

To the Public Utility Commission of Texas

# ERCOT Wholesale Electricity Market Monthly Report

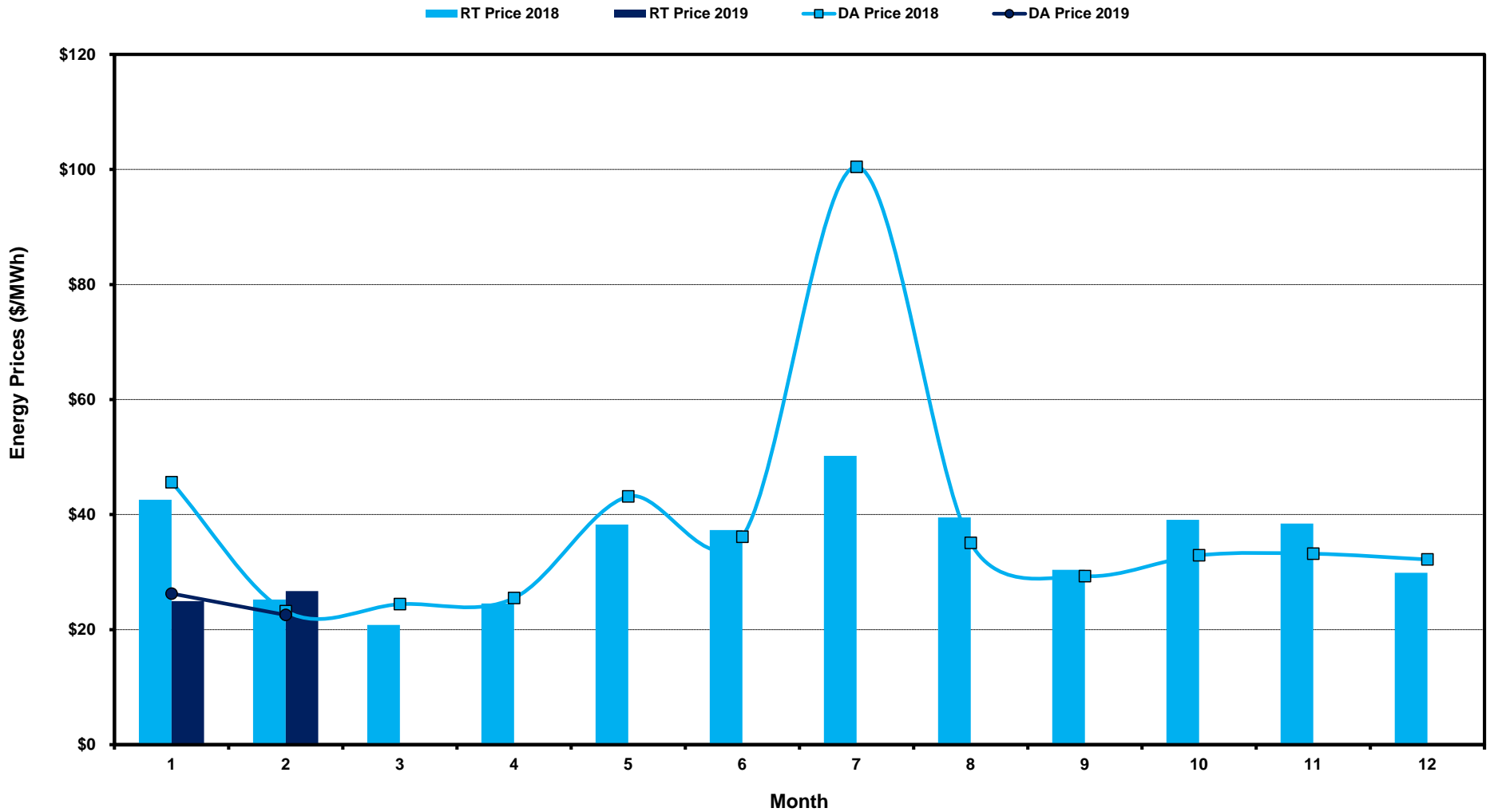
Monday, March 11, 2019

Potomac Economics, Ltd.  
Independent Market Monitor

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

# ERCOT-wide Average Energy Prices DA vs RT

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



[Home <<](#)

[previous <<](#)

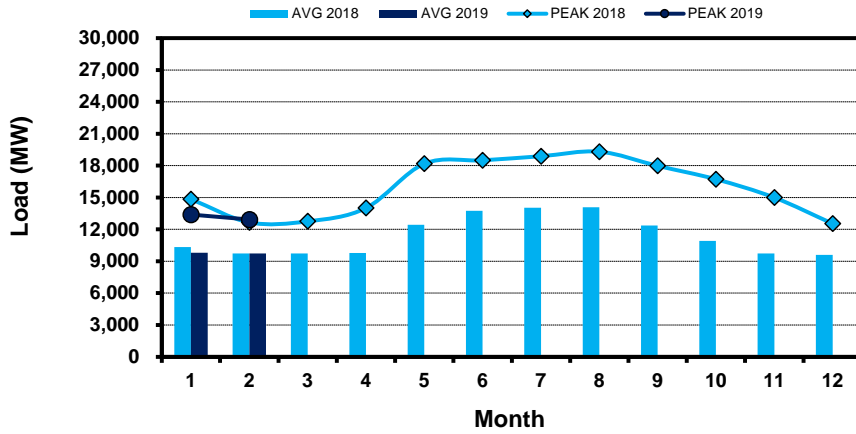
[next >>](#)

[data](#)

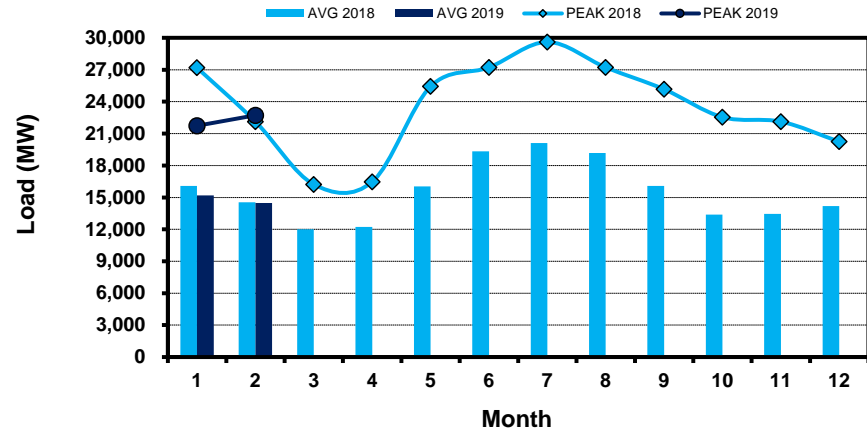
# Load Zone Load Statistics

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

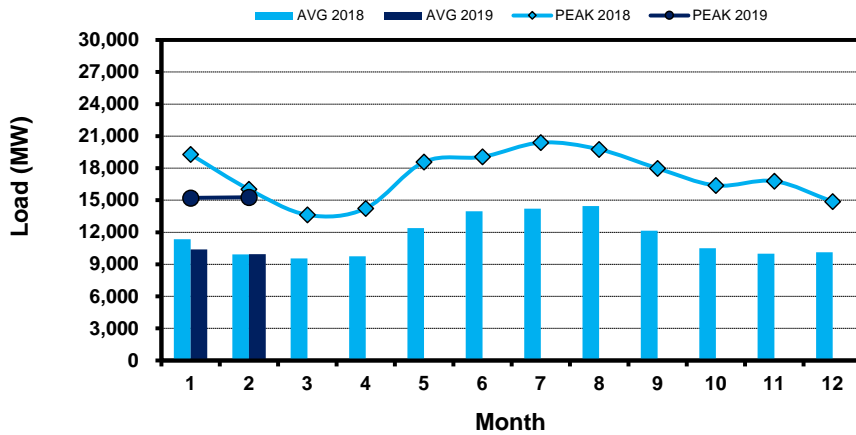
### Houston Zone



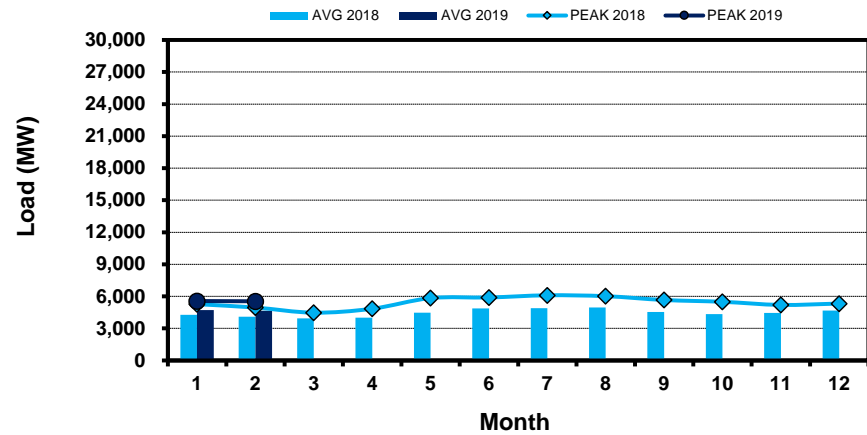
### North Zone



### South Zone



### West Zone



[Home <<](#)

[previous <<](#)

[next >>](#)

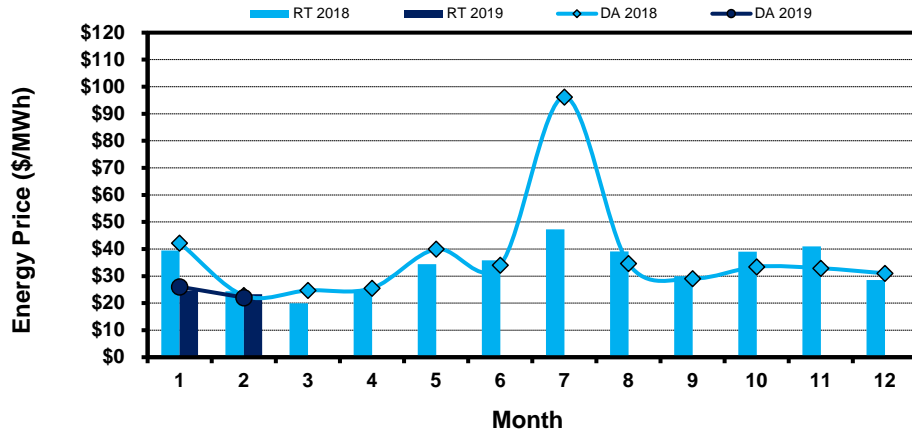
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

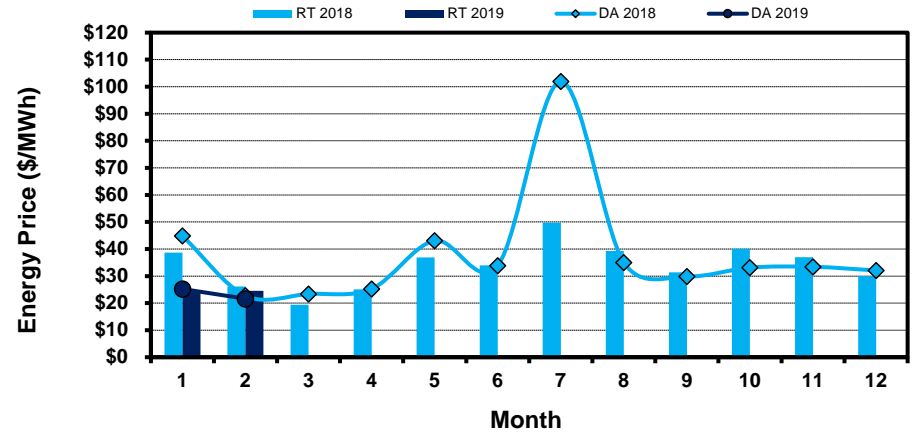
# Load Zone Monthly Average Energy Price DA vs RT

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

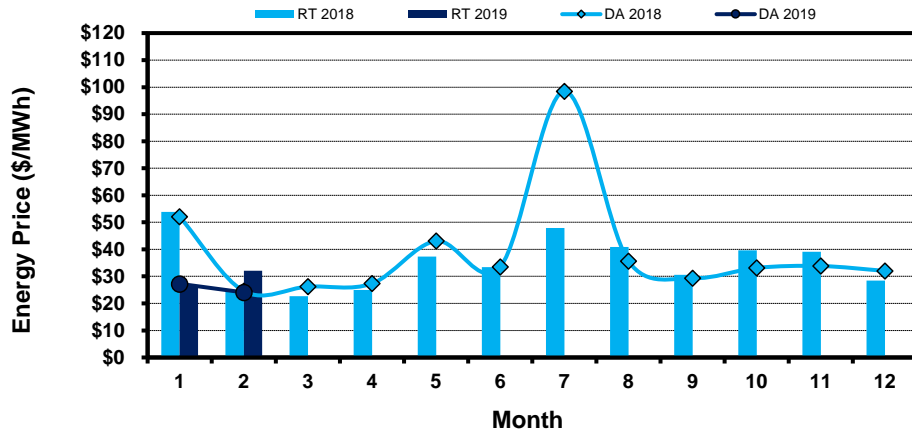
### Houston Zone



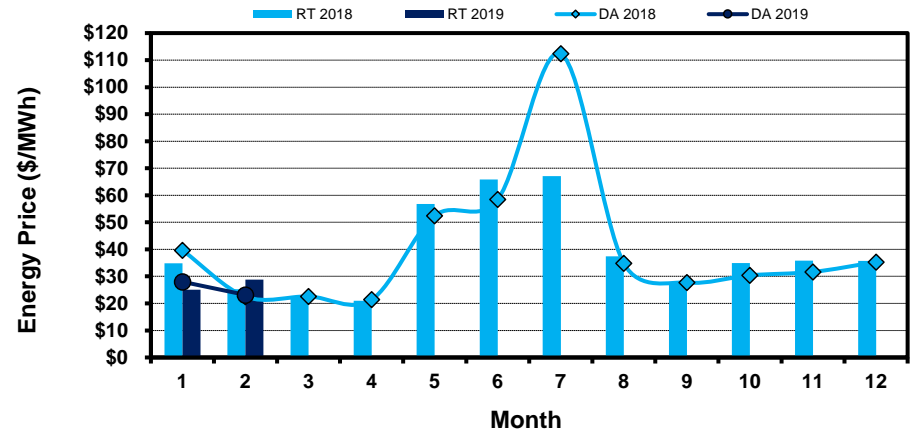
### North Zone



### South Zone



### West Zone



[Home <<](#)

[previous <<](#)

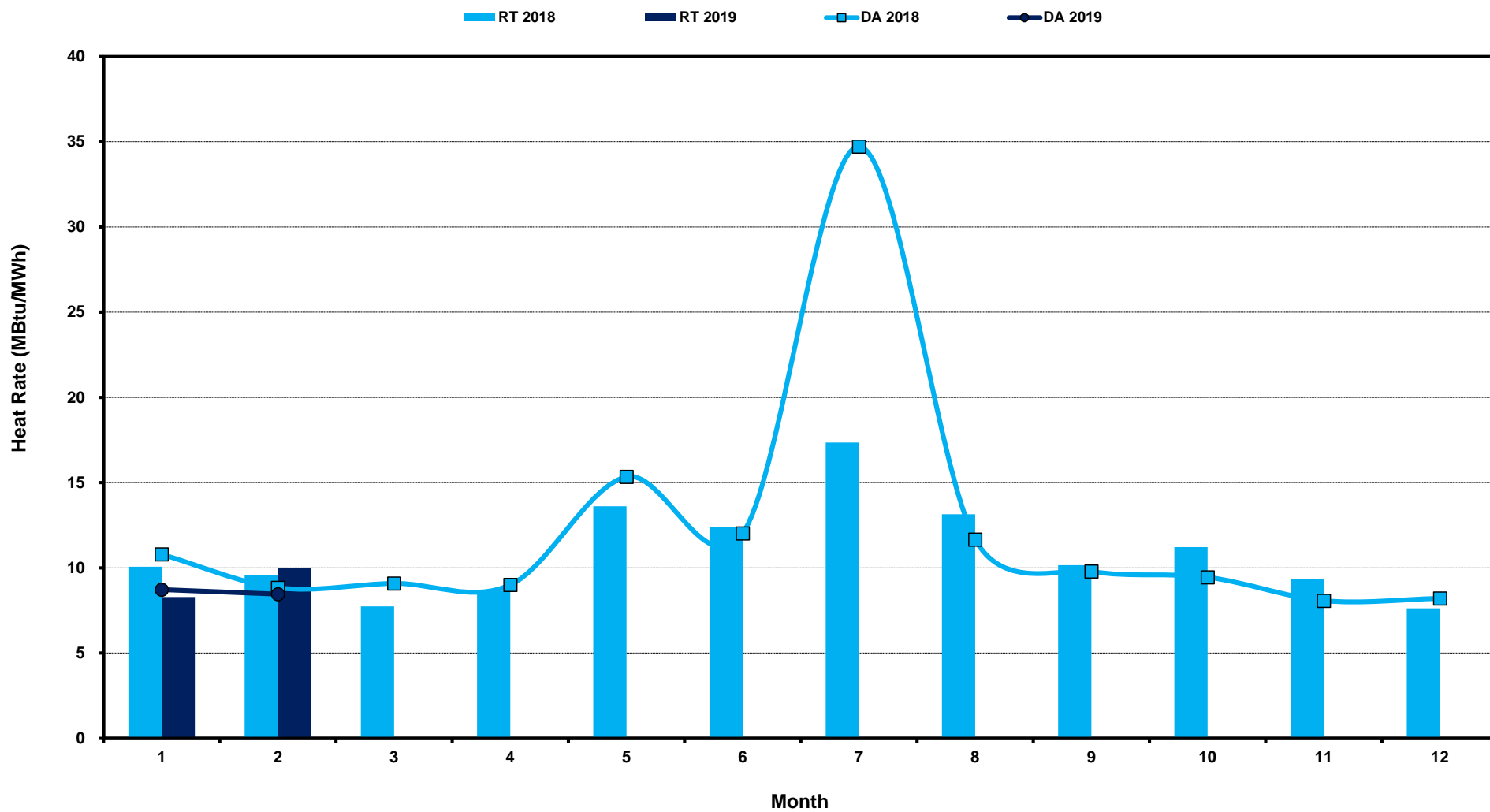
[next >>](#)

[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)

# ERCOT-wide Monthly Implied Heat Rate DA vs RT

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



[Home <<](#)

[previous <<](#)

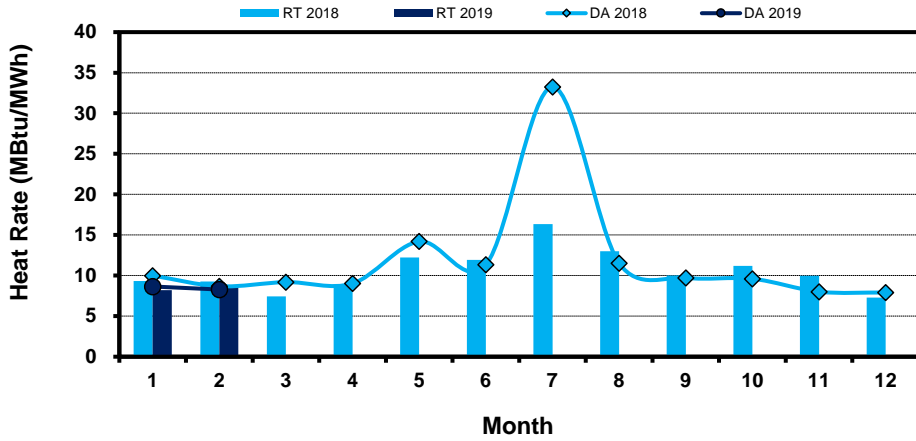
[next >>](#)

[data](#)

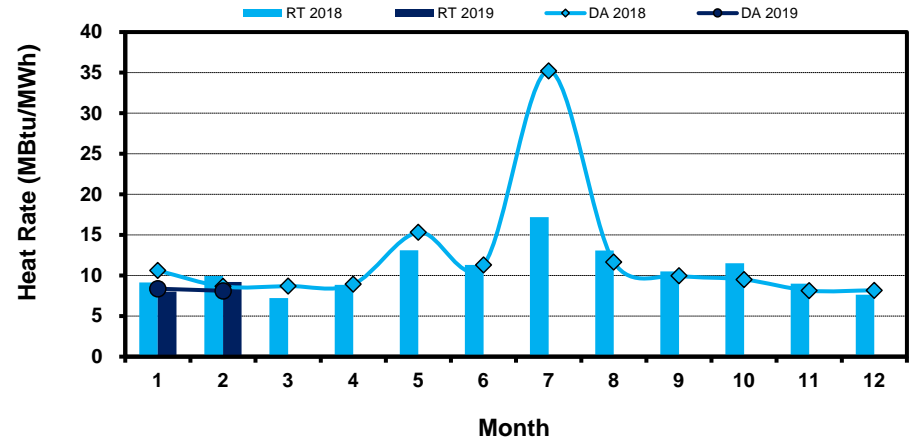
# Load Zone Monthly Implied Heat Rate DA vs RT

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

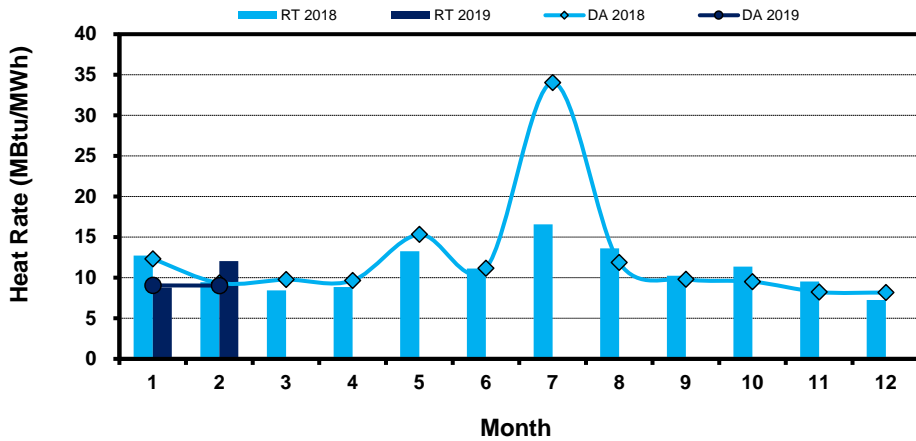
### Houston Zone



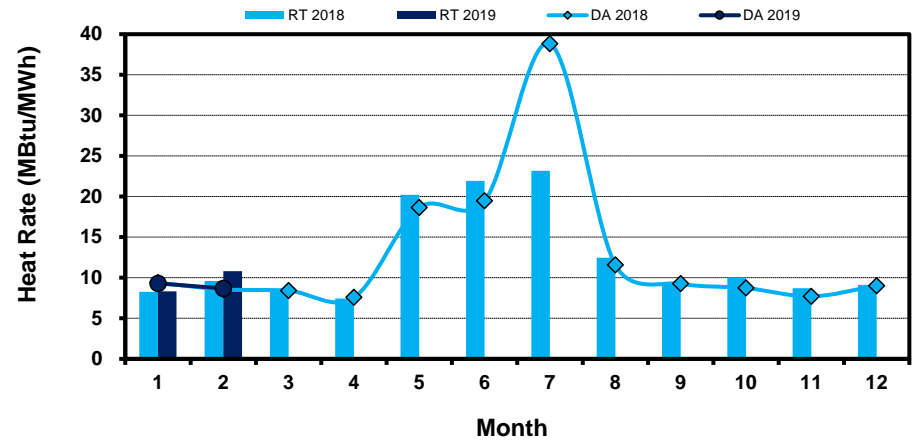
### North Zone



### South Zone



### West Zone



[Home <<](#)

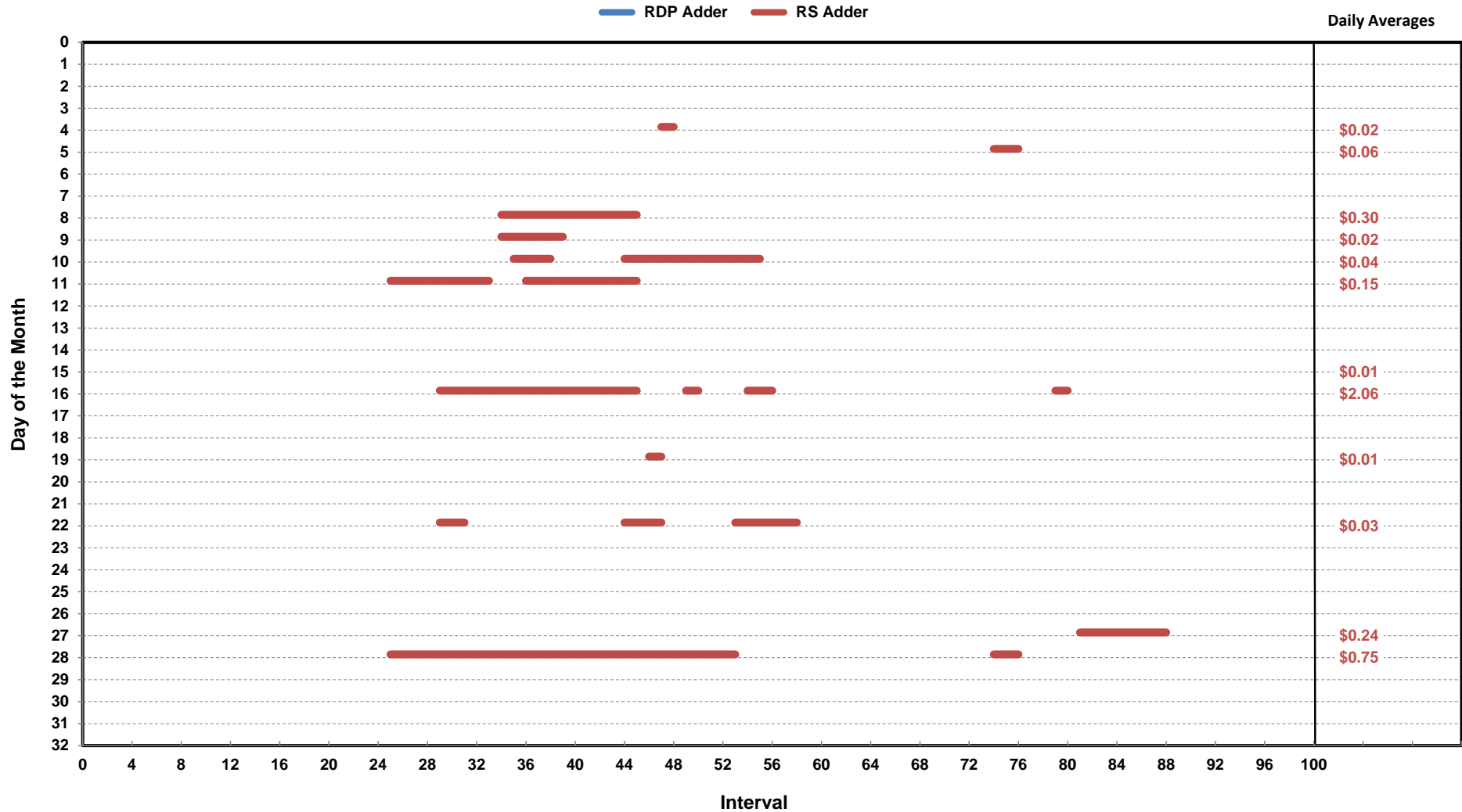
[previous <<](#)

[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 Feb-2019



[Home <<](#)

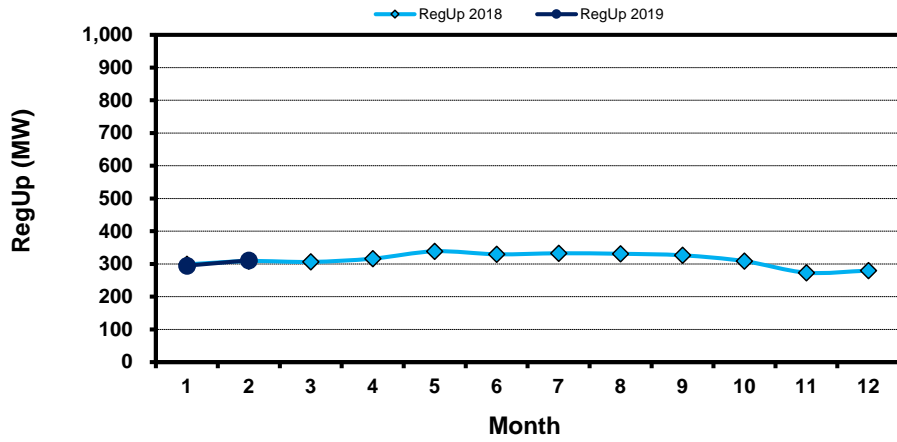
[previous <<](#)

[next >>](#)

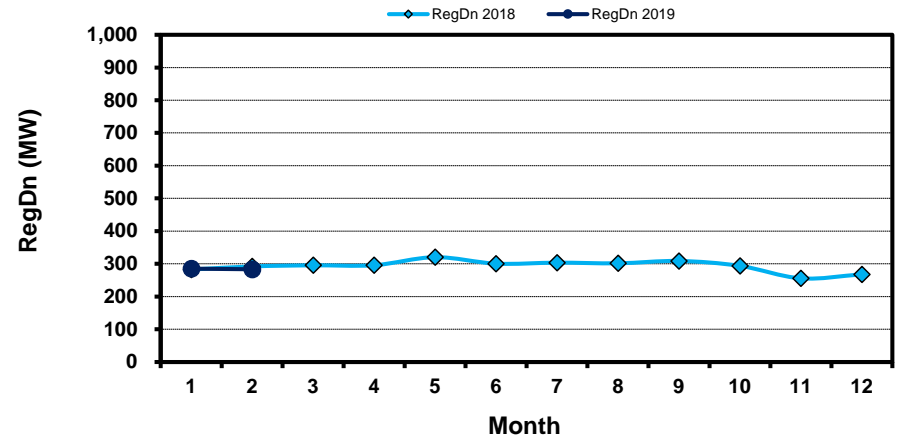
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# Monthly Average of Ancillary Services Required MW

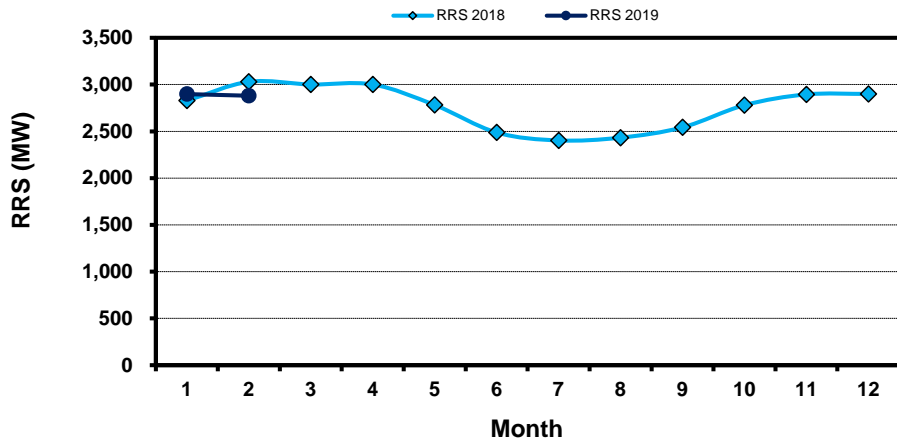
## Regulation Up



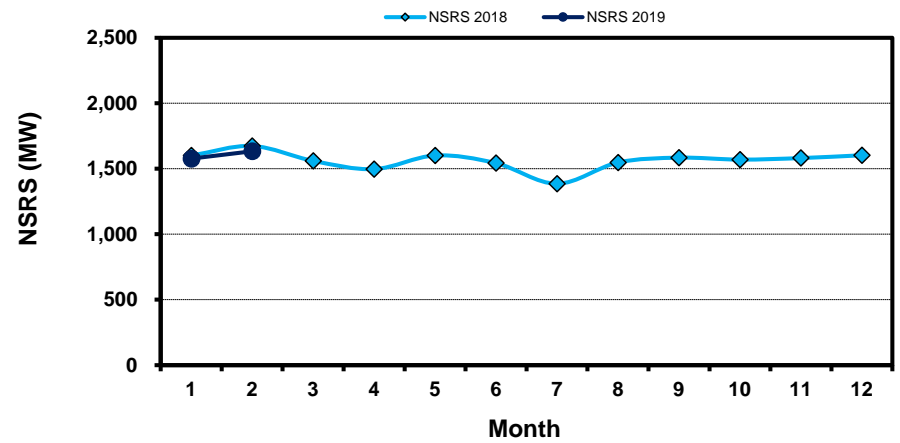
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



[Home <<](#)

[previous <<](#)

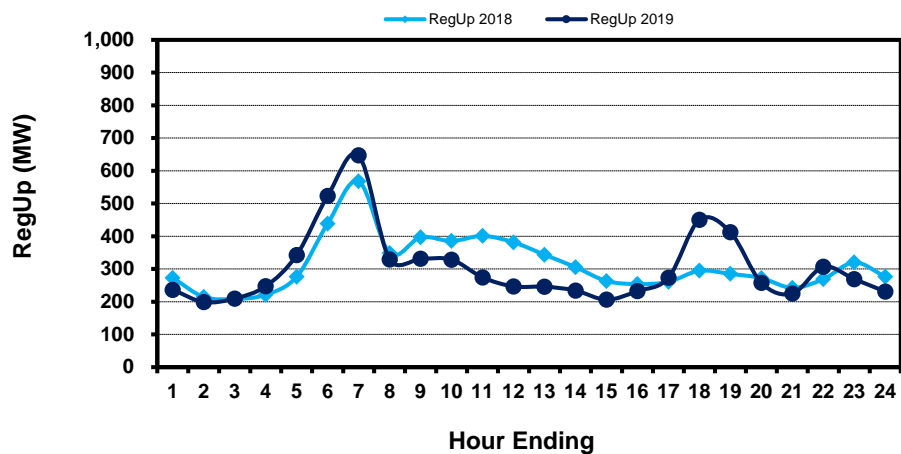
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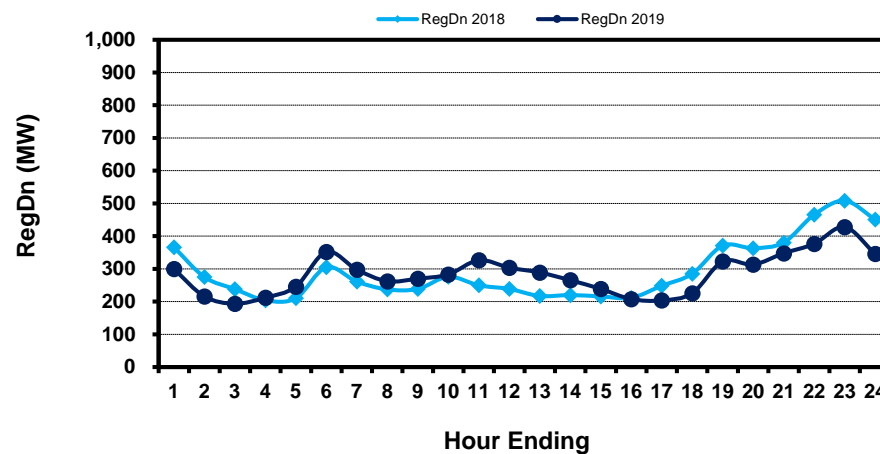


# Hourly Average of Ancillary Services Required MW

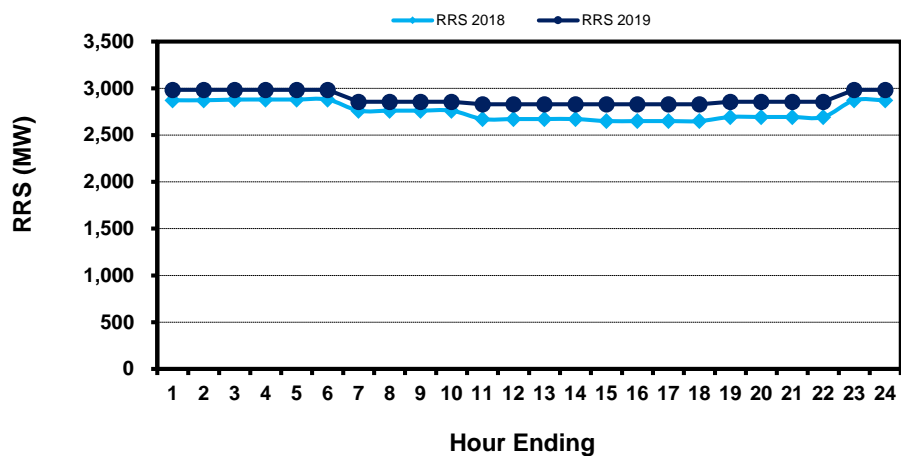
## Regulation Up



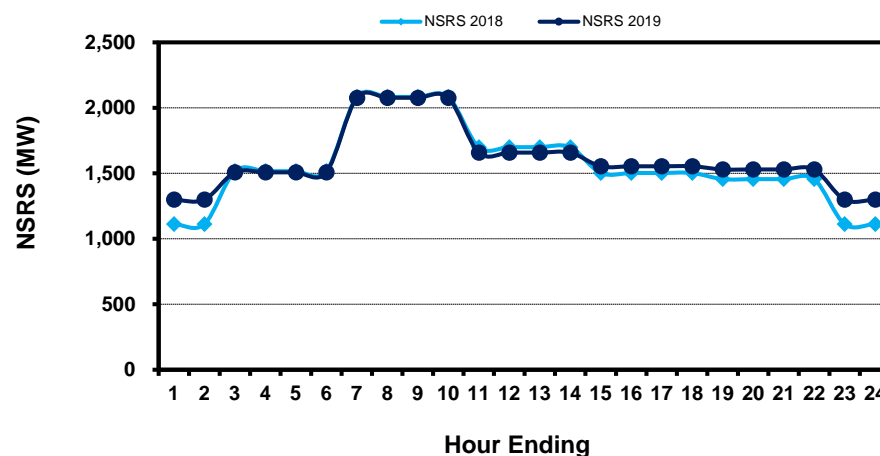
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



[Home <<](#)

[previous <<](#)

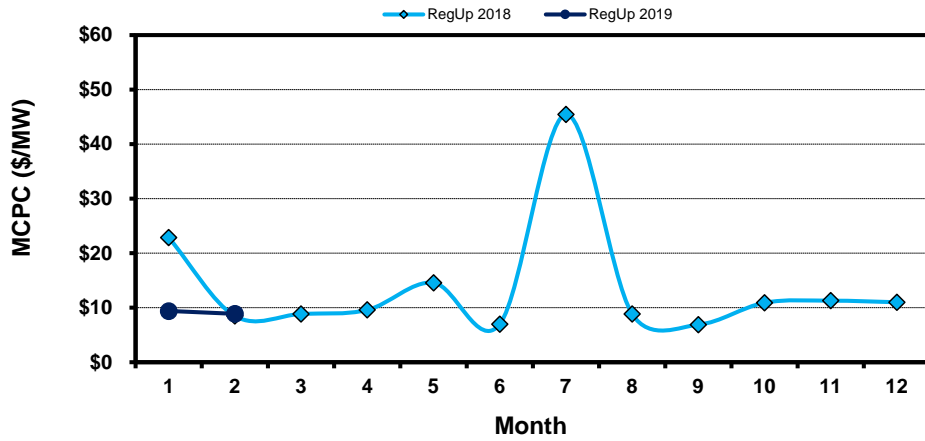
[next >>](#)

[data](#)

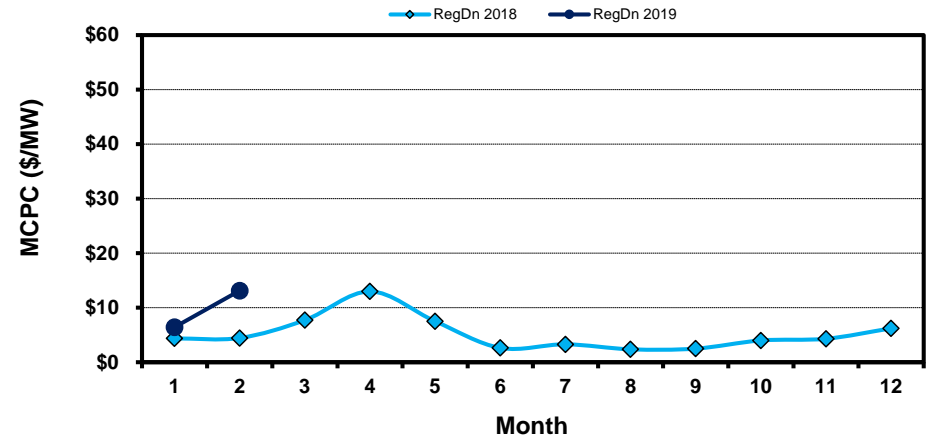
# Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

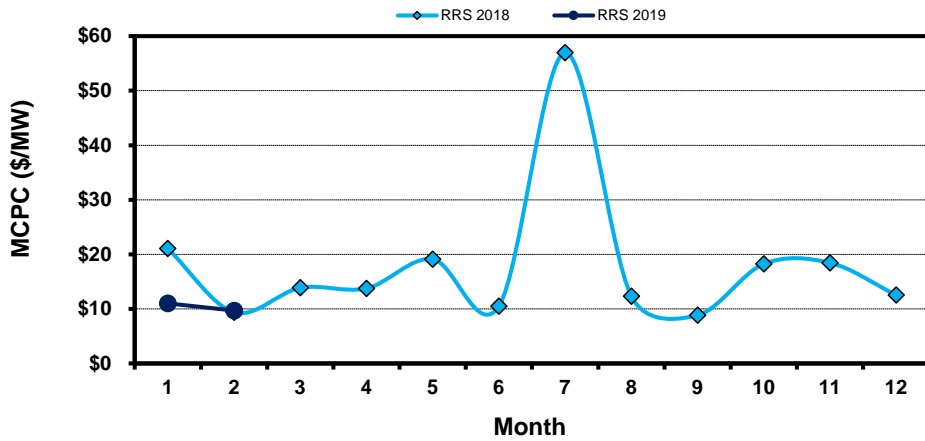
### Regulation Up



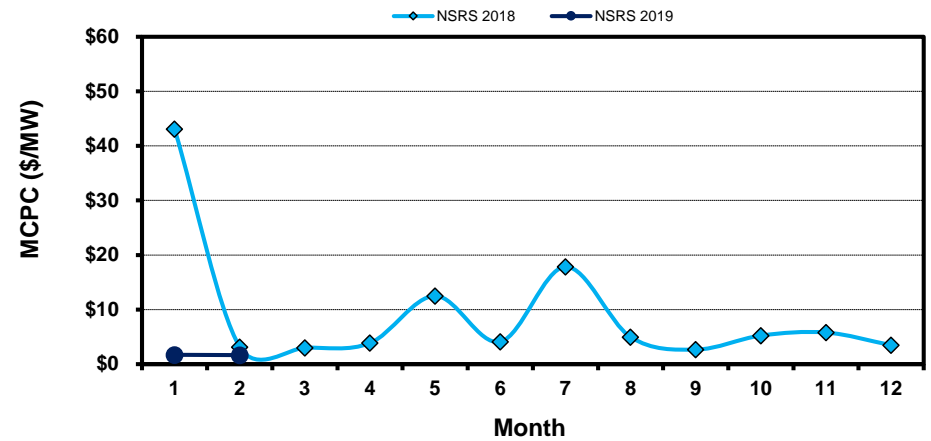
### Regulation Down



### Responsive Reserve



### Non-Spin Reserve



[Home <<](#)

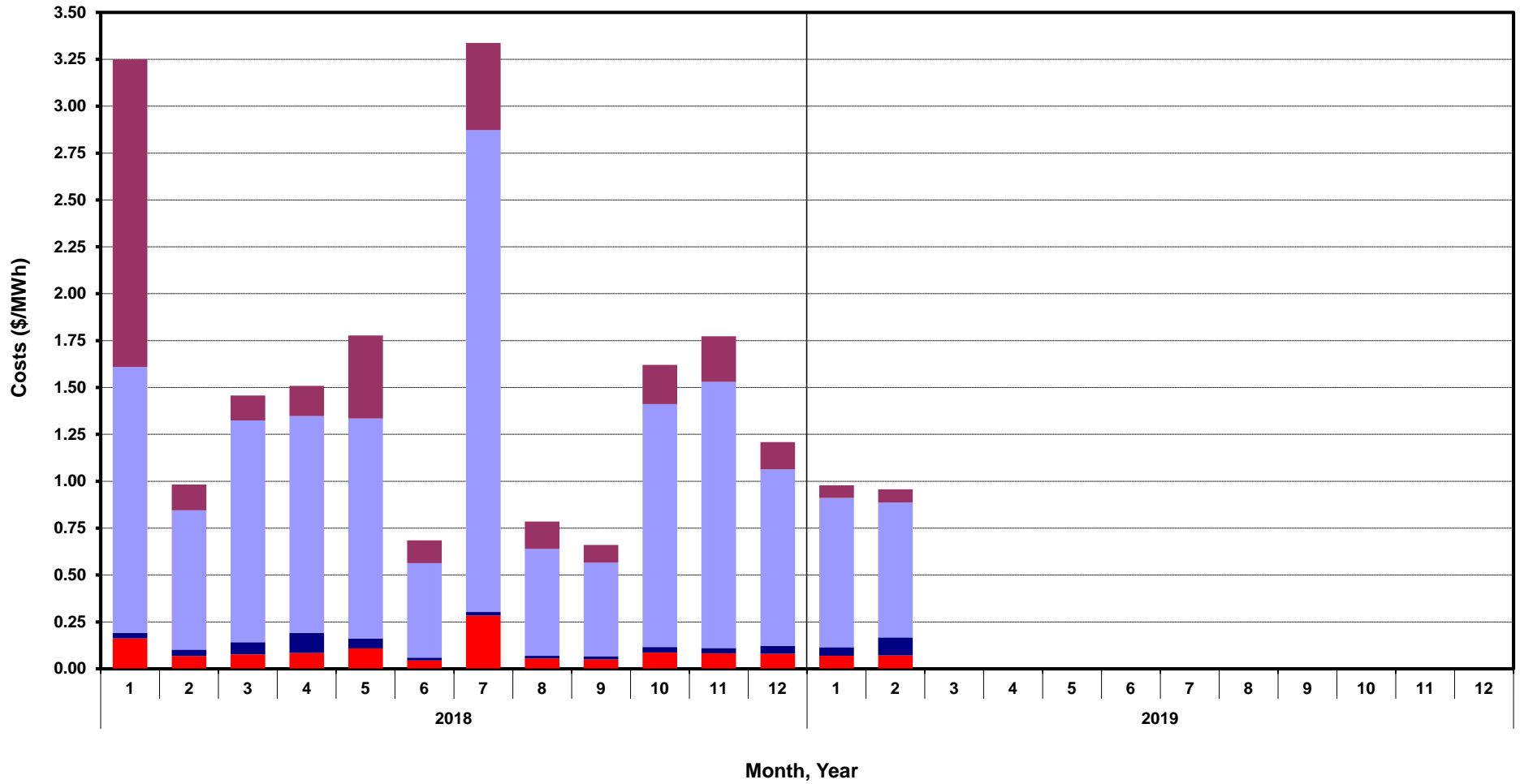
[previous <<](#)

[next >>](#)

[data](#)

# Monthly Average A/S Cost per MWh Load

RegUp RegDn RRS NonSpin



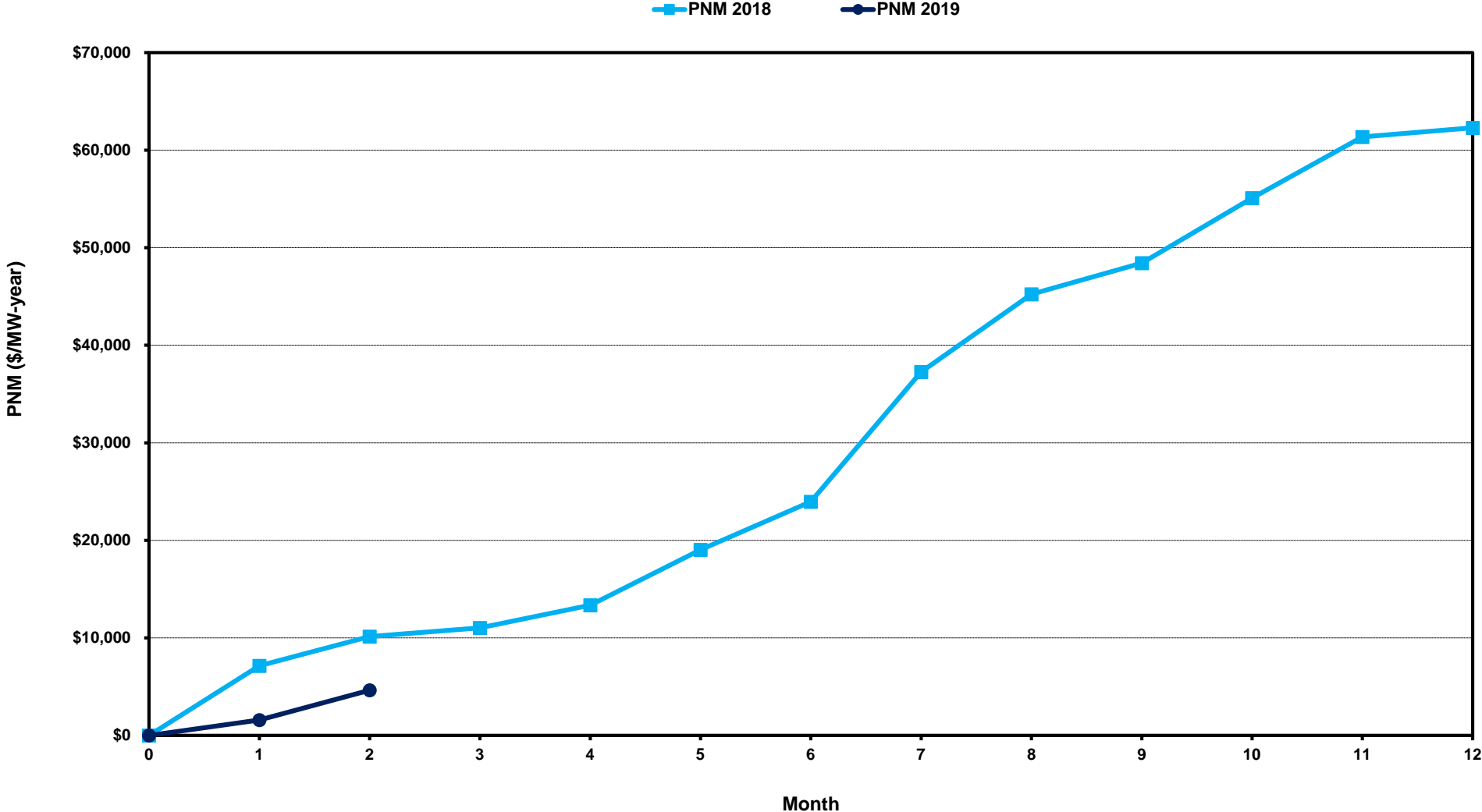
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

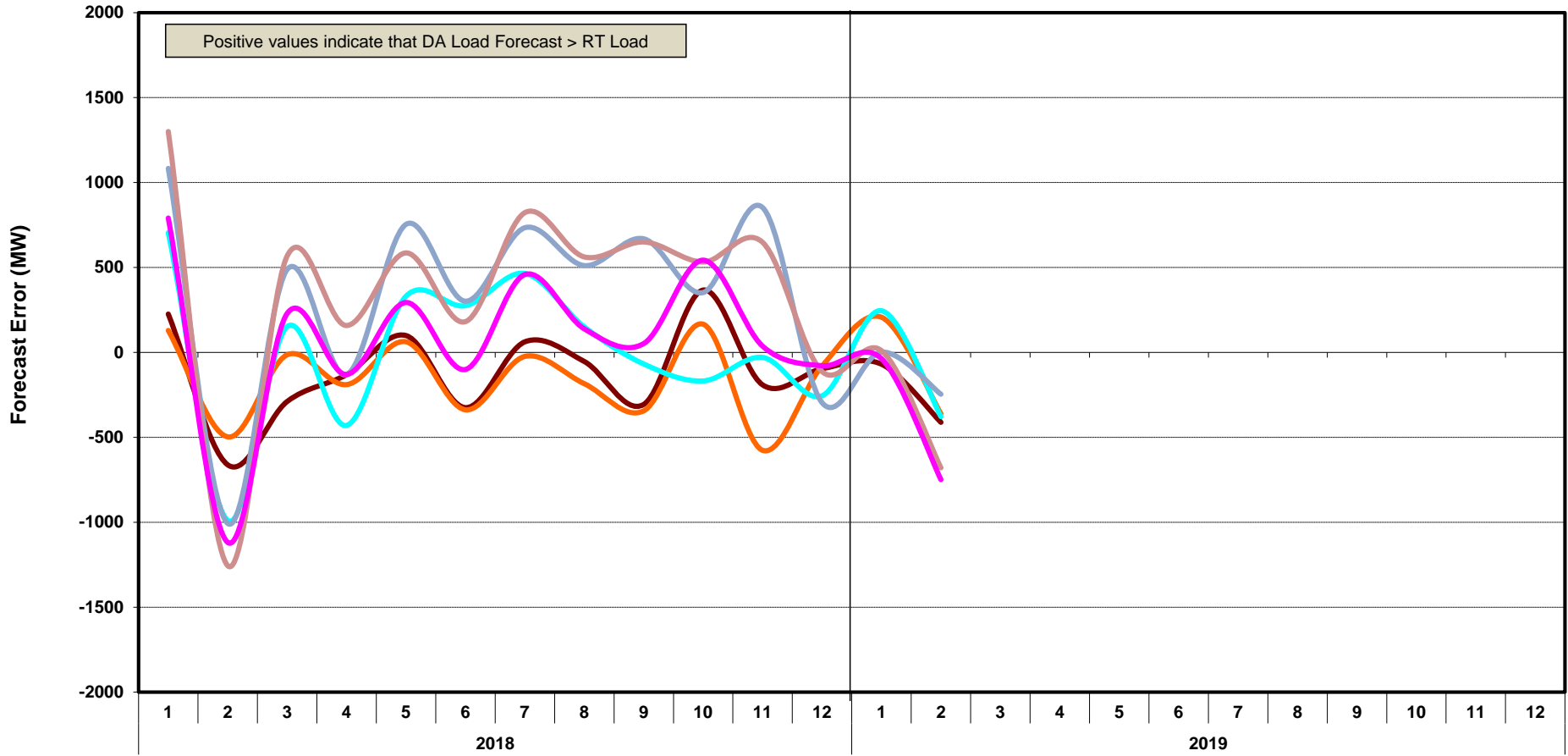
# ERCOT-wide Cumulative Peaker Net Margin



[Home <<](#)      [previous <<](#)      [next >>](#)  
[data](#)

# 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

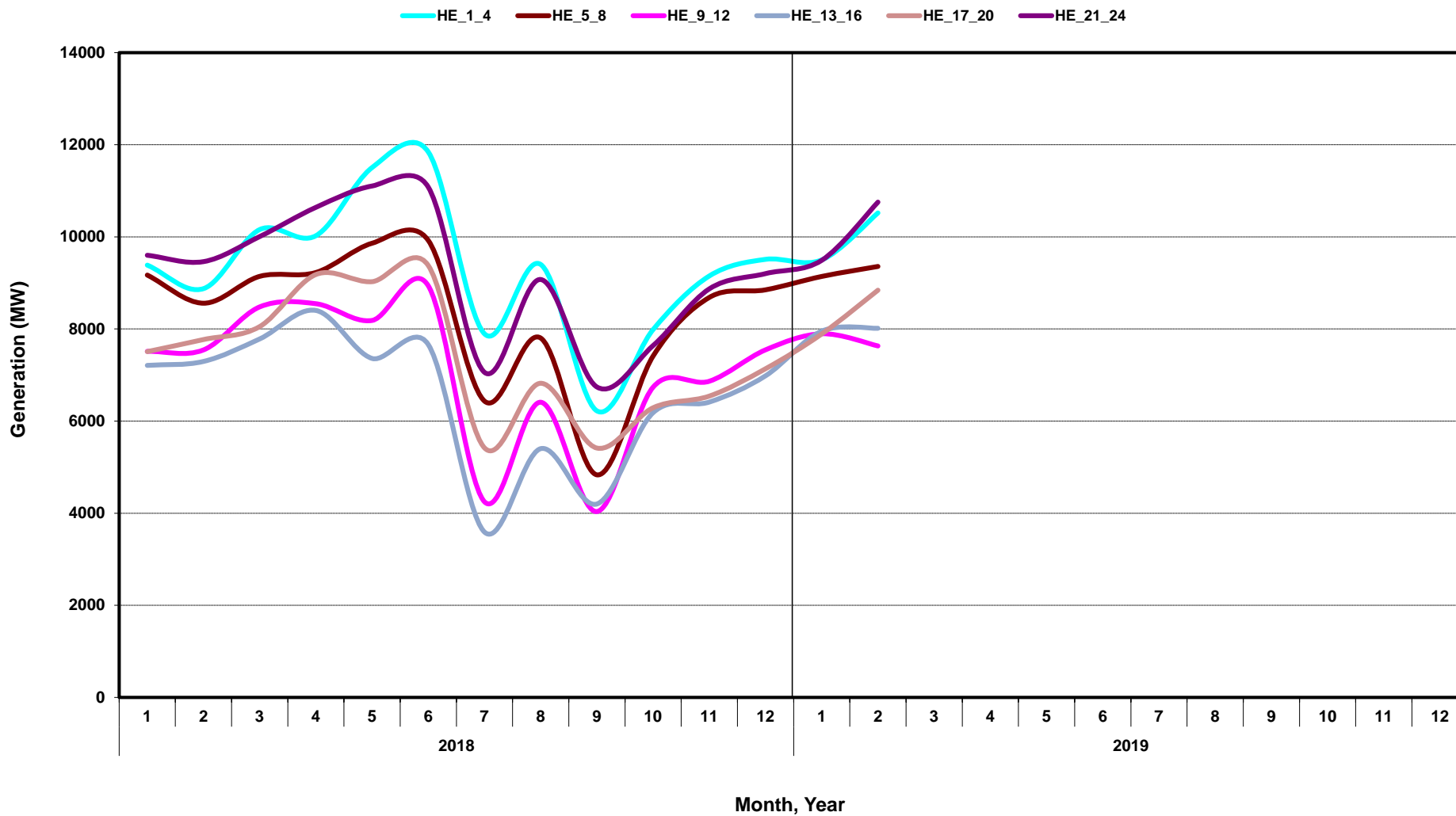
[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

# Monthly Average of Wind Generation by Hour Ending



[Home <<](#)

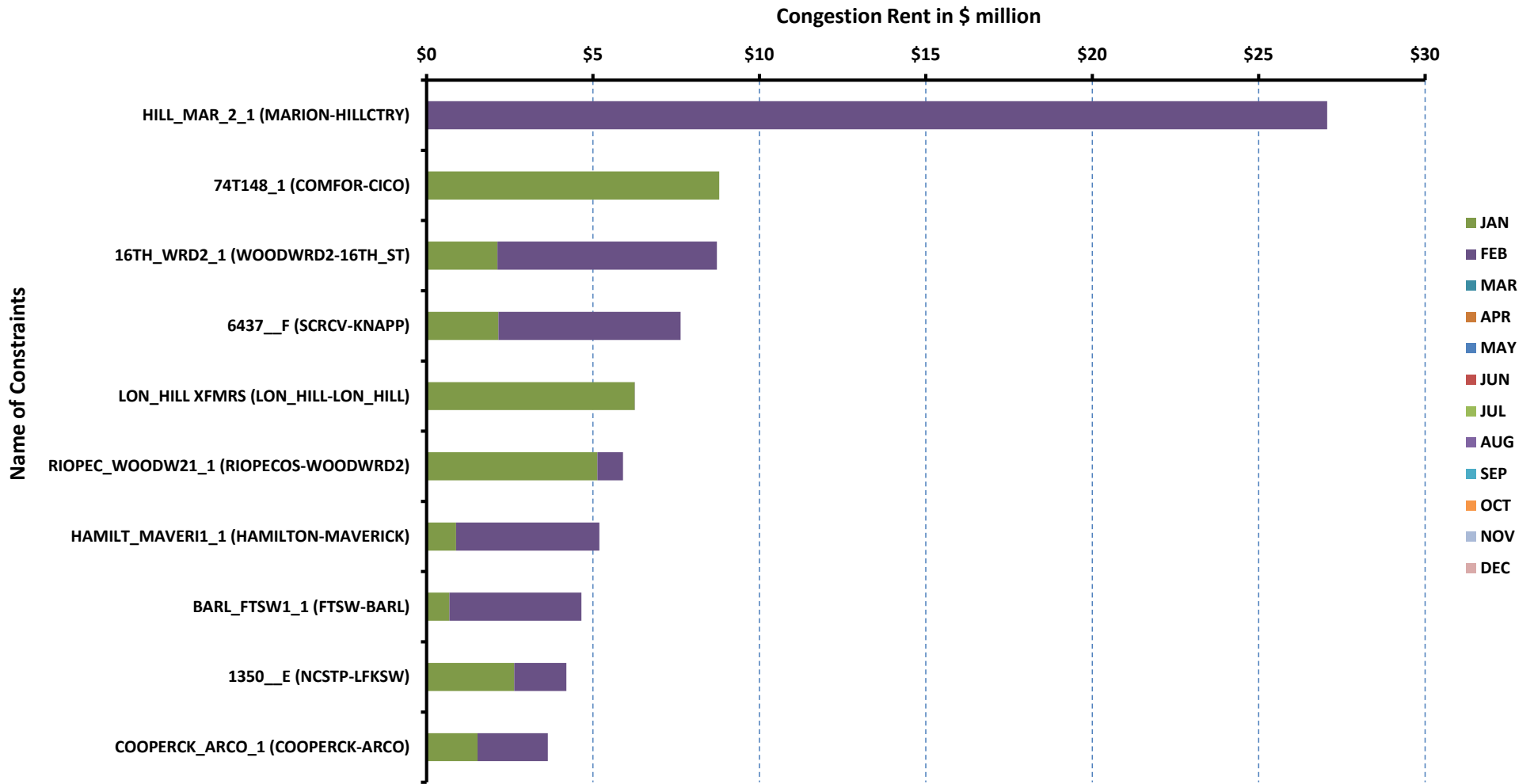
[previous <<](#)

[next >>](#)

[data](#)

# RT Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value - 2019



[Home <<](#)

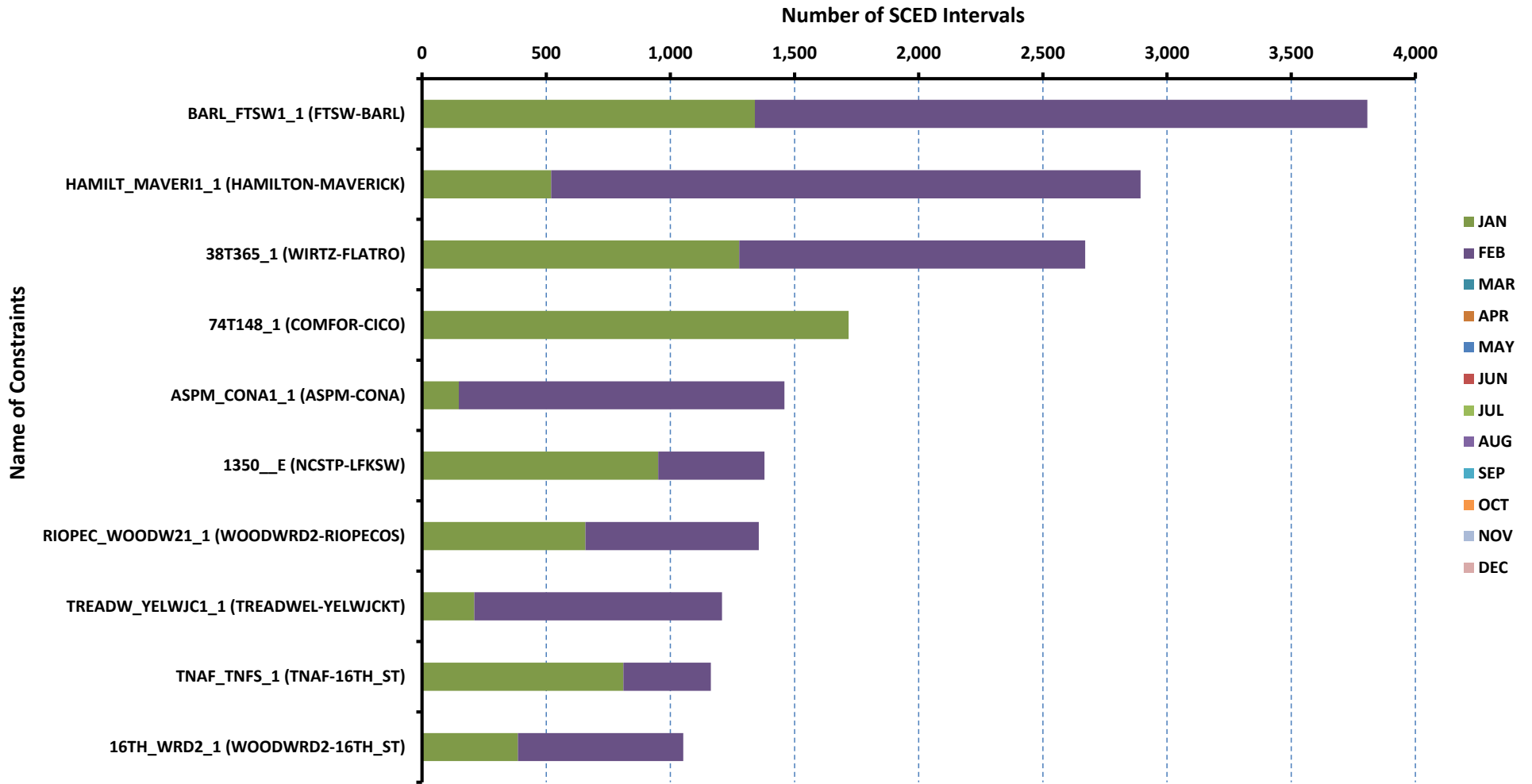
[previous <<](#)

[next >>](#)

[data](#)

# RT Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency - 2019



[Home <<](#)

[previous <<](#)

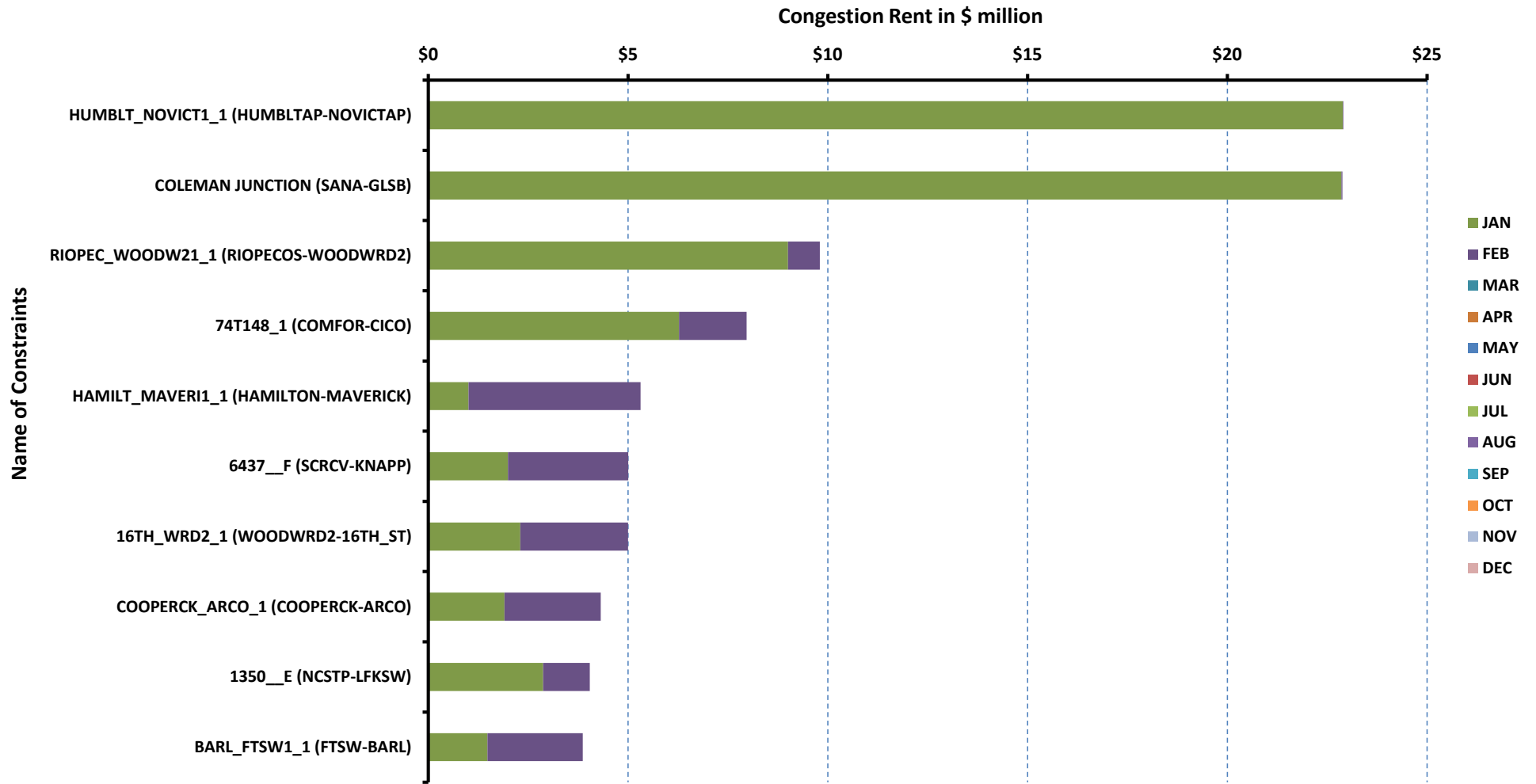
[next >>](#)

[data](#)



# DA Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value - 2019



[Home <<](#)

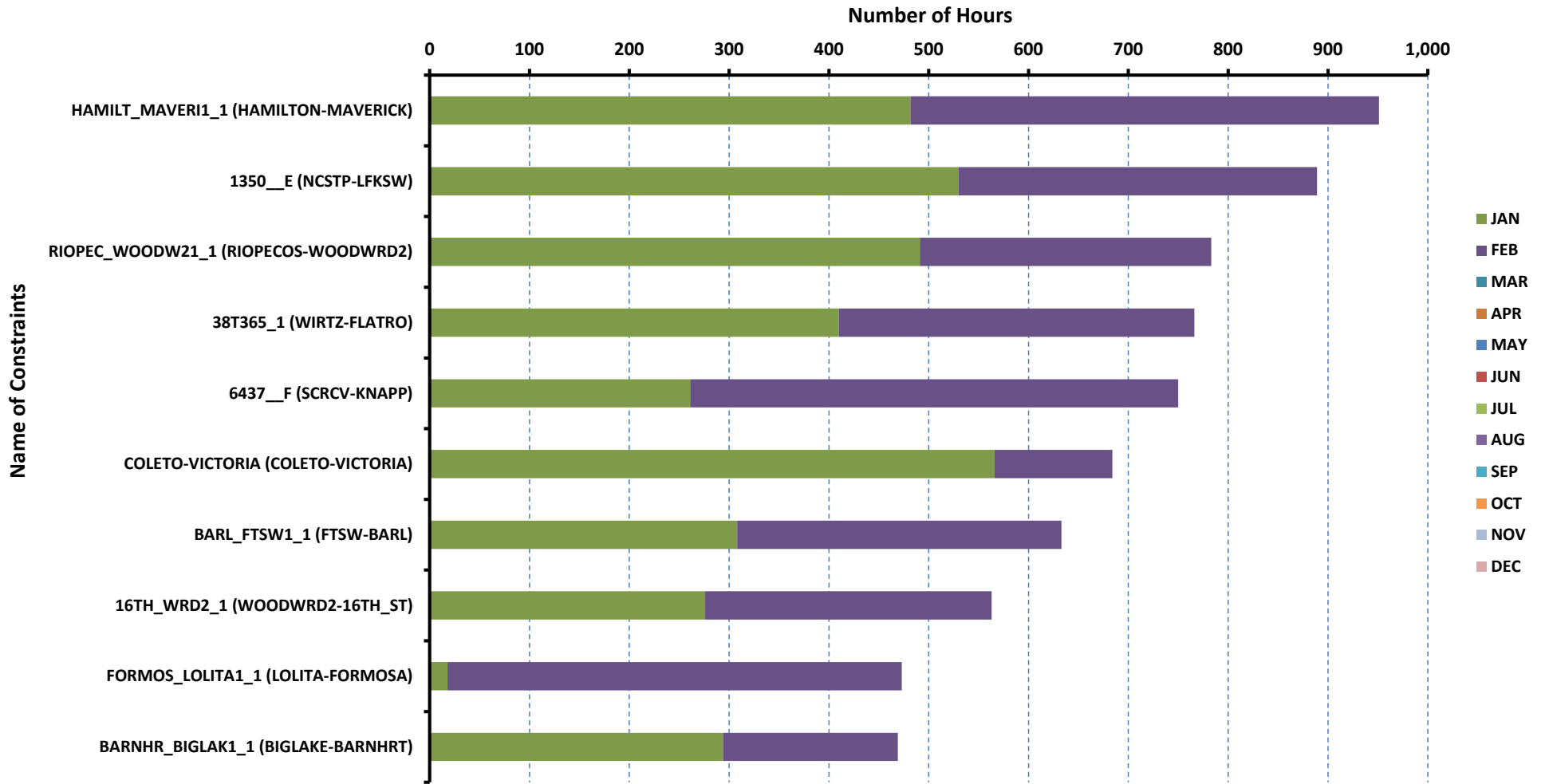
[previous <<](#)

[next >>](#)

[data](#)

# DA Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency - 2019



[Home <<](#)

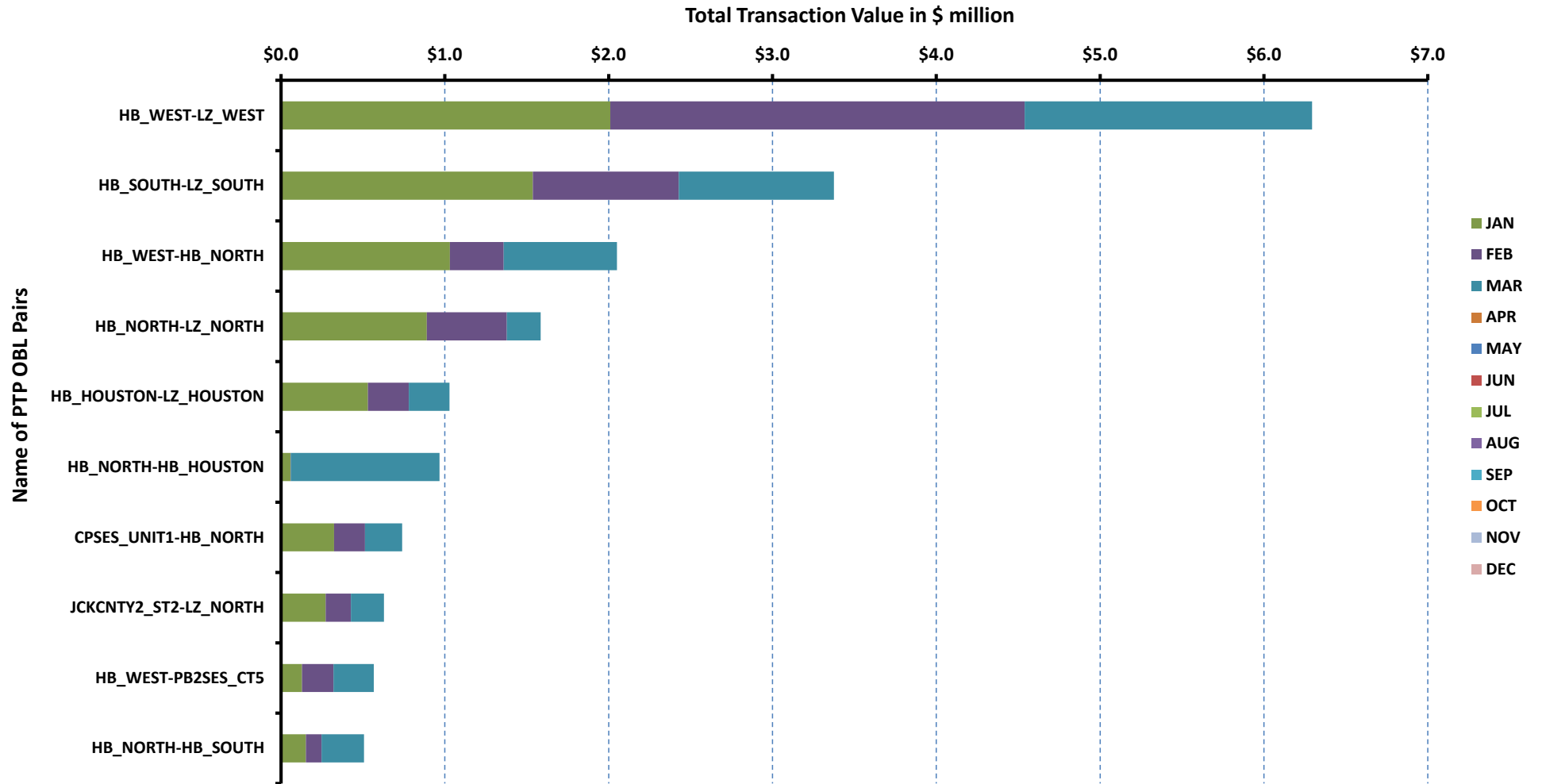
[previous <<](#)

[next >>](#)

[data](#)

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

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



[Home <<](#)

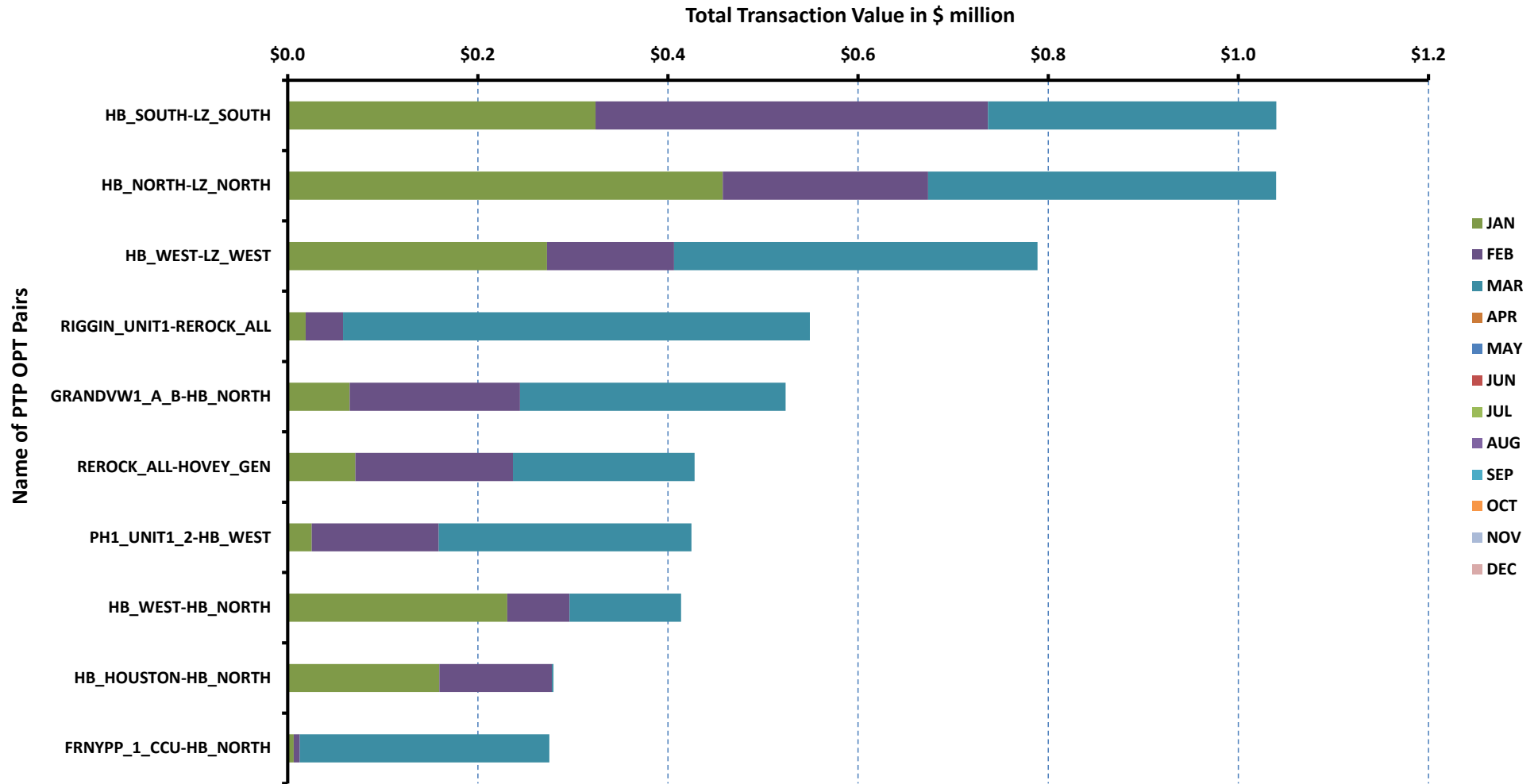
[previous <<](#)

[next >>](#)

[data](#)

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

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



[Home <<](#)

[previous <<](#)

[next >>](#)

[data](#)

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	\$ 26.68
	3	\$ -	\$ -
	4	\$ -	\$ -
	5	\$ -	\$ -
	6	\$ -	\$ -
	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	
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	14,084	19,181	14,463	4,964	
	9	17,979	25,162	17,984	5,661	12,364	16,072	12,140	4,533	
	10	16,718	22,540	16,381	5,492	10,919	13,392	10,516	4,333	
	11	14,993	22,122	16,789	5,200	9,738	13,449	9,988	4,448	
	12	12,540	20,244	14,871	5,325	9,601	14,196	10,136	4,677	
2019	1	13,393	21,735	15,218	5,564	9,800	15,185	10,385	4,715	
	2	12,928	22,720	15,276	5,539	9,726	14,478	9,962	4,647	
	3	-	-	-	-	-	-	-	-	
	4	-	-	-	-	-	-	-	-	
	5	-	-	-	-	-	-	-	-	
	6	-	-	-	-	-	-	-	-	
	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
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	\$ 39.60	\$ 34.97	\$ 33.45	\$ 33.12	\$ 33.15	\$ 30.40
	11	\$ 40.98	\$ 36.94	\$ 39.14	\$ 35.79	\$ 32.90	\$ 33.42	\$ 33.83	\$ 31.66
	12	\$ 28.56	\$ 29.93	\$ 28.42	\$ 35.75	\$ 31.02	\$ 32.07	\$ 32.04	\$ 35.31
2019	1	\$ 24.67	\$ 24.09	\$ 26.46	\$ 25.06	\$ 26.05	\$ 25.21	\$ 27.24	\$ 28.00
	2	\$ 23.31	\$ 24.55	\$ 32.10	\$ 28.80	\$ 22.06	\$ 21.63	\$ 24.07	\$ 23.15
	3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

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	\$ 26.68	10.01	\$ 22.55	8.46
	3	\$ -	\$ -	-	\$ -	-
	4	\$ -	\$ -	-	\$ -	-
	5	\$ -	\$ -	-	\$ -	-
	6	\$ -	\$ -	-	\$ -	-
	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
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	8.20	8.79	8.00	8.32
	2	8.28	9.03	8.12	8.68	8.74	12.04	9.21	10.81
	3	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	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
2019	2	1	\$ -	\$ -	0	0	80	90
2019	2	2	\$ -	\$ -	0	0	80	90
2019	2	3	\$ -	\$ -	0	0	80	90
2019	2	4	\$ 0.02	\$ -	2	0	80	90
2019	2	5	\$ 0.06	\$ -	3	0	80	90
2019	2	6	\$ -	\$ -	0	0	80	90
2019	2	7	\$ -	\$ -	0	0	80	90
2019	2	8	\$ 0.30	\$ -	12	0	80	90
2019	2	9	\$ 0.02	\$ -	7	0	80	90
2019	2	10	\$ 0.04	\$ -	17	0	80	90
2019	2	11	\$ 0.15	\$ -	19	0	80	90
2019	2	12	\$ -	\$ -	0	0	80	90
2019	2	13	\$ -	\$ -	0	0	80	90
2019	2	14	\$ -	\$ -	0	0	80	90
2019	2	15	\$ 0.01	\$ -	1	0	80	90
2019	2	16	\$ 2.06	\$ -	24	0	80	90
2019	2	17	\$ -	\$ -	0	0	80	90
2019	2	18	\$ -	\$ -	0	0	80	90
2019	2	19	\$ 0.01	\$ -	2	0	80	90
2019	2	20	\$ -	\$ -	0	0	80	90
2019	2	21	\$ -	\$ -	0	0	80	90
2019	2	22	\$ 0.03	\$ -	14	0	80	90
2019	2	23	\$ -	\$ -	0	0	80	90
2019	2	24	\$ -	\$ -	0	0	80	90
2019	2	25	\$ -	\$ -	0	0	80	90
2019	2	26	\$ -	\$ -	0	0	80	90
2019	2	27	\$ 0.24	\$ -	8	0	80	90
2019	2	28	\$ 0.75	\$ -	32	0	80	90
0	0	0	\$ -	\$ -	0	0	0	0
0	0	0	\$ -	\$ -	0	0	0	0
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
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	-	-	-	-
	4	-	-	-	-
	5	-	-	-	-
	6	-	-	-	-
	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
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	300	1,299	2,984	237
	2	216	1,299	2,984	199
	3	194	1,508	2,984	210
	4	212	1,508	2,984	247
	5	246	1,508	2,984	343
	6	352	1,508	2,984	523
	7	298	2,077	2,856	647
	8	262	2,077	2,856	329
	9	270	2,077	2,856	331
	10	283	2,077	2,856	328
	11	326	1,658	2,830	274
	12	304	1,658	2,830	247
	13	289	1,658	2,830	246
	14	265	1,658	2,830	234
	15	239	1,554	2,830	206
	16	208	1,554	2,830	232
	17	204	1,554	2,830	273
	18	226	1,554	2,830	450
	19	323	1,530	2,856	412
	20	313	1,530	2,856	258
	21	348	1,530	2,856	225
	22	376	1,530	2,856	307
	23	428	1,299	2,984	269
	24	346	1,299	2,984	231

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

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	\$ -	\$ -	\$ -	\$ -
	4	\$ -	\$ -	\$ -	\$ -
	5	\$ -	\$ -	\$ -	\$ -
	6	\$ -	\$ -	\$ -	\$ -
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

Monthly Average A/S Cost per MWh Load					
year	month	AScost_REGDN	AScost_NSPIIN	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	\$ -	\$ -	\$ -	\$ -
	4	\$ -	\$ -	\$ -	\$ -
	5	\$ -	\$ -	\$ -	\$ -
	6	\$ -	\$ -	\$ -	\$ -
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

[Home <<](#)

[previous <<](#)

[next >>](#)

[chart](#)

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	\$ -	\$ -
	5	\$ -	\$ -
	6	\$ -	\$ -
	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
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	-	-	-	-	-	-
	4	-	-	-	-	-	-
	5	-	-	-	-	-	-
	6	-	-	-	-	-	-
	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
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	-	-	-	-	-	-
	4	-	-	-	-	-	-
	5	-	-	-	-	-	-
	6	-	-	-	-	-	-
	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	2019	BARL_FTSW1_1 (FTSW-BARL)	3,807	1	1,340	2,467	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	HAMILT_MAVR11_1 (HAMILTON-MAVERICK)	2,893	2	520	2,373	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	38T365_1 (WIRTZ-FLATRO)	2,670	3	1,277	1,393	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	74T148_1 (COMFOR-CICO)	1,718	4	1,718	-	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	ASPM_CONA1_1 (ASPM-CONA)	1,459	5	148	1,311	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	1350_E (NCSTP-LFKSW)	1,379	6	951	428	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	RIOPEC_WOODW21_1 (WOODWRD2-RIOPECOS)	1,356	7	658	698	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	TREADW_YELWJC1_1 (TREADWEL-YELWJCKT)	1,208	8	210	998	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	TNAF_TNFS_1 (TNAF-16TH_ST)	1,163	9	811	352	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	16TH_WRD2_1 (WOODWRD2-16TH_ST)	1,052	10	386	666	-	-	-	-	-	-	-	-	-	-	
TOP10_RENT	2019	HILL_MAR_2_1 (MARION-HILLCTRY)	\$ 27.06	1	\$ -	\$ 27.06	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	74T148_1 (COMFOR-CICO)	\$ 8.79	2	\$ 8.79	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	16TH_WRD2_1 (WOODWRD2-16TH_ST)	\$ 8.72	3	\$ 2.13	\$ 6.59	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	6437_F (SCRCV-KNAPP)	\$ 7.63	4	\$ 2.16	\$ 5.48	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	LON_HILL_XFMRS (LON_HILL-LON_HILL)	\$ 6.25	5	\$ 6.25	\$ 0.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	\$ 5.90	6	\$ 5.13	\$ 0.77	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	HAMILT_MAVR11_1 (HAMILTON-MAVERICK)	\$ 5.19	7	\$ 0.89	\$ 4.31	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	BARL_FTSW1_1 (FTSW-BARL)	\$ 4.65	8	\$ 0.68	\$ 3.97	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	1350_E (NCSTP-LFKSW)	\$ 4.20	9	\$ 2.63	\$ 1.57	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	COOPERCK_ARCO_1 (COOPERCK-ARCO)	\$ 3.64	10	\$ 1.53	\$ 2.11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

[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	2019	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	951	1	482	469	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	1350_E (NCSTP-LFKSW)	889	2	530	359	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	783	3	491	292	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	38T365_1 (WIRTZ-FLATRO)	766	4	410	356	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	6437_F (SCRCV-KNAPP)	750	5	261	489	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	COLETO-VICTORIA (COLETO-VICTORIA)	684	6	566	118	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	BARL_FTSW1_1 (FTSW-BARL)	633	7	308	325	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	16TH_WRD2_1 (WOODWRD2-16TH_ST)	563	8	276	287	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	FORMOS_LOLITA1_1 (LOLITA-FORMOSA)	473	9	18	455	-	-	-	-	-	-	-	-	-	-	
FREQ_EXIST	2019	BARNHR_BIGLAK1_1 (BIGLAKE-BARNHRT)	469	10	294	175	-	-	-	-	-	-	-	-	-	-	
TOP10_RENT	2019	HUMBLT_NOVICT1_1 (HUMBLTAP-NOVICTAP)	\$ 22.91	1	\$ 22.89	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	COLEMAN JUNCTION (SANA-GLSB)	\$ 22.88	2	\$ 22.86	\$ 0.02	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	\$ 9.80	3	\$ 9.00	\$ 0.80	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	74T148_1 (COMFOR-CICO)	\$ 7.97	4	\$ 6.28	\$ 1.69	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	\$ 5.31	5	\$ 1.01	\$ 4.30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	6437_F (SCRCV-KNAPP)	\$ 5.01	6	\$ 1.99	\$ 3.01	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	16TH_WRD2_1 (WOODWRD2-16TH_ST)	\$ 5.00	7	\$ 2.30	\$ 2.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	COOPERCK_ARCO_1 (COOPERCK-ARCO)	\$ 4.32	8	\$ 1.90	\$ 2.41	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	1350_E (NCSTP-LFKSW)	\$ 4.04	9	\$ 2.87	\$ 1.17	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2019	BARL_FTSW1_1 (FTSW-BARL)	\$ 3.87	10	\$ 1.48	\$ 2.39	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

[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																	
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	\$ 6.29	1	\$ 2.01	\$ 2.53	\$ 1.75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB SOUTH-LZ SOUTH	\$ 3.38	2	\$ 1.54	\$ 0.89	\$ 0.95	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB WEST-HB NORTH	\$ 2.05	3	\$ 1.03	\$ 0.33	\$ 0.69	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB NORTH-LZ NORTH	\$ 1.58	4	\$ 0.89	\$ 0.49	\$ 0.21	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB HOUSTON-LZ HOUSTON	\$ 1.03	5	\$ 0.53	\$ 0.25	\$ 0.25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB NORTH-HB HOUSTON	\$ 0.97	6	\$ 0.06	\$ 0.00	\$ 0.91	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	CPSES UNIT1-HB NORTH	\$ 0.74	7	\$ 0.32	\$ 0.19	\$ 0.23	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	JCKCNTY2_ST2-LZ NORTH	\$ 0.63	8	\$ 0.27	\$ 0.15	\$ 0.20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB WEST-PB2SES CT5	\$ 0.57	9	\$ 0.13	\$ 0.19	\$ 0.25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2019	HB NORTH-HB SOUTH	\$ 0.51	10	\$ 0.15	\$ 0.10	\$ 0.26	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	HB SOUTH-LZ SOUTH	\$ 1.04	1	\$ 0.32	\$ 0.41	\$ 0.30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	HB NORTH-LZ NORTH	\$ 1.04	2	\$ 0.46	\$ 0.22	\$ 0.37	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	HB WEST-LZ WEST	\$ 0.79	3	\$ 0.27	\$ 0.13	\$ 0.38	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	RIGGIN UNIT1-REROCK ALL	\$ 0.55	4	\$ 0.02	\$ 0.04	\$ 0.49	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	GRANDVW1_A_B-HB NORTH	\$ 0.52	5	\$ 0.07	\$ 0.18	\$ 0.28	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	REROCK ALL-HOVEY GEN	\$ 0.43	6	\$ 0.07	\$ 0.17	\$ 0.19	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	PH1_UNIT1_2-HB WEST	\$ 0.42	7	\$ 0.03	\$ 0.13	\$ 0.27	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	HB WEST-HB NORTH	\$ 0.41	8	\$ 0.23	\$ 0.07	\$ 0.12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	HB HOUSTON-HB NORTH	\$ 0.28	9	\$ 0.16	\$ 0.12	\$ 0.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2019	FRNYPP_1_CCU-HB NORTH	\$ 0.28	10	\$ 0.01	\$ 0.01	\$ 0.26	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

[Home <<](#)

[previous <<](#)

[chart 1](#)

[chart 2](#)