



Item 14.1: ERCOT Recommendation regarding 2024 ERCOT Methodologies for Determining Minimum Ancillary Service Requirements – **REVISED**

Dan Woodfin

Vice President, System Operations

Reliability and Markets Committee Meeting

ERCOT Public

December 18-19, 2023

Revised 12/15/2023 to update slide 7 and add slides 8-13

Committee Request

Why this is being presented today:

Protocol § 3.16 Standards for Determining Ancillary Service Quantities

- (2) ERCOT shall, **at least annually**, determine with supporting data, the methodology for determining the quantity requirements for each Ancillary Service needed for reliability...
- (3) The ERCOT Board **shall review and approve** ERCOT's methodology for determining the minimum Ancillary Service requirements...

ERCOT staff requests that the Reliability and Markets Committee recommend that the Board approve the proposed 2024 Ancillary Service Methodology as described in the “ERCOT Methodologies for Determining Minimum Ancillary Service Requirements” document (Attachment A).

Regulation Service

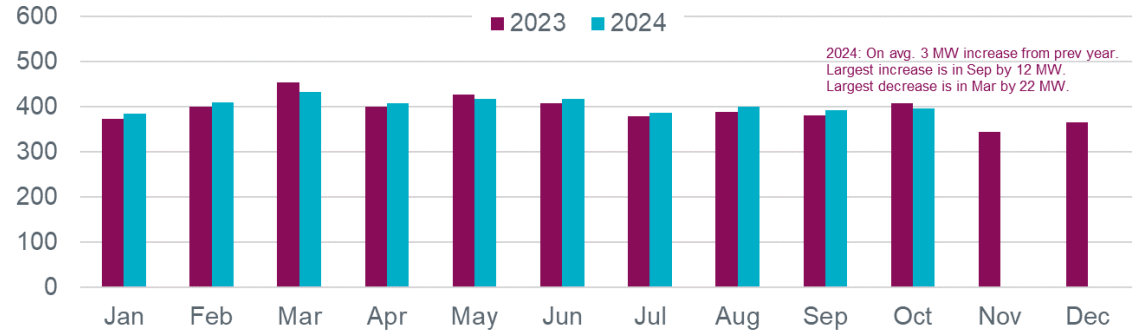
WHAT IS IT? Capacity that is deployed every 4 seconds to balance supply and demand and maintain frequency close to 60Hz between 5-minute SCED execution.

METHODOLOGY SUMMARY: Regulation quantities are computed based on historic five-minute variability in load and renewable generation. The analysis also accounts for expected increase in variability due to growth in wind and solar installed capacity*.

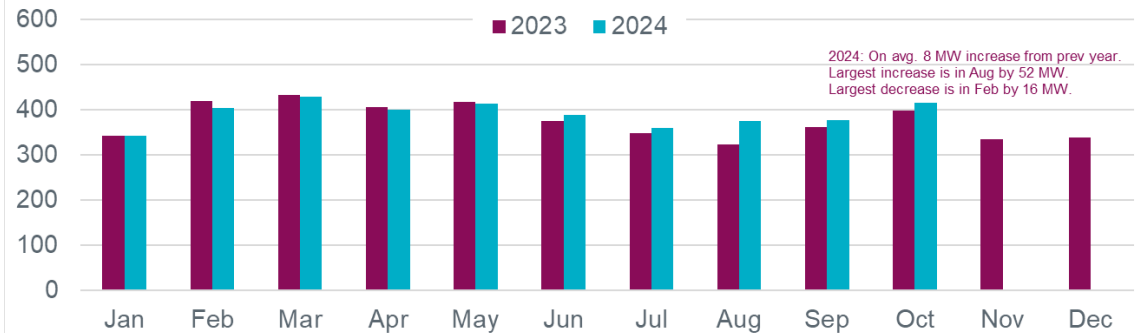
2024 CHANGES: No major change.

Based on preliminary assessments, between Jan 2024 and Oct 2024, hourly average Reg Up vary between 384 MW and 431 MW and hourly average Reg Down vary between 341 MW and 429 MW.

Average Regulation Up Requirement Comparison



Average Regulation Down Requirement Comparison



NOTES ON IMM RECOMMENDATION: The IMM did not provide a recommendation on Regulation Service methodology in their 09/22 or 12/04 presentations.

Responsive Reserve Service

WHAT IS IT? Capacity that is procured to respond to low frequency events typically triggered by generating unit trips.

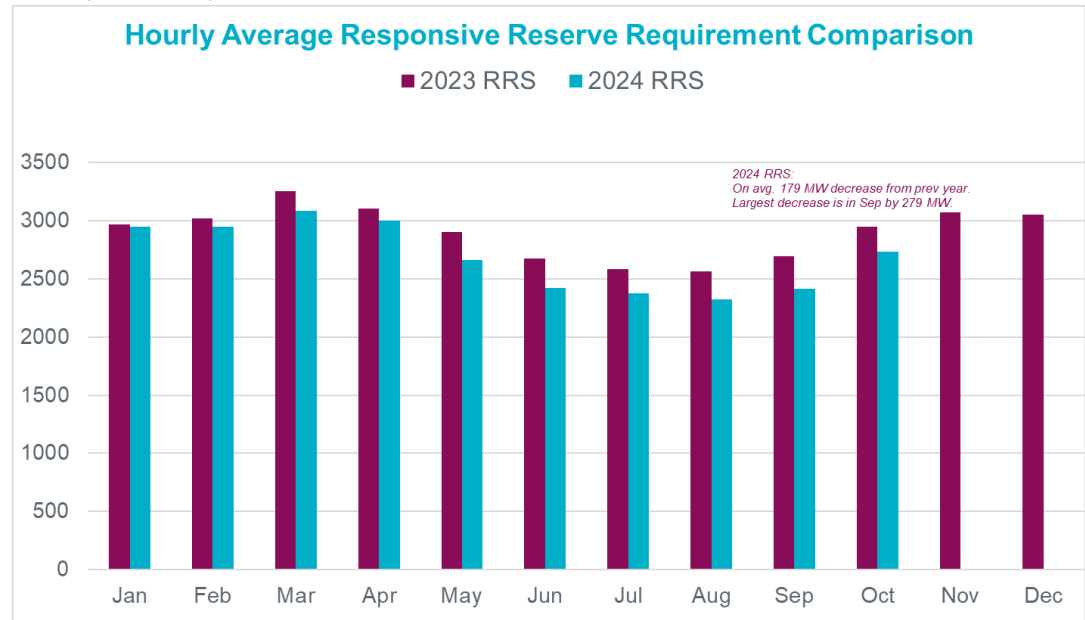
METHODOLOGY SUMMARY: RRS quantities are computed using historical inertia data and studies that determine the capacity needed following a large unit trip to arrest frequency such that the criteria established by NERC's BAL-003-2 standard is not violated.

2024 CHANGES: One change. Specifically, the 2,800 MW floor that is applied to summer peak hours will be removed; a minimum 2,300 MW of RRS will continue to apply to all hours.

To align with ERCOT's NERC assigned Interconnection Frequency Response Obligation (IFRO) for 2024, minimum RRS-PFR limit for 2024 will change to 1,185 MW.

NOTES ON IMM RECOMMENDATION: Proposed change agrees with the IMM's 09/22 recommendation on RRS methodology. The IMM did not make any further recommendations on RRS methodology in their 12/04 comments.

Based on preliminary assessments, between Jan 2024 and Oct 2024, hourly average RRS quantities vary between 2,326 MW and 3,088 MW.



ERCOT Contingency Reserve Service (ECRS)

Based on preliminary assessments, between Jan 2024 and Oct 2024, hourly average ECRS quantities vary between 1,463 MW and 2,172 MW.

WHAT IS IT? Capacity that can respond in 10 minutes to recover frequency, cover forecast errors or ramps and replace deployed reserves.

METHODOLOGY SUMMARY: ECRS quantities are computed as the sum of capacity needed to recover frequency following a large unit trip and capacity needed to respond to large under-forecast errors in forecasting large and sustained intra-hour load and renewable ramps.

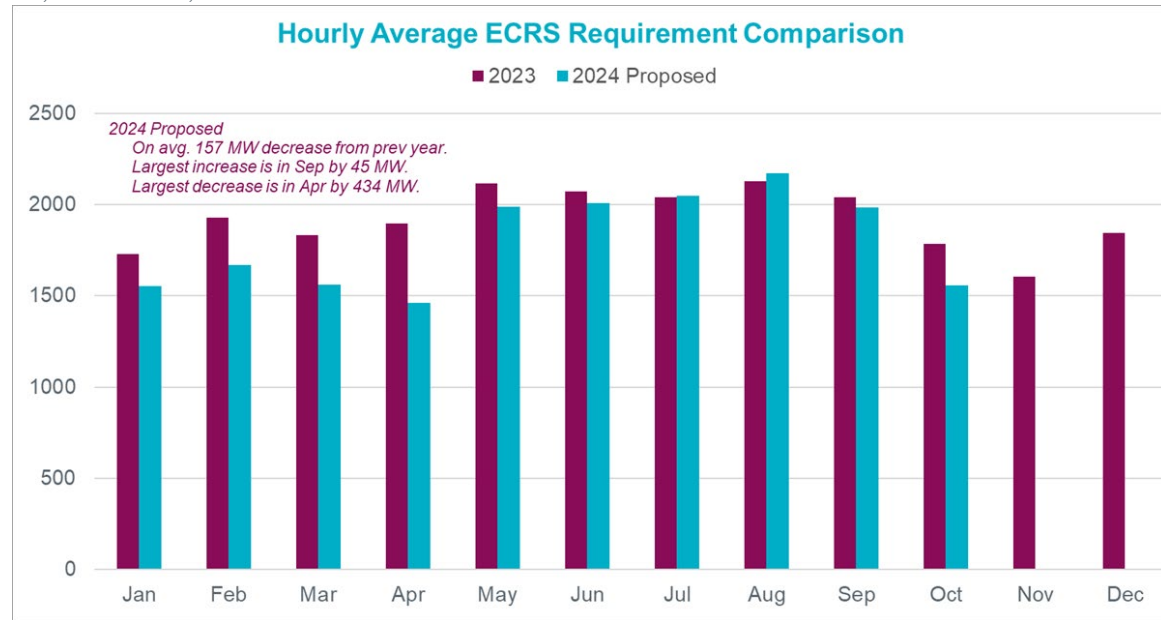
2024 Changes: Two changes.

Specifically,

- 1) the net load forecast error risk coverage during sunset hours will be adjusted to at least be 90th percentile;
- 2) the frequency recovery related analysis will be adjusted such that it uses 2 years of historic information and covers 60% of historic net load and inertia conditions; and accounts for Regulation requirement in the hour.

NOTES ON IMM RECOMMENDATION: On 09/22 the IMM recommended that the frequency recovery related ECRS quantity be reduced. On 12/04 the IMM recommended further reduction in the frequency recovery related ECRS quantity. The proposed change #2 above reflects the level of reduction in this regard that is acceptable to maintain reliability in actual events that involved unit trips and larger forecast errors simultaneously.

On 09/22 and 12/04 the IMM recommended using 10-minute ahead net load errors. ERCOT proposes to continue using 30 Minute Ahead net load forecast errors because when ECRS deployment is triggered by larger intra-hour net load forecast errors, this lookahead reflects the magnitude of the uncertainty that ECRS would be relied upon to cover until resources providing offline Non-Spin are online and ready for dispatch.



Non-Spinning Reserve Service (Non-Spin)

Based on preliminary assessments, between Jan 2024 and Oct 2024, hourly average Non-Spin quantities vary between 2,136 MW and 3,702 MW.

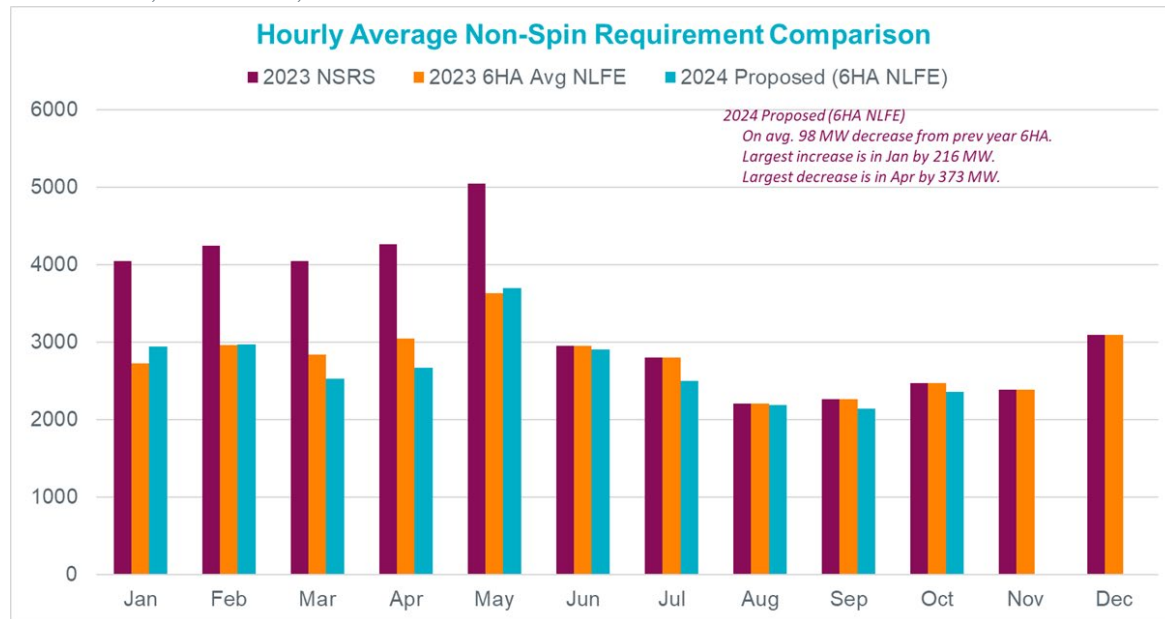
WHAT IS IT? Capacity that can be started in 30 minutes to cover forecast errors, ramps or forced outages and replace deployed reserves until additional resources can be committed.

METHODOLOGY SUMMARY: Non-Spin quantities are computed as the capacity needed to support under-forecast errors in forecasting load and renewable generation and forced thermal resource outages.

2024 Change: One change. Specifically, Non-Spin quantities for HE23 to HE02 in Winter and HE23 to HE06 rest of the year will be computed using 68th

percentile of 6 Hours Ahead (HA) net load forecast error. Non-Spin quantities during rest of the hours will continue to be based on 75th to 95th percentile of 6 HA hourly average net load forecast error; the percentile selected will continue to be based on risk of a net load up-ramp in these hours.

NOTES ON IMM RECOMMENDATION: On 09/22 the IMM recommended that the Non-Spin be computed using three Hour Ahead (HA) net load forecast error. On 12/04 the IMM recommended that the Non-Spin be computed using two HA net load forecast error. Based on feedback from IMM and Stakeholders, ERCOT assessed if the lookahead could be reduced across the year or even seasonally. Based on trends in cold start times of Resources available during tight operating conditions, ERCOT determined that the 6 HA lookahead was still appropriate. During tight operating days, if there are events that need Non-Spin deployment, then 6 Hour Ahead net load forecast errors reflect the magnitude of the uncertainty that Non-Spin would be relied upon to cover till the next offline Resource can be committed, is online and ready for dispatch.



Summary

- Two additional notes:
 - While the AS Methodology sets quantities of each AS based on an analysis of certain reliability risks, these are not necessarily the only reasons why each AS is needed or deployed in Real Time.
 - ERCOT has committed to TAC to perform additional assessment related to ECRS prior to April 30, 2024 which could result in an intra-year update to the methodology or deployment procedures related to ECRS.
- In summary, for the 2024 Ancillary Service Methodology:
 - ERCOT is not recommending major changes in the methodology used to compute Regulation Service;
 - To align with ERCOT's 2024 IFRO, minimum RRS-PFR limit will change to 1,185 MW.
 - ERCOT is recommending one change in the methodology for RRS; two changes in the methodology for ECRS; and one change in the methodology for Non-Spin.
- ERCOT is seeking that the Reliability and Markets Committee recommend approval of, and the Board approve, the 2024 Ancillary Service Methodology.

Appendix

Other AS Considerations

- Two categories of AS
 - Regulation, Responsive, and a portion of ECRS are generally used to maintain and recover frequency on a continuous basis and following a disturbance such as a unit trip. The quantification of the needed AS in this category is more deterministic.
 - Non-Spin and the remainder of ECRS are generally used to mitigate the risk of under-commitment of resources to serve load, either because of forecast errors, unit trips, and resource ramps. The quantification of needed AS of this category is a matter of how much risk of under-commitment should be mitigated.
- The policy guidance that ERCOT has received since 2021 is to not intentionally take any risk of having to shed load due insufficient commitment when resources are available.
 - Initially, ERCOT managed this risk through additional Reliability Unit Commitments but changed that approach to procure more Non-Spin based on feedback from the IMM among others.

Key Takeaway: ERCOT has been buying more AS in order to operate “further from the edge” while avoiding the use of RUC.

Response to Potomac Economics Statements

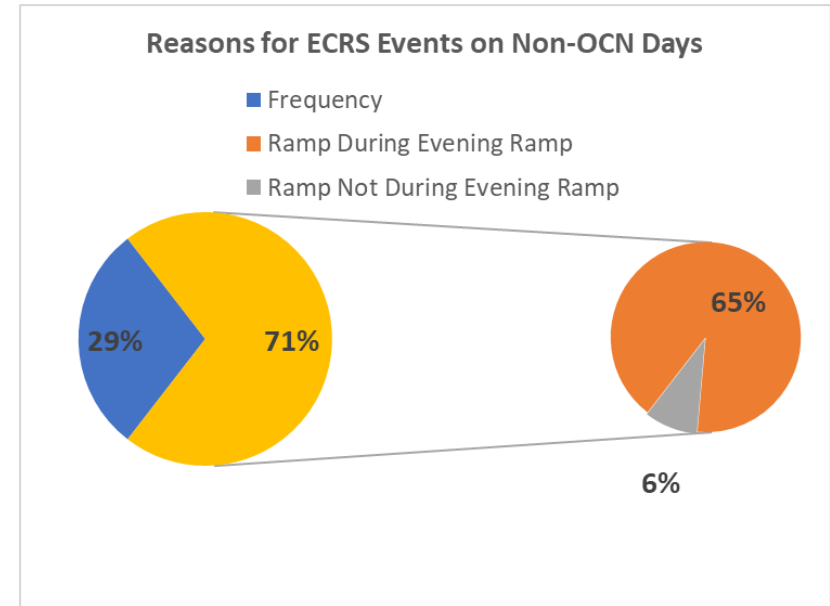
Potomac	ERCOT
AS Methodology is not based on sound reliability criteria.	The reliability bases for the required quantities of each AS are described in the AS Methodology document and have been discussed at numerous stakeholder meetings.
ERCOT procures operating reserves that exceed amounts procured by other ISOs.	Comparing the quantities of AS between ERCOT and Balancing Authorities in the Eastern Interconnection is technically inappropriate. • The impact of having insufficient AS is more severe for ERCOT; If ERCOT doesn't have sufficient AS to recover from a sustained low frequency event, it may have to shed load. • ERCOT has more uncertainty in its generation/load balance due to high volume of intermittent resources and variable load.
AS withheld units that were needed to manage transmission congestion.	ERCOT released ECRS when helpful to resolve transmission constraint.
ERCOT doubled amount of 10 min. reserves when it added ECRS to RRS.	RRS is no longer a 10 min. response service. Upon ECRS implementation, RRS is only used to arrest the decline of frequency and the frequency recovery role of RRS was moved to ECRS. The quantity of Non-spin was reduced when ECRS was implemented.

Response to Potomac Economics Statements (cont'd)

Potomac	ERCOT
There was no material risk of load shedding this summer in spite of hot weather and high load.	The Potomac analysis does not consider September 6, when ERCOT entered into EEA2 and released all available reserves and emergency resources.
ERCOT should use the 2-hour ahead (HA) forecast error rather than the 6-HA error for determining Non-Spin quantities.	In instances where Non-spin is deployed, ERCOT would not have reserves to cover forecast errors or recover frequency following unit trips until the next available generator that could be committed is able to come online. The 6-HA was chosen based on analysis of unit start times from historic RUC activity.
ERCOT should use the 10-minute ahead forecast error rather than the 30-minute ahead forecast error for determining ECRS quantities.	In instances where ECRS is deployed, ERCOT would not have reserves to cover forecast errors until Non-Spin could be deployed, which could take up to 30-minutes.

Use of ECRS

- Since being implemented on June 10, 2023, there have been 40 events where ECRS has been released to SCED.
 - 9 of the events were on days when ERCOT issued an Operating Condition Notice (OCN) due to expected tight conditions.
 - Of the rest, ~65% were triggered during evening ramps, 6% were triggered by net load ramps during other times and 29% were triggered by frequency events.



Key Takeaway: ECRS has become a critical tool that is used for multiple reliability needs

TAC Follow-up

- ERCOT appreciates constructive comments on the AS Methodology and committed to a follow-up discussion with TAC about ECRS.
- This discussion may result in an intra-year change to the AS Methodology or may include modification to procedures regarding the deployment of ECRS.
- As shown on previous slide, ECRS has demonstrated value on non-scarcity days, but it may be possible to release the ECRS capacity earlier on expected scarcity days.
- ERCOT will work with stakeholders and the IMM to determine what, if any, changes are needed.