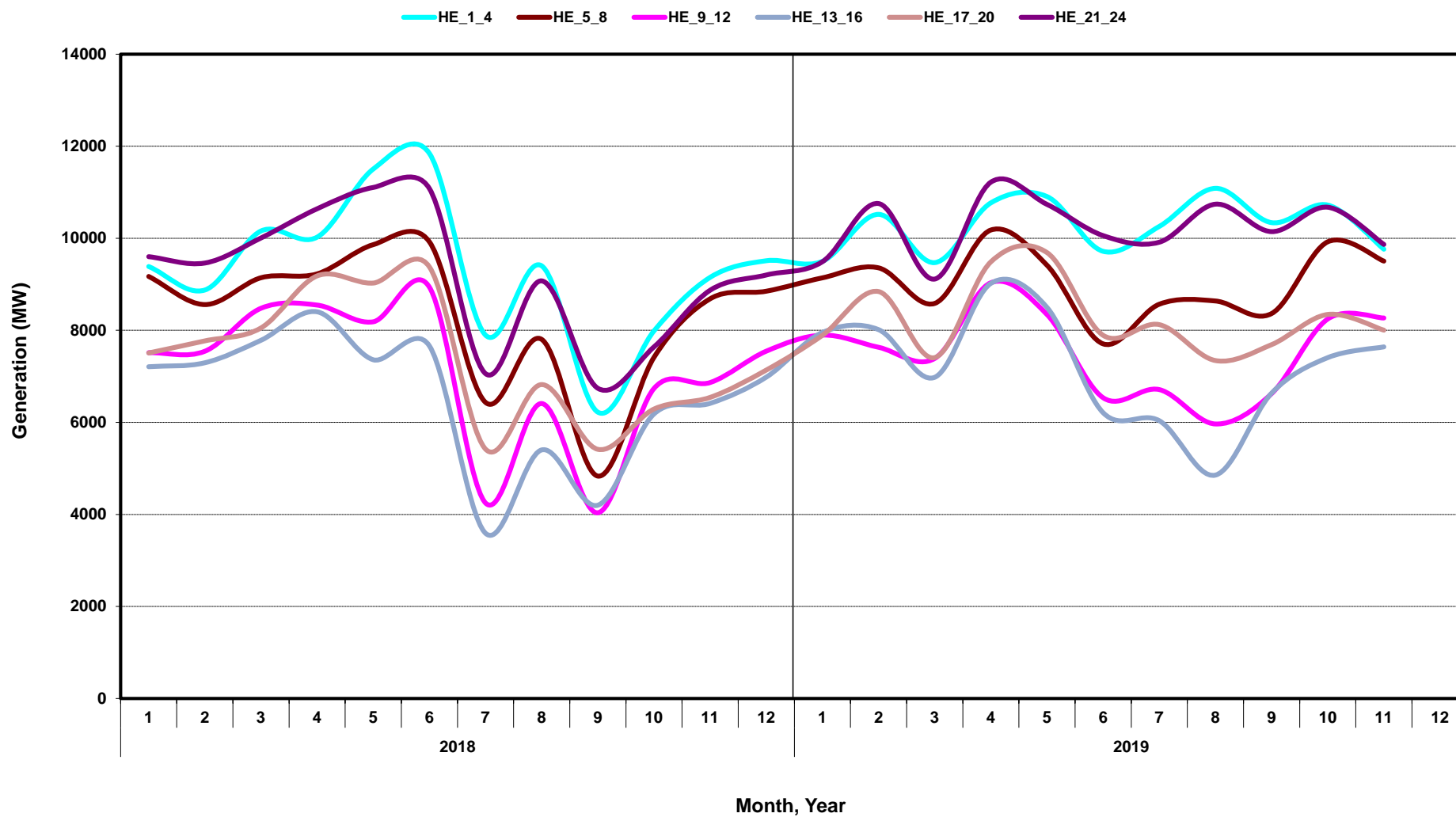
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# Monthly Average of Wind Generation by Hour Ending



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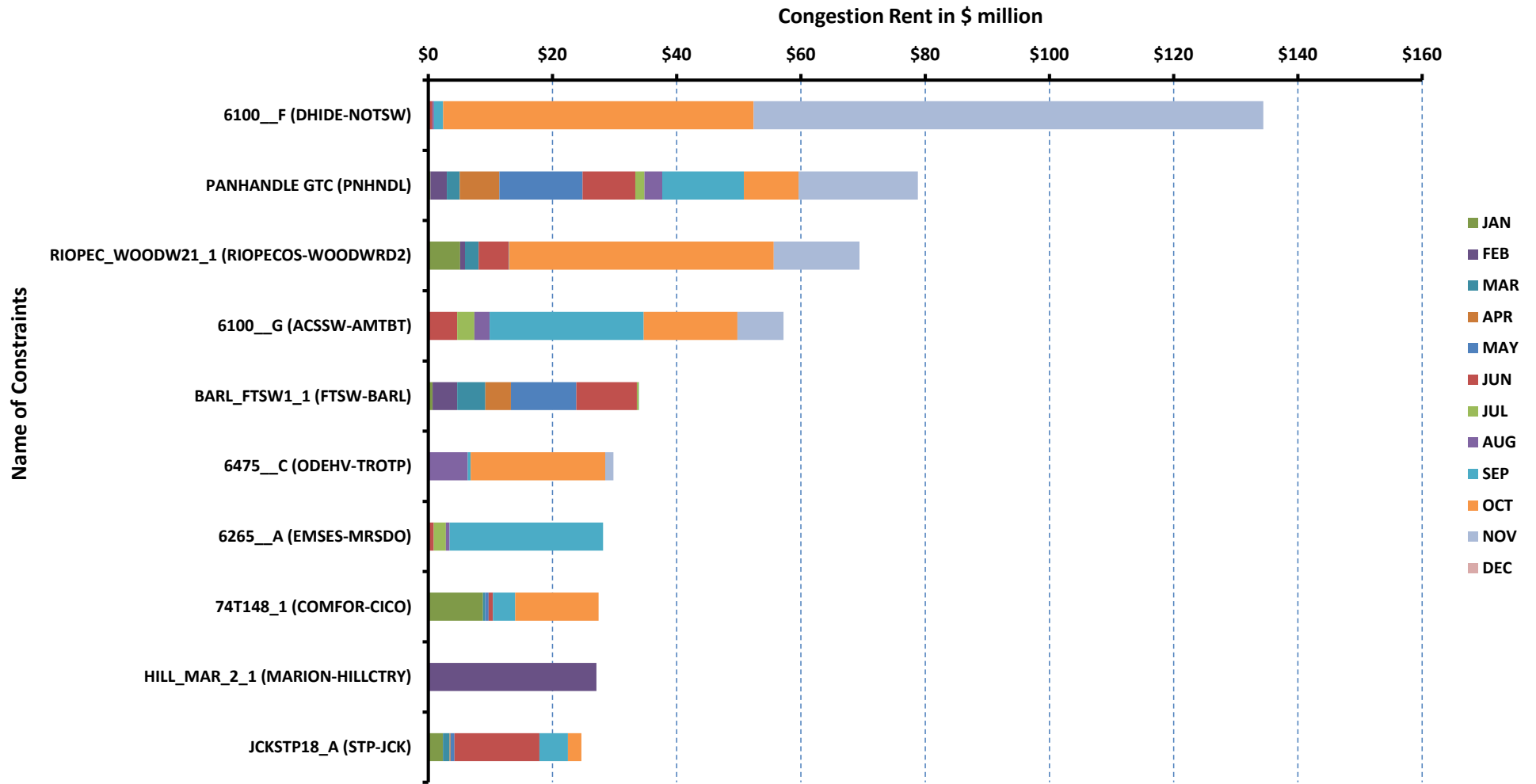
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# RT Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value - 2019



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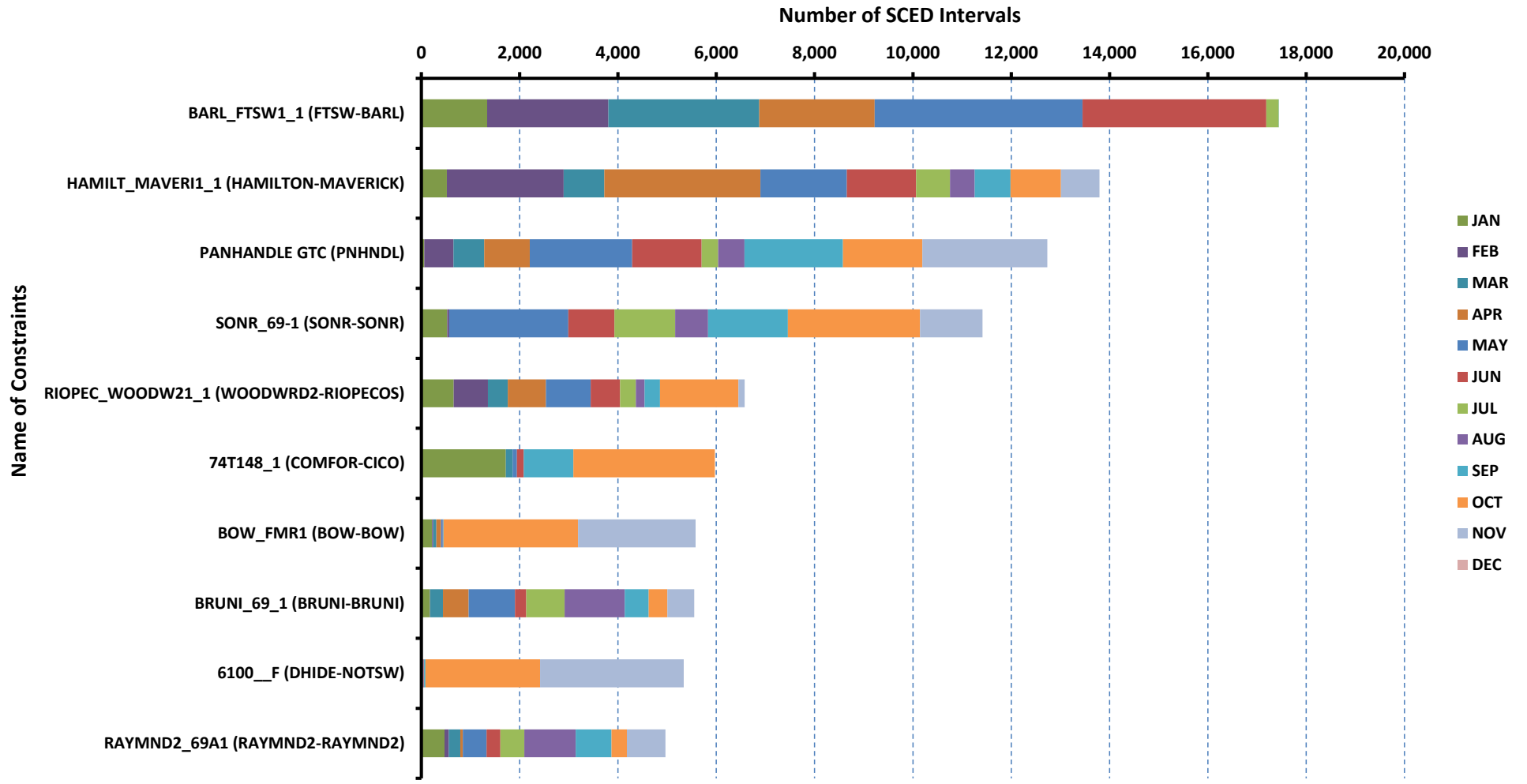
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# RT Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency - 2019



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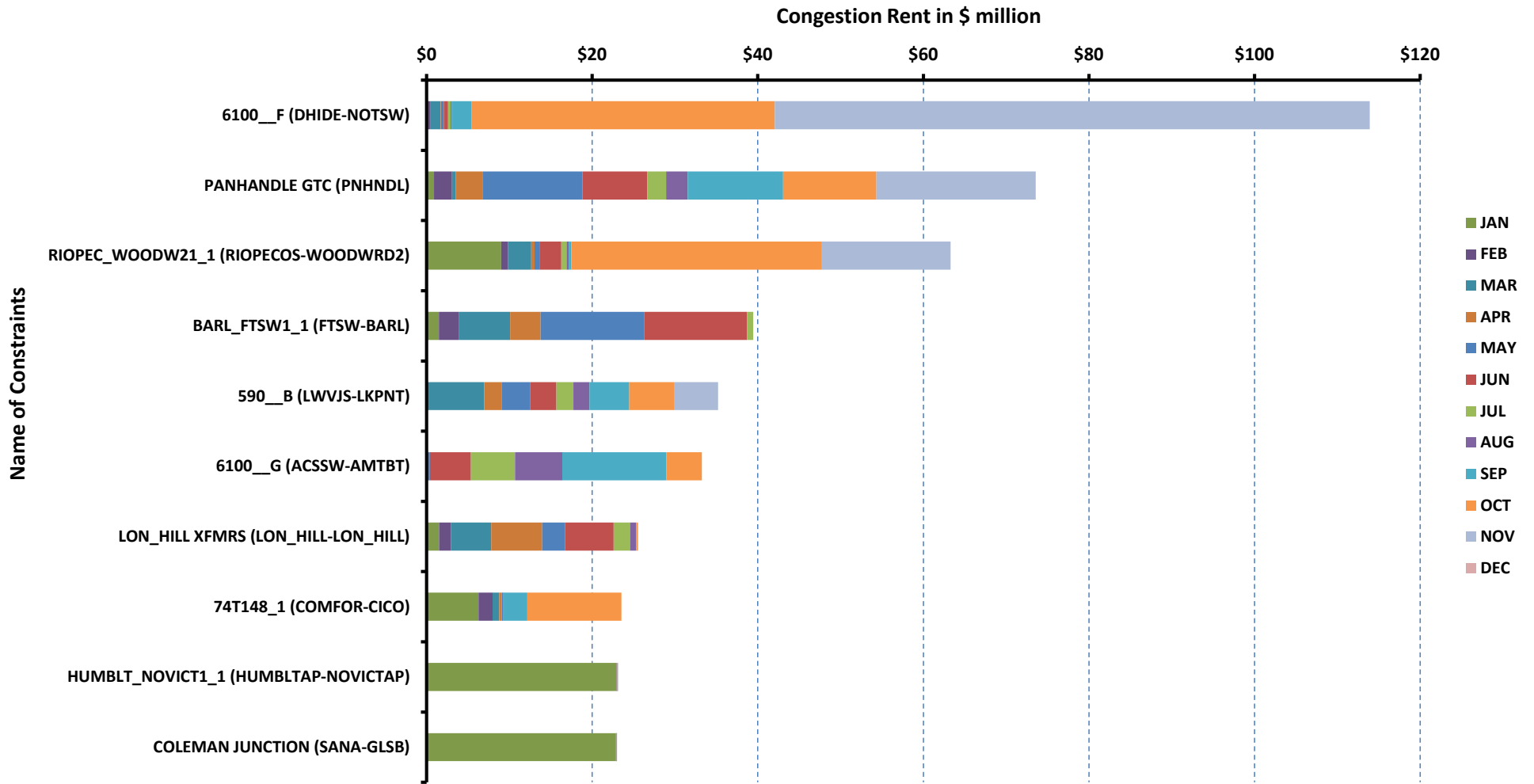
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# DA Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value - 2019



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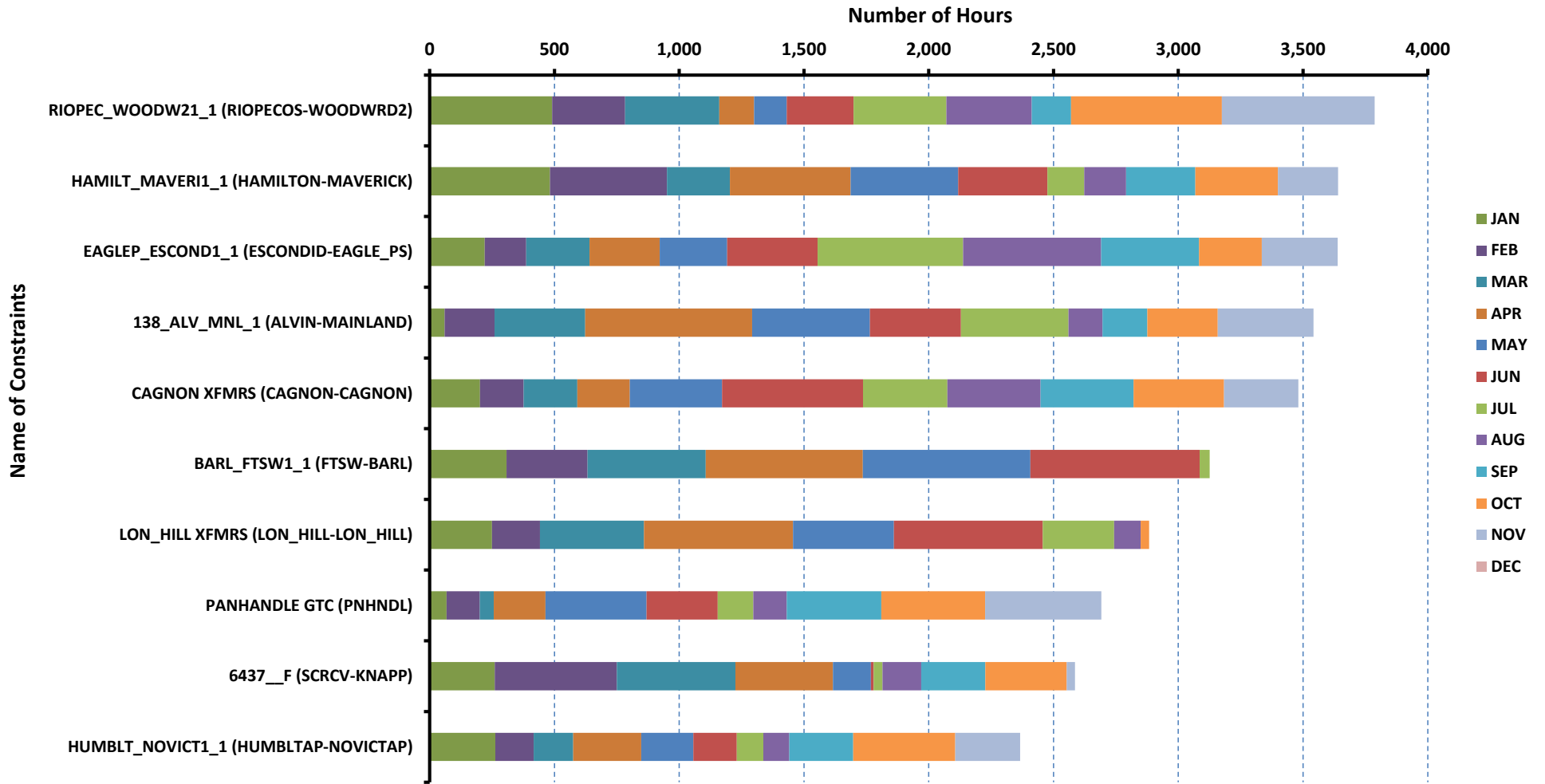
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# DA Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency - 2019



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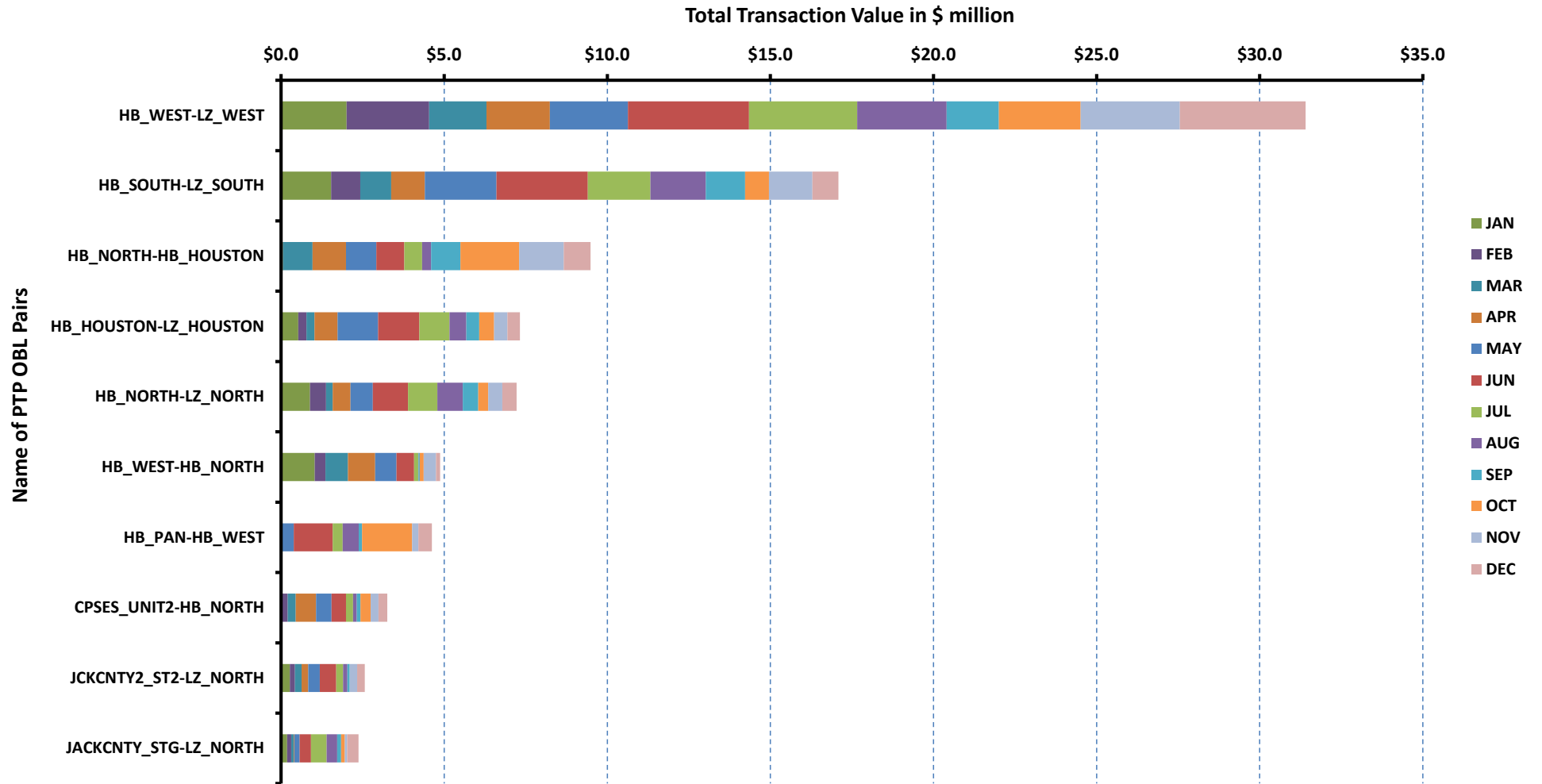
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# Top 10 CRR Pairs Ranked by Monthly Auction Values - 1

## Top 10 PTP Obligations by Total Transaction Value - 2019



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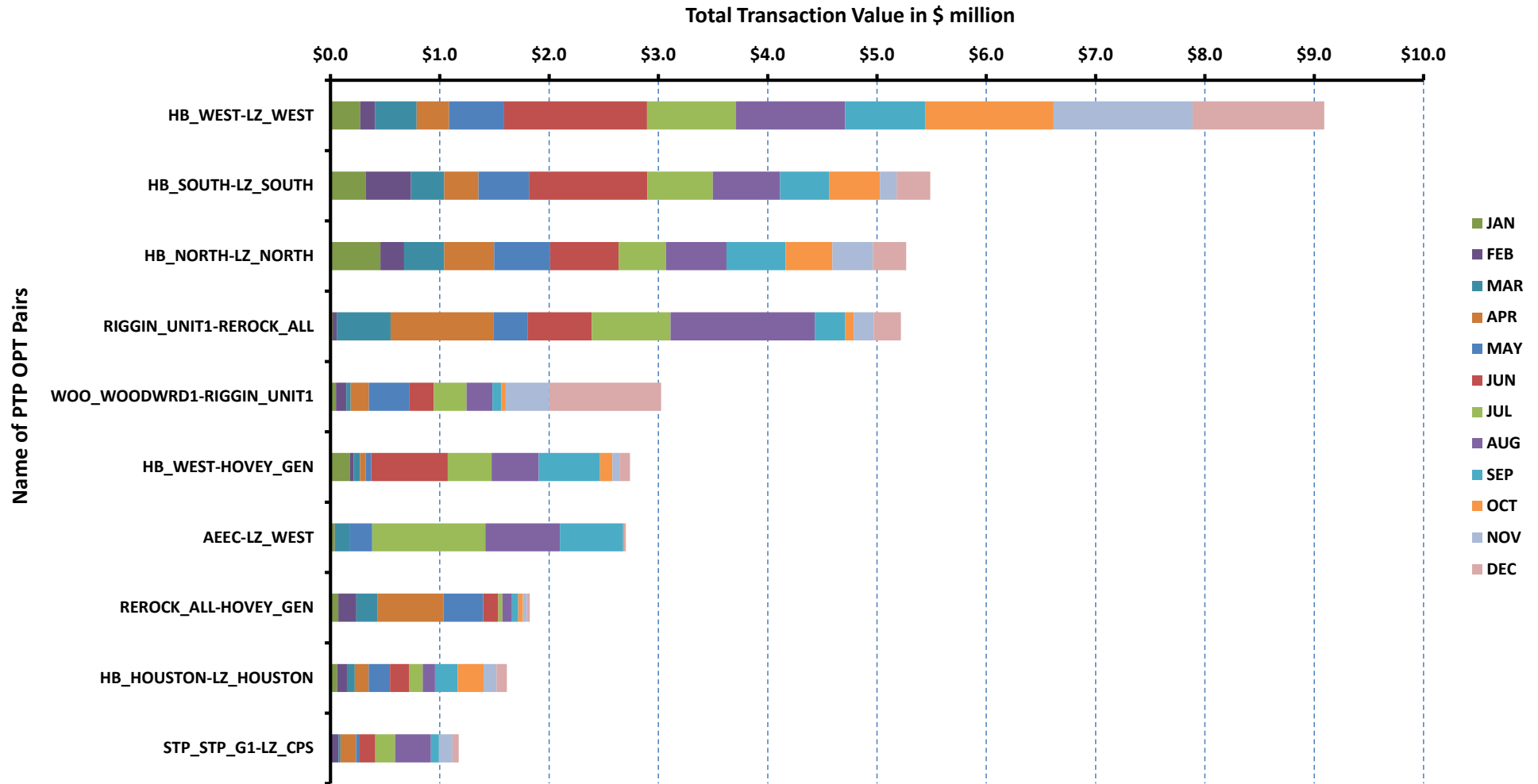
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# Top 10 CRR Pairs Ranked by Monthly Auction Values - 2

## Top 10 PTP Options by Total Transaction Value - 2019



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ERCOT-wide Avg. Energy Price - DA vs. RT			
year	month	dam_spp	rtm_spp
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	\$ 36.15	\$ 37.29
	7	\$ 100.46	\$ 50.22
	8	\$ 35.08	\$ 39.51
	9	\$ 29.31	\$ 30.40
	10	\$ 32.92	\$ 39.09
	11	\$ 33.19	\$ 38.44
	12	\$ 32.19	\$ 29.90
2019	1	\$ 26.27	\$ 24.96
	2	\$ 22.55	\$ 26.69
	3	\$ 31.55	\$ 30.25
	4	\$ 25.38	\$ 27.90
	5	\$ 26.47	\$ 28.08
	6	\$ 28.65	\$ 28.83
	7	\$ 33.43	\$ 34.10
	8	\$ 156.78	\$ 164.03
	9	\$ 99.48	\$ 60.87
	10	\$ 38.01	\$ 39.72
	11	\$ 29.02	\$ 29.98
	12	\$ -	\$ -

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Load Zone Load Statistics										
year	month	loadPEAK_Houston	loadPEAK_North	loadPEAK_South	loadPEAK_West	loadAVG_Houston	loadAVG_North	loadAVG_South	loadAVG_West	
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	18,179	25,425	18,585	5,840	12,436	16,042	12,382	4,477	
	6	18,501	27,219	19,059	5,898	13,746	19,328	13,975	4,872	
	7	18,885	29,606	20,395	6,101	14,046	20,118	14,207	4,890	
	8	19,311	27,221	19,761	6,017	14,083	19,181	14,463	4,965	
	9	17,980	25,161	17,984	5,661	12,364	16,072	12,140	4,533	
	10	16,718	22,540	16,381	5,492	10,919	13,391	10,514	4,336	
	11	14,989	22,127	16,793	5,224	9,739	13,438	9,986	4,462	
	12	12,545	20,233	14,873	5,332	9,601	14,187	10,136	4,685	
2019	1	13,254	21,938	15,626	5,577	9,787	15,227	10,361	4,720	
	2	12,967	22,880	15,171	5,483	9,754	14,467	9,950	4,662	
	3	13,805	24,563	17,622	5,730	9,761	13,291	9,834	4,557	
	4	14,684	17,895	14,450	5,377	10,377	12,468	9,820	4,558	
	5	17,622	21,976	17,107	5,732	12,243	14,355	11,704	4,763	
	6	18,971	25,775	19,006	6,303	13,812	16,691	13,217	5,123	
	7	19,022	27,176	19,428	6,510	14,330	18,828	14,170	5,420	
	8	20,291	28,632	20,440	6,798	14,850	20,336	15,353	5,736	
	9	18,617	26,190	18,941	6,398	13,482	18,929	14,006	5,435	
	10	17,117	24,741	18,171	6,117	11,015	14,008	11,268	4,957	
	11	13,054	22,800	15,838	6,168	9,859	13,502	10,144	5,063	
	12	-	-	-	-	-	-	-	-	-

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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
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	\$ 33.97	\$ 33.39	\$ 65.89	\$ 34.05	\$ 33.91	\$ 33.53	\$ 58.47
	7	\$ 47.28	\$ 49.79	\$ 47.92	\$ 67.06	\$ 96.21	\$ 101.92	\$ 98.48	\$ 112.38
	8	\$ 39.07	\$ 39.32	\$ 40.89	\$ 37.46	\$ 34.63	\$ 35.04	\$ 35.67	\$ 34.80
	9	\$ 29.92	\$ 31.42	\$ 30.61	\$ 27.56	\$ 29.11	\$ 29.87	\$ 29.36	\$ 27.71
	10	\$ 38.98	\$ 40.11	\$ 39.61	\$ 34.97	\$ 33.45	\$ 33.12	\$ 33.15	\$ 30.40
	11	\$ 40.99	\$ 36.95	\$ 39.15	\$ 35.80	\$ 32.91	\$ 33.42	\$ 33.83	\$ 31.67
	12	\$ 28.56	\$ 29.93	\$ 28.42	\$ 35.76	\$ 31.02	\$ 32.07	\$ 32.04	\$ 35.32
2019	1	\$ 24.67	\$ 24.09	\$ 26.47	\$ 25.06	\$ 26.05	\$ 25.20	\$ 27.25	\$ 28.00
	2	\$ 23.30	\$ 24.58	\$ 32.09	\$ 28.80	\$ 22.05	\$ 21.64	\$ 24.07	\$ 23.14
	3	\$ 29.20	\$ 30.43	\$ 31.39	\$ 29.52	\$ 29.73	\$ 31.70	\$ 32.83	\$ 32.27
	4	\$ 27.42	\$ 27.57	\$ 29.52	\$ 26.42	\$ 25.42	\$ 24.98	\$ 27.36	\$ 22.09
	5	\$ 27.41	\$ 26.16	\$ 29.80	\$ 31.34	\$ 26.23	\$ 24.93	\$ 27.53	\$ 29.11
	6	\$ 30.40	\$ 27.46	\$ 27.07	\$ 33.53	\$ 29.22	\$ 27.10	\$ 28.39	\$ 32.84
	7	\$ 34.09	\$ 34.58	\$ 33.73	\$ 33.38	\$ 32.78	\$ 33.41	\$ 34.02	\$ 33.67
	8	\$ 163.05	\$ 168.81	\$ 162.91	\$ 152.59	\$ 153.14	\$ 162.53	\$ 157.49	\$ 143.92
	9	\$ 57.84	\$ 62.35	\$ 60.89	\$ 63.15	\$ 100.74	\$ 101.76	\$ 98.15	\$ 91.84
	10	\$ 35.42	\$ 34.64	\$ 37.98	\$ 67.56	\$ 35.85	\$ 35.30	\$ 37.67	\$ 51.27
	11	\$ 25.29	\$ 26.57	\$ 26.44	\$ 55.33	\$ 24.96	\$ 25.74	\$ 26.85	\$ 50.03
	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

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ERCOT-wide Monthly Implied Heat Rate - DA vs. RT						
year	month	gasprice	rtn_spp	HR_rtn	dam_spp	HR_dam
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	12.42	\$ 36.15	12.03
	7	\$ 2.89	\$ 50.22	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	\$ 39.09	11.22	\$ 32.92	9.45
	11	\$ 4.11	\$ 38.44	9.35	\$ 33.19	8.07
	12	\$ 3.92	\$ 29.90	7.62	\$ 32.19	8.21
2019	1	\$ 3.01	\$ 24.96	8.29	\$ 26.27	8.73
	2	\$ 2.67	\$ 26.69	10.01	\$ 22.55	8.46
	3	\$ 2.88	\$ 30.25	10.49	\$ 31.55	10.94
	4	\$ 2.57	\$ 27.90	10.85	\$ 25.38	9.87
	5	\$ 2.54	\$ 28.08	11.07	\$ 26.47	10.44
	6	\$ 2.46	\$ 28.83	11.72	\$ 28.65	11.65
	7	\$ 2.25	\$ 34.10	15.18	\$ 33.43	14.89
	8	\$ 2.10	\$ 164.03	78.04	\$ 156.78	74.59
	9	\$ 2.45	\$ 60.87	24.80	\$ 99.48	40.54
	10	\$ 2.19	\$ 39.72	18.11	\$ 38.01	17.33
	11	\$ 2.47	\$ 29.98	12.16	\$ 29.02	11.77
	12	\$ -	\$ -	-	\$ -	-

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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
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	20.20
	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	17.20	23.17
	8	11.52	11.86	11.66	11.57	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	9.60	9.52	9.51	8.73	11.19	11.37	11.52	10.04
	11	8.01	8.23	8.13	7.70	9.97	9.52	8.99	8.71
	12	7.91	8.17	8.18	9.00	7.28	7.25	7.63	9.12
2019	1	8.65	9.05	8.37	9.30	8.19	8.79	8.00	8.32
	2	8.27	9.03	8.12	8.68	8.74	12.04	9.22	10.80
	3	10.31	11.38	10.99	11.19	10.12	10.88	10.55	10.23
	4	9.88	10.64	9.71	8.59	10.66	11.48	10.72	10.27
	5	10.35	10.86	9.83	11.48	10.81	11.75	10.32	12.36
	6	11.88	11.55	11.02	13.35	12.36	11.01	11.17	13.64
	7	14.60	15.15	14.88	14.99	15.18	15.02	15.40	14.87
	8	72.86	74.93	77.32	68.47	77.57	77.51	80.31	72.59
	9	41.06	40.00	41.47	37.43	23.57	24.81	25.41	25.73
	10	16.34	17.17	16.09	23.37	16.15	17.31	15.79	30.80
	11	10.12	10.89	10.44	20.29	10.26	10.72	10.78	22.44
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Daily ORDC Adders Average Values and Interval Duration								
YEAR	MONTH	DAY	PRICE_RS	PRICE_RDP	RS_CNT	RDP_CNT	RS_POS	RDP_POS
2019	11	1	\$ -	\$ -	0	0	80	90
2019	11	2	\$ -	\$ -	0	0	80	90
2019	11	3	\$ -	\$ -	0	0	80	90
2019	11	4	\$ 0.47	\$ -	28	0	80	90
2019	11	5	\$ 1.76	\$ -	49	0	80	90
2019	11	6	\$ 2.24	\$ -	16	0	80	90
2019	11	7	\$ 0.25	\$ -	37	0	80	90
2019	11	8	\$ 0.65	\$ -	48	0	80	90
2019	11	9	\$ 0.09	\$ -	26	0	80	90
2019	11	10	\$ -	\$ -	0	0	80	90
2019	11	11	\$ -	\$ -	0	0	80	90
2019	11	12	\$ 0.10	\$ -	33	0	80	90
2019	11	13	\$ 0.01	\$ 0.24	1	2	80	90
2019	11	14	\$ 0.23	\$ 0.99	12	10	80	90
2019	11	15	\$ 0.14	\$ -	8	0	80	90
2019	11	16	\$ -	\$ -	0	0	80	90
2019	11	17	\$ 0.54	\$ -	19	0	80	90
2019	11	18	\$ 0.47	\$ -	47	0	80	90
2019	11	19	\$ 0.07	\$ -	14	0	80	90
2019	11	20	\$ -	\$ -	0	0	80	90
2019	11	21	\$ 0.01	\$ -	1	0	80	90
2019	11	22	\$ 0.97	\$ -	60	0	80	90
2019	11	23	\$ 0.40	\$ -	27	0	80	90
2019	11	24	\$ 0.01	\$ -	3	0	80	90
2019	11	25	\$ 0.07	\$ -	11	0	80	90
2019	11	26	\$ -	\$ -	0	0	80	90
2019	11	27	\$ 0.17	\$ -	32	0	80	90
2019	11	28	\$ 3.06	\$ -	60	0	80	90
2019	11	29	\$ 1.05	\$ -	72	0	80	90
2019	11	30	\$ -	\$ -	0	0	80	90
0	0	0	\$ -	\$ -	0	0	0	0

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Monthly Average of Ancillary Services Required MW					
year	month	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
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	256	1,582	2,895	273
	12	268	1,603	2,900	280
2019	1	285	1,578	2,898	295
	2	283	1,634	2,881	311
	3	287	1,487	2,893	306
	4	292	1,513	2,904	321
	5	314	1,550	2,712	345
	6	303	1,486	2,467	322
	7	298	1,287	2,374	319
	8	300	1,507	2,386	323
	9	305	1,505	2,552	305
	10	282	1,508	2,759	301
	11	260	1,546	2,893	288
	12	-	-	-	-

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Hourly Average of Ancillary Services Required MW					
year	DELIVERY_HOUR	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2018	1	366	1,112	2,872	273
	2	275	1,112	2,872	215
	3	238	1,516	2,880	208
	4	204	1,516	2,880	221
	5	210	1,516	2,880	276
	6	305	1,516	2,880	439
	7	261	2,083	2,761	568
	8	237	2,083	2,761	348
	9	239	2,083	2,761	397
	10	276	2,083	2,761	385
	11	250	1,700	2,672	401
	12	239	1,700	2,672	382
	13	217	1,700	2,672	344
	14	220	1,700	2,672	306
	15	216	1,503	2,650	263
	16	212	1,503	2,650	254
	17	248	1,503	2,650	261
	18	285	1,503	2,650	295
	19	371	1,456	2,694	285
	20	363	1,456	2,694	272
	21	380	1,456	2,694	242
	22	465	1,456	2,694	269
	23	508	1,112	2,872	320
	24	451	1,112	2,872	276
2019	1	374	1,188	2,795	244
	2	284	1,188	2,795	185
	3	233	1,593	2,818	202
	4	196	1,592	2,819	221
	5	191	1,592	2,819	282
	6	274	1,592	2,819	446
	7	247	1,975	2,726	565
	8	224	1,975	2,726	356
	9	237	1,975	2,726	391
	10	263	1,975	2,726	400
	11	274	1,634	2,623	417
	12	232	1,634	2,623	410
	13	214	1,634	2,623	375
	14	217	1,634	2,623	331
	15	208	1,353	2,612	286
	16	214	1,353	2,612	273
	17	249	1,353	2,612	267
	18	285	1,353	2,612	294
	19	372	1,305	2,626	288
	20	377	1,305	2,626	267
	21	389	1,305	2,626	249
	22	476	1,305	2,626	222
	23	517	1,188	2,795	265
	24	460	1,188	2,795	264

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Monthly Average Ancillary Services Price					
year	month	MCPC_REGDN	MCPC_NSPIN	MCPC_RRS	MCPC_REGUP
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	\$ 4.30	\$ 5.80	\$ 18.44	\$ 11.28
	12	\$ 6.21	\$ 3.48	\$ 12.53	\$ 11.00
2019	1	\$ 6.43	\$ 1.71	\$ 11.01	\$ 9.40
	2	\$ 13.14	\$ 1.66	\$ 9.70	\$ 8.88
	3	\$ 13.34	\$ 5.10	\$ 15.43	\$ 13.77
	4	\$ 16.00	\$ 5.03	\$ 15.59	\$ 14.42
	5	\$ 7.83	\$ 4.27	\$ 9.47	\$ 11.00
	6	\$ 4.76	\$ 4.30	\$ 10.39	\$ 8.82
	7	\$ 3.71	\$ 5.25	\$ 13.23	\$ 11.65
	8	\$ 7.87	\$ 68.75	\$ 114.97	\$ 98.80
	9	\$ 13.60	\$ 44.57	\$ 81.63	\$ 52.36
	10	\$ 6.74	\$ 12.87	\$ 22.83	\$ 17.93
	11	\$ 8.19	\$ 6.23	\$ 17.63	\$ 16.10
	12	\$ -	\$ -	\$ -	\$ -

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Monthly Average A/S Cost per MWh Load					
year	month	AScost_REGDN	AScost_NSPIN	AScost_RRS	AScost_REGUP
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	\$ 0.03	\$ 0.24	\$ 1.42	\$ 0.08
	12	\$ 0.04	\$ 0.14	\$ 0.94	\$ 0.08
2019	1	\$ 0.05	\$ 0.07	\$ 0.80	\$ 0.07
	2	\$ 0.10	\$ 0.07	\$ 0.72	\$ 0.07
	3	\$ 0.10	\$ 0.20	\$ 1.19	\$ 0.11
	4	\$ 0.13	\$ 0.20	\$ 1.22	\$ 0.12
	5	\$ 0.06	\$ 0.15	\$ 0.60	\$ 0.09
	6	\$ 0.03	\$ 0.13	\$ 0.52	\$ 0.06
	7	\$ 0.02	\$ 0.13	\$ 0.60	\$ 0.07
	8	\$ 0.04	\$ 1.84	\$ 4.87	\$ 0.57
	9	\$ 0.08	\$ 1.29	\$ 4.02	\$ 0.31
	10	\$ 0.05	\$ 0.47	\$ 1.53	\$ 0.13
	11	\$ 0.06	\$ 0.25	\$ 1.32	\$ 0.12
	12	\$ -	\$ -	\$ -	\$ -

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ERCOT-wide Cumulative PNM			
year	month	pnm	pnm_accum
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	\$ 6,257.98	\$ 61,352.23
12	\$ 941.00	\$ 62,293.23	
2019	0	\$ -	\$ -
	1	\$ 1,594.61	\$ 1,594.61
	2	\$ 3,042.70	\$ 4,637.31
	3	\$ 4,087.75	\$ 8,725.06
	4	\$ 4,232.61	\$ 12,957.67
	5	\$ 3,234.19	\$ 16,191.86
	6	\$ 4,409.46	\$ 20,601.32
	7	\$ 8,110.34	\$ 28,711.66
	8	\$ 84,095.03	\$ 112,806.69
	9	\$ 21,413.10	\$ 134,219.79
	10	\$ 8,602.94	\$ 142,822.73
	11	\$ 3,834.05	\$ 146,656.78
12	\$ -	\$ -	

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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
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	(191)	853	648	37	(577)	(30)
	12	(96)	(296)	(112)	(79)	(80)	(255)
2019	1	(69)	2	10	(37)	207	245
	2	(412)	(246)	(679)	(749)	(361)	(378)
	3	275	(45)	258	142	152	(52)
	4	125	668	573	292	35	171
	5	(32)	5	(31)	19	(21)	76
	6	107	1,213	916	510	330	1,059
	7	(127)	29	(239)	(201)	(273)	(188)
	8	72	768	869	503	64	623
	9	27	306	248	325	4	334
	10	101	676	309	182	102	404
	11	21	199	138	108	(97)	67
	12	-	-	-	-	-	-

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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
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	11,105	9,862	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	9,151	6,413	6,543	8,872	8,685	6,866
	12	9,512	6,983	7,137	9,202	8,850	7,547
2019	1	9,500	7,954	7,892	9,491	9,141	7,897
	2	10,520	8,015	8,843	10,755	9,358	7,631
	3	9,471	6,980	7,408	9,114	8,585	7,389
	4	10,770	9,020	9,488	11,220	10,180	9,034
	5	10,907	8,497	9,689	10,736	9,414	8,343
	6	9,717	6,210	7,891	10,058	7,706	6,535
	7	10,258	6,036	8,124	9,915	8,568	6,712
	8	11,086	4,854	7,343	10,742	8,638	5,965
	9	10,340	6,635	7,689	10,145	8,364	6,624
	10	10,722	7,407	8,345	10,675	9,924	8,246
	11	9,762	7,641	8,003	9,866	9,504	8,268
	12	-	-	-	-	-	-

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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	2019	BARL_FTSW1_1 (FTSW-BARL)	17,442	1	1,340	2,467	3,067	2,346	4,230	3,737	254	-	1	-	-	-	
FREQ_EXIST	2019	HAMILT_MAVR1_1 (HAMILTON-MAVERICK)	13,795	2	520	2,373	827	3,178	1,756	1,410	691	503	728	1,026	783	-	
FREQ_EXIST	2019	PANHANDLE_GTC (PNHNDL)	12,735	3	61	594	623	928	2,083	1,411	338	533	2,004	1,615	2,545	-	
FREQ_EXIST	2019	SONR_69-1 (SONR-SONR)	11,414	4	528	37	-	-	2,423	941	1,235	668	1,625	2,686	1,271	-	
FREQ_EXIST	2019	RIOPEC_WOODW21_1 (WOODWRD2-RIOPECOS)	6,576	5	658	698	401	779	908	598	322	176	316	1,596	124	-	
FREQ_EXIST	2019	74T148_1 (COMFOR-CICO)	5,970	6	1,718	-	138	-	90	135	-	-	1,011	2,878	-	-	
FREQ_EXIST	2019	BOW_FMR1 (BOW-BOW)	5,579	7	219	24	61	95	37	-	-	5	12	2,733	2,393	-	
FREQ_EXIST	2019	BRUNL_69_1 (BRUNL-BRUNL)	5,551	8	173	5	261	523	941	231	781	1,224	484	382	546	-	
FREQ_EXIST	2019	6100_F (DHIDE-NOTSW)	5,339	9	-	12	17	-	8	12	-	5	30	2,332	2,923	-	
FREQ_EXIST	2019	RAYMND2_69A1 (RAYMND2-RAYMND2)	4,964	10	471	86	236	51	483	280	487	1,046	727	314	783	-	
TOP10_RENT	2019	6100_F (DHIDE-NOTSW)	\$ 134.42	1	\$ -	\$ 0.03	\$ 0.02	\$ -	\$ 0.16	\$ 0.47	\$ -	\$ 0.25	\$ 1.45	\$ 49.99	\$ 82.05	\$ -	
TOP10_RENT	2019	PANHANDLE_GTC (PNHNDL)	\$ 78.82	2	\$ 0.35	\$ 2.64	\$ 2.06	\$ 6.40	\$ 13.38	\$ 8.49	\$ 1.48	\$ 2.86	\$ 13.15	\$ 8.80	\$ 19.21	\$ -	
TOP10_RENT	2019	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	\$ 69.42	3	\$ 5.13	\$ 0.77	\$ 2.16	\$ 0.06	\$ -	\$ 4.85	\$ -	\$ -	\$ 0.05	\$ 42.60	\$ 13.81	\$ -	
TOP10_RENT	2019	6100_G (ACSSW-AMTBT)	\$ 57.17	4	\$ -	\$ 0.02	\$ 0.07	\$ -	\$ -	\$ 4.56	\$ 2.76	\$ 2.45	\$ 24.83	\$ 15.08	\$ 7.40	\$ -	
TOP10_RENT	2019	BARL_FTSW1_1 (FTSW-BARL)	\$ 33.90	5	\$ 0.68	\$ 3.97	\$ 4.52	\$ 4.13	\$ 10.52	\$ 9.76	\$ 0.32	\$ -	\$ 0.01	\$ -	\$ -	\$ -	
TOP10_RENT	2019	6475_C (ODEHV-TROTP)	\$ 29.82	6	\$ -	\$ -	\$ -	\$ 0.02	\$ -	\$ -	\$ 0.03	\$ 6.29	\$ 0.49	\$ 21.66	\$ 1.32	\$ -	
TOP10_RENT	2019	6265_A (EMSES-MRSDO)	\$ 28.14	7	\$ -	\$ -	\$ -	\$ 0.19	\$ -	\$ 0.69	\$ 1.93	\$ 0.62	\$ 24.70	\$ -	\$ -	\$ -	
TOP10_RENT	2019	74T148_1 (COMFOR-CICO)	\$ 27.40	8	\$ 8.79	\$ -	\$ 0.34	\$ -	\$ 0.59	\$ 0.67	\$ -	\$ -	\$ 3.59	\$ 13.42	\$ -	\$ -	
TOP10_RENT	2019	HILL_MAR_2_1 (MARION-HILLCTRY)	\$ 27.06	9	\$ -	\$ 27.06	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	JCKSTP18_A (STP-JCK)	\$ 24.65	10	\$ 2.34	\$ -	\$ 1.10	\$ 0.14	\$ 0.63	\$ 13.68	\$ -	\$ -	\$ 4.60	\$ 2.16	\$ -	\$ -	

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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	2019	RIOPEC WOODW21 1 (RIOPECOS-WOODWRD2)	3,787	1	491	292	378	139	131	268	372	342	157	605	612	-	
FREQ_EXIST	2019	HAMILT MAVER1 1 (HAMILTON-MAVERICK)	3,640	2	482	469	252	484	431	358	147	168	277	331	241	-	
FREQ_EXIST	2019	EAGLEP ESCOND1 1 (ESCONDID-EAGLE PS)	3,639	3	221	166	254	281	270	363	583	553	392	252	304	-	
FREQ_EXIST	2019	138 ALV_MNL 1 (ALVIN-MAINLAND)	3,542	4	60	200	363	669	472	365	431	136	180	282	384	-	
FREQ_EXIST	2019	CAGNON XFMRS (CAGNON-CAGNON)	3,481	5	202	175	215	210	370	565	338	373	373	362	298	-	
FREQ_EXIST	2019	BARL_FTSW1 1 (FTSW-BARL)	3,126	6	308	325	473	630	671	679	40	-	-	-	-	-	
FREQ_EXIST	2019	LON_HILL_XFMRS (LON_HILL-LON_HILL)	2,883	7	250	192	417	597	404	597	286	106	-	34	-	-	
FREQ_EXIST	2019	PANHANDLE_GTC (PNHNDL)	2,692	8	68	133	56	207	405	285	143	134	379	416	466	-	
FREQ_EXIST	2019	6437_F (SCRCV-KNAPP)	2,586	9	261	489	475	391	152	11	36	155	257	326	33	-	
FREQ_EXIST	2019	HUMBLT_NOVICT1_1 (HUMBLTAP-NOVICTAP)	2,366	10	263	154	158	273	209	174	106	104	256	409	260	-	
TOP10_RENT	2019	6100_F (DHIDE-NOTSW)	\$ 113.90	1	\$ 0.03	\$ 0.40	\$ 1.26	\$ 0.05	\$ 0.33	\$ 0.53	\$ 0.29	\$ 0.14	\$ 2.41	\$ 36.61	\$ 71.84	\$ -	
TOP10_RENT	2019	PANHANDLE_GTC (PNHNDL)	\$ 73.56	2	\$ 0.89	\$ 2.17	\$ 0.47	\$ 3.29	\$ 12.00	\$ 7.82	\$ 2.29	\$ 2.59	\$ 11.54	\$ 11.27	\$ 19.24	\$ -	
TOP10_RENT	2019	RIOPEC WOODW21 1 (RIOPECOS-WOODWRD2)	\$ 63.29	3	\$ 9.00	\$ 0.80	\$ 2.85	\$ 0.40	\$ 0.66	\$ 2.57	\$ 0.63	\$ 0.26	\$ 0.32	\$ 30.25	\$ 15.55	\$ -	
TOP10_RENT	2019	BARL_FTSW1 1 (FTSW-BARL)	\$ 39.45	4	\$ 1.48	\$ 2.39	\$ 6.22	\$ 3.68	\$ 12.55	\$ 12.38	\$ 0.75	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	590_B (LWVJS-LKPNT)	\$ 35.21	5	\$ -	\$ -	\$ 6.96	\$ 2.10	\$ 3.44	\$ 3.17	\$ 2.06	\$ 1.93	\$ 4.81	\$ 5.40	\$ 5.34	\$ -	
TOP10_RENT	2019	6100_G (ACSSW-AMTBT)	\$ 33.24	6	\$ -	\$ -	\$ 0.02	\$ 0.06	\$ 0.33	\$ 4.96	\$ 5.31	\$ 5.71	\$ 12.57	\$ 4.28	\$ -	\$ -	
TOP10_RENT	2019	LON_HILL_XFMRS (LON_HILL-LON_HILL)	\$ 25.54	7	\$ 1.51	\$ 1.42	\$ 4.86	\$ 6.15	\$ 2.78	\$ 5.86	\$ 1.98	\$ 0.77	\$ -	\$ 0.21	\$ -	\$ -	
TOP10_RENT	2019	74T148_1 (COMFOR-CICO)	\$ 23.52	8	\$ 6.28	\$ 1.69	\$ 0.80	\$ 0.31	\$ 0.18	\$ 0.06	\$ -	\$ 0.00	\$ 2.86	\$ 11.35	\$ -	\$ -	
TOP10_RENT	2019	HUMBLT_NOVICT1_1 (HUMBLTAP-NOVICTAP)	\$ 23.15	9	\$ 22.89	\$ 0.01	\$ 0.02	\$ 0.03	\$ 0.04	\$ 0.02	\$ 0.01	\$ 0.01	\$ 0.02	\$ 0.05	\$ 0.03	\$ -	
TOP10_RENT	2019	COLEMAN JUNCTION (SANA-GLSB)	\$ 22.97	10	\$ 22.86	\$ 0.02	\$ 0.05	\$ 0.02	\$ 0.01	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.01	\$ 0.00	\$ -	

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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																	
fr_option	year	pair	total_value	rank	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
N	2019	HB WEST-LZ WEST	\$ 31.41	1	\$ 2.01	\$ 2.53	\$ 1.75	\$ 1.95	\$ 2.39	\$ 3.71	\$ 3.32	\$ 2.74	\$ 1.60	\$ 2.51	\$ 3.04	\$ 3.86	
N	2019	HB SOUTH-LZ SOUTH	\$ 17.09	2	\$ 1.54	\$ 0.89	\$ 0.95	\$ 1.03	\$ 2.19	\$ 2.80	\$ 1.92	\$ 1.70	\$ 1.20	\$ 0.73	\$ 1.33	\$ 0.80	
N	2019	HB NORTH-HB HOUSTON	\$ 9.49	3	\$ 0.06	\$ 0.00	\$ 0.91	\$ 1.02	\$ 0.93	\$ 0.86	\$ 0.55	\$ 0.28	\$ 0.90	\$ 1.80	\$ 1.36	\$ 0.82	
N	2019	HB HOUSTON-LZ HOUSTON	\$ 7.32	4	\$ 0.53	\$ 0.25	\$ 0.25	\$ 0.70	\$ 1.24	\$ 1.27	\$ 0.92	\$ 0.52	\$ 0.39	\$ 0.46	\$ 0.40	\$ 0.38	
N	2019	HB NORTH-LZ NORTH	\$ 7.22	5	\$ 0.89	\$ 0.49	\$ 0.21	\$ 0.54	\$ 0.69	\$ 1.08	\$ 0.90	\$ 0.78	\$ 0.47	\$ 0.31	\$ 0.43	\$ 0.44	
N	2019	HB WEST-HB NORTH	\$ 4.87	6	\$ 1.03	\$ 0.33	\$ 0.69	\$ 0.83	\$ 0.66	\$ 0.54	\$ 0.13	\$ 0.01	\$ 0.04	\$ 0.12	\$ 0.37	\$ 0.13	
N	2019	HB PAN-HB WEST	\$ 4.62	7	\$ -	\$ -	\$ -	\$ -	\$ 0.39	\$ 1.19	\$ 0.30	\$ 0.49	\$ 0.10	\$ 1.53	\$ 0.20	\$ 0.41	
N	2019	CPSSES_UNIT2-HB NORTH	\$ 3.26	8	\$ -	\$ 0.20	\$ 0.24	\$ 0.62	\$ 0.48	\$ 0.44	\$ 0.22	\$ 0.11	\$ 0.12	\$ 0.31	\$ 0.24	\$ 0.27	
N	2019	JCKCNTY2_ST2-LZ NORTH	\$ 2.57	9	\$ 0.27	\$ 0.15	\$ 0.20	\$ 0.20	\$ 0.35	\$ 0.50	\$ 0.21	\$ 0.14	\$ 0.07	\$ -	\$ 0.22	\$ 0.24	
N	2019	JACKCNTY_STG-LZ NORTH	\$ 2.37	10	\$ 0.19	\$ 0.13	\$ 0.08	\$ 0.01	\$ 0.17	\$ 0.35	\$ 0.48	\$ 0.32	\$ 0.12	\$ 0.11	\$ 0.08	\$ 0.35	
Y	2019	HB WEST-LZ WEST	\$ 9.09	1	\$ 0.27	\$ 0.13	\$ 0.38	\$ 0.30	\$ 0.50	\$ 1.31	\$ 0.82	\$ 1.00	\$ 0.73	\$ 1.17	\$ 1.27	\$ 1.21	
Y	2019	HB SOUTH-LZ SOUTH	\$ 5.49	2	\$ 0.32	\$ 0.41	\$ 0.30	\$ 0.31	\$ 0.46	\$ 1.08	\$ 0.60	\$ 0.62	\$ 0.45	\$ 0.47	\$ 0.15	\$ 0.31	
Y	2019	HB NORTH-LZ NORTH	\$ 5.27	3	\$ 0.46	\$ 0.22	\$ 0.37	\$ 0.46	\$ 0.51	\$ 0.63	\$ 0.43	\$ 0.55	\$ 0.54	\$ 0.43	\$ 0.37	\$ 0.30	
Y	2019	RIGGIN_UNIT1-REROCK ALL	\$ 5.22	4	\$ 0.02	\$ 0.04	\$ 0.49	\$ 0.94	\$ 0.31	\$ 0.59	\$ 0.72	\$ 1.32	\$ 0.28	\$ 0.08	\$ 0.18	\$ 0.25	
Y	2019	WOO_WOODWRD1-RIGGIN_UNIT1	\$ 3.02	5	\$ 0.05	\$ 0.10	\$ 0.04	\$ 0.17	\$ 0.37	\$ 0.22	\$ 0.30	\$ 0.24	\$ 0.08	\$ 0.04	\$ 0.40	\$ 1.02	
Y	2019	HB WEST-HOVEY_GEN	\$ 2.74	6	\$ 0.18	\$ 0.03	\$ 0.06	\$ 0.05	\$ 0.05	\$ 0.70	\$ 0.40	\$ 0.43	\$ 0.56	\$ 0.11	\$ 0.06	\$ 0.10	
Y	2019	AEEC-LZ WEST	\$ 2.70	7	\$ 0.04	\$ 0.00	\$ 0.14	\$ -	\$ 0.20	\$ -	\$ 1.03	\$ 0.68	\$ 0.58	\$ 0.01	\$ -	\$ 0.02	
Y	2019	REROCK_ALL-HOVEY_GEN	\$ 1.82	8	\$ 0.07	\$ 0.17	\$ 0.19	\$ 0.60	\$ 0.36	\$ 0.14	\$ 0.04	\$ 0.09	\$ 0.06	\$ 0.04	\$ 0.03	\$ 0.03	
Y	2019	HB HOUSTON-LZ HOUSTON	\$ 1.61	9	\$ 0.06	\$ 0.09	\$ 0.07	\$ 0.13	\$ 0.20	\$ 0.18	\$ 0.12	\$ 0.11	\$ 0.21	\$ 0.24	\$ 0.12	\$ 0.10	
Y	2019	STP_STP_G1-LZ_CPS	\$ 1.17	10	\$ -	\$ 0.07	\$ 0.02	\$ 0.14	\$ 0.03	\$ 0.14	\$ 0.18	\$ 0.33	\$ 0.07	\$ -	\$ 0.12	\$ 0.06	

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