

To the Public Utility Commission of Texas

# ERCOT Wholesale Electricity Market Monthly Report

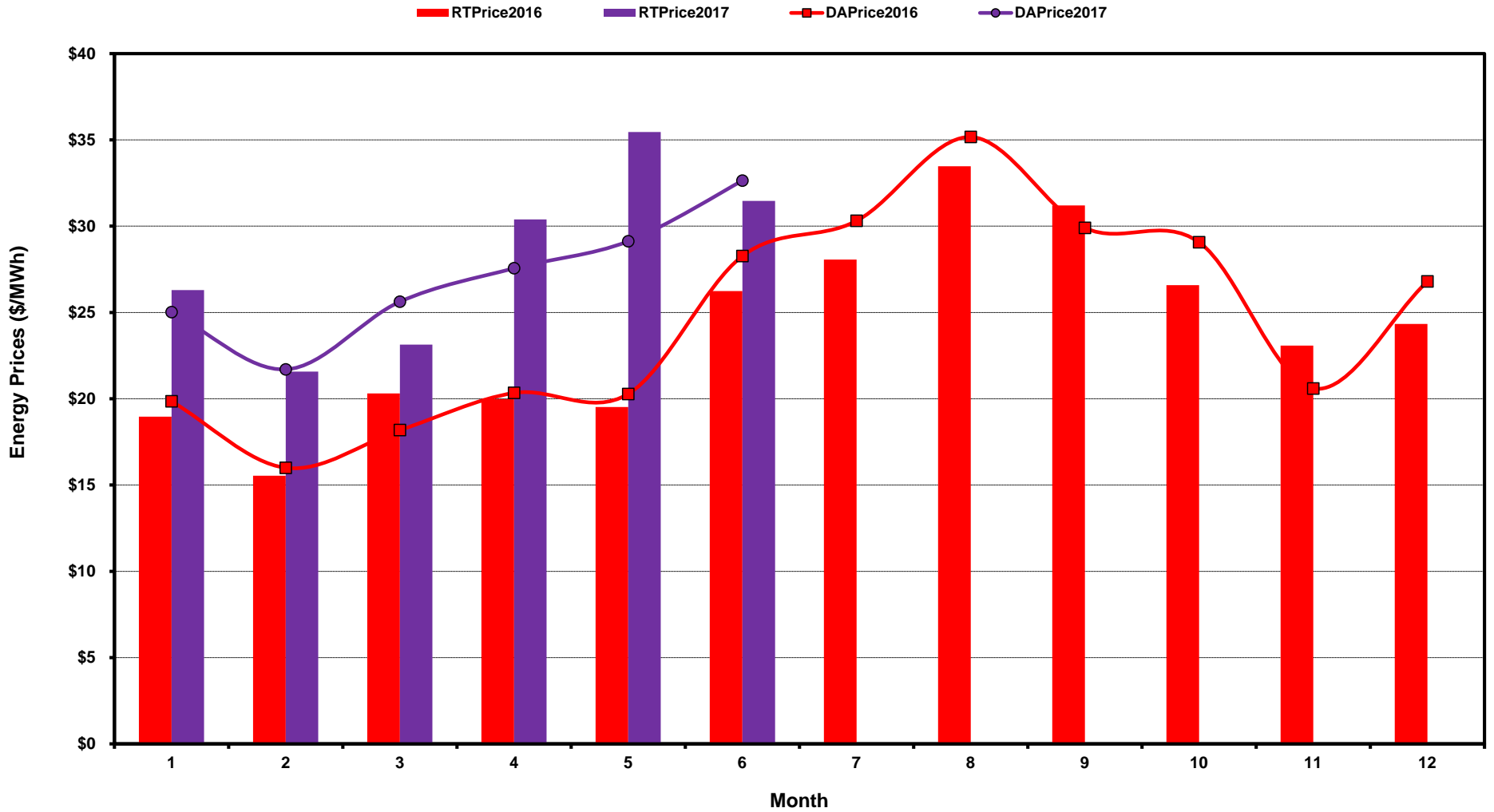
Wednesday, July 12, 2017

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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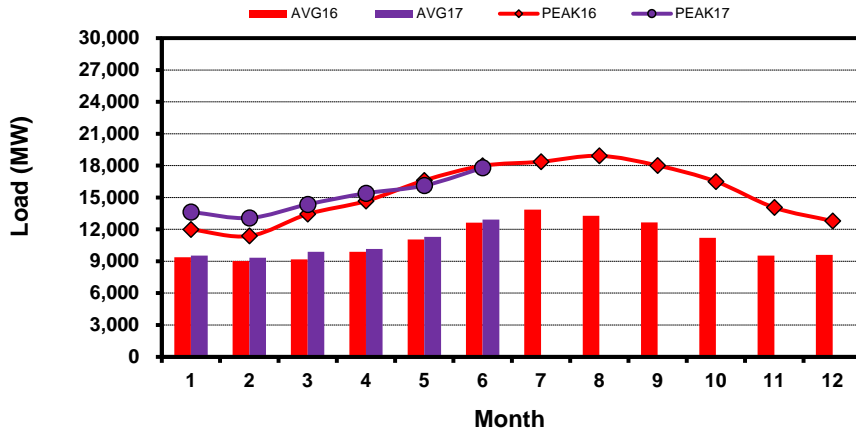
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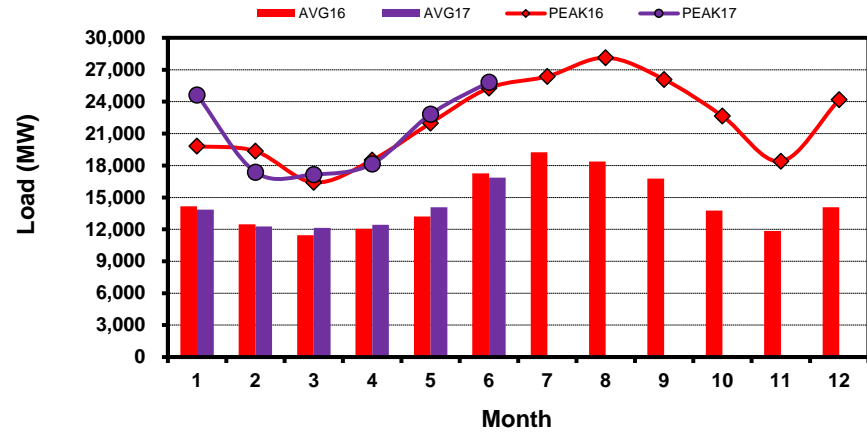
# Load Zone Load Statistics

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

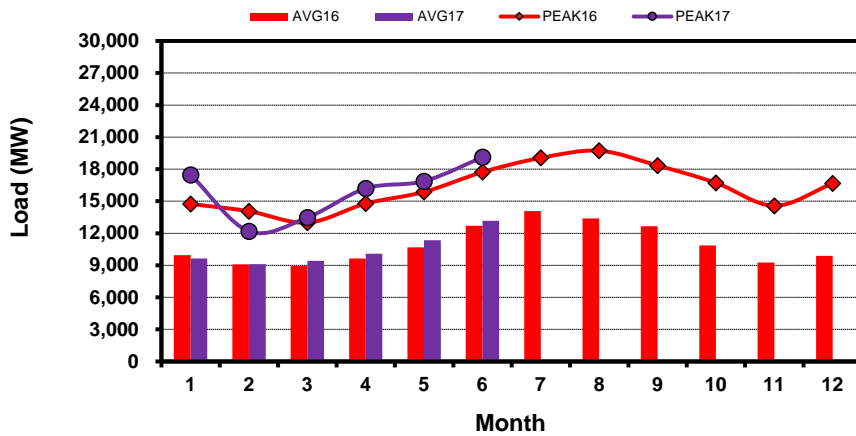
### Houston Zone



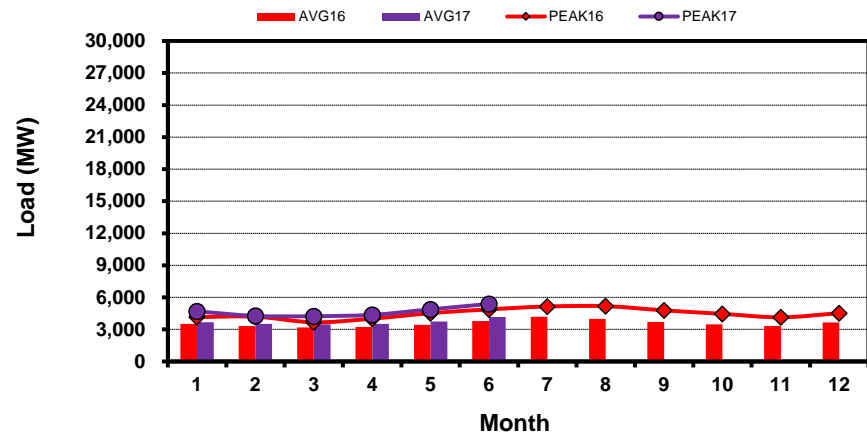
### North Zone



### South Zone



### West Zone



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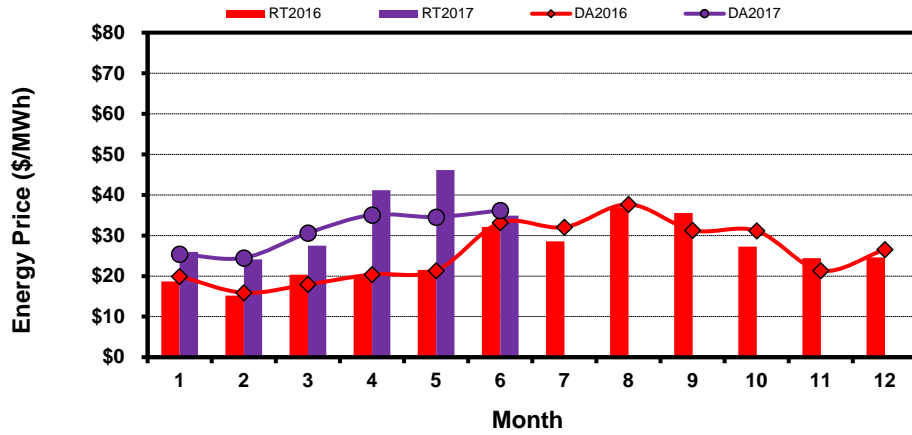
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

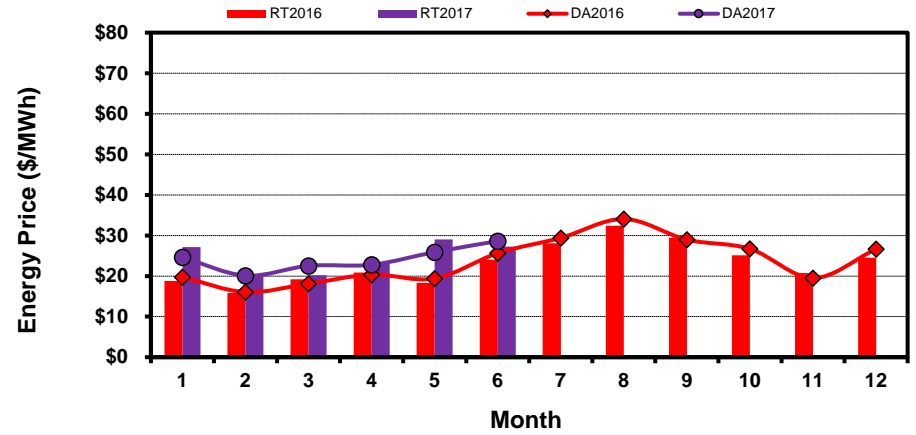
# Load Zone Monthly Average Energy Price DA vs RT

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

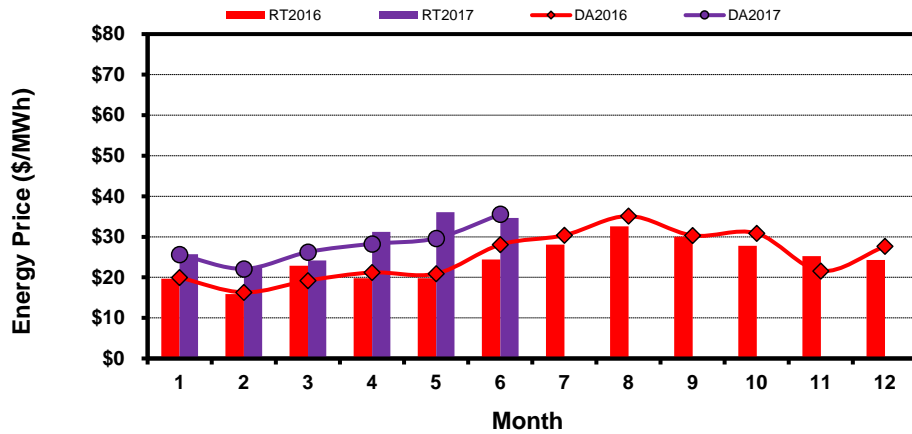
### Houston Zone



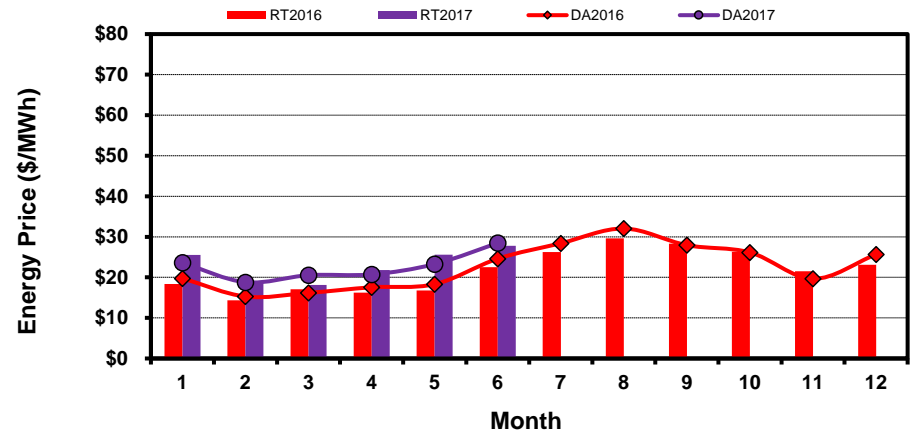
### North Zone



### South Zone



### West Zone



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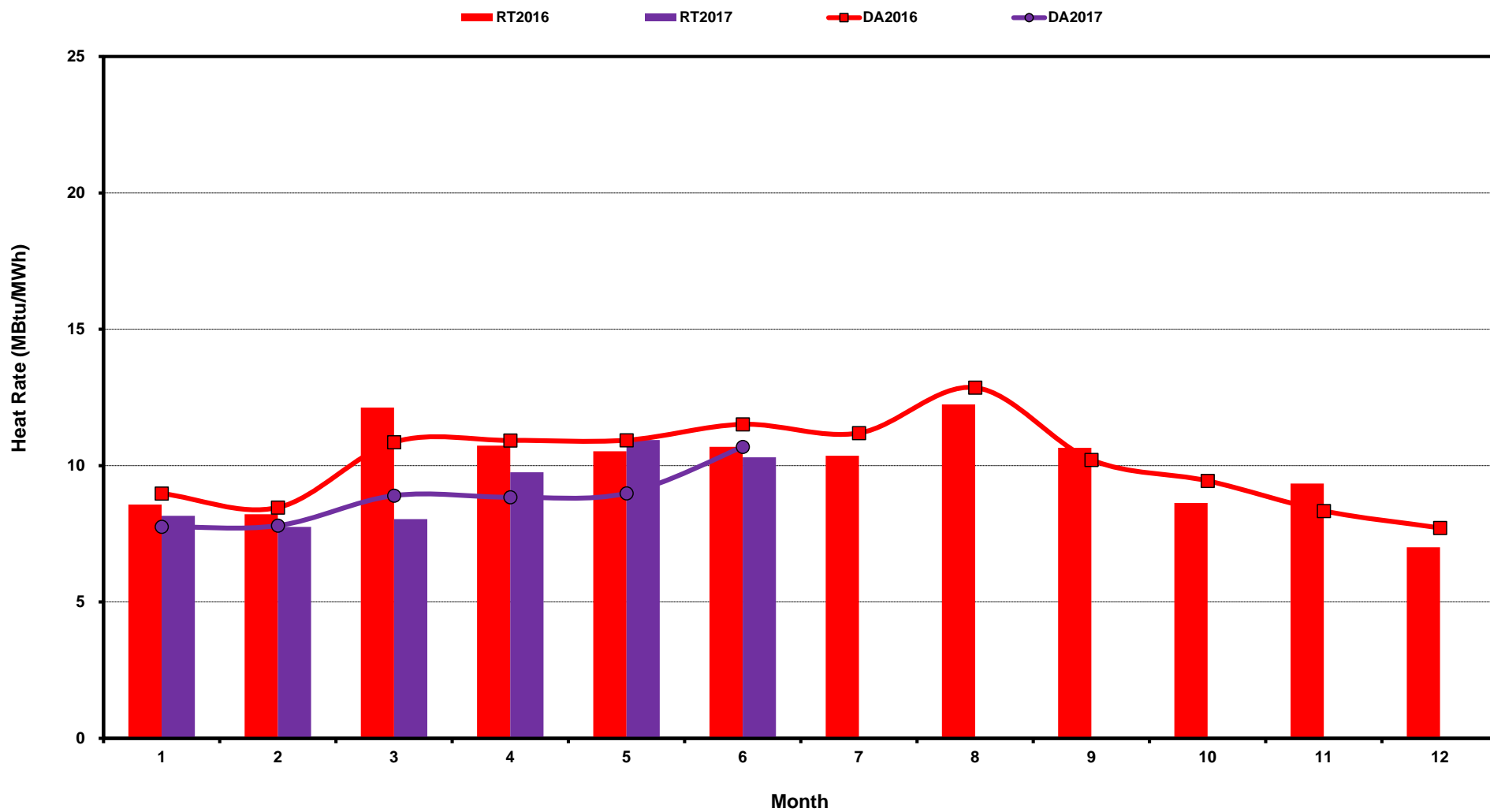
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

# ERCOT-wide Monthly Implied Heat Rate DA vs RT

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



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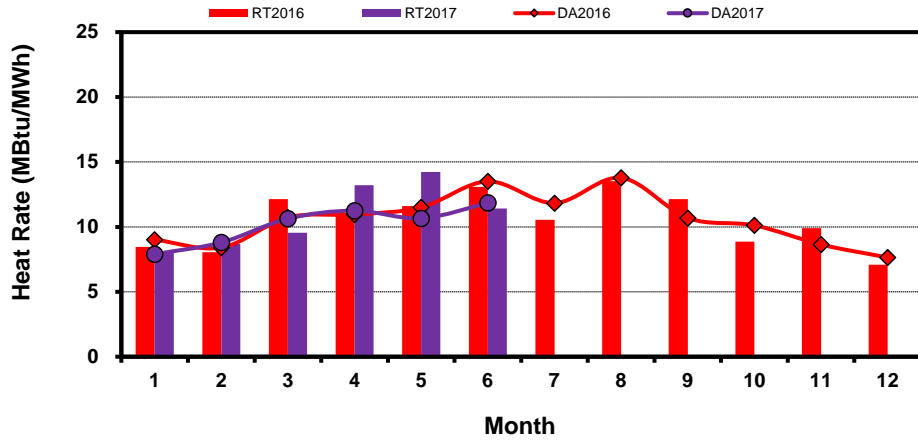
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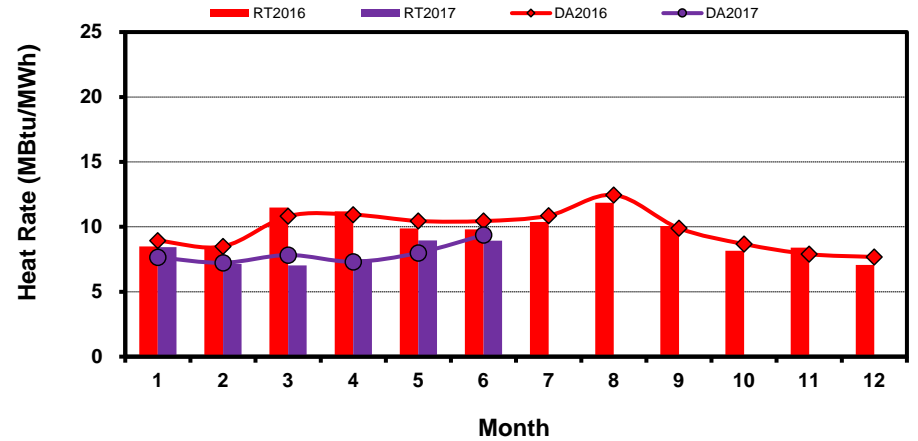
# Load Zone Monthly Implied Heat Rate DA vs RT

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

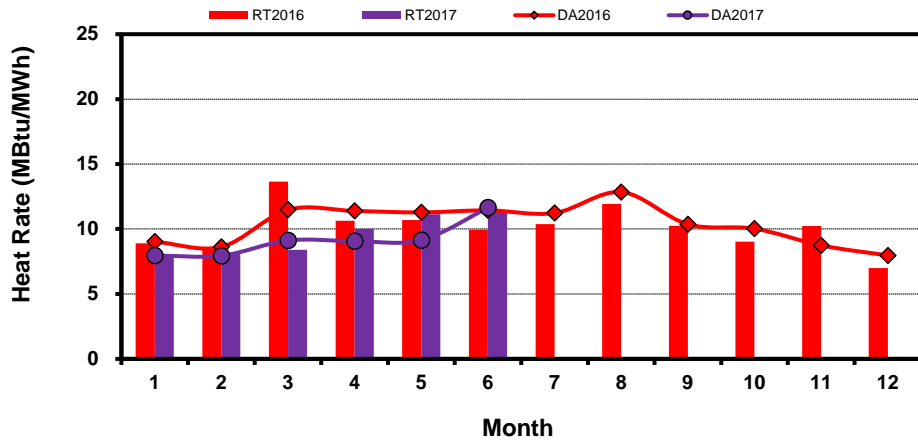
### Houston Zone



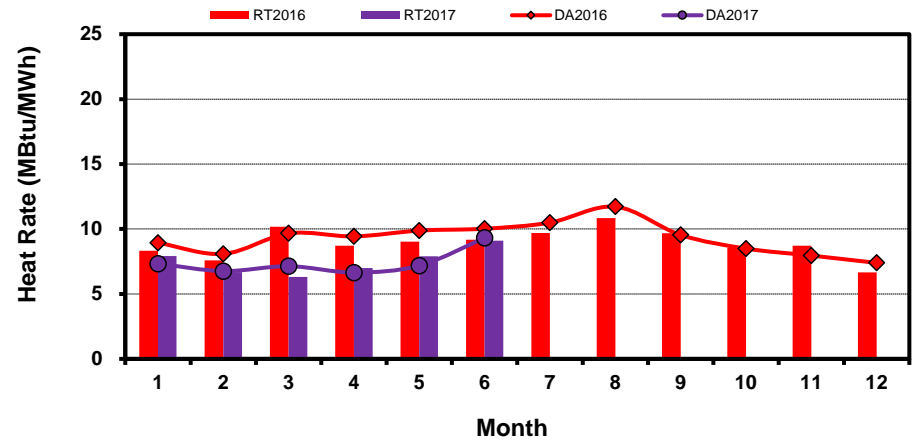
### North Zone



### South Zone



### West Zone



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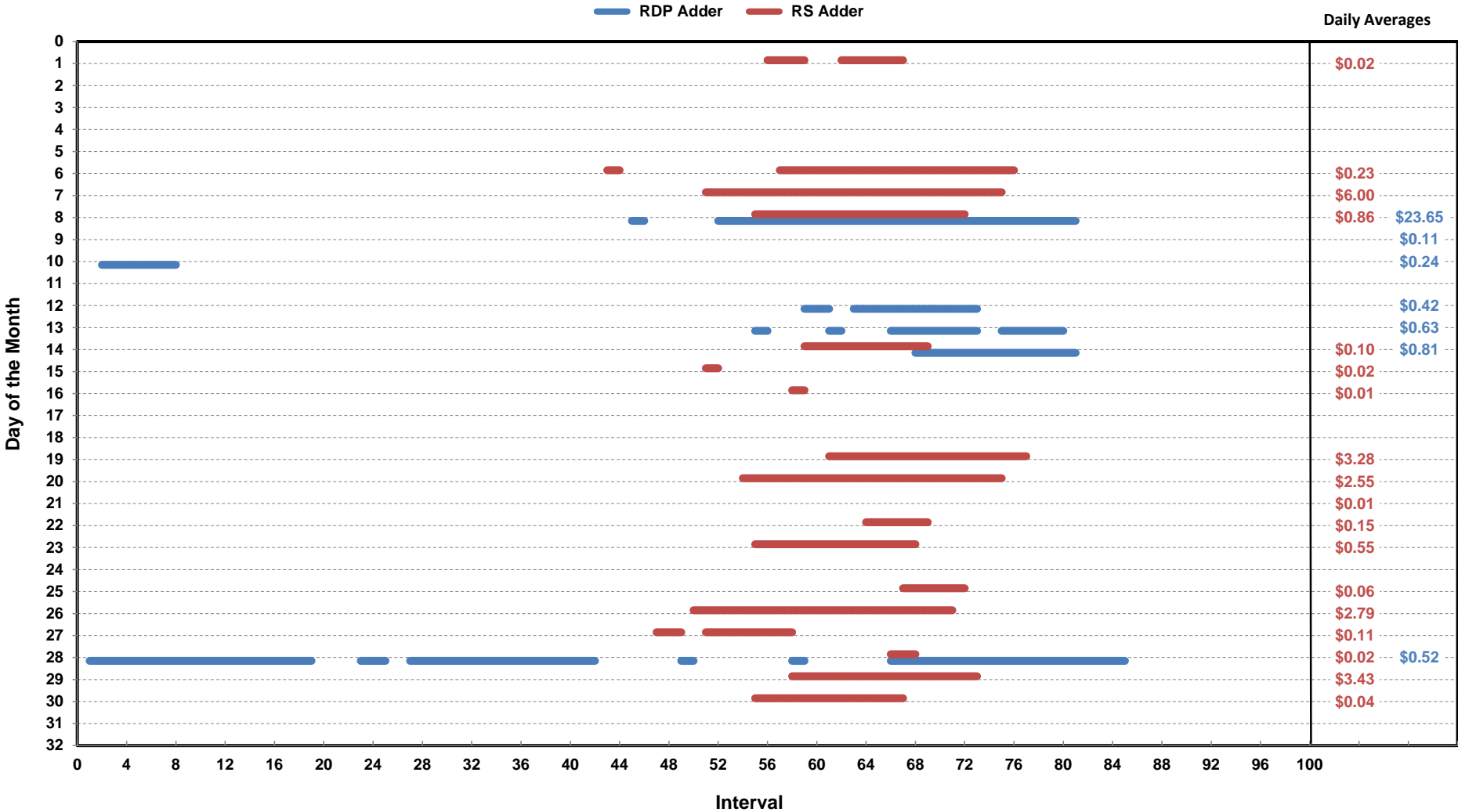
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**Note:** \* Zonal load zone definition vs. Nodal comparable load zone definition: LZ\_Houston=LZ\_Houston; LZ\_West=LZ\_West; LZ\_North=(LZ\_North,LZ\_RAYBN); LZ\_South=(LZ\_South,LZ\_CPS,LZ\_AEN,LZ\_LCRA)

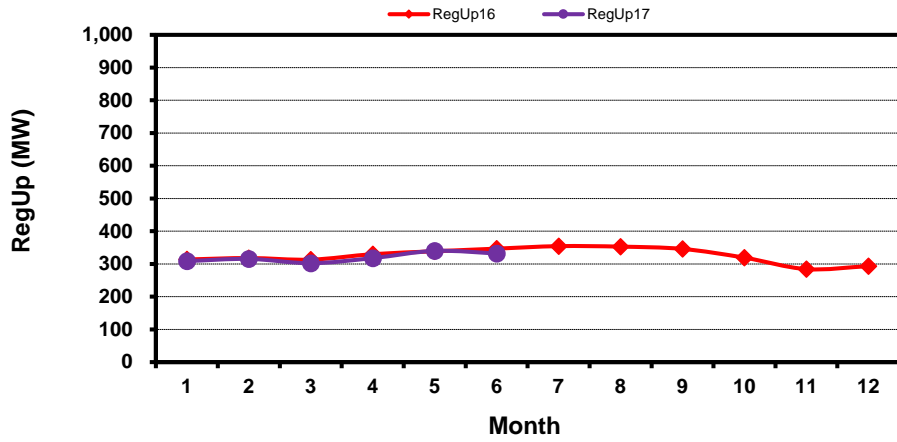
# Daily ORDC Adders Average Values and Interval Duration Jun-2017



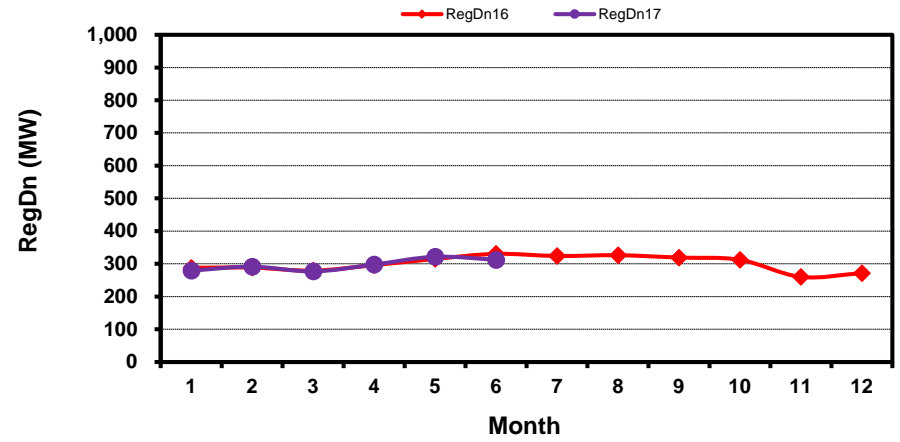
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# Monthly Average of Ancillary Services Required MW

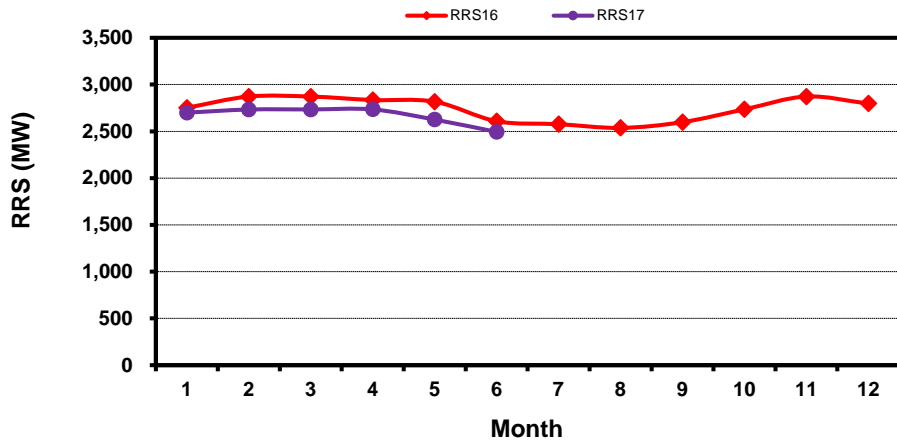
## Regulation Up



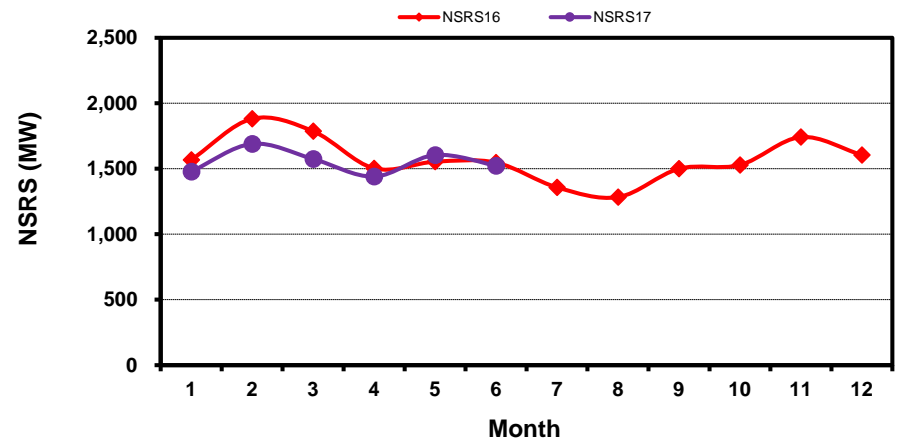
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



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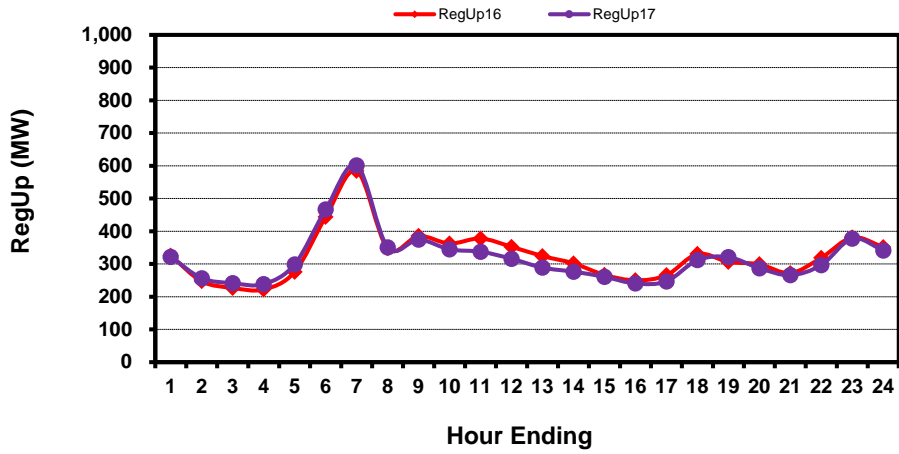
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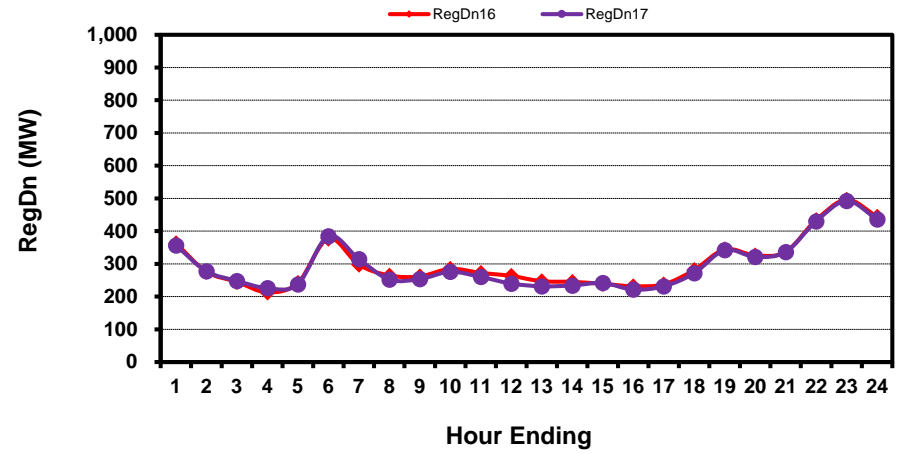


# Hourly Average of Ancillary Services Required MW

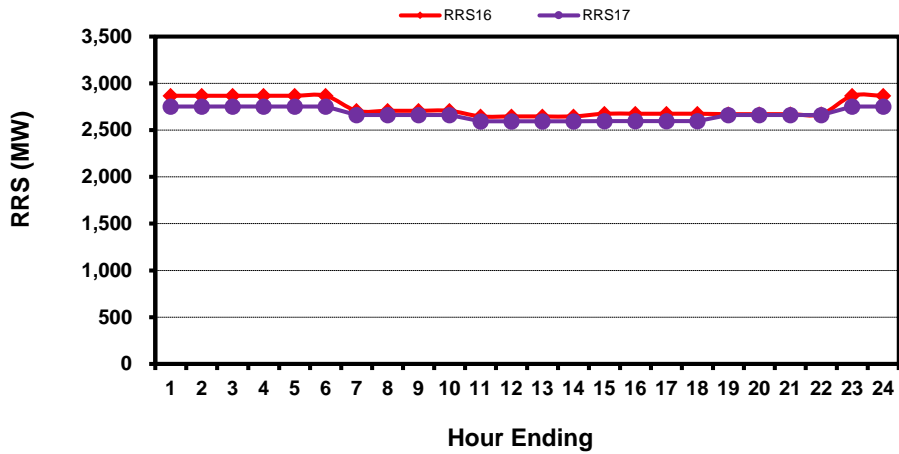
## Regulation Up



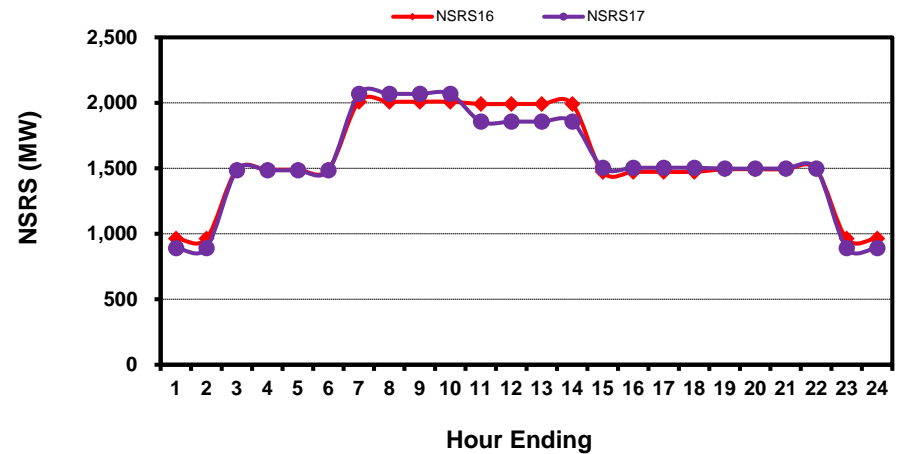
## Regulation Down



## Responsive Reserve



## Non-Spin Reserve



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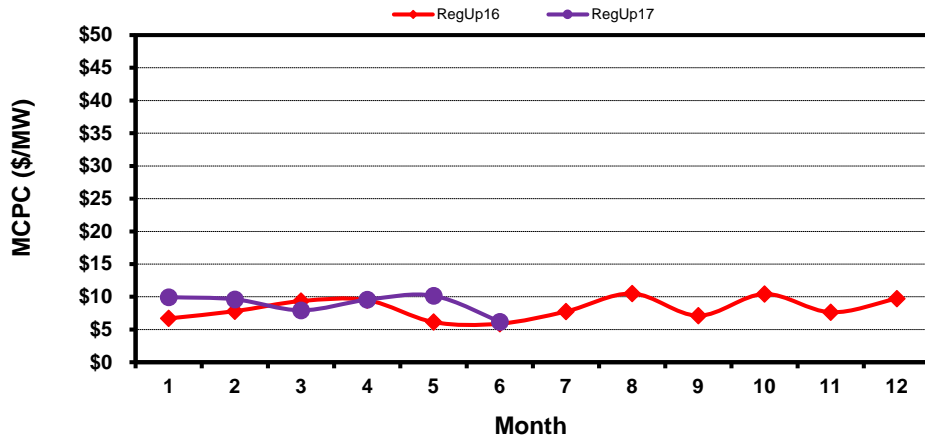
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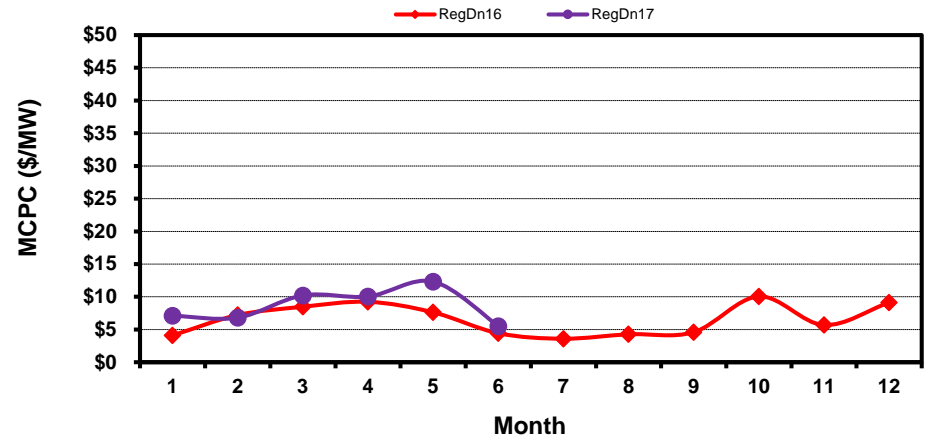
# Monthly Average Ancillary Services Price

(weighted by A/S Quantities Required)

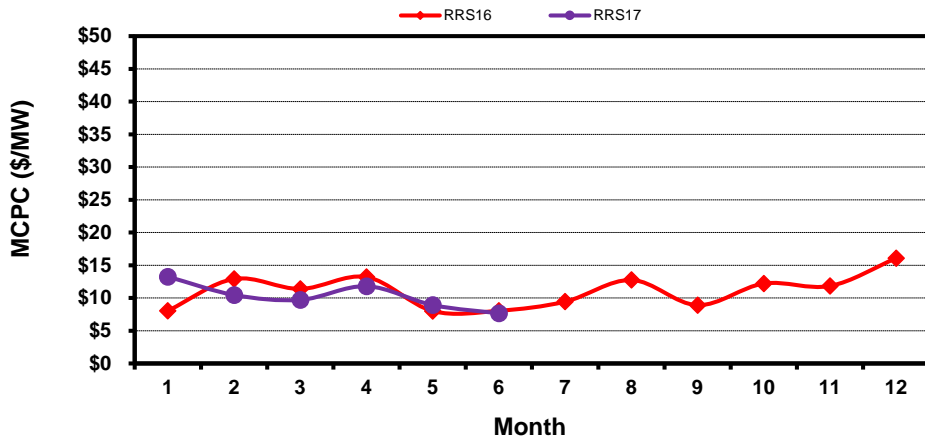
### Regulation Up



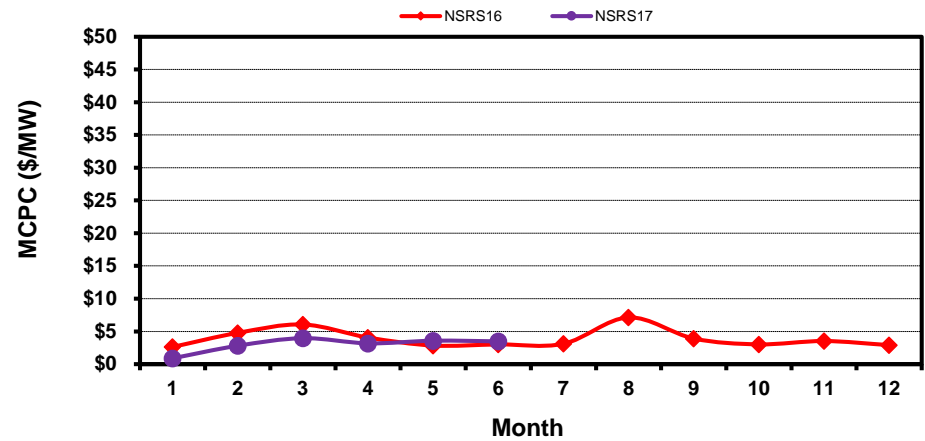
### Regulation Down



### Responsive Reserve



### Non-Spin Reserve



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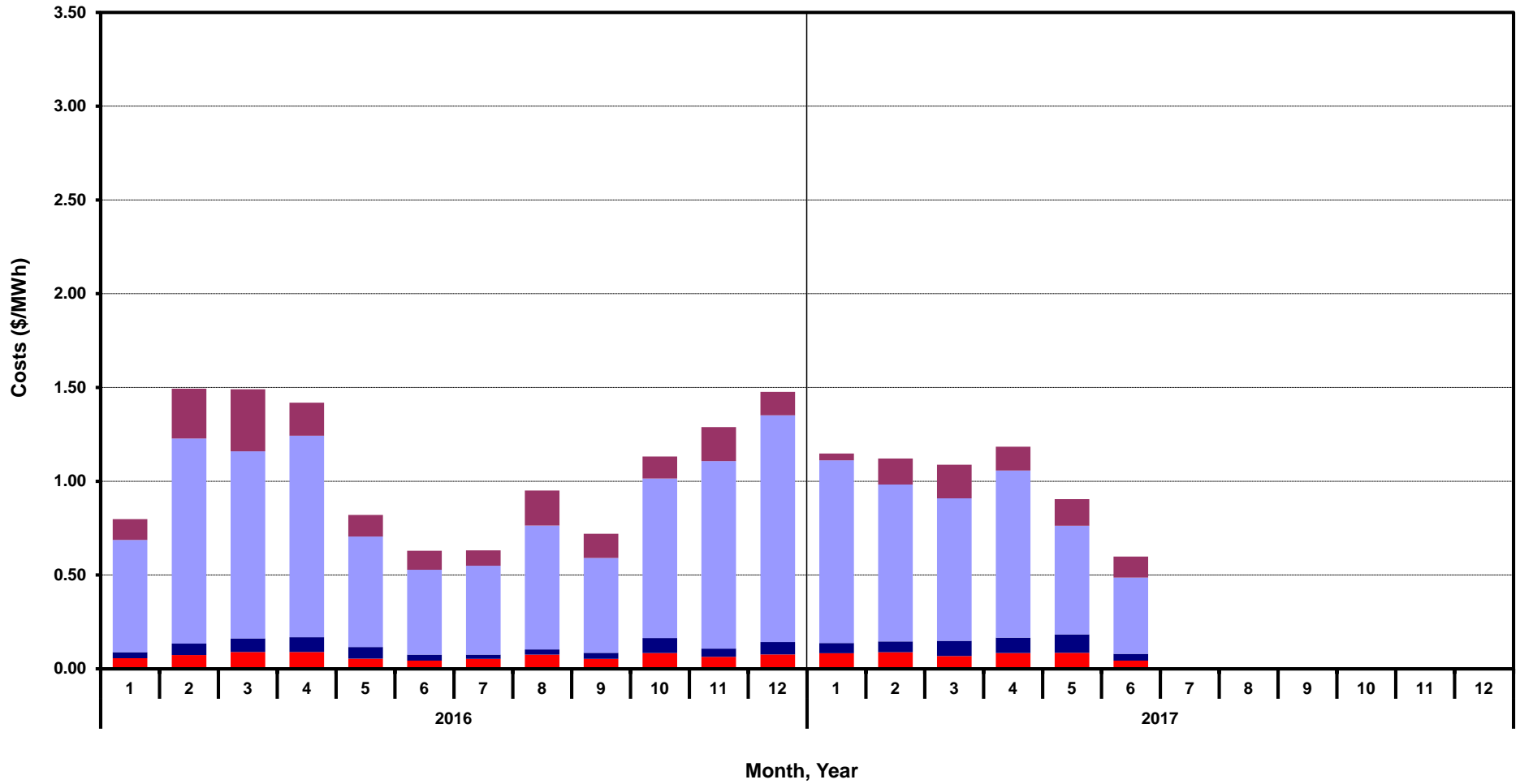
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# Monthly Average A/S Cost per MWh Load

RegUp RegDn RRS NonSpin



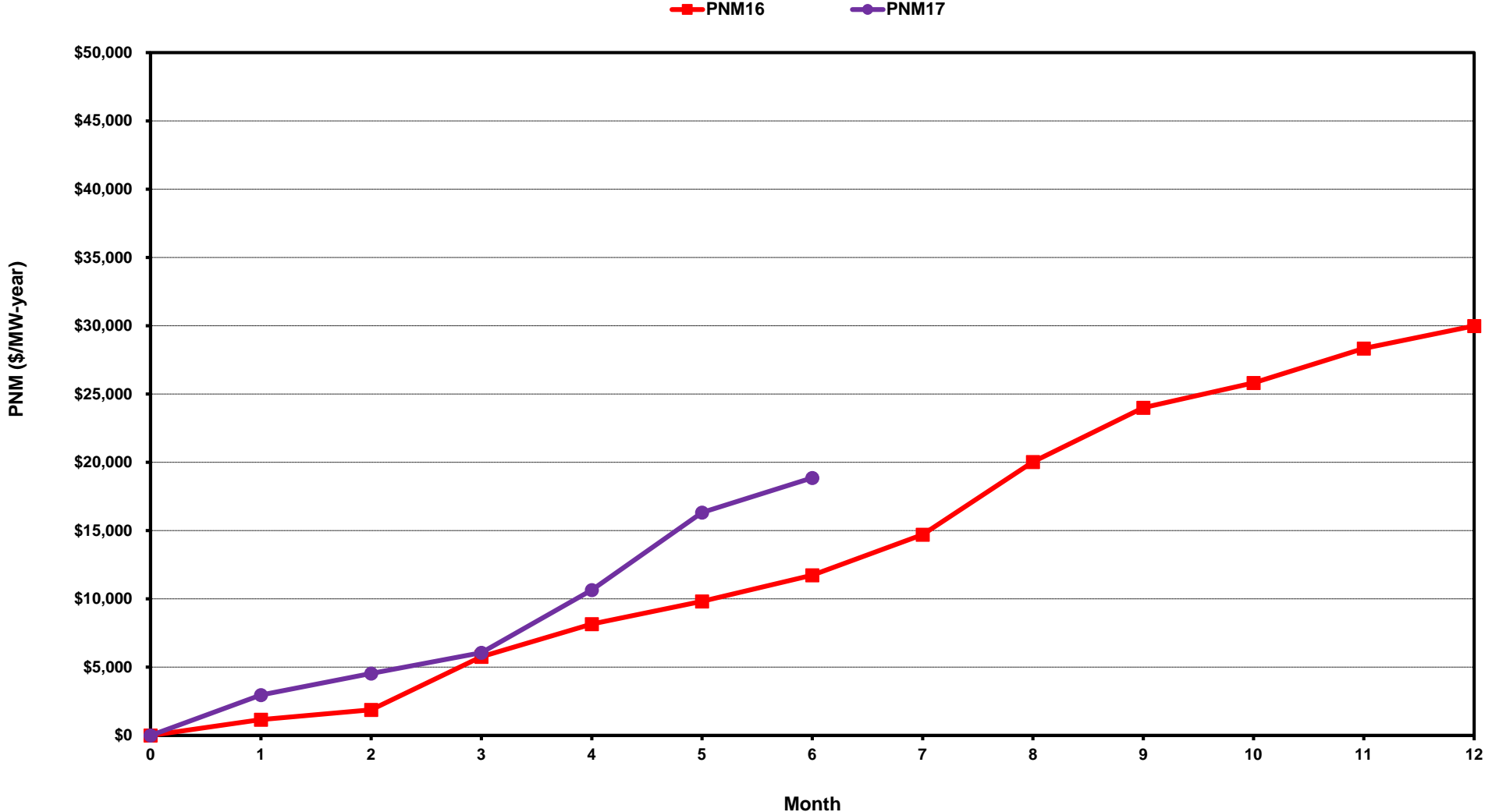
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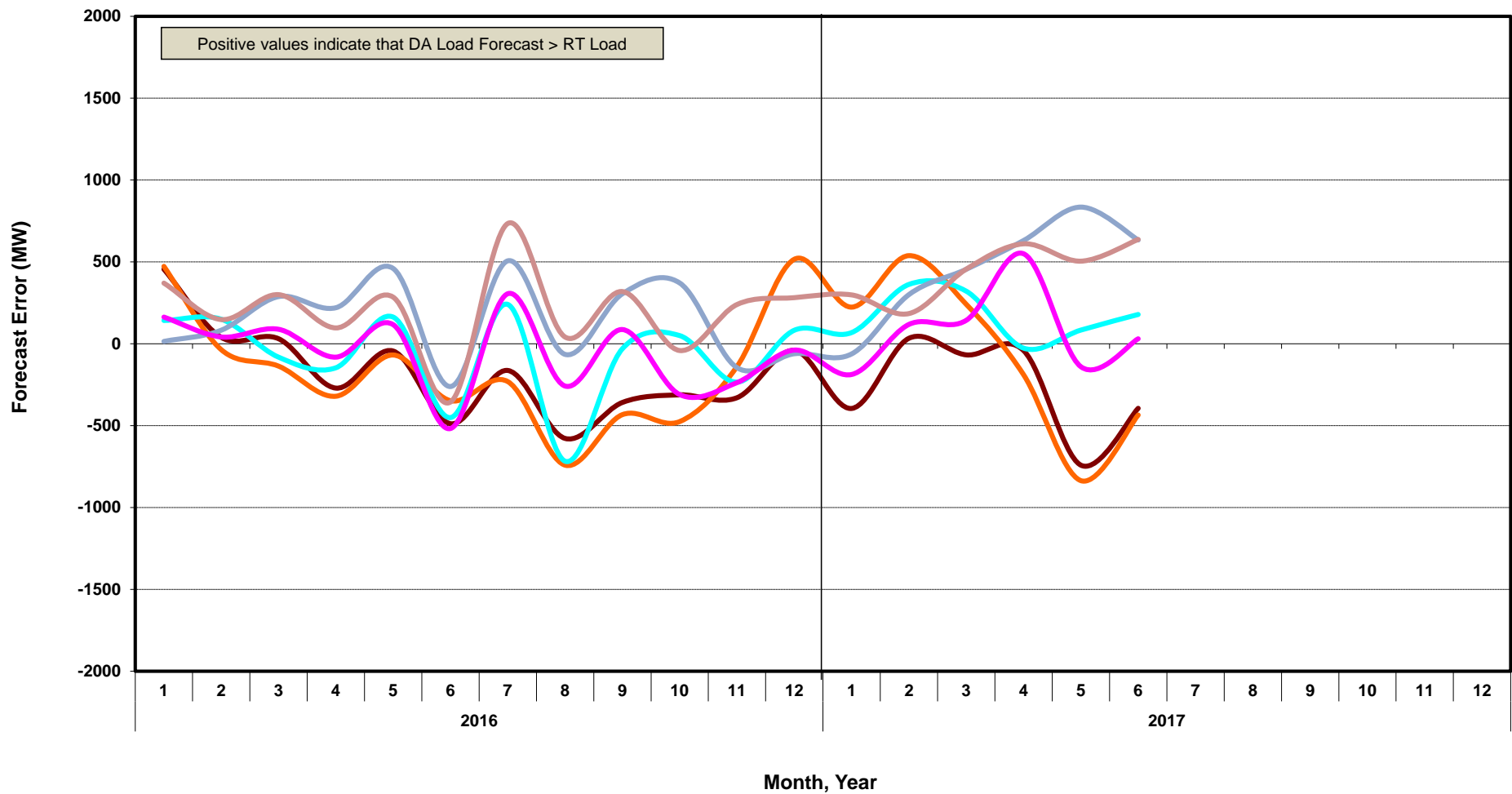
# ERCOT-wide Cumulative Peaker Net Margin



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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



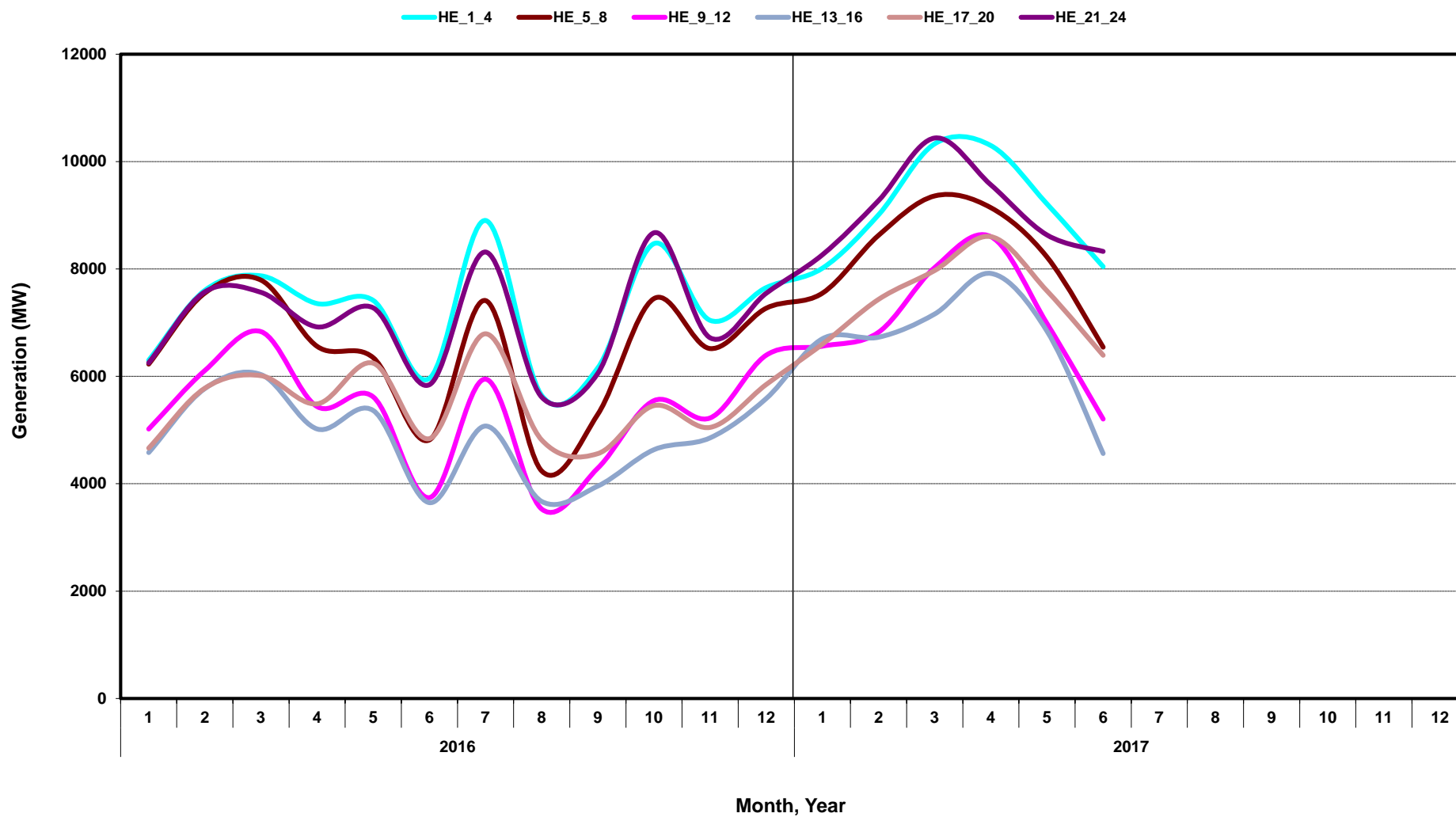
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# Monthly Average of Wind Generation by Hour Ending



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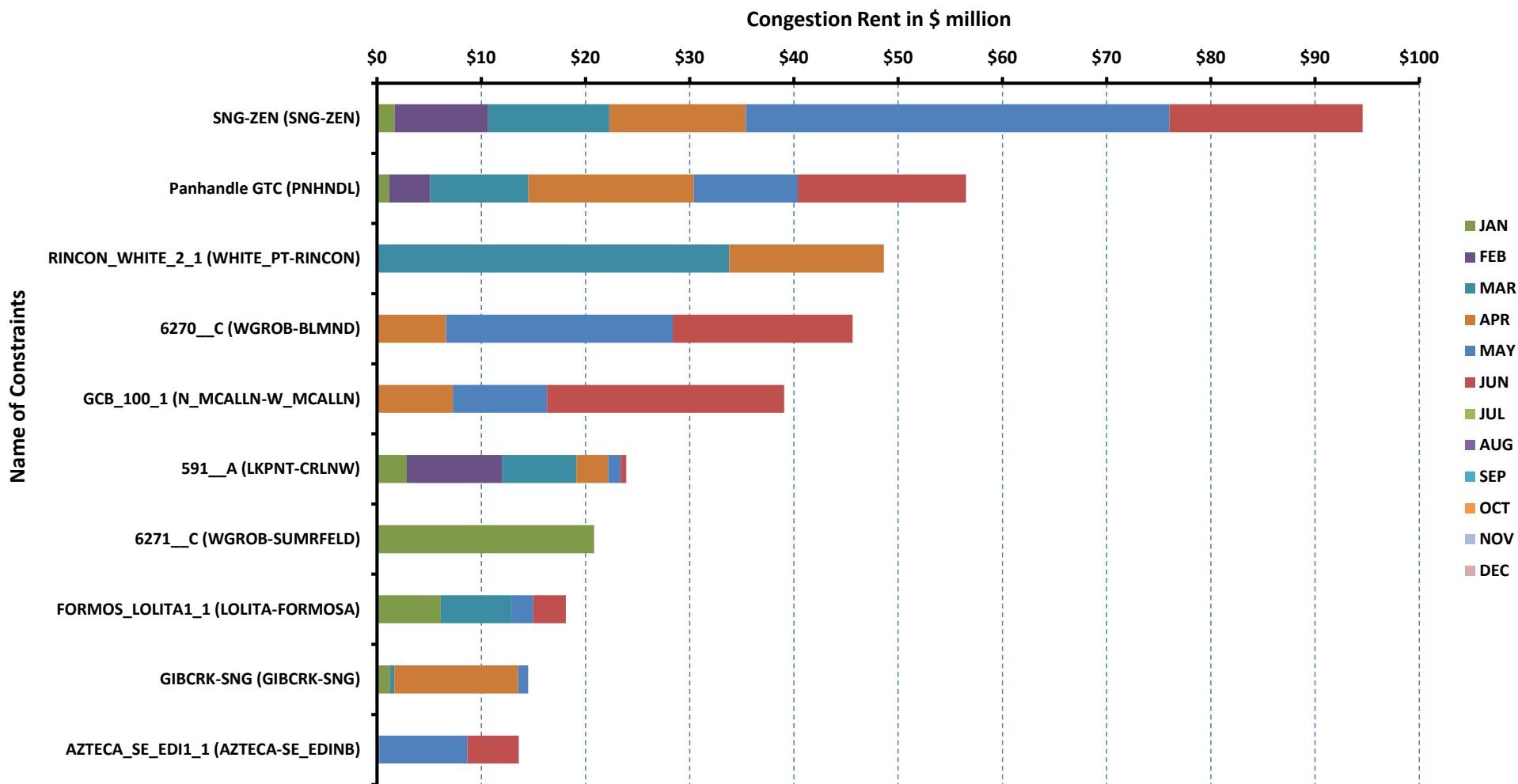
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# RT Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value



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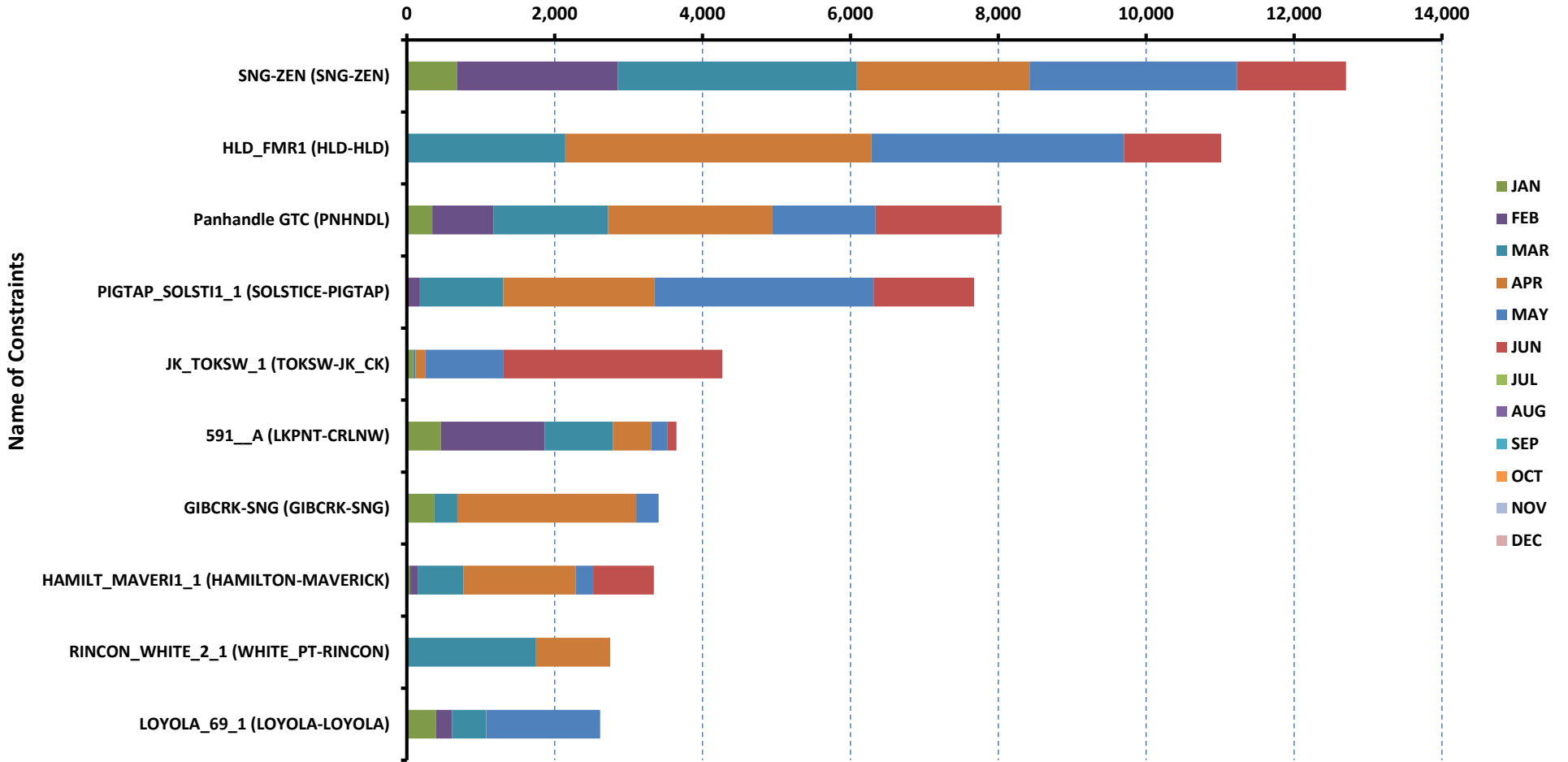
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# RT Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency

Number of SCED Intervals



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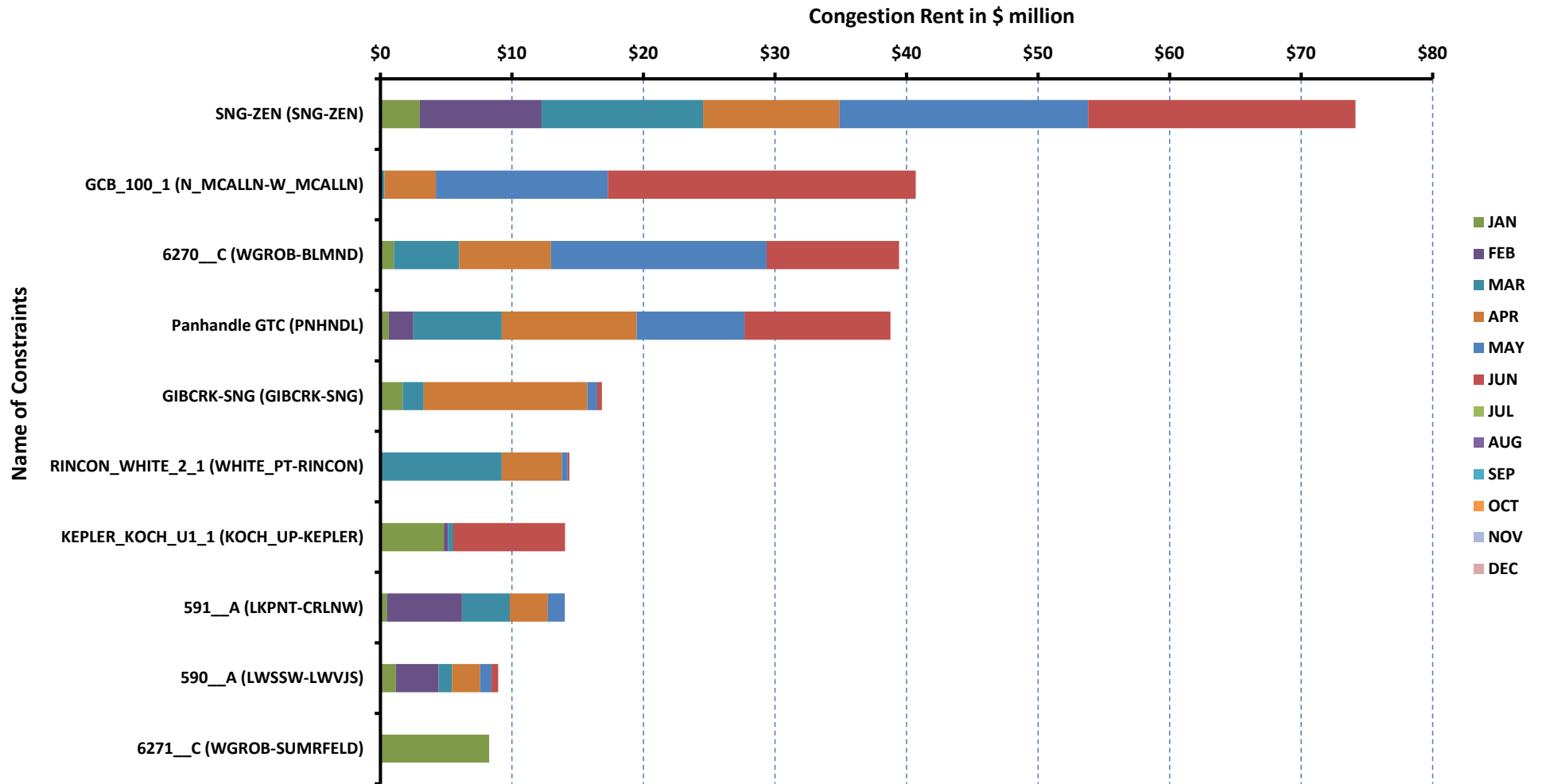
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# DA Congestion Constraint Rankings - 1

## Top 10 Constraints by Total Congestion Value



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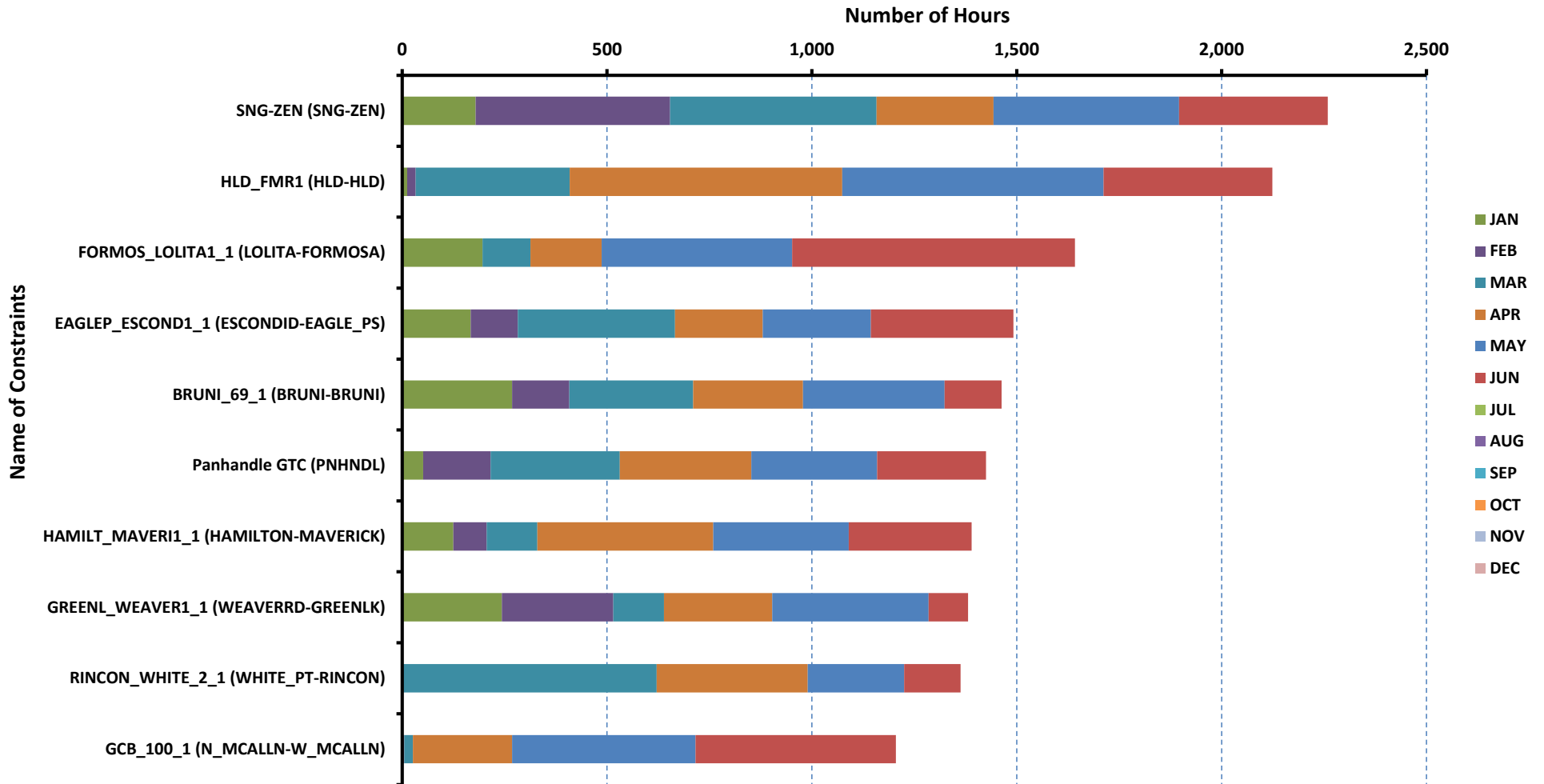
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# DA Congestion Constraint Rankings - 2

## Top 10 Constraints by Binding Frequency



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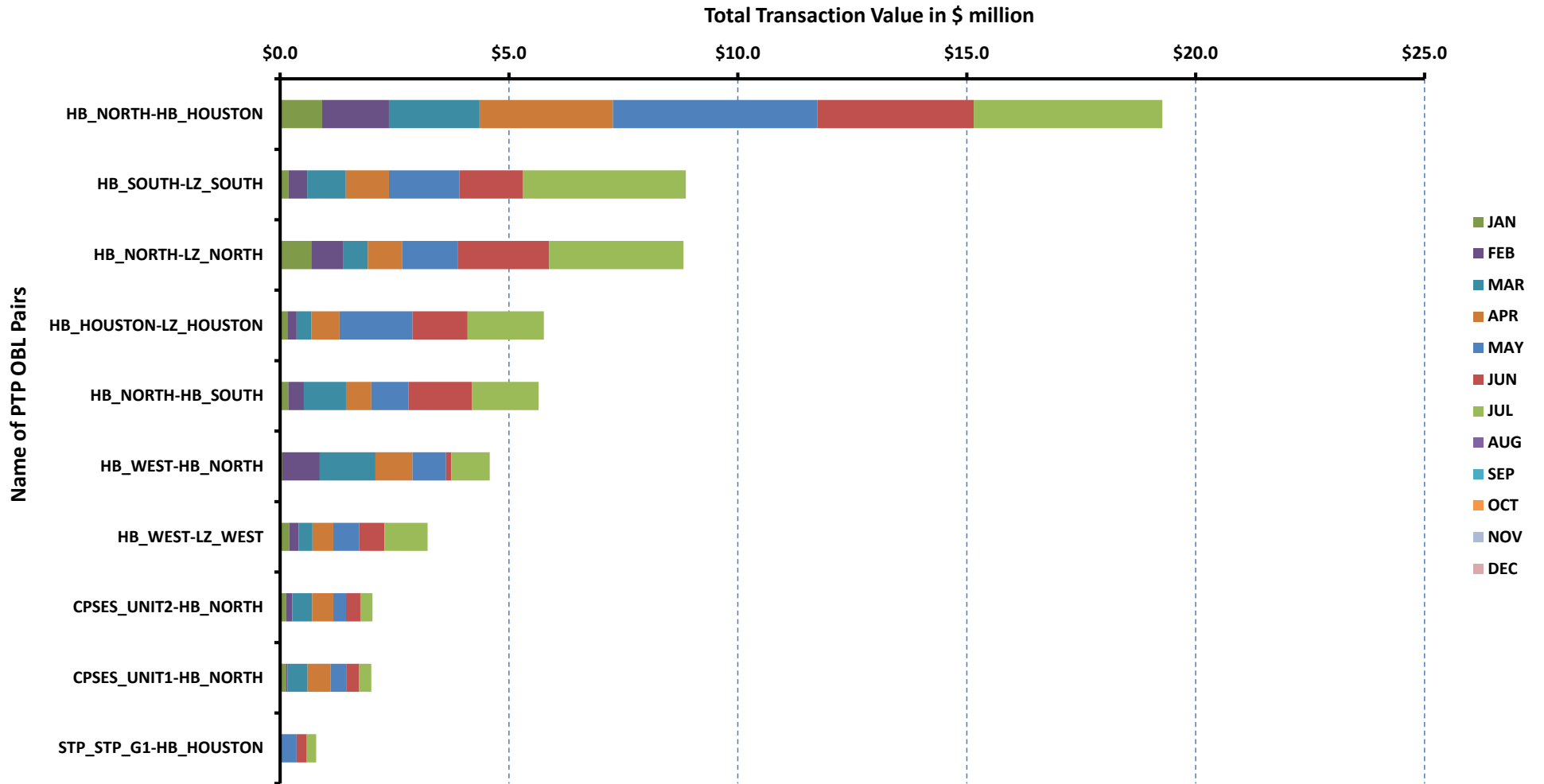
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# Top 10 CRR Pairs Ranked by Monthly Auction Values - 1

## Top 10 PTP Obligations by Total Transaction Value



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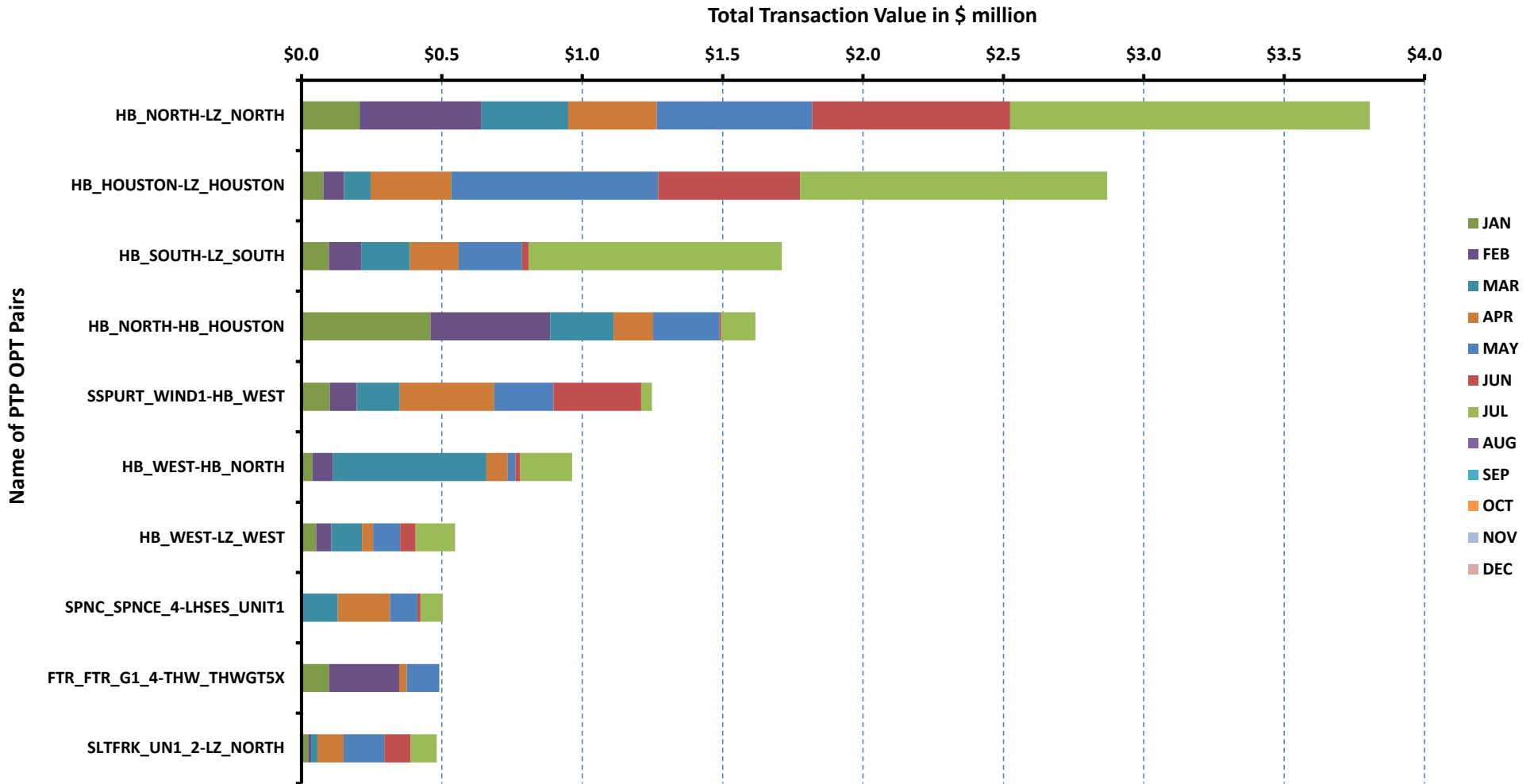
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# Top 10 CRR Pairs Ranked by Monthly Auction Values - 2

## Top 10 PTP Options by Total Transaction Value



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| ERCOT-wide Avg. Energy Price - DA vs. RT |       |          |          |
|------------------------------------------|-------|----------|----------|
| year                                     | month | dam_spp  | rtm_spp  |
| 2016                                     | 1     | \$ 19.85 | \$ 18.96 |
|                                          | 2     | \$ 16.00 | \$ 15.54 |
|                                          | 3     | \$ 18.18 | \$ 20.30 |
|                                          | 4     | \$ 20.34 | \$ 19.98 |
|                                          | 5     | \$ 20.28 | \$ 19.52 |
|                                          | 6     | \$ 28.27 | \$ 26.23 |
|                                          | 7     | \$ 30.31 | \$ 28.06 |
|                                          | 8     | \$ 35.17 | \$ 33.47 |
|                                          | 9     | \$ 29.90 | \$ 31.20 |
|                                          | 10    | \$ 29.07 | \$ 26.58 |
|                                          | 11    | \$ 20.59 | \$ 23.08 |
|                                          | 12    | \$ 26.80 | \$ 24.33 |
| 2017                                     | 1     | \$ 25.01 | \$ 26.30 |
|                                          | 2     | \$ 21.70 | \$ 21.57 |
|                                          | 3     | \$ 25.62 | \$ 23.14 |
|                                          | 4     | \$ 27.56 | \$ 30.40 |
|                                          | 5     | \$ 29.12 | \$ 35.46 |
|                                          | 6     | \$ 32.64 | \$ 31.46 |
|                                          | 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 |   |  |
| 2016                      | 1     | 11,996           | 19,817         | 14,745         | 4,154         | 9,367           | 14,160        | 9,958         | 3,525        |   |  |
|                           | 2     | 11,378           | 19,345         | 14,062         | 4,194         | 9,027           | 12,473        | 9,085         | 3,318        |   |  |
|                           | 3     | 13,434           | 16,410         | 12,996         | 3,667         | 9,184           | 11,447        | 8,934         | 3,177        |   |  |
|                           | 4     | 14,666           | 18,506         | 14,780         | 4,007         | 9,890           | 12,058        | 9,634         | 3,239        |   |  |
|                           | 5     | 16,608           | 21,991         | 15,871         | 4,520         | 11,044          | 13,212        | 10,679        | 3,423        |   |  |
|                           | 6     | 17,981           | 25,275         | 17,724         | 4,876         | 12,627          | 17,254        | 12,696        | 3,795        |   |  |
|                           | 7     | 18,366           | 26,373         | 19,056         | 5,146         | 13,866          | 19,237        | 14,083        | 4,192        |   |  |
|                           | 8     | 18,920           | 28,134         | 19,726         | 5,173         | 13,285          | 18,380        | 13,383        | 3,975        |   |  |
|                           | 9     | 18,008           | 26,088         | 18,339         | 4,783         | 12,650          | 16,767        | 12,651        | 3,698        |   |  |
|                           | 10    | 16,500           | 22,643         | 16,722         | 4,457         | 11,209          | 13,756        | 10,856        | 3,472        |   |  |
|                           | 11    | 14,053           | 18,396         | 14,574         | 4,132         | 9,533           | 11,857        | 9,264         | 3,330        |   |  |
|                           | 12    | 12,783           | 24,181         | 16,662         | 4,523         | 9,606           | 14,071        | 9,886         | 3,654        |   |  |
| 2017                      | 1     | 13,640           | 24,641         | 17,476         | 4,693         | 9,534           | 13,864        | 9,649         | 3,681        |   |  |
|                           | 2     | 13,075           | 17,382         | 12,185         | 4,263         | 9,321           | 12,283        | 9,102         | 3,514        |   |  |
|                           | 3     | 14,353           | 17,152         | 13,478         | 4,237         | 9,894           | 12,147        | 9,428         | 3,485        |   |  |
|                           | 4     | 15,401           | 18,155         | 16,198         | 4,365         | 10,161          | 12,431        | 10,079        | 3,523        |   |  |
|                           | 5     | 16,122           | 22,825         | 16,877         | 4,880         | 11,285          | 14,075        | 11,351        | 3,740        |   |  |
|                           | 6     | 17,802           | 25,826         | 19,128         | 5,383         | 12,926          | 16,852        | 13,159        | 4,172        |   |  |
|                           | 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 |
| 2016                                               | 1     | \$ 18.68        | \$ 18.77      | \$ 19.69      | \$ 18.39     | \$ 19.93        | \$ 19.74      | \$ 19.95      | \$ 19.76     |
|                                                    | 2     | \$ 15.20        | \$ 15.84      | \$ 15.89      | \$ 14.35     | \$ 15.89        | \$ 16.05      | \$ 16.30      | \$ 15.28     |
|                                                    | 3     | \$ 20.31        | \$ 19.22      | \$ 22.84      | \$ 17.04     | \$ 17.95        | \$ 18.12      | \$ 19.22      | \$ 16.18     |
|                                                    | 4     | \$ 20.32        | \$ 20.84      | \$ 19.79      | \$ 16.22     | \$ 20.39        | \$ 20.35      | \$ 21.20      | \$ 17.56     |
|                                                    | 5     | \$ 21.52        | \$ 18.32      | \$ 19.82      | \$ 16.75     | \$ 21.33        | \$ 19.38      | \$ 20.92      | \$ 18.32     |
|                                                    | 6     | \$ 32.12        | \$ 24.08      | \$ 24.42      | \$ 22.53     | \$ 33.15        | \$ 25.64      | \$ 28.08      | \$ 24.60     |
|                                                    | 7     | \$ 28.55        | \$ 28.07      | \$ 28.10      | \$ 26.26     | \$ 32.03        | \$ 29.41      | \$ 30.40      | \$ 28.41     |
|                                                    | 8     | \$ 36.96        | \$ 32.41      | \$ 32.61      | \$ 29.64     | \$ 37.68        | \$ 34.06      | \$ 35.13      | \$ 32.05     |
|                                                    | 9     | \$ 35.54        | \$ 29.45      | \$ 30.02      | \$ 28.34     | \$ 31.27        | \$ 28.97      | \$ 30.34      | \$ 27.94     |
|                                                    | 10    | \$ 27.27        | \$ 25.14      | \$ 27.77      | \$ 26.33     | \$ 31.14        | \$ 26.70      | \$ 30.86      | \$ 26.15     |
|                                                    | 11    | \$ 24.43        | \$ 20.73      | \$ 25.25      | \$ 21.51     | \$ 21.33        | \$ 19.50      | \$ 21.58      | \$ 19.65     |
|                                                    | 12    | \$ 24.59        | \$ 24.51      | \$ 24.28      | \$ 23.11     | \$ 26.55        | \$ 26.66      | \$ 27.66      | \$ 25.67     |
| 2017                                               | 1     | \$ 25.97        | \$ 27.15      | \$ 25.69      | \$ 25.53     | \$ 25.44        | \$ 24.65      | \$ 25.65      | \$ 23.62     |
|                                                    | 2     | \$ 24.14        | \$ 19.84      | \$ 22.43      | \$ 18.59     | \$ 24.48        | \$ 20.12      | \$ 22.10      | \$ 18.81     |
|                                                    | 3     | \$ 27.46        | \$ 20.23      | \$ 24.18      | \$ 18.15     | \$ 30.61        | \$ 22.53      | \$ 26.24      | \$ 20.54     |
|                                                    | 4     | \$ 41.17        | \$ 23.37      | \$ 31.21      | \$ 21.81     | \$ 35.06        | \$ 22.79      | \$ 28.27      | \$ 20.73     |
|                                                    | 5     | \$ 46.11        | \$ 29.04      | \$ 36.07      | \$ 25.58     | \$ 34.55        | \$ 25.90      | \$ 29.64      | \$ 23.27     |
|                                                    | 6     | \$ 34.88        | \$ 27.26      | \$ 34.65      | \$ 27.77     | \$ 36.20        | \$ 28.62      | \$ 35.60      | \$ 28.49     |
|                                                    | 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 |
| 2016                                             | 1     | \$ 2.21  | \$ 18.96 | 8.58   | \$ 19.85 | 8.98   |
|                                                  | 2     | \$ 1.89  | \$ 15.54 | 8.22   | \$ 16.00 | 8.46   |
|                                                  | 3     | \$ 1.67  | \$ 20.30 | 12.13  | \$ 18.18 | 10.86  |
|                                                  | 4     | \$ 1.86  | \$ 19.98 | 10.73  | \$ 20.34 | 10.92  |
|                                                  | 5     | \$ 1.85  | \$ 19.52 | 10.52  | \$ 20.28 | 10.93  |
|                                                  | 6     | \$ 2.46  | \$ 26.23 | 10.69  | \$ 28.27 | 11.51  |
|                                                  | 7     | \$ 2.71  | \$ 28.06 | 10.36  | \$ 30.31 | 11.19  |
|                                                  | 8     | \$ 2.73  | \$ 33.47 | 12.24  | \$ 35.17 | 12.86  |
|                                                  | 9     | \$ 2.93  | \$ 31.20 | 10.66  | \$ 29.90 | 10.21  |
|                                                  | 10    | \$ 3.08  | \$ 26.58 | 8.63   | \$ 29.07 | 9.44   |
|                                                  | 11    | \$ 2.47  | \$ 23.08 | 9.34   | \$ 20.59 | 8.34   |
|                                                  | 12    | \$ 3.47  | \$ 24.33 | 7.00   | \$ 26.80 | 7.72   |
| 2017                                             | 1     | \$ 3.22  | \$ 26.30 | 8.16   | \$ 25.01 | 7.76   |
|                                                  | 2     | \$ 2.78  | \$ 21.57 | 7.75   | \$ 21.70 | 7.80   |
|                                                  | 3     | \$ 2.88  | \$ 23.14 | 8.04   | \$ 25.62 | 8.90   |
|                                                  | 4     | \$ 3.12  | \$ 30.40 | 9.75   | \$ 27.56 | 8.84   |
|                                                  | 5     | \$ 3.24  | \$ 35.46 | 10.94  | \$ 29.12 | 8.99   |
|                                                  | 6     | \$ 3.05  | \$ 31.46 | 10.30  | \$ 32.64 | 10.69  |
|                                                  | 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 |
| 2016                                            | 1     | 9.02          | 9.02        | 8.93        | 8.94       | 8.45          | 8.91        | 8.49        | 8.32       |
|                                                 | 2     | 8.41          | 8.62        | 8.49        | 8.08       | 8.04          | 8.41        | 8.38        | 7.59       |
|                                                 | 3     | 10.73         | 11.48       | 10.82       | 9.67       | 12.13         | 13.65       | 11.48       | 10.18      |
|                                                 | 4     | 10.95         | 11.39       | 10.93       | 9.43       | 10.92         | 10.63       | 11.20       | 8.71       |
|                                                 | 5     | 11.50         | 11.28       | 10.45       | 9.88       | 11.60         | 10.68       | 9.88        | 9.03       |
|                                                 | 6     | 13.50         | 11.44       | 10.44       | 10.02      | 13.08         | 9.95        | 9.81        | 9.18       |
|                                                 | 7     | 11.83         | 11.23       | 10.86       | 10.49      | 10.55         | 10.38       | 10.37       | 9.70       |
|                                                 | 8     | 13.78         | 12.84       | 12.45       | 11.72      | 13.52         | 11.92       | 11.85       | 10.84      |
|                                                 | 9     | 10.68         | 10.36       | 9.89        | 9.54       | 12.14         | 10.25       | 10.06       | 9.68       |
|                                                 | 10    | 10.11         | 10.02       | 8.67        | 8.49       | 8.86          | 9.02        | 8.16        | 8.55       |
|                                                 | 11    | 8.64          | 8.74        | 7.89        | 7.95       | 9.89          | 10.22       | 8.39        | 8.71       |
|                                                 | 12    | 7.64          | 7.96        | 7.67        | 7.39       | 7.08          | 6.99        | 7.06        | 6.65       |
| 2017                                            | 1     | 7.89          | 7.96        | 7.65        | 7.33       | 8.06          | 7.97        | 8.42        | 7.92       |
|                                                 | 2     | 8.80          | 7.94        | 7.23        | 6.76       | 8.68          | 8.06        | 7.13        | 6.68       |
|                                                 | 3     | 10.63         | 9.12        | 7.83        | 7.13       | 9.54          | 8.40        | 7.03        | 6.30       |
|                                                 | 4     | 11.25         | 9.07        | 7.31        | 6.65       | 13.21         | 10.01       | 7.50        | 7.00       |
|                                                 | 5     | 10.66         | 9.15        | 7.99        | 7.18       | 14.23         | 11.13       | 8.96        | 7.89       |
|                                                 | 6     | 11.85         | 11.66       | 9.37        | 9.33       | 11.42         | 11.35       | 8.93        | 9.09       |
|                                                 | 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 |
| 2017                                                   | 6     | 1   | \$ 0.02  | \$ -      | 10     | 0       | 80     | 90      |
| 2017                                                   | 6     | 2   | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 3   | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 4   | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 5   | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 6   | \$ 0.23  | \$ -      | 23     | 0       | 80     | 90      |
| 2017                                                   | 6     | 7   | \$ 6.00  | \$ -      | 26     | 0       | 80     | 90      |
| 2017                                                   | 6     | 8   | \$ 0.86  | \$ 23.65  | 18     | 32      | 80     | 90      |
| 2017                                                   | 6     | 9   | \$ -     | \$ 0.11   | 0      | 1       | 80     | 90      |
| 2017                                                   | 6     | 10  | \$ -     | \$ 0.24   | 0      | 7       | 80     | 90      |
| 2017                                                   | 6     | 11  | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 12  | \$ -     | \$ 0.42   | 0      | 16      | 80     | 90      |
| 2017                                                   | 6     | 13  | \$ -     | \$ 0.63   | 0      | 19      | 80     | 90      |
| 2017                                                   | 6     | 14  | \$ 0.10  | \$ 0.81   | 11     | 14      | 80     | 90      |
| 2017                                                   | 6     | 15  | \$ 0.02  | \$ -      | 2      | 0       | 80     | 90      |
| 2017                                                   | 6     | 16  | \$ 0.01  | \$ -      | 2      | 0       | 80     | 90      |
| 2017                                                   | 6     | 17  | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 18  | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 19  | \$ 3.28  | \$ -      | 17     | 0       | 80     | 90      |
| 2017                                                   | 6     | 20  | \$ 2.55  | \$ -      | 23     | 0       | 80     | 90      |
| 2017                                                   | 6     | 21  | \$ 0.01  | \$ -      | 1      | 0       | 80     | 90      |
| 2017                                                   | 6     | 22  | \$ 0.15  | \$ -      | 6      | 0       | 80     | 90      |
| 2017                                                   | 6     | 23  | \$ 0.55  | \$ -      | 14     | 0       | 80     | 90      |
| 2017                                                   | 6     | 24  | \$ -     | \$ -      | 0      | 0       | 80     | 90      |
| 2017                                                   | 6     | 25  | \$ 0.06  | \$ -      | 6      | 0       | 80     | 90      |
| 2017                                                   | 6     | 26  | \$ 2.79  | \$ -      | 22     | 0       | 80     | 90      |
| 2017                                                   | 6     | 27  | \$ 0.11  | \$ -      | 13     | 0       | 80     | 90      |
| 2017                                                   | 6     | 28  | \$ 0.02  | \$ 0.52   | 3      | 62      | 80     | 90      |
| 2017                                                   | 6     | 29  | \$ 3.43  | \$ -      | 16     | 0       | 80     | 90      |
| 2017                                                   | 6     | 30  | \$ 0.04  | \$ -      | 13     | 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 |
| 2016                                              | 1     | 288        | 1,568      | 2,752    | 314        |
|                                                   | 2     | 289        | 1,882      | 2,872    | 318        |
|                                                   | 3     | 279        | 1,787      | 2,872    | 313        |
|                                                   | 4     | 296        | 1,503      | 2,835    | 330        |
|                                                   | 5     | 315        | 1,554      | 2,817    | 339        |
|                                                   | 6     | 331        | 1,547      | 2,608    | 347        |
|                                                   | 7     | 324        | 1,358      | 2,577    | 354        |
|                                                   | 8     | 326        | 1,283      | 2,537    | 353        |
|                                                   | 9     | 319        | 1,500      | 2,598    | 346        |
|                                                   | 10    | 312        | 1,529      | 2,735    | 319        |
|                                                   | 11    | 260        | 1,742      | 2,872    | 284        |
|                                                   | 12    | 272        | 1,605      | 2,797    | 293        |
| 2017                                              | 1     | 279        | 1,479      | 2,700    | 309        |
|                                                   | 2     | 291        | 1,690      | 2,733    | 315        |
|                                                   | 3     | 277        | 1,575      | 2,734    | 302        |
|                                                   | 4     | 298        | 1,441      | 2,734    | 318        |
|                                                   | 5     | 322        | 1,605      | 2,626    | 340        |
|                                                   | 6     | 312        | 1,522      | 2,494    | 332        |
|                                                   | 7     | -          | -          | -        | -          |
|                                                   | 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 |
| 2016                                             | 1             | 363        | 964        | 2,867    | 325        |
|                                                  | 2             | 276        | 964        | 2,867    | 247        |
|                                                  | 3             | 245        | 1,489      | 2,867    | 227        |
|                                                  | 4             | 213        | 1,489      | 2,867    | 222        |
|                                                  | 5             | 242        | 1,489      | 2,867    | 276        |
|                                                  | 6             | 378        | 1,489      | 2,867    | 444        |
|                                                  | 7             | 298        | 2,008      | 2,706    | 584        |
|                                                  | 8             | 264        | 2,008      | 2,706    | 348        |
|                                                  | 9             | 262        | 2,008      | 2,706    | 385        |
|                                                  | 10            | 285        | 2,008      | 2,706    | 363        |
|                                                  | 11            | 273        | 1,991      | 2,646    | 378        |
|                                                  | 12            | 263        | 1,991      | 2,646    | 353        |
|                                                  | 13            | 247        | 1,991      | 2,646    | 324        |
|                                                  | 14            | 245        | 1,991      | 2,646    | 302        |
|                                                  | 15            | 239        | 1,473      | 2,675    | 267        |
|                                                  | 16            | 232        | 1,473      | 2,675    | 250        |
|                                                  | 17            | 237        | 1,473      | 2,675    | 266        |
|                                                  | 18            | 281        | 1,473      | 2,675    | 331        |
|                                                  | 19            | 344        | 1,492      | 2,670    | 306        |
|                                                  | 20            | 326        | 1,492      | 2,670    | 299        |
|                                                  | 21            | 337        | 1,492      | 2,670    | 272        |
|                                                  | 22            | 434        | 1,492      | 2,670    | 319        |
|                                                  | 23            | 496        | 964        | 2,867    | 381        |
|                                                  | 24            | 444        | 964        | 2,867    | 352        |
| 2017                                             | 1             | 357        | 890        | 2,752    | 322        |
|                                                  | 2             | 278        | 890        | 2,752    | 257        |
|                                                  | 3             | 248        | 1,485      | 2,752    | 241        |
|                                                  | 4             | 226        | 1,485      | 2,752    | 238        |
|                                                  | 5             | 238        | 1,485      | 2,752    | 299        |
|                                                  | 6             | 385        | 1,485      | 2,752    | 466        |
|                                                  | 7             | 315        | 2,068      | 2,662    | 601        |
|                                                  | 8             | 252        | 2,068      | 2,662    | 351        |
|                                                  | 9             | 253        | 2,068      | 2,662    | 375        |
|                                                  | 10            | 276        | 2,068      | 2,662    | 345        |
|                                                  | 11            | 260        | 1,857      | 2,594    | 338        |
|                                                  | 12            | 240        | 1,857      | 2,594    | 316        |
|                                                  | 13            | 231        | 1,857      | 2,594    | 289        |
|                                                  | 14            | 234        | 1,857      | 2,594    | 277        |
|                                                  | 15            | 242        | 1,504      | 2,596    | 261        |
|                                                  | 16            | 222        | 1,504      | 2,596    | 240        |
|                                                  | 17            | 232        | 1,504      | 2,596    | 247        |
|                                                  | 18            | 271        | 1,504      | 2,596    | 312        |
|                                                  | 19            | 342        | 1,498      | 2,662    | 321        |
|                                                  | 20            | 321        | 1,498      | 2,662    | 287        |
|                                                  | 21            | 337        | 1,498      | 2,662    | 266        |
|                                                  | 22            | 430        | 1,498      | 2,662    | 297        |
|                                                  | 23            | 493        | 890        | 2,752    | 378        |
|                                                  | 24            | 436        | 890        | 2,752    | 341        |

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| Monthly Average Ancillary Services Price |       |            |            |          |            |
|------------------------------------------|-------|------------|------------|----------|------------|
| year                                     | month | MCPC_REGDN | MCPC_NSPIN | MCPC_RRS | MCPC_REGUP |
| 2016                                     | 1     | \$ 4.10    | \$ 2.62    | \$ 8.05  | \$ 6.69    |
|                                          | 2     | \$ 7.21    | \$ 4.77    | \$ 12.91 | \$ 7.80    |
|                                          | 3     | \$ 8.47    | \$ 6.06    | \$ 11.39 | \$ 9.34    |
|                                          | 4     | \$ 9.23    | \$ 4.07    | \$ 13.20 | \$ 9.48    |
|                                          | 5     | \$ 7.63    | \$ 2.84    | \$ 8.01  | \$ 6.14    |
|                                          | 6     | \$ 4.43    | \$ 3.02    | \$ 8.05  | \$ 5.89    |
|                                          | 7     | \$ 3.59    | \$ 3.11    | \$ 9.44  | \$ 7.75    |
|                                          | 8     | \$ 4.27    | \$ 7.13    | \$ 12.75 | \$ 10.49   |
|                                          | 9     | \$ 4.59    | \$ 3.91    | \$ 8.91  | \$ 7.12    |
|                                          | 10    | \$ 10.06   | \$ 3.02    | \$ 12.21 | \$ 10.42   |
|                                          | 11    | \$ 5.68    | \$ 3.53    | \$ 11.84 | \$ 7.64    |
|                                          | 12    | \$ 9.13    | \$ 2.91    | \$ 16.08 | \$ 9.72    |
| 2017                                     | 1     | \$ 7.10    | \$ 0.89    | \$ 13.26 | \$ 9.94    |
|                                          | 2     | \$ 6.81    | \$ 2.81    | \$ 10.47 | \$ 9.62    |
|                                          | 3     | \$ 10.21   | \$ 3.96    | \$ 9.71  | \$ 7.94    |
|                                          | 4     | \$ 10.04   | \$ 3.18    | \$ 11.80 | \$ 9.55    |
|                                          | 5     | \$ 12.33   | \$ 3.58    | \$ 8.92  | \$ 10.16   |
|                                          | 6     | \$ 5.50    | \$ 3.48    | \$ 7.67  | \$ 6.18    |
|                                          | 7     | \$ -       | \$ -       | \$ -     | \$ -       |
|                                          | 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 |
| 2016                                  | 1     | \$ 0.03      | \$ 0.11       | \$ 0.60    | \$ 0.06      |
|                                       | 2     | \$ 0.06      | \$ 0.26       | \$ 1.09    | \$ 0.07      |
|                                       | 3     | \$ 0.07      | \$ 0.33       | \$ 1.00    | \$ 0.09      |
|                                       | 4     | \$ 0.08      | \$ 0.18       | \$ 1.07    | \$ 0.09      |
|                                       | 5     | \$ 0.06      | \$ 0.12       | \$ 0.59    | \$ 0.05      |
|                                       | 6     | \$ 0.03      | \$ 0.10       | \$ 0.45    | \$ 0.04      |
|                                       | 7     | \$ 0.02      | \$ 0.08       | \$ 0.47    | \$ 0.05      |
|                                       | 8     | \$ 0.03      | \$ 0.19       | \$ 0.66    | \$ 0.08      |
|                                       | 9     | \$ 0.03      | \$ 0.13       | \$ 0.51    | \$ 0.05      |
|                                       | 10    | \$ 0.08      | \$ 0.12       | \$ 0.85    | \$ 0.08      |
|                                       | 11    | \$ 0.04      | \$ 0.18       | \$ 1.00    | \$ 0.06      |
|                                       | 12    | \$ 0.07      | \$ 0.13       | \$ 1.21    | \$ 0.08      |
| 2017                                  | 1     | \$ 0.05      | \$ 0.04       | \$ 0.97    | \$ 0.08      |
|                                       | 2     | \$ 0.06      | \$ 0.14       | \$ 0.84    | \$ 0.09      |
|                                       | 3     | \$ 0.08      | \$ 0.18       | \$ 0.76    | \$ 0.07      |
|                                       | 4     | \$ 0.08      | \$ 0.13       | \$ 0.89    | \$ 0.08      |
|                                       | 5     | \$ 0.10      | \$ 0.14       | \$ 0.58    | \$ 0.09      |
|                                       | 6     | \$ 0.04      | \$ 0.11       | \$ 0.41    | \$ 0.04      |
|                                       | 7     | \$ -         | \$ -          | \$ -       | \$ -         |
|                                       | 8     | \$ -         | \$ -          | \$ -       | \$ -         |
|                                       | 9     | \$ -         | \$ -          | \$ -       | \$ -         |
|                                       | 10    | \$ -         | \$ -          | \$ -       | \$ -         |
|                                       | 11    | \$ -         | \$ -          | \$ -       | \$ -         |
|                                       | 12    | \$ -         | \$ -          | \$ -       | \$ -         |

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| ERCOT-wide Cumulative PNM |             |              |              |
|---------------------------|-------------|--------------|--------------|
| year                      | month       | pnm          | pnm_accum    |
| 2016                      | 0           | \$ -         | \$ -         |
|                           | 1           | \$ 1,160.69  | \$ 1,160.69  |
|                           | 2           | \$ 720.57    | \$ 1,881.26  |
|                           | 3           | \$ 3,883.41  | \$ 5,764.67  |
|                           | 4           | \$ 2,389.99  | \$ 8,154.66  |
|                           | 5           | \$ 1,661.50  | \$ 9,816.16  |
|                           | 6           | \$ 1,922.76  | \$ 11,738.92 |
|                           | 7           | \$ 2,969.44  | \$ 14,708.36 |
|                           | 8           | \$ 5,321.18  | \$ 20,029.54 |
|                           | 9           | \$ 3,967.65  | \$ 23,997.19 |
|                           | 10          | \$ 1,824.61  | \$ 25,821.80 |
|                           | 11          | \$ 2,510.79  | \$ 28,332.59 |
| 12                        | \$ 1,658.38 | \$ 29,990.97 |              |
| 2017                      | 0           | \$ -         | \$ -         |
|                           | 1           | \$ 2,964.83  | \$ 2,964.83  |
|                           | 2           | \$ 1,573.68  | \$ 4,538.51  |
|                           | 3           | \$ 1,520.94  | \$ 6,059.45  |
|                           | 4           | \$ 4,590.29  | \$ 10,649.74 |
|                           | 5           | \$ 5,673.67  | \$ 16,323.41 |
|                           | 6           | \$ 2,542.93  | \$ 18,866.34 |
|                           | 7           | \$ -         | \$ -         |
|                           | 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 |
| 2016                                         | 1     | 455    | 14       | 371      | 163      | 473    | 142     |
|                                              | 2     | 39     | 83       | 148      | 42       | (36)   | 150     |
|                                              | 3     | 31     | 288      | 300      | 89       | (136)  | (82)    |
|                                              | 4     | (271)  | 220      | 97       | (82)     | (320)  | (147)   |
|                                              | 5     | (44)   | 460      | 285      | 117      | (69)   | 163     |
|                                              | 6     | (488)  | (261)    | (356)    | (518)    | (348)  | (451)   |
|                                              | 7     | (163)  | 507      | 735      | 306      | (231)  | 240     |
|                                              | 8     | (578)  | (65)     | 41       | (258)    | (741)  | (717)   |
|                                              | 9     | (358)  | 305      | 319      | 87       | (433)  | (30)    |
|                                              | 10    | (312)  | 371      | (41)     | (310)    | (475)  | 50      |
|                                              | 11    | (329)  | (146)    | 240      | (237)    | (139)  | (234)   |
|                                              | 12    | (41)   | (61)     | 282      | (38)     | 516    | 83      |
| 2017                                         | 1     | (395)  | (62)     | 298      | (188)    | 224    | 69      |
|                                              | 2     | 34     | 300      | 185      | 118      | 538    | 363     |
|                                              | 3     | (68)   | 455      | 456      | 143      | 241    | 321     |
|                                              | 4     | (41)   | 631      | 611      | 550      | (189)  | (27)    |
|                                              | 5     | (741)  | 835      | 505      | (140)    | (836)  | 84      |
|                                              | 6     | (394)  | 634      | 637      | 30       | (435)  | 179     |
|                                              | 7     | -      | -        | -        | -        | -      | -       |
|                                              | 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 |
| 2016                                              | 1     | 6,300  | 4,581    | 4,663    | 6,253    | 6,228  | 5,019   |
|                                                   | 2     | 7,602  | 5,772    | 5,779    | 7,573    | 7,552  | 6,109   |
|                                                   | 3     | 7,872  | 6,033    | 6,013    | 7,565    | 7,793  | 6,833   |
|                                                   | 4     | 7,356  | 5,020    | 5,488    | 6,921    | 6,559  | 5,437   |
|                                                   | 5     | 7,414  | 5,363    | 6,245    | 7,275    | 6,347  | 5,617   |
|                                                   | 6     | 5,963  | 3,648    | 4,840    | 5,845    | 4,816  | 3,741   |
|                                                   | 7     | 8,903  | 5,074    | 6,793    | 8,315    | 7,411  | 5,948   |
|                                                   | 8     | 5,644  | 3,670    | 4,814    | 5,613    | 4,238  | 3,529   |
|                                                   | 9     | 6,159  | 3,957    | 4,561    | 6,057    | 5,295  | 4,291   |
|                                                   | 10    | 8,472  | 4,634    | 5,455    | 8,674    | 7,449  | 5,548   |
|                                                   | 11    | 7,043  | 4,855    | 5,049    | 6,718    | 6,517  | 5,225   |
|                                                   | 12    | 7,653  | 5,588    | 5,849    | 7,549    | 7,270  | 6,395   |
| 2017                                              | 1     | 8,014  | 6,700    | 6,599    | 8,265    | 7,550  | 6,562   |
|                                                   | 2     | 9,009  | 6,729    | 7,434    | 9,274    | 8,627  | 6,821   |
|                                                   | 3     | 10,332 | 7,161    | 7,971    | 10,439   | 9,360  | 8,027   |
|                                                   | 4     | 10,299 | 7,917    | 8,602    | 9,566    | 9,141  | 8,602   |
|                                                   | 5     | 9,211  | 6,841    | 7,592    | 8,633    | 8,222  | 6,984   |
|                                                   | 6     | 8,043  | 4,563    | 6,393    | 8,327    | 6,543  | 5,205   |
|                                                   | 7     | -      | -        | -        | -        | -      | -       |
|                                                   | 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                                                                                                                  | 2017 | SNG-ZEN (SNG-ZEN)                   | 12,702   | 1    | 679      | 2,173   | 3,235    | 2,335    | 2,807    | 1,473    | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | HLD_FMR1 (HLD-HLD)                  | 11,016   | 2    | -        | -       | 2,143    | 4,143    | 3,413    | 1,317    | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | Panhandle GTC (PNHNDL)              | 8,043    | 3    | 344      | 826     | 1,553    | 2,223    | 1,393    | 1,704    | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | PIGTAP_SOLST11_1 (SOLSTICE-PIGTAP)  | 7,671    | 4    | -        | 176     | 1,127    | 2,048    | 2,960    | 1,380    | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | JK_TOKSW_1 (TOKSW-JK_CK)            | 4,266    | 5    | 85       | 3       | 29       | 136      | 1,055    | 2,958    | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | 591_A (LKPNT-CRLNW)                 | 3,648    | 6    | 462      | 1,403   | 922      | 519      | 222      | 120      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | GIBCRK-SNG (GIBCRK-SNG)             | 3,405    | 7    | 375      | -       | 308      | 2,419    | 303      | -        | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | HAMILT_MAVR11_1 (HAMILTON-MAVERICK) | 3,341    | 8    | 47       | 99      | 621      | 1,516    | 236      | 822      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | RINCON_WHITE_2_1 (WHITE_PT-RINCON)  | 2,749    | 9    | -        | -       | 1,747    | 1,002    | -        | -        | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | LOYOLA_69_1 (LOYOLA-LOYOLA)         | 2,614    | 10   | 396      | 215     | 461      | 5        | 1,537    | -        | -    | -    | -    | -    | -    | -    |
| TOP10_RENT                                                                                                                  | 2017 | SNG-ZEN (SNG-ZEN)                   | \$ 94.56 | 1    | \$ 1.68  | \$ 8.98 | \$ 11.62 | \$ 13.11 | \$ 40.63 | \$ 18.53 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | Panhandle GTC (PNHNDL)              | \$ 56.50 | 2    | \$ 1.17  | \$ 3.92 | \$ 9.44  | \$ 15.86 | \$ 9.98  | \$ 16.13 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | RINCON_WHITE_2_1 (WHITE_PT-RINCON)  | \$ 48.63 | 3    | \$ -     | \$ -    | \$ 33.80 | \$ 14.82 | \$ -     | \$ -     | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 6270_C (WGROB-BLMND)                | \$ 45.64 | 4    | \$ -     | \$ -    | \$ 0.09  | \$ 6.52  | \$ 21.76 | \$ 17.26 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | GCB_100_1 (N_MCALLN-W_MCALLN)       | \$ 39.06 | 5    | \$ -     | \$ -    | \$ -     | \$ 7.27  | \$ 9.05  | \$ 22.74 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 591_A (LKPNT-CRLNW)                 | \$ 23.92 | 6    | \$ 2.86  | \$ 9.12 | \$ 7.14  | \$ 3.06  | \$ 1.20  | \$ 0.54  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 6271_C (WGROB-SUMRFELD)             | \$ 20.83 | 7    | \$ 20.83 | \$ -    | \$ -     | \$ -     | \$ -     | \$ -     | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | FORMOS_LOLITA1_1 (LOLITA-FORMOSA)   | \$ 18.11 | 8    | \$ 6.11  | \$ -    | \$ 6.83  | \$ -     | \$ 2.04  | \$ 3.12  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | GIBCRK-SNG (GIBCRK-SNG)             | \$ 14.51 | 9    | \$ 1.25  | \$ -    | \$ 0.42  | \$ 11.85 | \$ 0.99  | \$ -     | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | AZTECA_SE_ED11_1 (AZTECA-SE_EDINB)  | \$ 13.61 | 10   | \$ -     | \$ 0.09 | \$ 0.13  | \$ 0.00  | \$ 8.47  | \$ 4.92  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |

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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                                                                                                                  | 2017 | SNG-ZEN (SNG-ZEN)                    | 2,259    | 1    | 179     | 475     | 504      | 285      | 453      | 363      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | HLD_FMR1 (HLD-HLD)                   | 2,124    | 2    | 12      | 21      | 376      | 665      | 638      | 412      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | FORMOS_LOLITA1_1 (LOLITA-FORMOSA)    | 1,642    | 3    | 196     | -       | 117      | 174      | 465      | 690      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | EAGLEP_ESCOND1_1 (ESCONDID-EAGLE PS) | 1,492    | 4    | 167     | 115     | 384      | 214      | 264      | 348      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | BRUNI_69_1 (BRUNI-BRUNI)             | 1,463    | 5    | 268     | 140     | 302      | 268      | 346      | 139      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | Panhandle GTC (PNHNDL)               | 1,425    | 6    | 51      | 165     | 315      | 321      | 307      | 266      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | HAMILT_MAVERI1_1 (HAMILTON-MAVERICK) | 1,390    | 7    | 125     | 81      | 124      | 429      | 331      | 300      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | GREENL_WEAVER1_1 (WEAVERRD-GREENLK)  | 1,381    | 8    | 243     | 272     | 124      | 264      | 382      | 96       | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | RINCON_WHITE_2_1 (WHITE_PT-RINCON)   | 1,363    | 9    | -       | 1       | 620      | 369      | 235      | 138      | -    | -    | -    | -    | -    | -    |
| FREQ_EXIST                                                                                                                  | 2017 | GCB_100_1 (N_MCALLN-W_MCALLN)        | 1,205    | 10   | -       | 5       | 21       | 242      | 448      | 489      | -    | -    | -    | -    | -    | -    |
| TOP10_RENT                                                                                                                  | 2017 | SNG-ZEN (SNG-ZEN)                    | \$ 74.14 | 1    | \$ 3.00 | \$ 9.25 | \$ 12.28 | \$ 10.37 | \$ 18.90 | \$ 20.34 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | GCB_100_1 (N_MCALLN-W_MCALLN)        | \$ 40.69 | 2    | \$ -    | \$ 0.00 | \$ 0.30  | \$ 3.91  | \$ 13.07 | \$ 23.41 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 6270_C (WGROB-BLMND)                 | \$ 39.44 | 3    | \$ 1.03 | \$ -    | \$ 4.96  | \$ 6.97  | \$ 16.41 | \$ 10.07 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | Panhandle GTC (PNHNDL)               | \$ 38.78 | 4    | \$ 0.61 | \$ 1.89 | \$ 6.71  | \$ 10.27 | \$ 8.19  | \$ 11.11 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | GIBCRK-SNG (GIBCRK-SNG)              | \$ 16.84 | 5    | \$ 1.68 | \$ 0.01 | \$ 1.60  | \$ 12.45 | \$ 0.74  | \$ 0.36  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | RINCON_WHITE_2_1 (WHITE_PT-RINCON)   | \$ 14.36 | 6    | \$ -    | \$ 0.00 | \$ 9.22  | \$ 4.57  | \$ 0.43  | \$ 0.13  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | KEPLER_KOCH_U1_1 (KOCH_UP-KEPLER)    | \$ 14.04 | 7    | \$ 4.82 | \$ 0.32 | \$ 0.39  | \$ -     | \$ -     | \$ 8.51  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 591_A (LKPNT-CRLNW)                  | \$ 14.03 | 8    | \$ 0.49 | \$ 5.71 | \$ 3.64  | \$ 2.88  | \$ 1.28  | \$ 0.02  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 590_A (LWSSW-LWVJS)                  | \$ 8.95  | 9    | \$ 1.18 | \$ 3.24 | \$ 1.02  | \$ 2.14  | \$ 0.87  | \$ 0.49  | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOP10_RENT                                                                                                                  | 2017 | 6271_C (WGROB-SUMRFELD)              | \$ 8.27  | 10   | \$ 8.27 | \$ -    | \$ -     | \$ -     | \$ -     | \$ -     | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |

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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                                                                                                                                                         | 2017 | HB NORTH-HB HOUSTON      | \$ 19.27    | 1    | \$ 0.92 | \$ 1.46 | \$ 1.98 | \$ 2.92 | \$ 4.46 | \$ 3.42 | \$ 4.12 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB SOUTH-LZ SOUTH        | \$ 8.86     | 2    | \$ 0.18 | \$ 0.41 | \$ 0.85 | \$ 0.94 | \$ 1.54 | \$ 1.39 | \$ 3.56 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB NORTH-LZ NORTH        | \$ 8.81     | 3    | \$ 0.68 | \$ 0.70 | \$ 0.53 | \$ 0.75 | \$ 1.21 | \$ 2.00 | \$ 2.94 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB HOUSTON-LZ HOUSTON    | \$ 5.76     | 4    | \$ 0.17 | \$ 0.19 | \$ 0.33 | \$ 0.61 | \$ 1.59 | \$ 1.21 | \$ 1.67 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB NORTH-HB SOUTH        | \$ 5.65     | 5    | \$ 0.18 | \$ 0.34 | \$ 0.92 | \$ 0.55 | \$ 0.81 | \$ 1.39 | \$ 1.45 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB WEST-HB NORTH         | \$ 4.58     | 6    | \$ 0.05 | \$ 0.82 | \$ 1.22 | \$ 0.81 | \$ 0.73 | \$ 0.12 | \$ 0.84 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | HB WEST-LZ WEST          | \$ 3.22     | 7    | \$ 0.20 | \$ 0.20 | \$ 0.30 | \$ 0.46 | \$ 0.56 | \$ 0.55 | \$ 0.94 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | CPSES_UNIT2-HB NORTH     | \$ 2.02     | 8    | \$ 0.13 | \$ 0.13 | \$ 0.44 | \$ 0.46 | \$ 0.28 | \$ 0.31 | \$ 0.27 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | CPSES_UNIT1-HB NORTH     | \$ 1.99     | 9    | \$ 0.14 | \$ 0.02 | \$ 0.44 | \$ 0.50 | \$ 0.34 | \$ 0.28 | \$ 0.27 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| N                                                                                                                                                         | 2017 | STP_STP_G1-HB HOUSTON    | \$ 0.79     | 10   | \$ -    | \$ 0.00 | \$ -    | \$ -    | \$ 0.36 | \$ 0.22 | \$ 0.21 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB NORTH-LZ NORTH        | \$ 3.81     | 1    | \$ 0.21 | \$ 0.43 | \$ 0.31 | \$ 0.32 | \$ 0.55 | \$ 0.71 | \$ 1.28 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB HOUSTON-LZ HOUSTON    | \$ 2.87     | 2    | \$ 0.08 | \$ 0.07 | \$ 0.09 | \$ 0.29 | \$ 0.74 | \$ 0.50 | \$ 1.09 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB SOUTH-LZ SOUTH        | \$ 1.71     | 3    | \$ 0.10 | \$ 0.12 | \$ 0.17 | \$ 0.17 | \$ 0.23 | \$ 0.02 | \$ 0.90 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB NORTH-HB HOUSTON      | \$ 1.62     | 4    | \$ 0.46 | \$ 0.43 | \$ 0.23 | \$ 0.14 | \$ 0.24 | \$ 0.01 | \$ 0.12 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | SSPURT_WIND1-HB WEST     | \$ 1.25     | 5    | \$ 0.10 | \$ 0.09 | \$ 0.15 | \$ 0.34 | \$ 0.21 | \$ 0.31 | \$ 0.04 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB WEST-HB NORTH         | \$ 0.96     | 6    | \$ 0.04 | \$ 0.07 | \$ 0.55 | \$ 0.08 | \$ 0.03 | \$ 0.02 | \$ 0.18 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | HB WEST-LZ WEST          | \$ 0.55     | 7    | \$ 0.05 | \$ 0.05 | \$ 0.11 | \$ 0.04 | \$ 0.10 | \$ 0.06 | \$ 0.14 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | SPNC SPNCE_4-LHSES_UNIT1 | \$ 0.50     | 8    | \$ 0.00 | \$ 0.00 | \$ 0.12 | \$ 0.19 | \$ 0.10 | \$ 0.01 | \$ 0.08 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | FTR_FTR_G1_4-THW_THWGT5X | \$ 0.49     | 9    | \$ 0.10 | \$ 0.25 | \$ -    | \$ 0.03 | \$ 0.12 | \$ -    | \$ 0.00 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |
| Y                                                                                                                                                         | 2017 | SLFRK_UN1_2-LZ NORTH     | \$ 0.48     | 10   | \$ 0.02 | \$ 0.01 | \$ 0.02 | \$ 0.09 | \$ 0.14 | \$ 0.09 | \$ 0.09 | \$ - | \$ - | \$ - | \$ - | \$ - |  |  |

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