

To the Public Utility Commission of Texas

ERCOT Wholesale Electricity Market Monthly Report

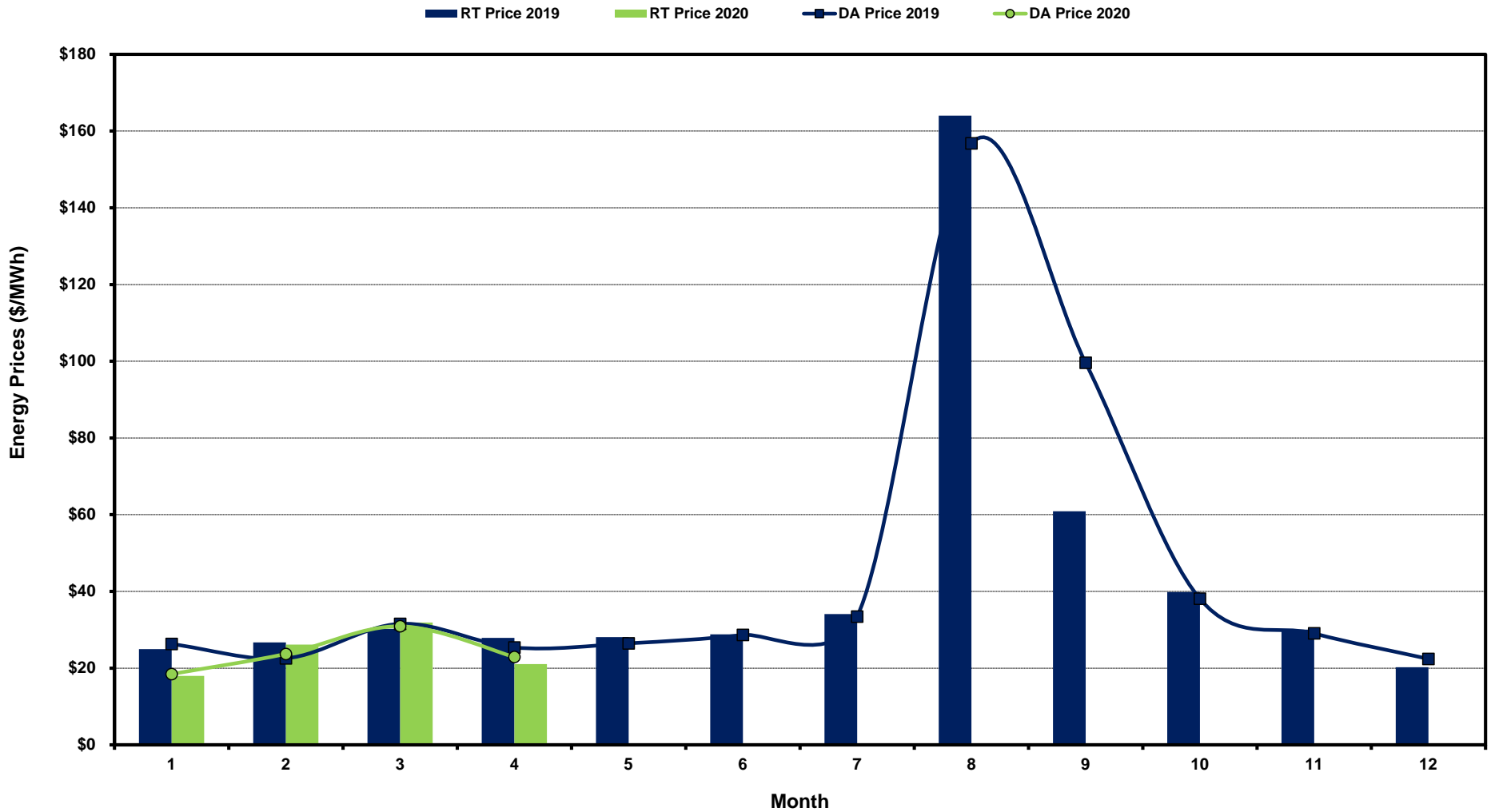
Monday, May 11, 2020

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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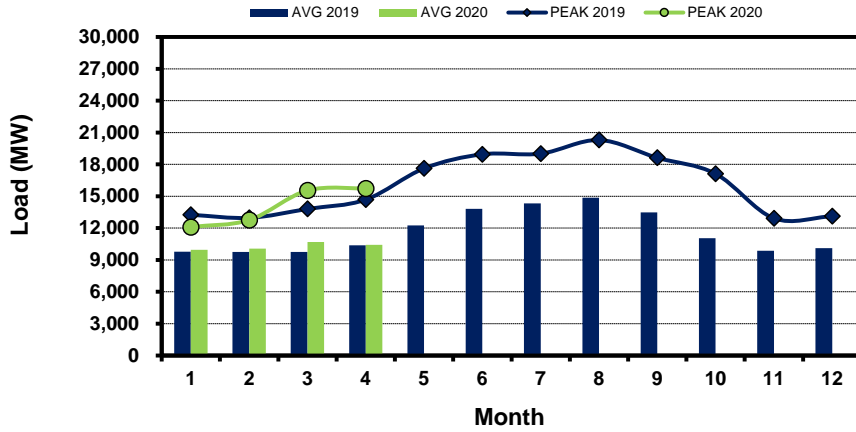
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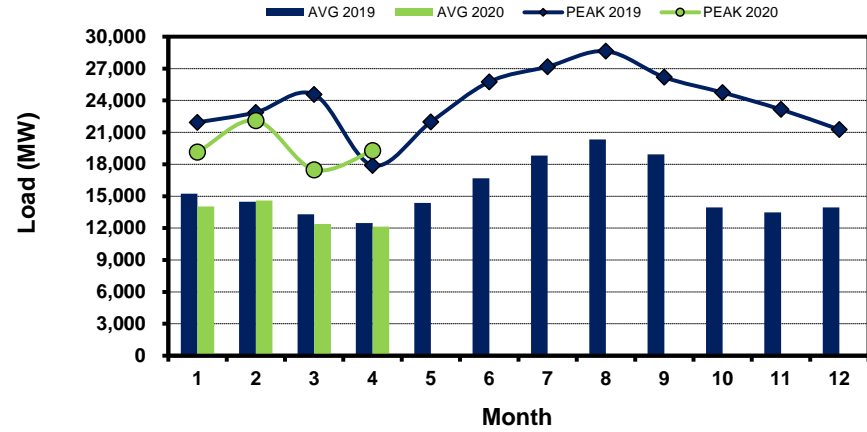
Load Zone Load Statistics

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

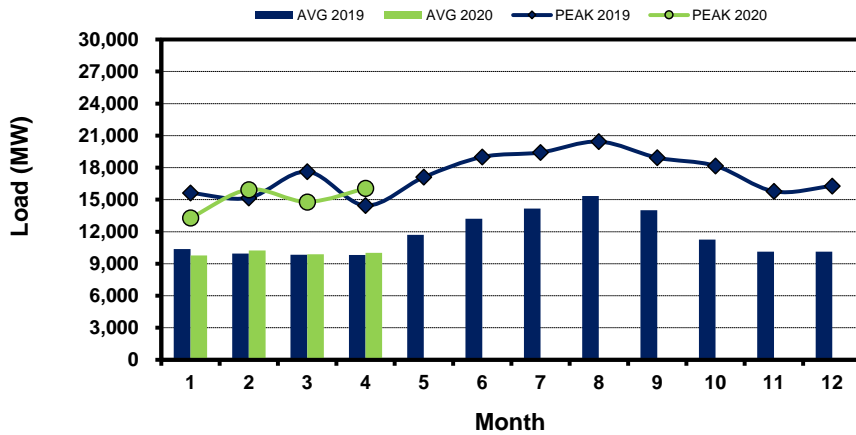
Houston Zone



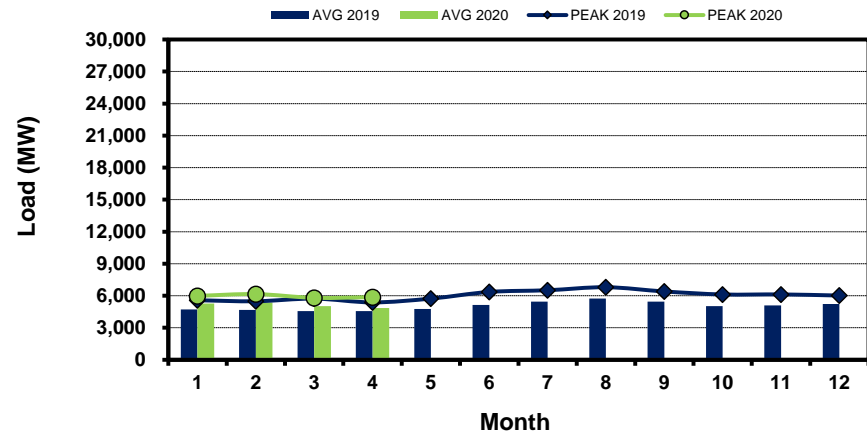
North Zone



South Zone



West Zone



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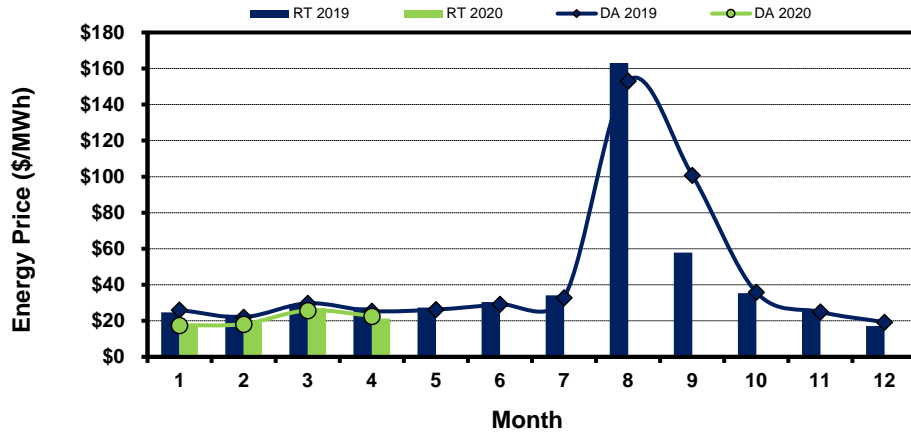
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Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

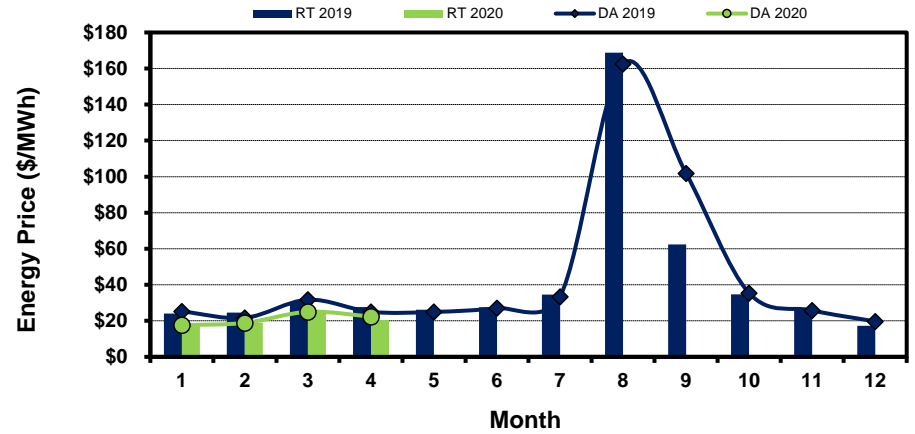
Load Zone Monthly Average Energy Price DA vs RT

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

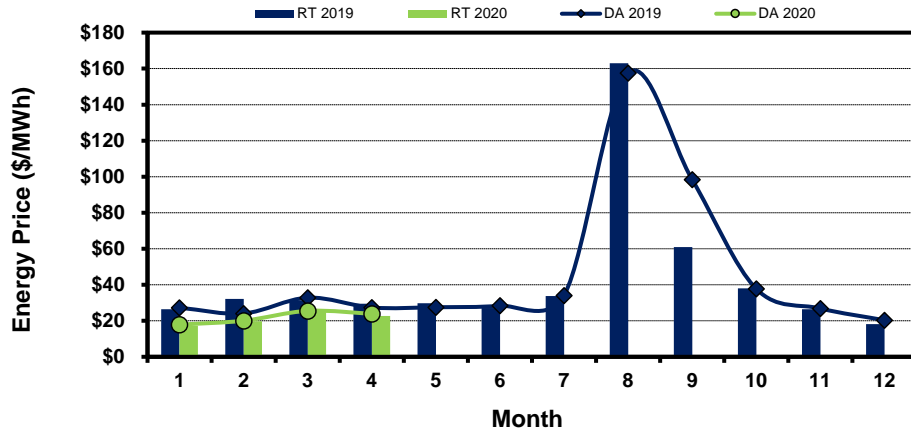
Houston Zone



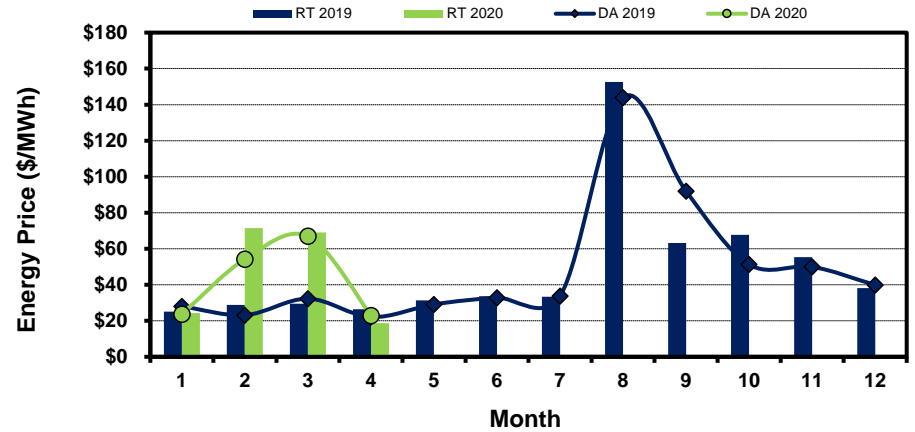
North Zone



South Zone



West Zone



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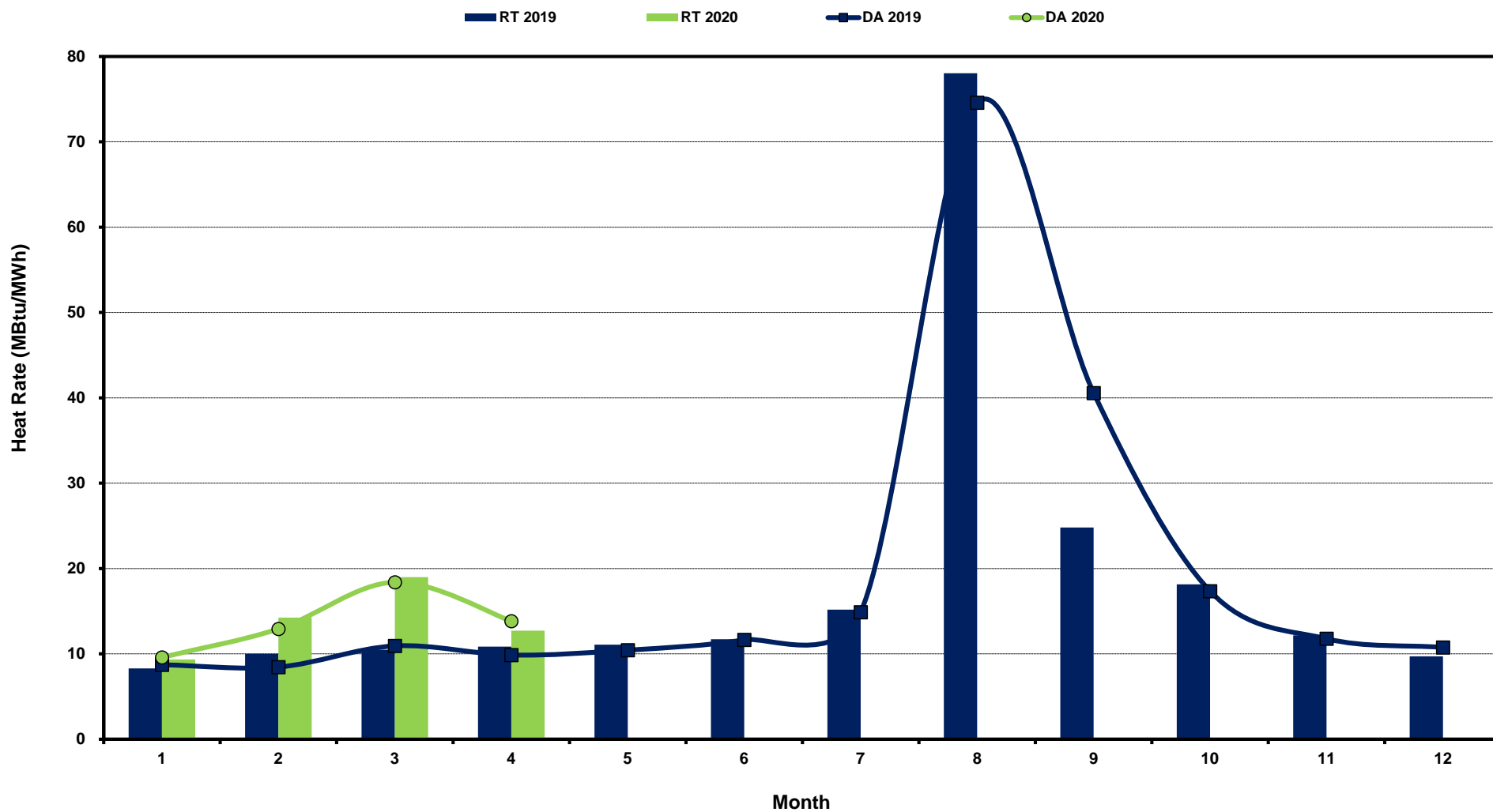
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Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

ERCOT-wide Monthly Implied Heat Rate DA vs RT

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



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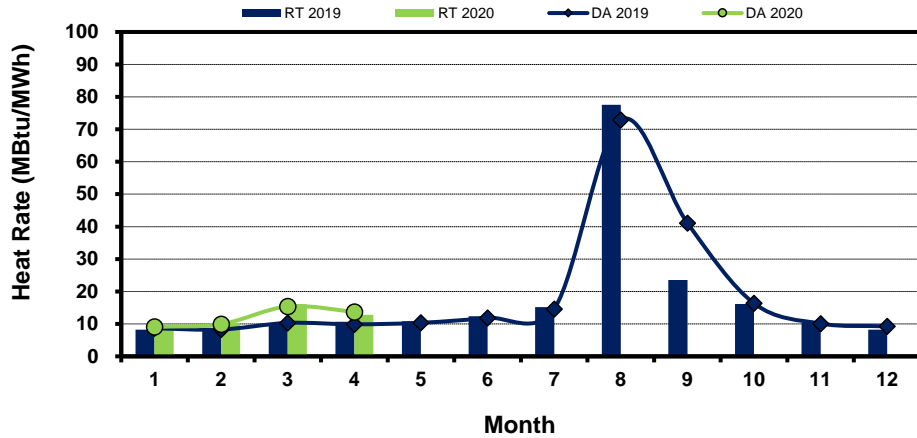
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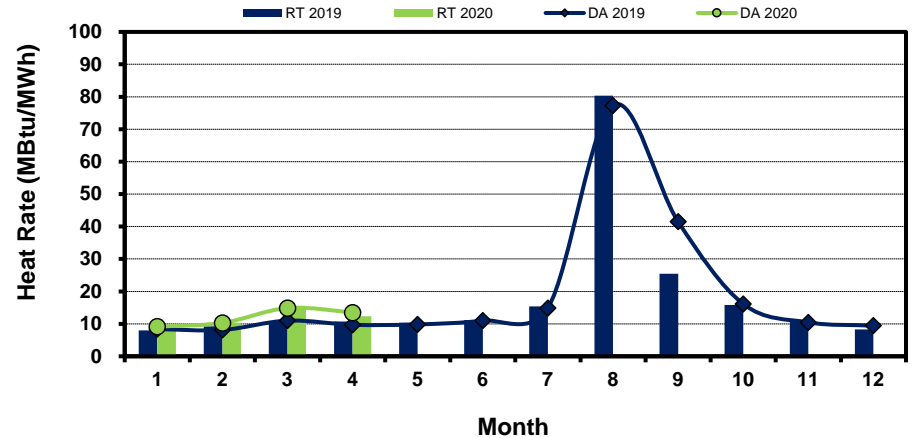
Load Zone Monthly Implied Heat Rate DA vs RT

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

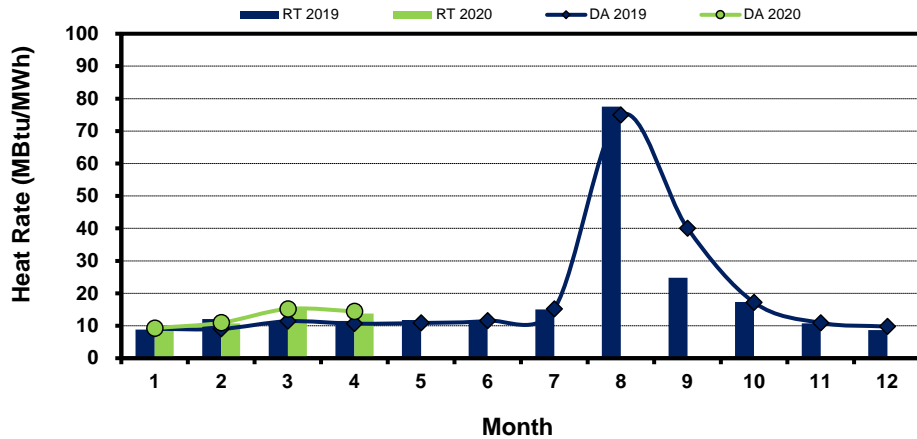
Houston Zone



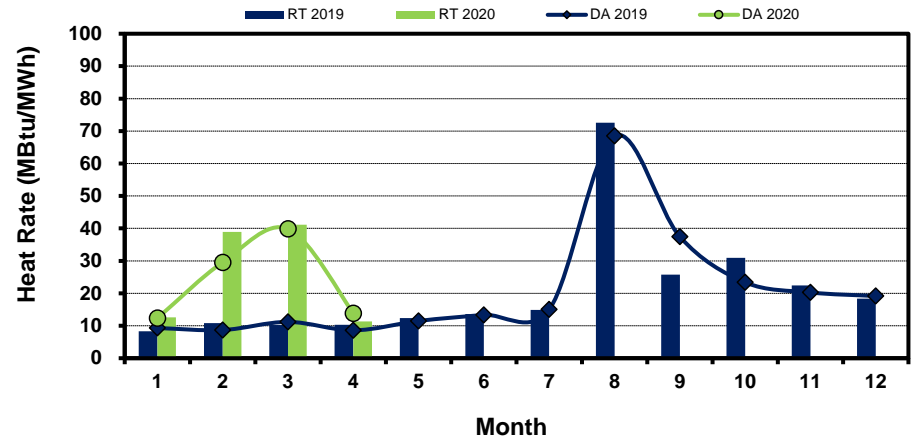
North Zone



South Zone



West Zone



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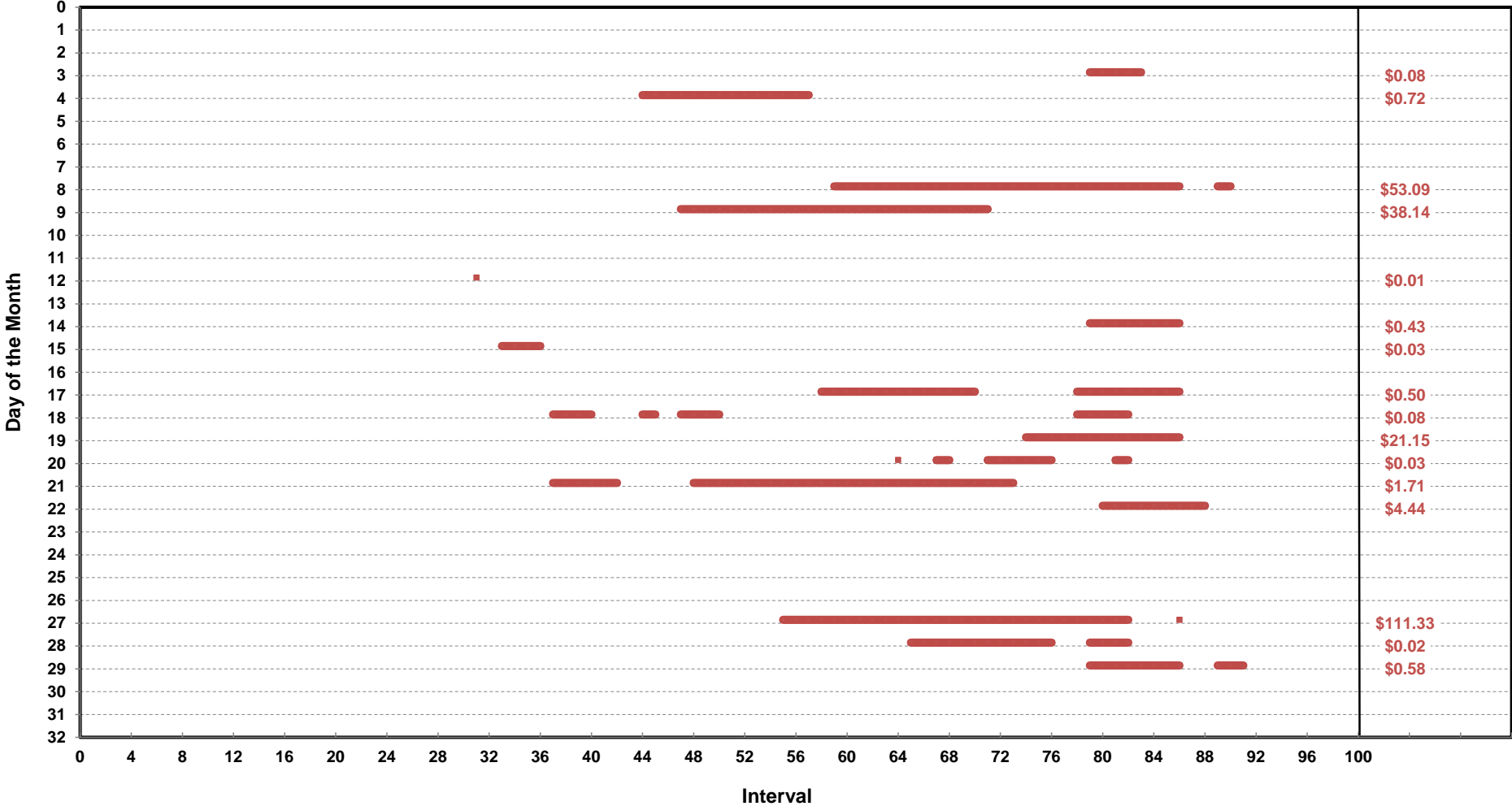
Note: * Zonal load zone definition vs. Nodal comparable load zone definition: LZ_Houston=LZ_Houston; LZ_West=LZ_West; LZ_North=(LZ_North,LZ_RAYBN); LZ_South=(LZ_South,LZ_CPS,LZ_AEN,LZ_LCRA)

Daily ORDC Adders Average Values and Interval Duration

Apr-2020

RDP Adder RS Adder

Daily Averages



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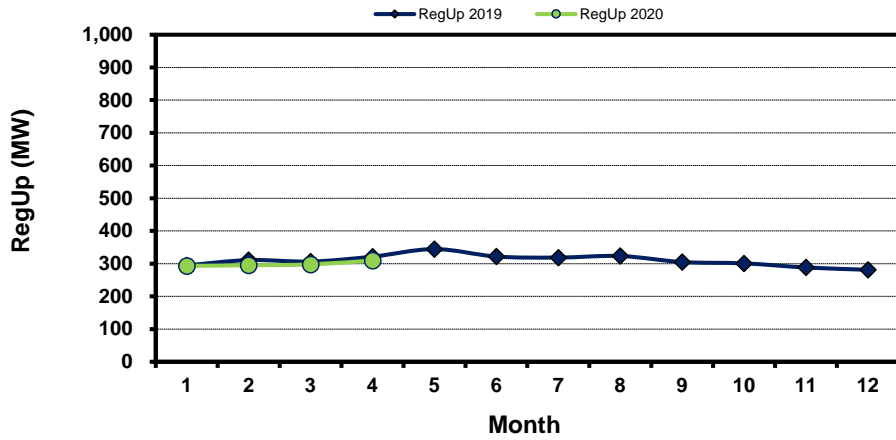
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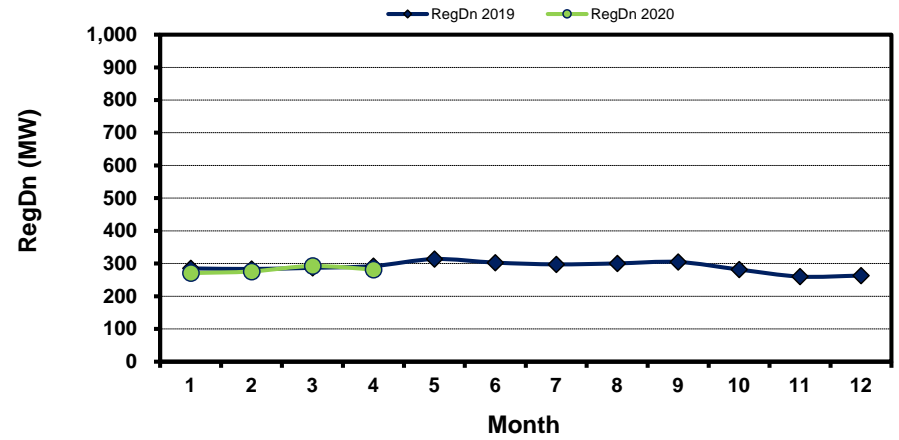
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Monthly Average of Ancillary Services Required MW

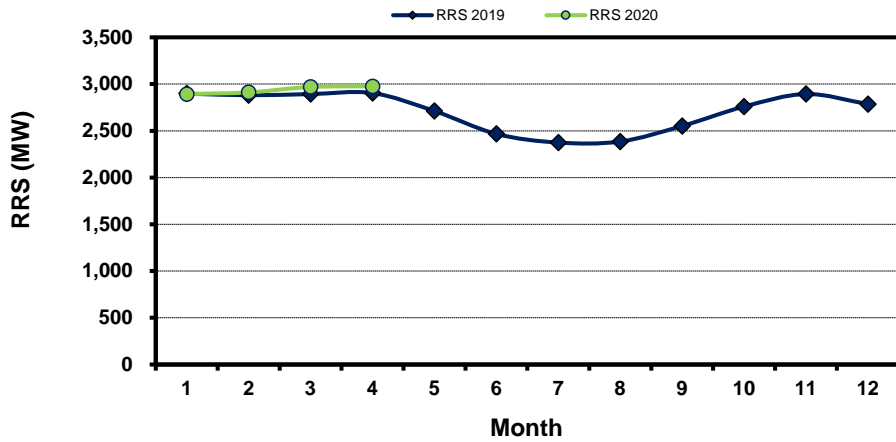
Regulation Up



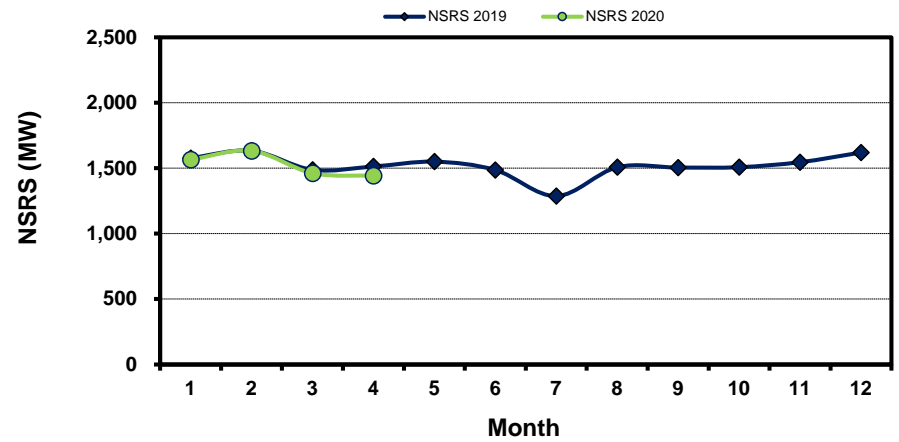
Regulation Down



Responsive Reserve



Non-Spin Reserve



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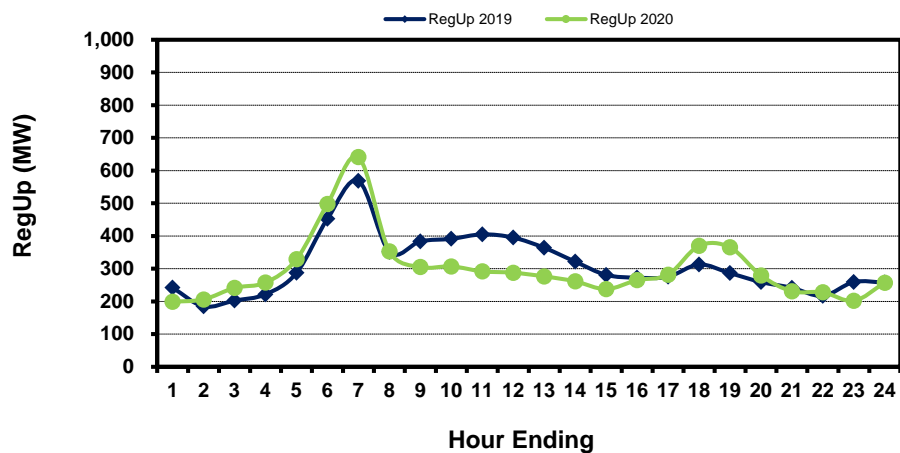
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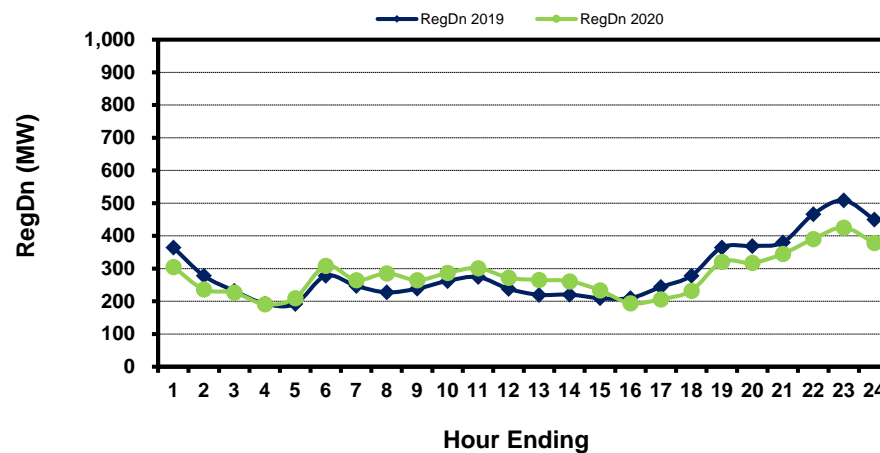
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Hourly Average of Ancillary Services Required MW

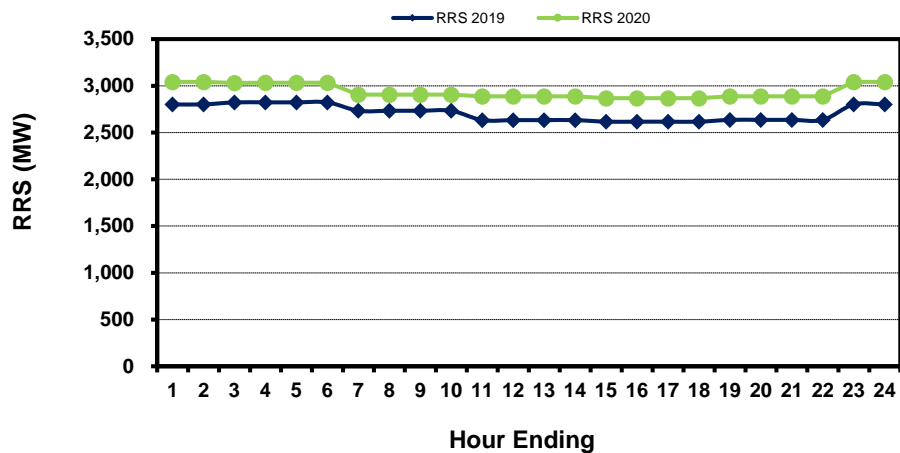
Regulation Up



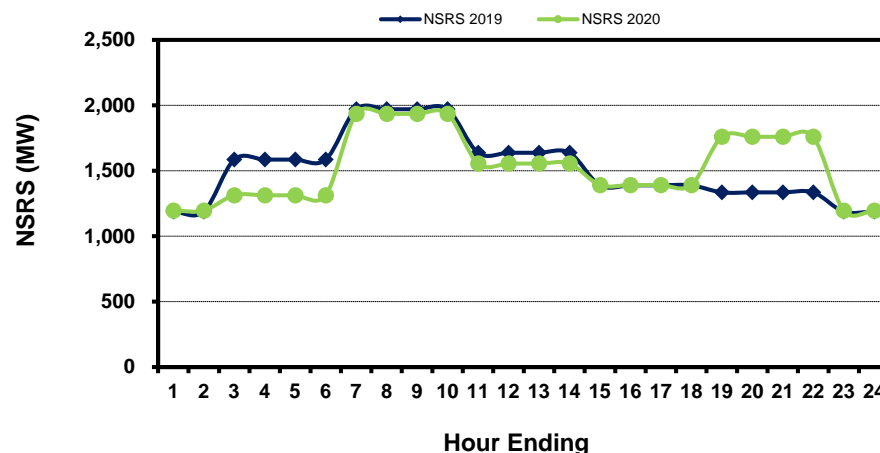
Regulation Down



Responsive Reserve



Non-Spin Reserve



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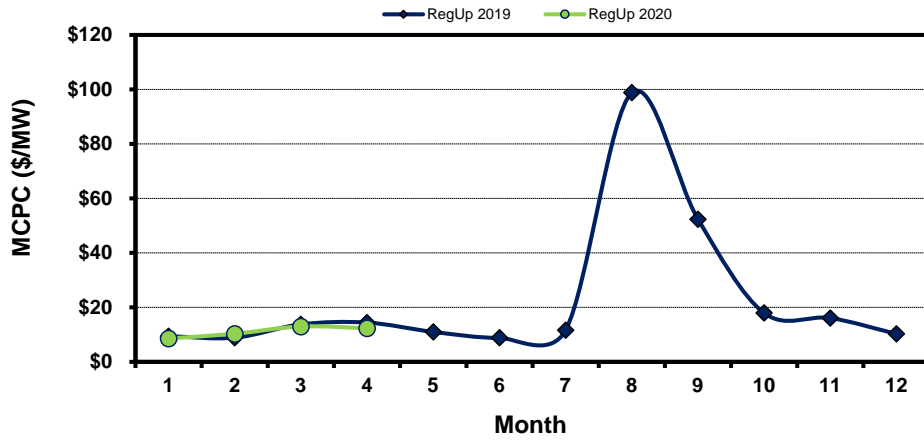
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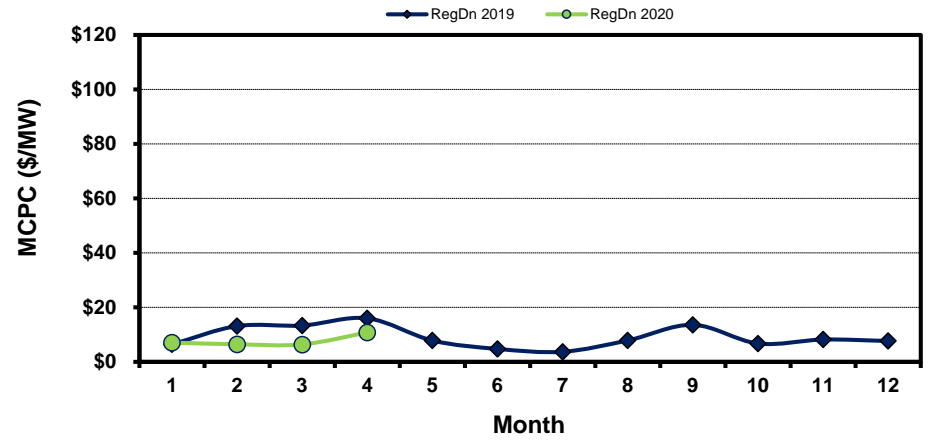
Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

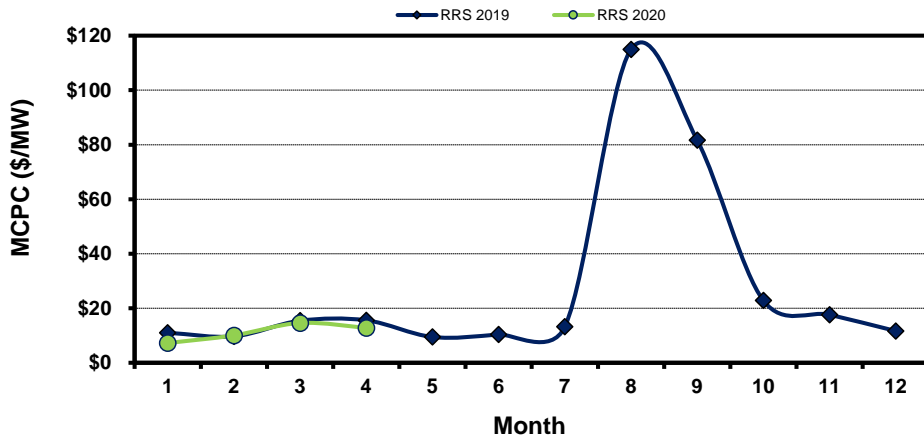
Regulation Up



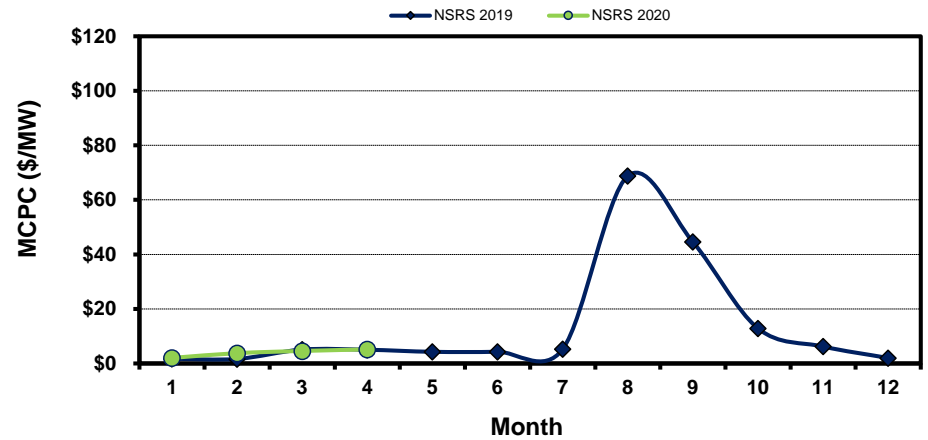
Regulation Down



Responsive Reserve



Non-Spin Reserve



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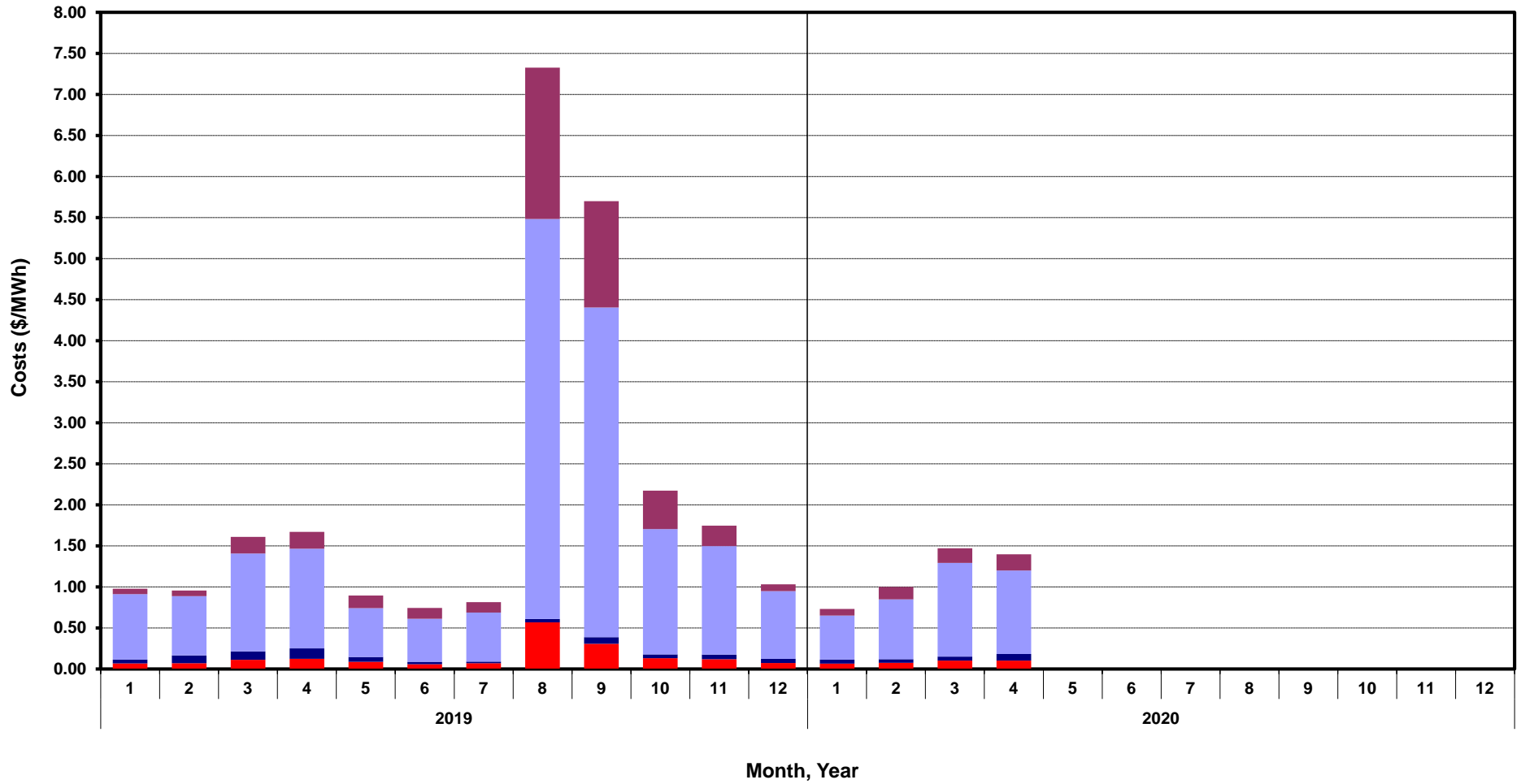
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Monthly Average A/S Cost per MWh Load

RegUp RegDn RRS NonSpin



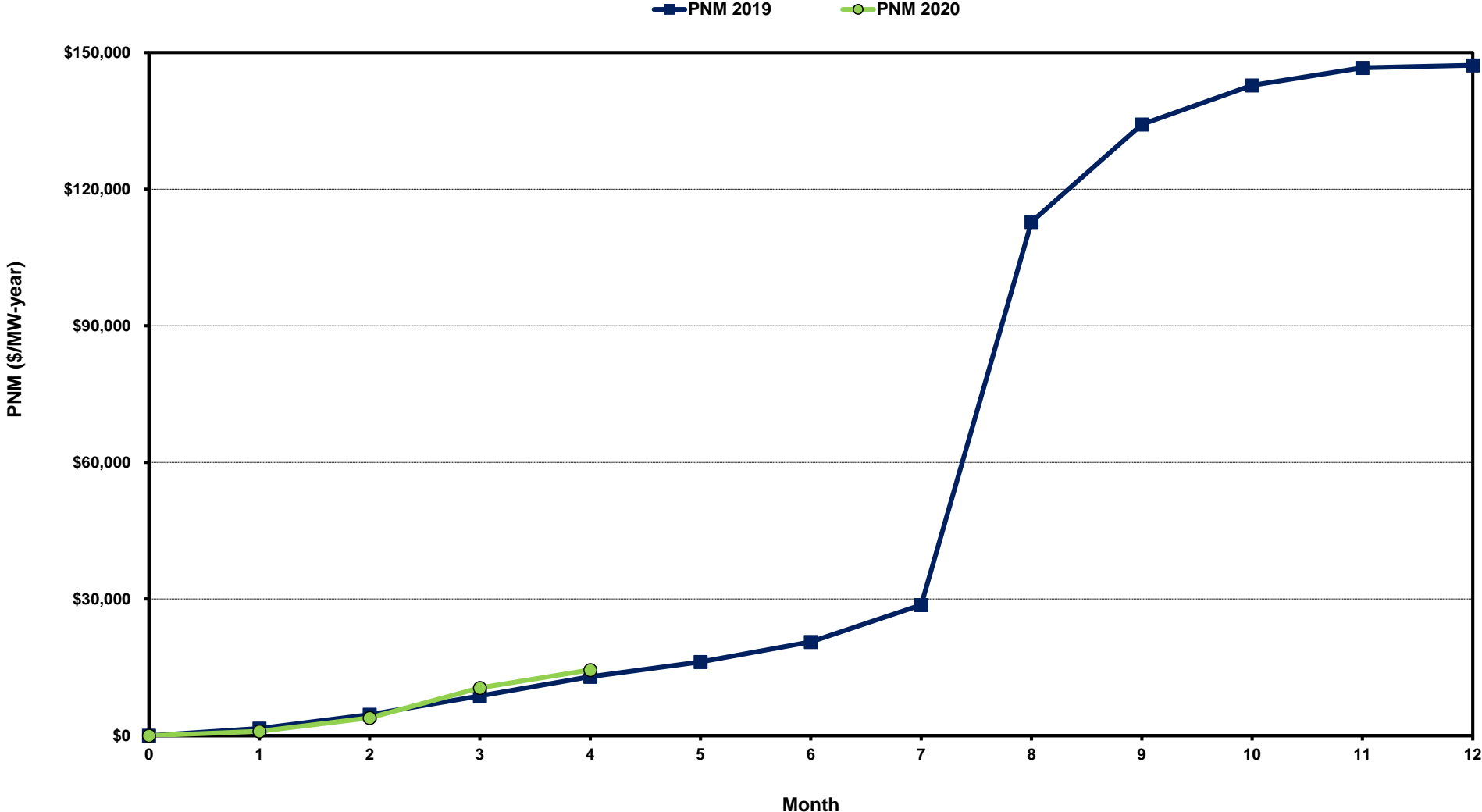
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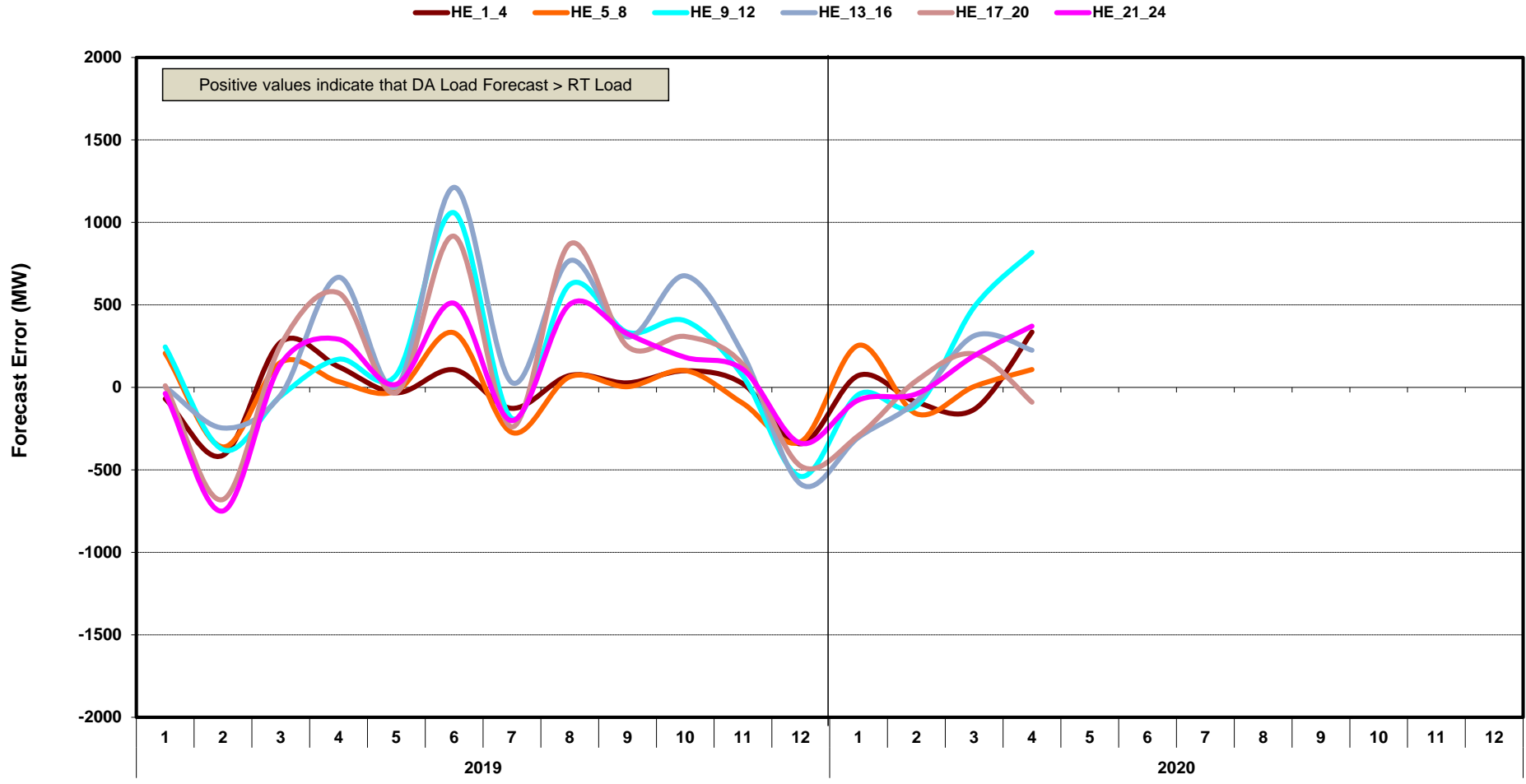
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ERCOT-wide Cumulative Peaker Net Margin



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DA vs. RT Load Forecast Error by Hour Ending



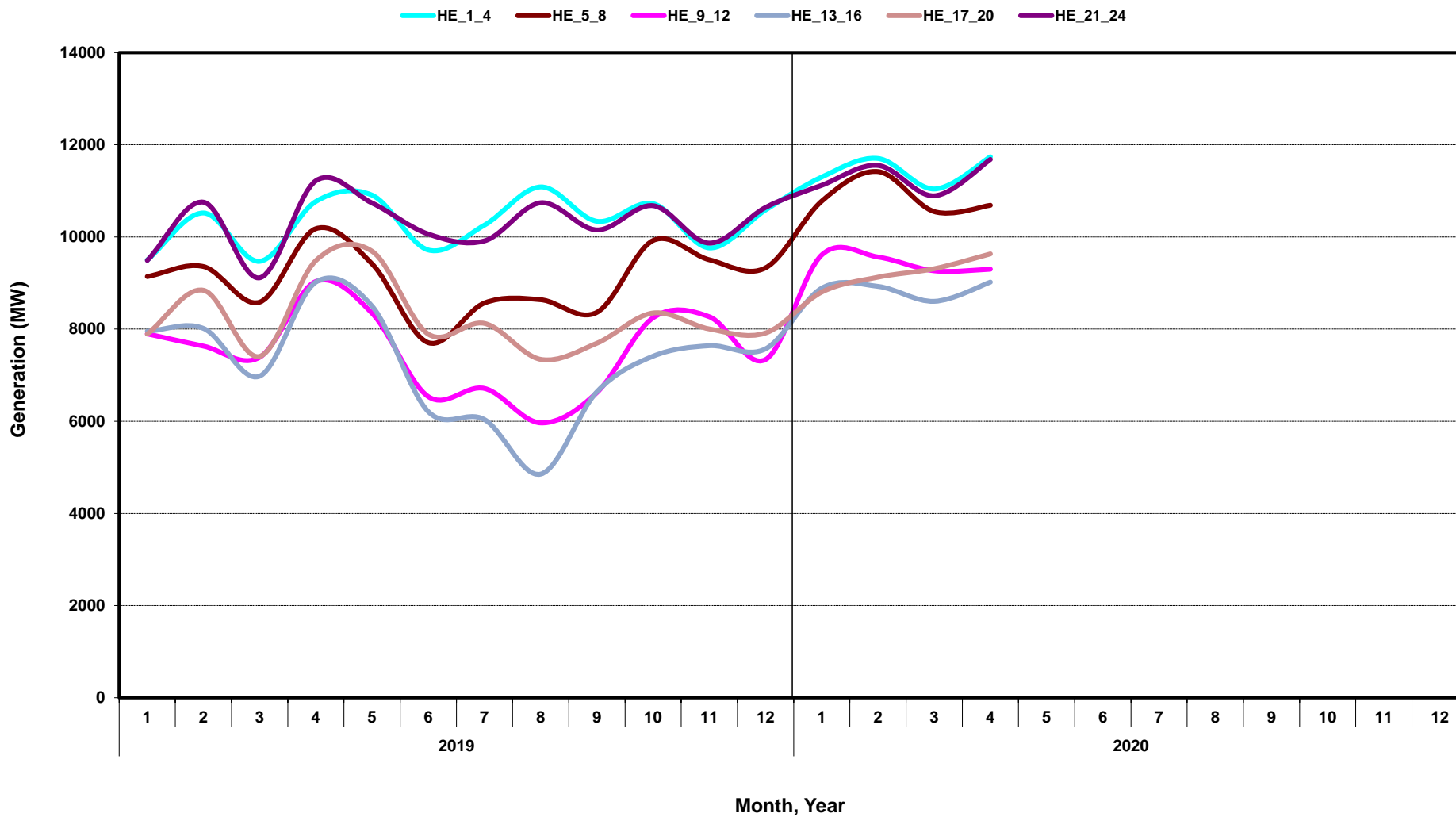
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Monthly Average of Wind Generation by Hour Ending



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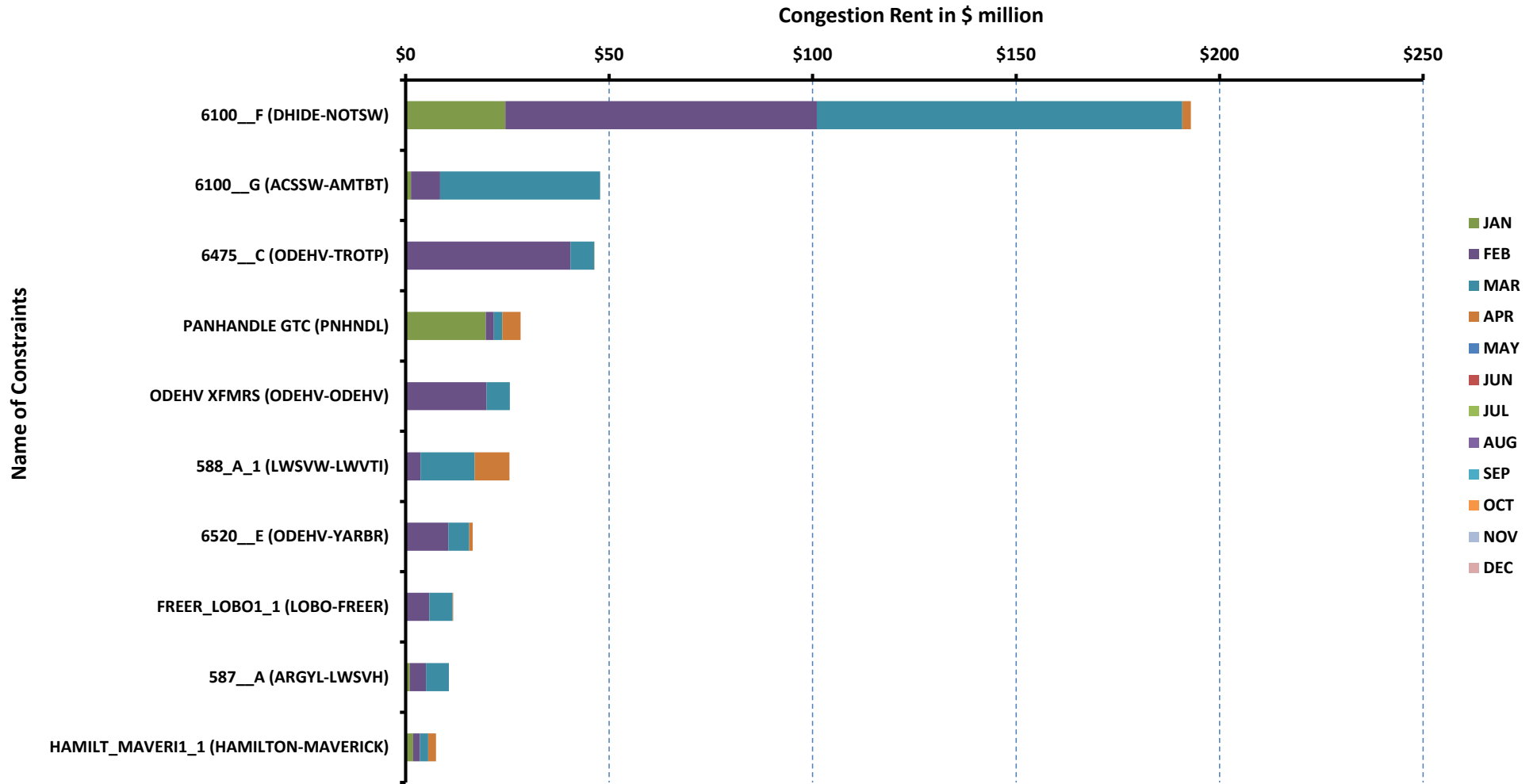
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RT Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Value - 2019



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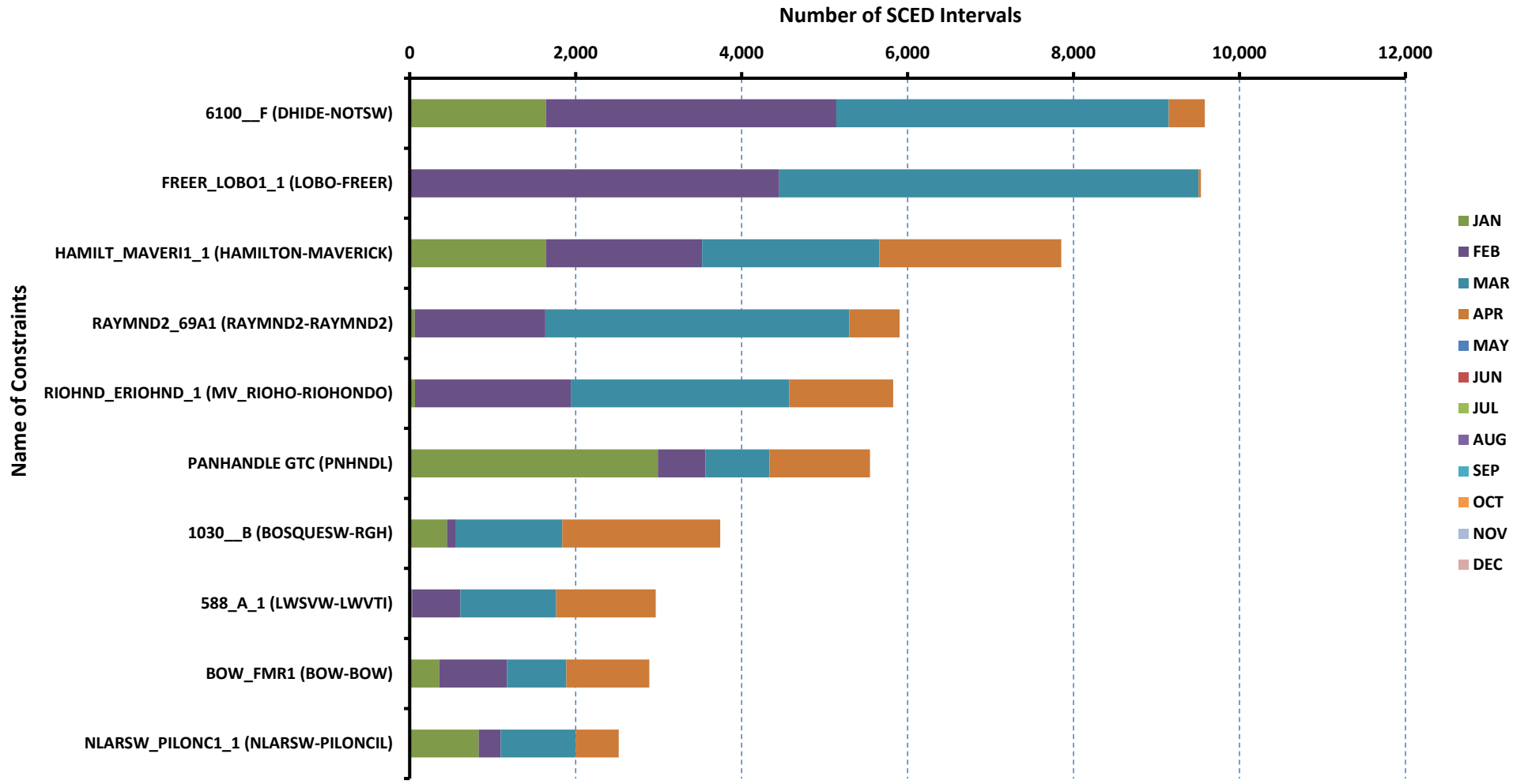
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RT Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency - 2019



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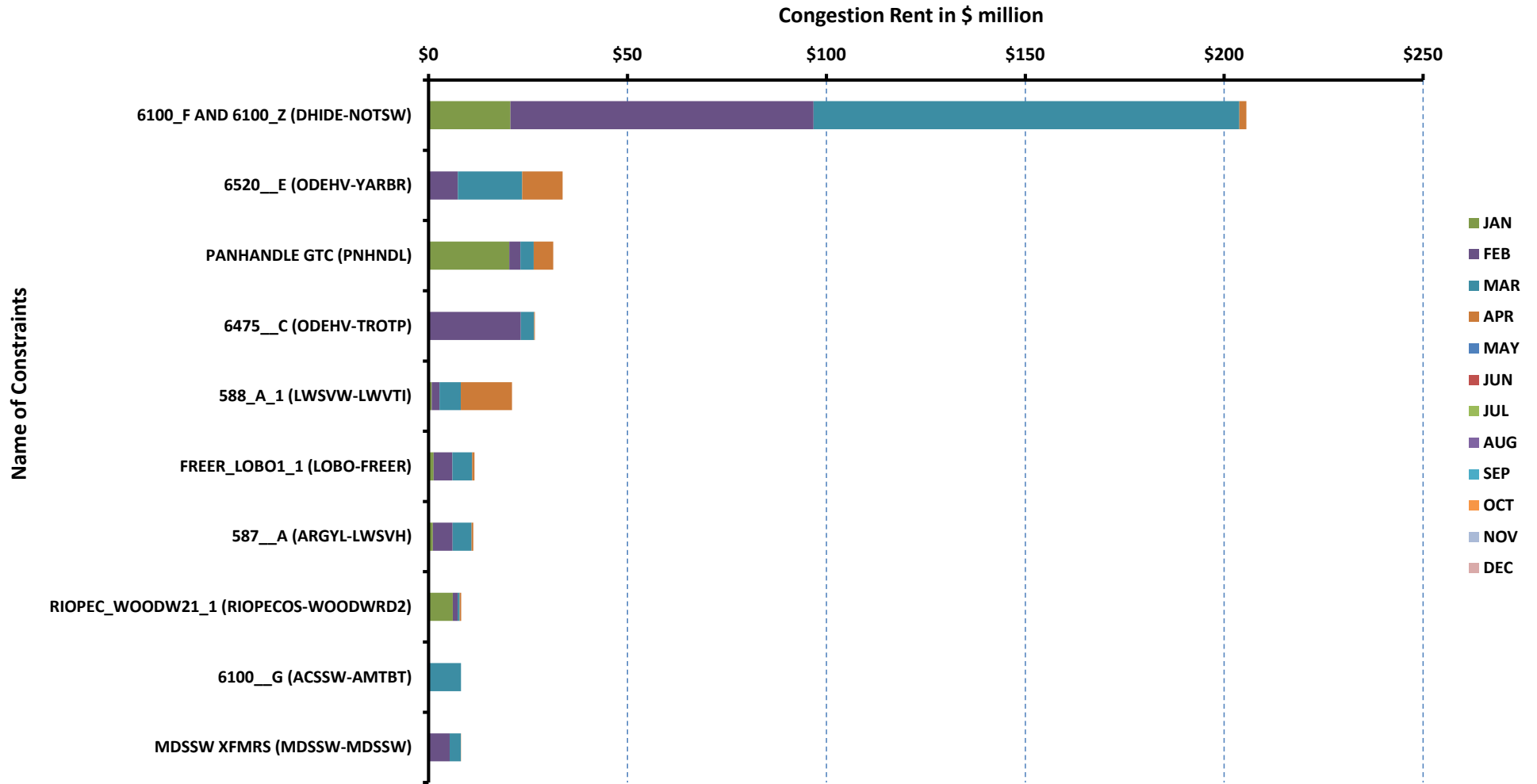
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DA Congestion Constraint Rankings - 1

Top 10 Constraints by Total Congestion Value - 2019



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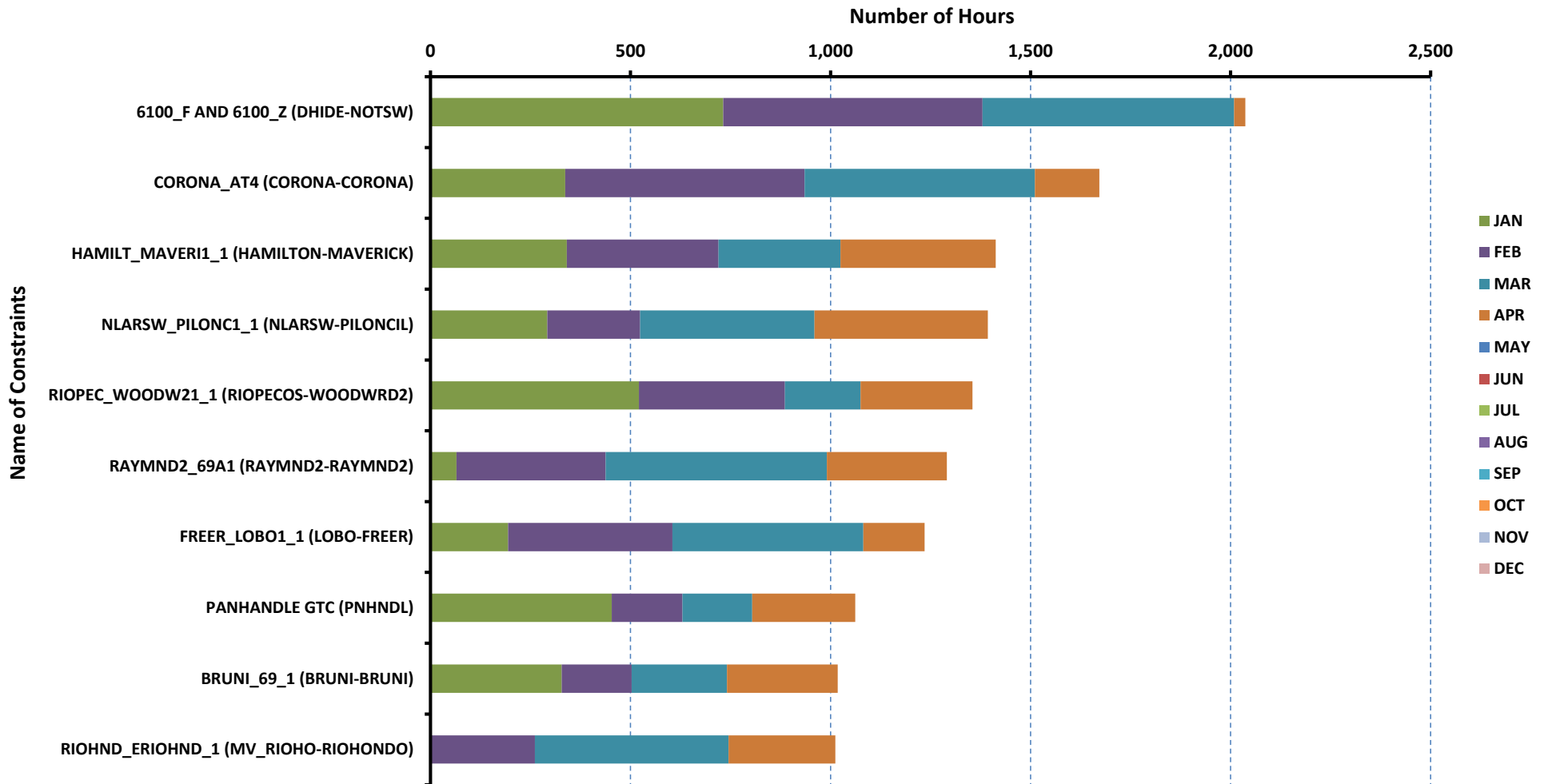
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DA Congestion Constraint Rankings - 2

Top 10 Constraints by Binding Frequency - 2019



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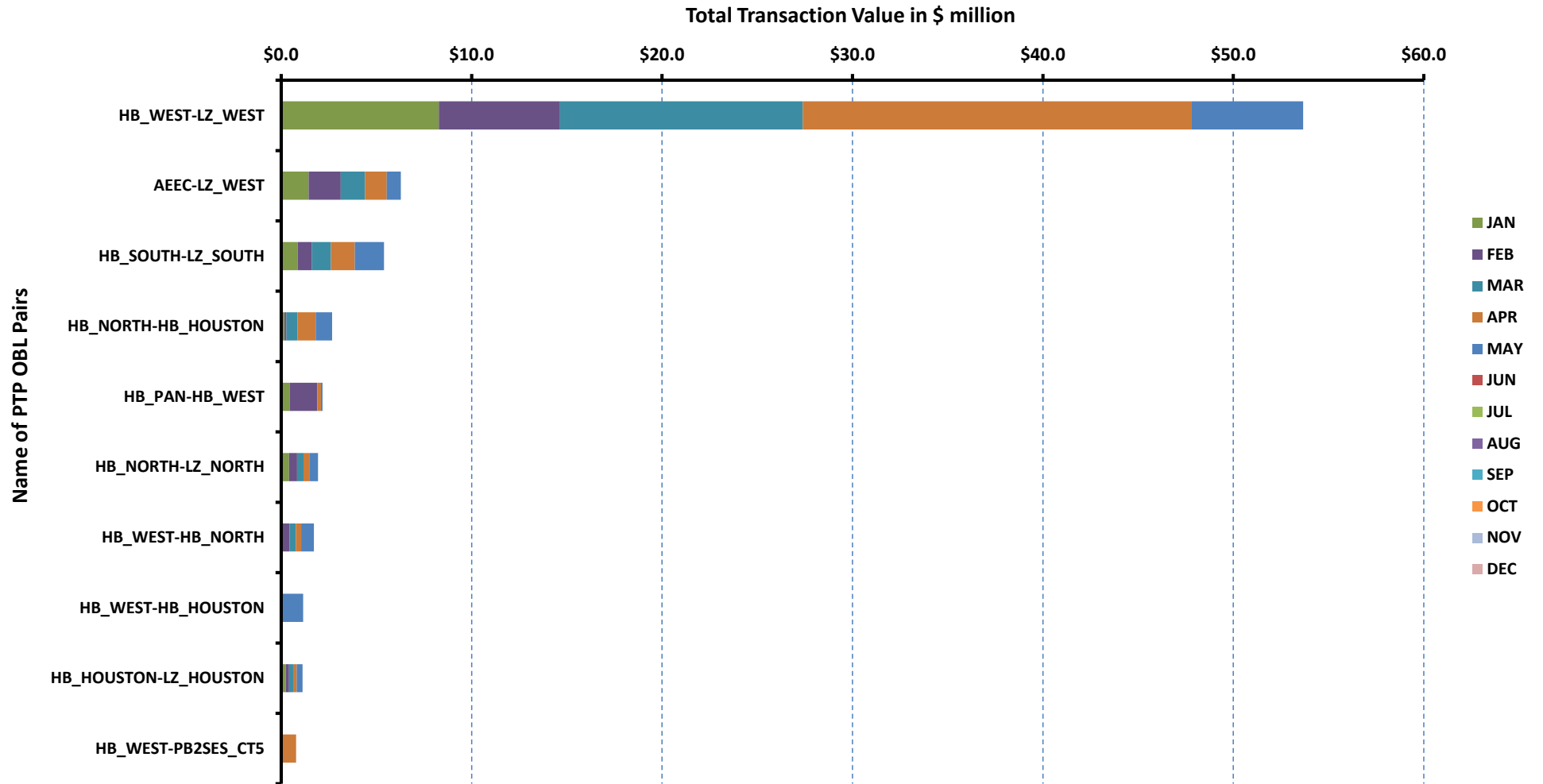
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Top 10 CRR Pairs Ranked by Monthly Auction Values - 1

Top 10 PTP Obligations by Total Transaction Value - 2019



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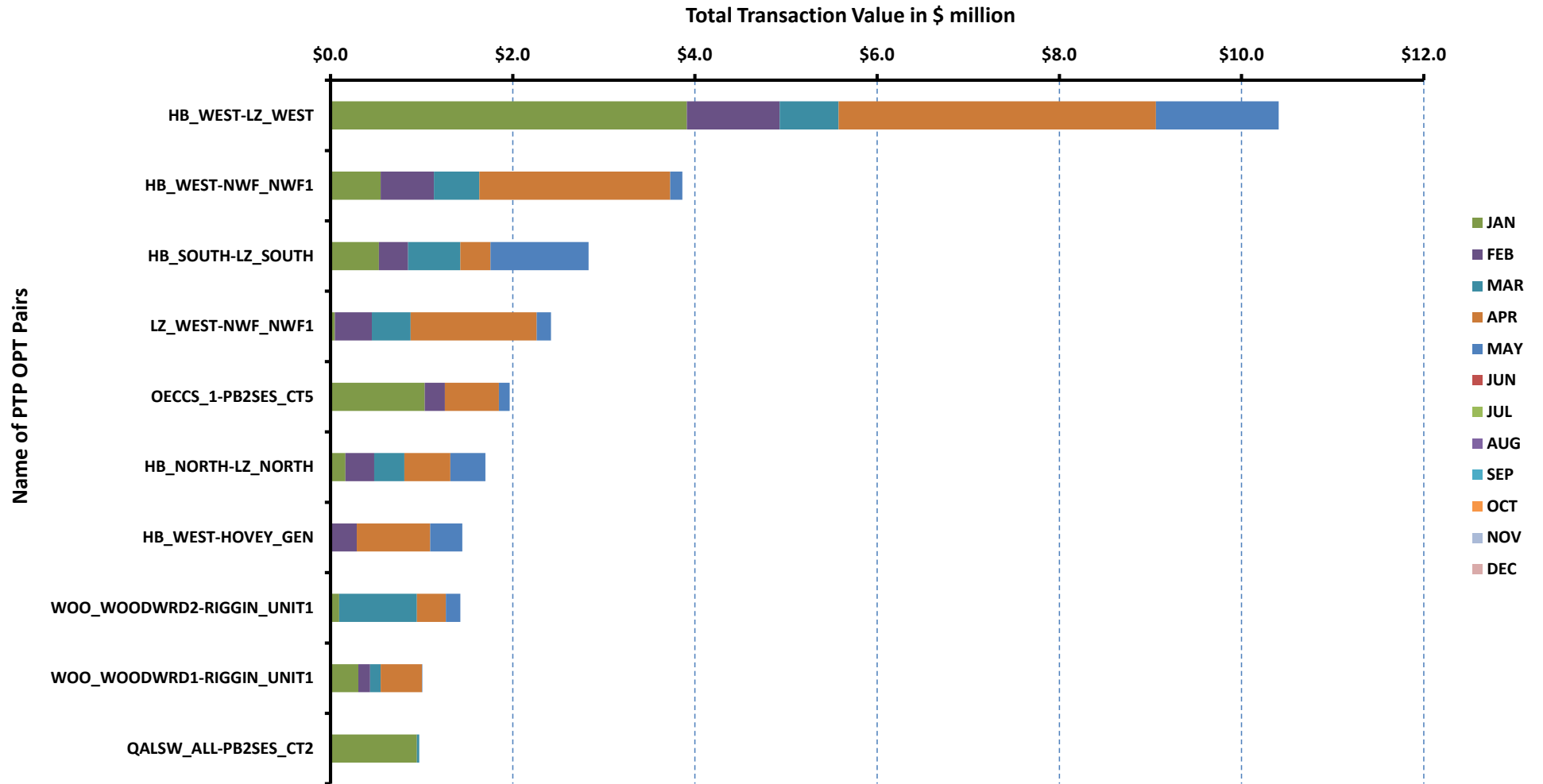
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Top 10 CRR Pairs Ranked by Monthly Auction Values - 2

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
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	\$ 99.57	\$ 60.87
	10	\$ 38.07	\$ 39.83
	11	\$ 29.04	\$ 30.02
	12	\$ 22.41	\$ 20.21
2020	1	\$ 18.46	\$ 17.97
	2	\$ 23.70	\$ 26.13
	3	\$ 30.91	\$ 31.90
	4	\$ 22.88	\$ 21.05
	5	\$ -	\$ -
	6	\$ -	\$ -
	7	\$ -	\$ -
	8	\$ -	\$ -
	9	\$ -	\$ -
	10	\$ -	\$ -
	11	\$ -	\$ -
	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	
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	18,952	25,751	18,994	6,356	13,805	16,680	13,212	5,146	
	7	19,012	27,177	19,420	6,515	14,322	18,820	14,159	5,446	
	8	20,293	28,632	20,438	6,798	14,852	20,332	15,348	5,742	
	9	18,622	26,186	18,933	6,400	13,485	18,926	14,002	5,440	
	10	17,118	24,745	18,162	6,119	11,040	13,934	11,252	5,028	
	11	12,925	23,153	15,777	6,124	9,875	13,473	10,137	5,095	
	12	13,116	21,264	16,274	6,018	10,109	13,950	10,128	5,226	
2020	1	12,105	19,152	13,292	5,988	9,951	14,032	9,777	5,277	
	2	12,764	22,114	15,943	6,154	10,075	14,584	10,236	5,355	
	3	15,550	17,477	14,794	5,803	10,688	12,378	9,885	5,017	
	4	15,722	19,295	16,067	5,873	10,432	12,134	10,027	4,848	
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-	-
	9	-	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-	-
	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	
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	\$ 27.47	\$ 27.07	\$ 33.54	\$ 29.22	\$ 27.10	\$ 28.39	\$ 32.83	
	7	\$ 34.10	\$ 34.59	\$ 33.73	\$ 33.38	\$ 32.78	\$ 33.41	\$ 34.02	\$ 33.68	
	8	\$ 163.06	\$ 168.80	\$ 162.94	\$ 152.57	\$ 153.14	\$ 162.52	\$ 157.51	\$ 143.92	
	9	\$ 57.84	\$ 62.35	\$ 60.89	\$ 63.14	\$ 100.80	\$ 101.83	\$ 98.31	\$ 91.91	
	10	\$ 35.39	\$ 34.74	\$ 38.01	\$ 67.77	\$ 35.83	\$ 35.38	\$ 37.70	\$ 51.30	
	11	\$ 25.32	\$ 26.59	\$ 26.44	\$ 55.32	\$ 24.92	\$ 25.79	\$ 26.85	\$ 49.96	
	12	\$ 17.13	\$ 17.24	\$ 18.13	\$ 38.16	\$ 19.25	\$ 19.67	\$ 20.31	\$ 39.89	
2020	1	\$ 16.65	\$ 17.03	\$ 17.27	\$ 24.25	\$ 17.48	\$ 17.57	\$ 17.87	\$ 23.75	
	2	\$ 18.94	\$ 18.97	\$ 19.71	\$ 71.42	\$ 18.21	\$ 18.86	\$ 20.04	\$ 54.20	
	3	\$ 27.00	\$ 26.03	\$ 25.71	\$ 69.06	\$ 25.82	\$ 24.98	\$ 25.51	\$ 66.99	
	4	\$ 21.21	\$ 20.43	\$ 22.73	\$ 18.75	\$ 22.62	\$ 22.31	\$ 23.84	\$ 22.90	
	5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	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
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	24.81	\$ 99.57	40.58
	10	\$ 2.19	\$ 39.83	18.16	\$ 38.07	17.36
	11	\$ 2.47	\$ 30.02	12.17	\$ 29.04	11.78
	12	\$ 2.08	\$ 20.21	9.71	\$ 22.41	10.76
2020	1	\$ 1.92	\$ 17.97	9.34	\$ 18.46	9.59
	2	\$ 1.83	\$ 26.13	14.25	\$ 23.70	12.92
	3	\$ 1.68	\$ 31.90	19.00	\$ 30.91	18.41
	4	\$ 1.65	\$ 21.05	12.72	\$ 22.88	13.83
	5	\$ -	\$ -	-	\$ -	-
	6	\$ -	\$ -	-	\$ -	-
	7	\$ -	\$ -	-	\$ -	-
	8	\$ -	\$ -	-	\$ -	-
	9	\$ -	\$ -	-	\$ -	-
	10	\$ -	\$ -	-	\$ -	-
	11	\$ -	\$ -	-	\$ -	-
	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
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	14.86
	8	72.86	74.94	77.32	68.47	77.57	77.52	80.31	72.58
	9	41.08	40.07	41.50	37.46	23.57	24.82	25.41	25.73
	10	16.33	17.18	16.13	23.39	16.13	17.33	15.84	30.90
	11	10.11	10.89	10.46	20.26	10.27	10.72	10.78	22.44
	12	9.24	9.75	9.44	19.15	8.23	8.70	8.28	18.32
2020	1	9.08	9.29	9.13	12.34	8.65	8.98	8.85	12.60
	2	9.93	10.93	10.28	29.56	10.33	10.75	10.35	38.95
	3	15.38	15.19	14.88	39.89	16.08	15.31	15.50	41.13
	4	13.68	14.41	13.49	13.85	12.83	13.74	12.35	11.33
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-
	9	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-

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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
2020	4	1	\$ -	\$ -	0	0	80	90
2020	4	2	\$ -	\$ -	0	0	80	90
2020	4	3	\$ 0.08	\$ -	5	0	80	90
2020	4	4	\$ 0.72	\$ -	14	0	80	90
2020	4	5	\$ -	\$ -	0	0	80	90
2020	4	6	\$ -	\$ -	0	0	80	90
2020	4	7	\$ -	\$ -	0	0	80	90
2020	4	8	\$ 53.09	\$ -	30	0	80	90
2020	4	9	\$ 38.14	\$ -	25	0	80	90
2020	4	10	\$ -	\$ -	0	0	80	90
2020	4	11	\$ -	\$ -	0	0	80	90
2020	4	12	\$ 0.01	\$ -	1	0	80	90
2020	4	13	\$ -	\$ -	0	0	80	90
2020	4	14	\$ 0.43	\$ -	8	0	80	90
2020	4	15	\$ 0.03	\$ -	4	0	80	90
2020	4	16	\$ -	\$ -	0	0	80	90
2020	4	17	\$ 0.50	\$ -	22	0	80	90
2020	4	18	\$ 0.08	\$ -	15	0	80	90
2020	4	19	\$ 21.15	\$ -	13	0	80	90
2020	4	20	\$ 0.03	\$ -	11	0	80	90
2020	4	21	\$ 1.71	\$ -	32	0	80	90
2020	4	22	\$ 4.44	\$ -	9	0	80	90
2020	4	23	\$ -	\$ -	0	0	80	90
2020	4	24	\$ -	\$ -	0	0	80	90
2020	4	25	\$ -	\$ -	0	0	80	90
2020	4	26	\$ -	\$ -	0	0	80	90
2020	4	27	\$ 111.33	\$ -	29	0	80	90
2020	4	28	\$ 0.02	\$ -	16	0	80	90
2020	4	29	\$ 0.58	\$ -	11	0	80	90
2020	4	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
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	263	1,620	2,786	281
2020	1	271	1,565	2,893	293
	2	276	1,633	2,911	295
	3	293	1,462	2,969	298
	4	282	1,444	2,976	310
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	-	-	-
	12	-	-	-	-

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Hourly Average of Ancillary Services Required MW					
year	DELIVERY_HOUR	ASMW_REGDN	ASMW_NSPIN	ASMW_RRS	ASMW_REGUP
2019	1	365	1,188	2,802	242
	2	278	1,188	2,802	185
	3	232	1,586	2,823	202
	4	193	1,585	2,823	222
	5	192	1,585	2,823	287
	6	278	1,585	2,823	453
	7	247	1,970	2,733	569
	8	227	1,970	2,733	351
	9	239	1,970	2,733	384
	10	262	1,970	2,733	391
	11	274	1,638	2,633	405
	12	238	1,638	2,633	395
	13	220	1,638	2,633	364
	14	221	1,638	2,633	322
	15	210	1,389	2,617	281
	16	210	1,389	2,617	273
	17	244	1,389	2,617	275
	18	278	1,389	2,617	313
	19	365	1,335	2,636	286
	20	369	1,335	2,636	259
	21	380	1,335	2,636	242
	22	466	1,335	2,636	217
	23	508	1,188	2,802	259
	24	450	1,188	2,802	258
2020	1	305	1,196	3,042	199
	2	237	1,196	3,042	206
	3	227	1,313	3,032	242
	4	191	1,313	3,032	257
	5	210	1,313	3,032	329
	6	309	1,313	3,032	498
	7	265	1,935	2,905	641
	8	286	1,935	2,905	353
	9	265	1,935	2,905	305
	10	287	1,935	2,905	307
	11	302	1,555	2,888	292
	12	272	1,555	2,888	288
	13	265	1,555	2,888	277
	14	262	1,555	2,888	261
	15	234	1,391	2,868	238
	16	194	1,391	2,868	265
	17	207	1,391	2,868	282
	18	232	1,391	2,868	370
	19	321	1,760	2,888	365
	20	318	1,760	2,888	279
	21	345	1,760	2,888	231
	22	391	1,760	2,888	228
	23	425	1,196	3,042	202
	24	379	1,196	3,042	257

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Monthly Average Ancillary Services Price					
year	month	MCPC_REGDN	MCPC_NSPIN	MCPC_RRS	MCPC_REGUP
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	\$ 7.66	\$ 2.01	\$ 11.65	\$ 10.28
2020	1	\$ 7.06	\$ 2.04	\$ 7.24	\$ 8.60
	2	\$ 6.46	\$ 3.78	\$ 10.06	\$ 10.33
	3	\$ 6.39	\$ 4.59	\$ 14.60	\$ 13.00
	4	\$ 10.83	\$ 5.15	\$ 12.78	\$ 12.31
	5	\$ -	\$ -	\$ -	\$ -
	6	\$ -	\$ -	\$ -	\$ -
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

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Monthly Average A/S Cost per MWh Load					
year	month	AScost_REGDN	AScost_NSPIIN	AScost_RRS	AScost_REGUP
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	\$ 0.05	\$ 0.08	\$ 0.82	\$ 0.07
2020	1	\$ 0.05	\$ 0.08	\$ 0.54	\$ 0.06
	2	\$ 0.04	\$ 0.15	\$ 0.73	\$ 0.08
	3	\$ 0.05	\$ 0.18	\$ 1.14	\$ 0.10
	4	\$ 0.08	\$ 0.20	\$ 1.02	\$ 0.10
	5	\$ -	\$ -	\$ -	\$ -
	6	\$ -	\$ -	\$ -	\$ -
	7	\$ -	\$ -	\$ -	\$ -
	8	\$ -	\$ -	\$ -	\$ -
	9	\$ -	\$ -	\$ -	\$ -
	10	\$ -	\$ -	\$ -	\$ -
	11	\$ -	\$ -	\$ -	\$ -
	12	\$ -	\$ -	\$ -	\$ -

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ERCOT-wide Cumulative PNM			
year	month	pnm	pnm_accum
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	\$ 8,603.88	\$ 142,823.67
	11	\$ 3,834.05	\$ 146,657.72
	12	\$ 534.58	\$ 147,192.30
2020	0	\$ -	\$ -
	1	\$ 948.71	\$ 948.71
	2	\$ 2,962.95	\$ 3,911.66
	3	\$ 6,596.00	\$ 10,507.66
	4	\$ 3,928.31	\$ 14,435.97
	5	\$ -	\$ -
	6	\$ -	\$ -
	7	\$ -	\$ -
	8	\$ -	\$ -
	9	\$ -	\$ -
	10	\$ -	\$ -
	11	\$ -	\$ -
	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
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	(342)	(587)	(477)	(339)	(329)	(540)
2020	1	73	(303)	(292)	(76)	255	(43)
	2	(89)	(84)	40	(39)	(160)	(113)
	3	(133)	313	202	192	5	487
	4	335	225	(90)	371	108	819
	5	-	-	-	-	-	-
	6	-	-	-	-	-	-
	7	-	-	-	-	-	-
	8	-	-	-	-	-	-
	9	-	-	-	-	-	-
	10	-	-	-	-	-	-
	11	-	-	-	-	-	-
	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
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	10,062	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	6,640	7,694	10,152	8,364	6,624
	10	10,722	7,413	8,350	10,678	9,924	8,246
	11	9,762	7,641	8,003	9,866	9,504	8,268
	12	10,585	7,573	7,916	10,641	9,330	7,340
2020	1	11,301	8,889	8,804	11,122	10,778	9,611
	2	11,703	8,927	9,127	11,552	11,418	9,565
	3	11,041	8,603	9,310	10,892	10,550	9,266
	4	11,740	9,020	9,632	11,683	10,687	9,300
	5	-	-	-	-	-	-
	6	-	-	-	-	-	-
	7	-	-	-	-	-	-
	8	-	-	-	-	-	-
	9	-	-	-	-	-	-
	10	-	-	-	-	-	-
	11	-	-	-	-	-	-
	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	2020	6100_F (DHIDE-NOTSW)	9,582	1	1,642	3,500	4,006	434	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	FREER_LOBO1_1 (LOBO-FREER)	9,535	2	14	4,439	5,054	28	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	7,852	3	1,645	1,879	2,137	2,191	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	RAYMND2_89A1 (RAYMND2-RAYMND2)	5,903	4	62	1,573	3,663	605	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	RIOHND_ERIOHND_1 (MV_RIOHO-RIOHONDO)	5,827	5	63	1,879	2,634	1,251	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	PANHANDLE_GTC (PNHNDL)	5,547	6	2,990	573	774	1,210	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	1030_B (BOSQUESW-RGH)	3,743	7	450	100	1,289	1,904	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	588_A_1 (LWSVW-LWVTI)	2,965	8	30	582	1,155	1,198	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	BOW_FMR1 (BOW-BOW)	2,889	9	356	817	715	1,001	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	NLARSW_PILONC1_1 (NLARSW-PILONCIL)	2,519	10	832	265	904	518	-	-	-	-	-	-	-	-	
TOP10_RENT	2020	6100_F (DHIDE-NOTSW)	\$ 192.97	1	\$ 24.52	\$ 76.51	\$ 89.80	\$ 2.14	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6100_G (ACSSW-AMTBT)	\$ 47.79	2	\$ 1.31	\$ 7.16	\$ 39.32	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6475_C (ODEHV-TROTP)	\$ 46.35	3	\$ -	\$ 40.50	\$ 5.85	\$ 0.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	PANHANDLE_GTC (PNHNDL)	\$ 28.26	4	\$ 19.72	\$ 1.94	\$ 2.07	\$ 4.53	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	ODEHV_XFMRS (ODEHV-ODEHV)	\$ 25.59	5	\$ -	\$ 19.91	\$ 5.68	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	588_A_1 (LWSVW-LWVTI)	\$ 25.49	6	\$ 0.13	\$ 3.52	\$ 13.33	\$ 8.51	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6520_E (ODEHV-YARBR)	\$ 16.47	7	\$ -	\$ 10.49	\$ 5.12	\$ 0.87	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	FREER_LOBO1_1 (LOBO-FREER)	\$ 11.68	8	\$ 0.04	\$ 5.79	\$ 5.71	\$ 0.14	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	587_A (ARGYL-LWSVH)	\$ 10.61	9	\$ 1.03	\$ 3.98	\$ 5.60	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	HAMILT_MAVERI1_1 (HAMILTON-MAVERICK)	\$ 7.45	10	\$ 1.84	\$ 1.68	\$ 2.02	\$ 1.91	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

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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	2020	6100_F AND 6100_Z (DHIDE-NOTSW)	2,037	1	732	648	629	28	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	CORONA_AT4 (CORONA-CORONA)	1,672	2	337	598	576	161	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	HAMILT_MAVERT1_1 (HAMILTON-MAVERICK)	1,413	3	341	379	305	388	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	NLARSW_PILONC1_1 (NLARSW-PILONCIL)	1,393	4	292	232	436	433	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	1,355	5	521	365	189	280	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	RAYMND2_69A1 (RAYMND2-RAYMND2)	1,291	6	65	373	553	300	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	FREER_LOBO1_1 (LOBO-FREER)	1,235	7	194	411	477	153	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	PANHANDLE_GTC (PNHNDL)	1,062	8	453	177	174	258	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	BRJUN1_69_1 (BRJUN1-BRJUN1)	1,018	9	328	175	238	277	-	-	-	-	-	-	-	-	
FREQ_EXIST	2020	RIOHND_ERIOHND_1 (MV_RIOHO-RIOHONDO)	1,012	10	-	261	484	267	-	-	-	-	-	-	-	-	
TOP10_RENT	2020	6100_F AND 6100_Z (DHIDE-NOTSW)	\$ 205.56	1	\$ 20.58	\$ 76.21	\$ 107.05	\$ 1.73	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6520_E (ODEHV-YARBR)	\$ 33.70	2	\$ -	\$ 7.35	\$ 16.19	\$ 10.17	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	PANHANDLE_GTC (PNHNDL)	\$ 31.32	3	\$ 20.27	\$ 2.80	\$ 3.38	\$ 4.88	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6475_C (ODEHV-TROTP)	\$ 26.72	4	\$ -	\$ 23.18	\$ 3.34	\$ 0.20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	588_A_1 (LWSVW-LWVTI)	\$ 20.96	5	\$ 0.76	\$ 1.98	\$ 5.35	\$ 12.86	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	FREER_LOBO1_1 (LOBO-FREER)	\$ 11.57	6	\$ 1.26	\$ 4.71	\$ 4.96	\$ 0.63	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	587_A (ARGYL-LWSVH)	\$ 11.25	7	\$ 1.07	\$ 4.96	\$ 4.76	\$ 0.46	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	RIOPEC_WOODW21_1 (RIOPECOS-WOODWRD2)	\$ 8.20	8	\$ 6.07	\$ 1.24	\$ 0.48	\$ 0.41	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	6100_G (ACSSW-AMTBT)	\$ 8.14	9	\$ -	\$ -	\$ 8.14	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
TOP10_RENT	2020	MDSSW_XFMRS (MDSSW-MDSSW)	\$ 8.11	10	\$ -	\$ 5.32	\$ 2.78	\$ 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	2020	HB WEST-LZ WEST	\$ 53.66	1	\$ 8.27	\$ 6.36	\$ 12.75	\$ 20.43	\$ 5.85	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	AEEC-LZ WEST	\$ 6.28	2	\$ 1.44	\$ 1.69	\$ 1.27	\$ 1.14	\$ 0.74	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB SOUTH-LZ SOUTH	\$ 5.40	3	\$ 0.87	\$ 0.75	\$ 1.00	\$ 1.25	\$ 1.54	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB NORTH-HB HOUSTON	\$ 2.67	4	\$ 0.18	\$ 0.10	\$ 0.58	\$ 0.95	\$ 0.87	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB PAN-HB WEST	\$ 2.16	5	\$ 0.44	\$ 1.45	\$ 0.01	\$ 0.18	\$ 0.08	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB NORTH-LZ NORTH	\$ 1.93	6	\$ 0.41	\$ 0.42	\$ 0.34	\$ 0.33	\$ 0.44	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB WEST-HB NORTH	\$ 1.72	7	\$ 0.00	\$ 0.44	\$ 0.33	\$ 0.28	\$ 0.66	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB WEST-HB HOUSTON	\$ 1.15	8	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.01	\$ 1.13	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB HOUSTON-LZ HOUSTON	\$ 1.12	9	\$ 0.24	\$ 0.17	\$ 0.21	\$ 0.19	\$ 0.31	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
N	2020	HB WEST-PB2SES CT5	\$ 0.78	10	\$ 0.00	\$ 0.06	\$ -	\$ 0.72	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	HB WEST-LZ WEST	\$ 10.41	1	\$ 3.91	\$ 1.02	\$ 0.65	\$ 3.48	\$ 1.35	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	HB WEST-NWF NWF1	\$ 3.86	2	\$ 0.55	\$ 0.59	\$ 0.50	\$ 2.10	\$ 0.13	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	HB SOUTH-LZ SOUTH	\$ 2.83	3	\$ 0.53	\$ 0.32	\$ 0.57	\$ 0.33	\$ 1.08	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	LZ WEST-NWF NWF1	\$ 2.42	4	\$ 0.05	\$ 0.41	\$ 0.43	\$ 1.38	\$ 0.16	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	OECCS 1-PB2SES CT5	\$ 1.97	5	\$ 1.03	\$ 0.22	\$ -	\$ 0.59	\$ 0.12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	HB NORTH-LZ NORTH	\$ 1.70	6	\$ 0.16	\$ 0.32	\$ 0.33	\$ 0.51	\$ 0.38	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	HB WEST-HOVEY GEN	\$ 1.45	7	\$ -	\$ 0.29	\$ -	\$ 0.81	\$ 0.35	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	WOO WOODWRD2-RIGGIN_UNIT1	\$ 1.42	8	\$ 0.09	\$ -	\$ 0.85	\$ 0.32	\$ 0.16	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	WOO WOODWRD1-RIGGIN_UNIT1	\$ 1.01	9	\$ 0.31	\$ 0.13	\$ 0.12	\$ 0.45	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Y	2020	QALSW ALL-PB2SES CT2	\$ 0.97	10	\$ 0.95	\$ -	\$ 0.03	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

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