ERCOT FAST proposal:
Regulation Service Pay for Performance

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INTRODUCTION

- A unit's precision in following ERCOT instruction signals should be inherently linked to its value
- The current ERCOT market for Regulation Services neglects historical hourly precision as an important performance criterion, which can adversely affect grid or market operations
- A real-time pay-for-performance mechanism will ameliorate these issues and deliver two major benefits to ERCOT market participants…
    1. Decrease procurement volumes for Regulation Services by increasing unit performance
    2. Partially or fully rebate ancillary service costs to Load Serving Entities for payments to resources who fail to perform fully

PAY-FOR-PERFORMANCE MECHANISM

1-minute Deployment Deviation* = $|ATG\ MW_t - AEPFR\ MW_t - UDBP\ MW_t - ARI\ MW_t|$

Cumulative Instructed Changes = $\sum_{t=1}^{60} |UDBP\ MW_t - UDBP\ MW_{t-1}|$

ATG = Average Telemetered Net Generation over 1-minute interval

AEPFR = Average estimated Primary Frequency Response (8.1.1.4.1)

UDBP = Updated Desired Base Point (6.5.7.6.1)

ARI MW_t = Average Regulation Instruction (8.1.1.4.1); sum of Reg Up and Reg Down Instruction

Hourly tolerance band = *Max (5 MW, 5% *$\sum_{t=1}^{60} Cumulative\ Instructed\ Changes)$*

Interval tolerance band = *5% * Instructed Change*

Hourly Error Rate (%) = $\frac{\left[\sum_{t=1}^{60}(Dispatch\ deviation) - \sum_{t=0}^{360}(Tolerance\ band)\right]}{\sum_{t=0}^{60}(Cum.Instructed\ Changes)}$

Regulation Penalty Rate ($/MWh) = *[2.0] * Max (0, Hourly Error Rate) * Regulation $MCPC_{DAM}$ ($/MW)*

Hourly Regulation Penalty ($) = *Regulation Penalty Rate ($/MWh) * Regulation Award for Resource (MW)*

* Not to exceed the Regulation supply commitment for the Resource

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EXAMPLE CALCULATION

Time	Signal MW	Unit output MW	Dispatch deviation |Unit - UDBP| MW	Cumulative Instructed Changes $\|UDBP_t - UDBP_{t-1}\|$ MW	Interval Tolerance Band (5% * Instructed Changes) MW
0:01:00	540	542	2	0	0.00
0:02:00	550	551	1	10	0.50
0:03:00	560	560	0	10	0.50
0:04:00	570	569	1	10	0.50
0:05:00	580	578	2	10	0.50
…					
0:55:00	579	579	0	9	0.45
0:56:00	589	589	0	10	0.50
0:57:00	584	584	0	5	0.25
0:58:00	577	578	1	7	0.35
0:59:00	570	571	1	7	0.35
1:00:00	562	562	0	8	0.40
			56	***374***	***18.70***

Hourly Tolerance Band = *max(5,18.7)*

Hourly Error Rate (%) *= (56 MW – 18.70 MW) / 374 MW =* ***10%***

Regulation Penalty Rate ($/MWh) *= [2.0] * 10% * $15/MWh =* ***$3.00/MWh***

Hourly Regulation Penalty ($) *= 50 MW * $3.00/MWh =* ***$150***

NECESSARY CONSIDERATIONS

Implementation of the pay-for-performance concept will require integration with ERCOT Protocols. Some areas where integration would be necessary…

1. Are fixes needed for UDBP process to account for transitions between PFR and non-PFR periods?
2. Consolidation of measurement across a QSE with multiple Resources
3. Modifications for Controllable Load Resources and Fast Responding Resources
4. Can QSE self monitor the calculation data?
5. Should hourly Regulation Penalty Rate ($/MWh) and Hourly Regulation Penalty ($) by Resource/QSE be published?

Also, should pay-for-performance mechanism be applied to other AS products, such as PFR, FRRS, RRS, and NSRS?