September 10, 2025

Supply Analysis Working Group (SAWG) September 2025 Update to WMS

Kevin Hanson (Invenergy) Chair
Greg Lackey (CPS Energy) Co-Vice Chair
Pete Warnken (ERCOT) Co-Vice Chair

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Overview

SAWG discussed four issues at the meeting:

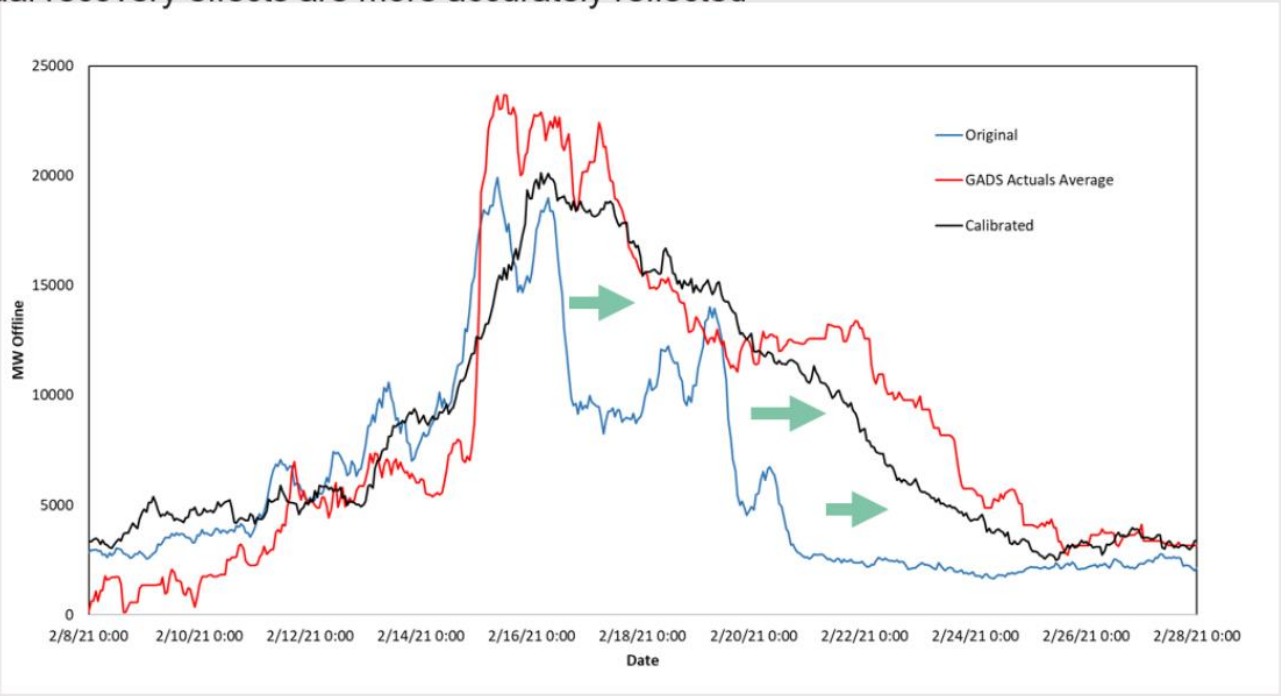
1) Probabilistic Reliability Model (SERVM) Project Status & Study Results To Date (presentation can be found here)
    a) Event Duration Risk Assessment Project
    b) January Reliability Risk Assessment
    c) Zonal Reliability Study
    d) Supply Deliverability Study
        - Load response is modeled as a generator in TARA
    e) NERC Probabilistic Assessment
    f) Reliability Standard Assessment Prototyping
2) Recent Generation Interconnection Project Trends (presentation can be found here)
3) 2026 Reliability Assessment Activity Update (presentation can be found here)
    - CONE will need to consider the additional transmission costs beyond the allowances
4) SAWG Scope Language Update (revised language can be found here)
    - Removal of the Seasonal Assessment of Resource Adequacy Report (SARA) and addition of the Monthly Outlook for Resource Adequacy (MORA)

Probabilistic Reliability Model (SERVM) Project Status:
Event Duration Risk Assessment Project

- Originally, SERVM assumed weather outages were uniformly 10 hours in duration (single point)
- This distribution was broadened to 7 points, unique to each unit, by subsampling technology specific fits of the underlying GADS data
- Time to Repair (TTR) distribution modeling appears to have minimal impact on results assuming weatherization.

Comparison to Base

Gradual recovery effects are more accurately reflected



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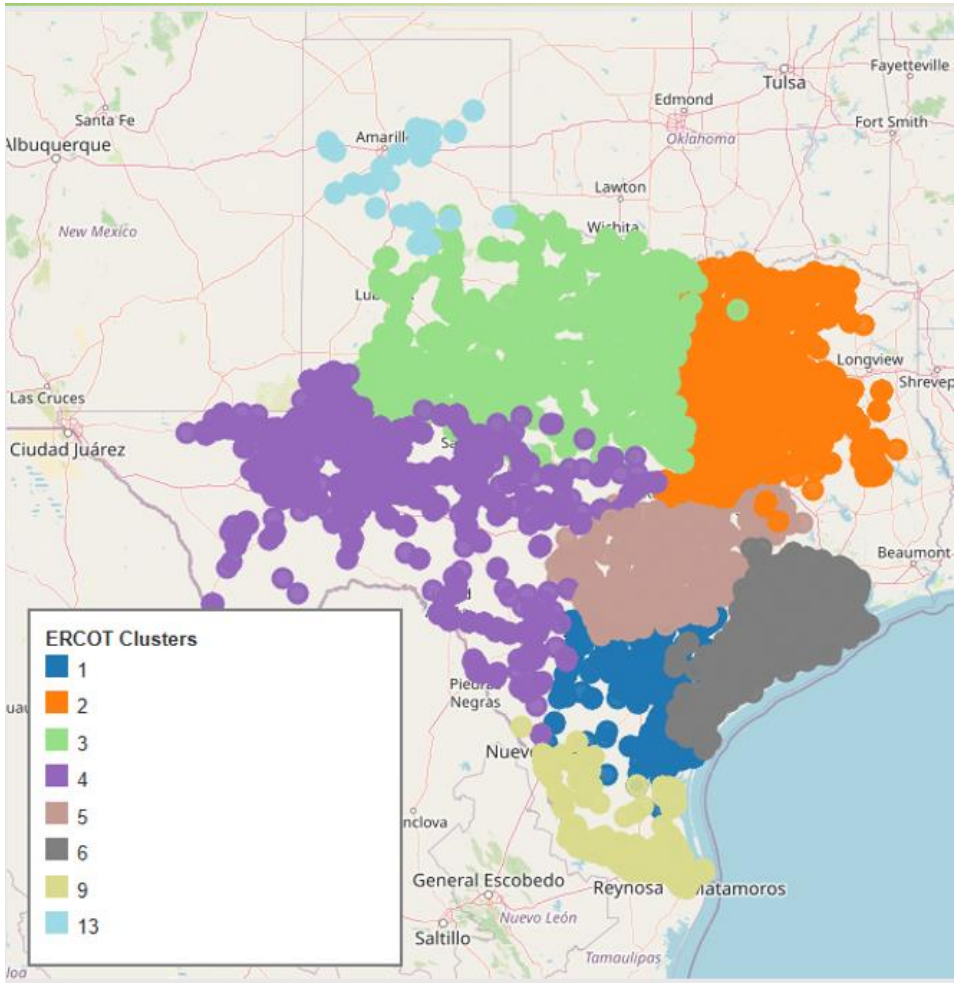
Probabilistic Reliability Model (SERVM) Project Status:
January Reliability Risk Assessment

- Reviewing the available historic temperature date, there continues to be a slight over-representation of December cold weather events in the longer range record.
- Within the SERVM modeled weather years, significant weather events are noted in Dec and Feb, whereas the long range historical records indicated January is the coldest month.
- The approach taken to align SERVM results with expected extreme monthly weather conditions include:
    1. Shift weather year inclusive of Dec 1989 weather event 10 days forward in time (moving it into Jan)
    2. Shift weather year inclusive of Uri weather event (Feb 2021) 21 days backward in time (moving it into Jan)
    3. The two new weather years get 50% weighting of a normal weather year
    4. Original 1989 and 2021 weather years get 50% weighting of a normal weather year
- Weather year shift includes adjusting all weather driven inputs (load, solar, wind, temperature) forward or backward in time for winter season for the weather year under investigation
- Summer inputs are held static

Probabilistic Reliability Model (SERVM) Project Status: Zonal Reliability Study

- PowerGEM (SERVM) using TARA model
  - performed clustering analysis using to identify clusters with similar effects on flow-gates
  - performed transfer limit analysis to identify zone-to-zone constraints and simultaneous import and export constraints
- SERVM ran simulations to analyze the change in reliability for 2026 when moving from single zone to the clustered representation
- 13 clusters were initially identified
- Powergem worked with ERCOT and ultimately consolidated several zones
- Final clustering includes 8 zones
- Next steps
  - Calculate zonal reliability for 2026
  - Compare to single ERCOT zone reliability for 2026
- Study doesn't include Permian Basin of 765 kV additions



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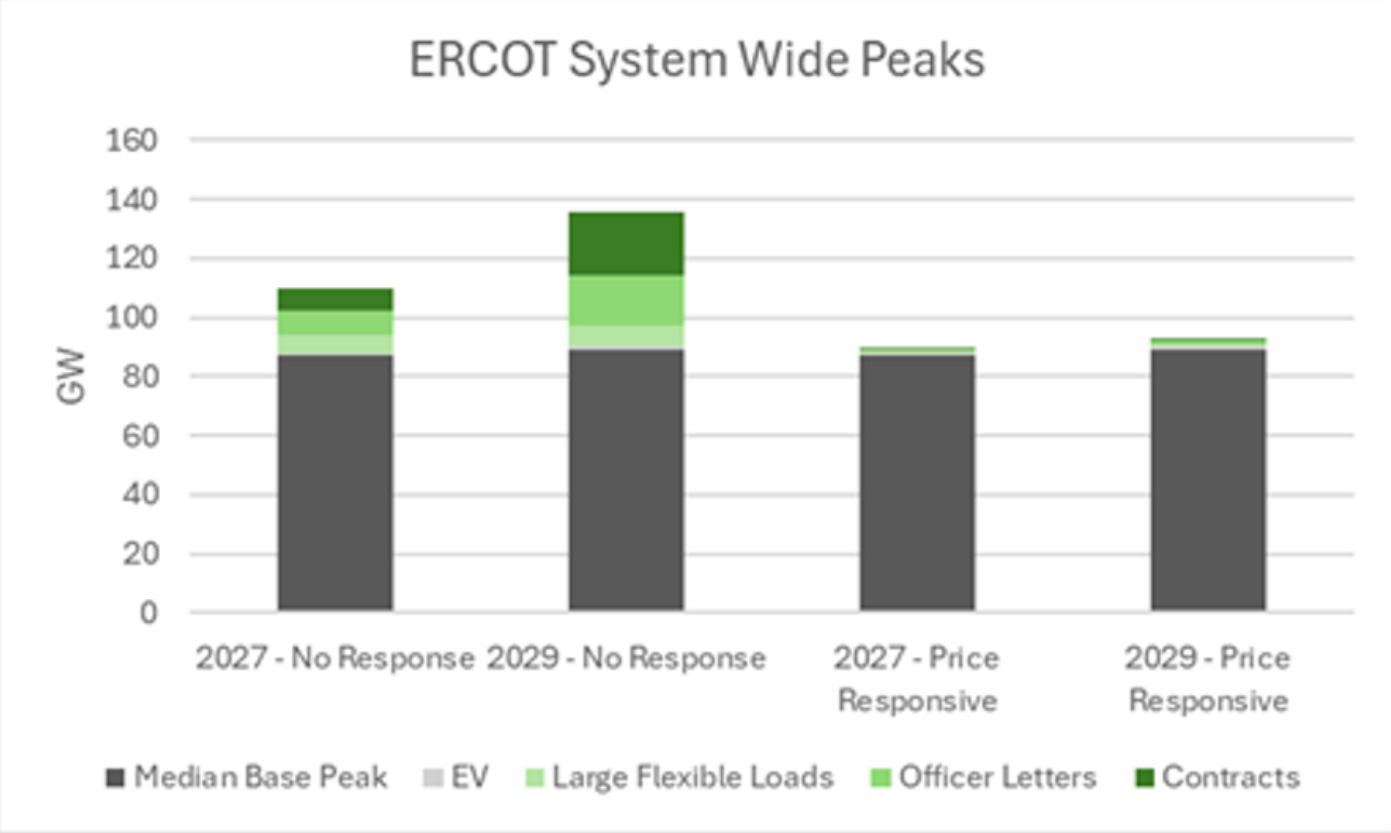
Probabilistic Reliability Model (SERVM) Project Status: NERC Probabilistic Assessment

- The study objective is:
  - Calculate single zone ERCOT EUE and LOLH metrics for 2027 and 2029
  - The study drivers are load forecast and behavior of large loads
- 95% of Contracts and Officer letters loads are assumed to be curtailable
- A question was asked if ERCOT is looking at curtailment percentage sensitivities.
  - ERCOT is currently not looking at those.



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Probabilistic Reliability Model (SERVM) Project Status: Reliability Standard Assessment Prototyping

Study Objectives

- The Reliability Standard assessment will use a probability-based model to determine if the ERCOT region is meeting the Reliability Standard and how likely it is to continue meeting it for the next three years.
- First study in 2026, but prototyping ongoing in 2025
- Criteria
  - Frequency of load shed: <1 day in 10 years
  - Magnitude: less than can be rotated among consumers during the outage
  - Duration: maximum duration less than 12 hours

Recent Generation Interconnection Project Trends: Key Takeaways

Presentation from Tyler Vickery and Dan Mantena of ERCOT

- Interconnection Trend: Project Synchronized and Cancelations
  - The capacity ratio or project cancellations to synchronized projects has converged to typical historical levels after anomalous April and May cancellation activity
  - Longer term, cancellation activity has trended upward
- Interconnection Queue Project Trends by Phase of Study: BESS
  - Relative to the December 2024 snapshot,
    - Project without IAs has shown the years with the highest expected in-service BESS capacity shifting from 2026-27 to 2027-2028
    - Projects with signed IAs has shown more in-service capacity is expected for 2027.
- Interconnection Queue Project Trends by Phase of Study: Solar
  - Solar continues steady growth with an increase for newer projects relative to year-end 2024 expections.
  - There is an acceleration of project completions to 2027 for projects with signed IAs, which might be influenced by compressed construction/in-service deadlines for tax credit qualification.
- Interconnection Queue Project Trends by Phase of Study: Wind
  - Wind continues steady growth with an increase in counts and capacity for projects without signed IAs relative to year-end 2024 expectations
  - For projects with signed IAs, the number and capacity of expected in-service projects experience sharp growth during 2027.
- Interconnection Queue Project Trends by Phase of Study: Gas
  - Relative to the December 2024 snapshot, projects without signed Ias have increased in number and capacity – particularly during 2028.
  - For projects with signed IAs, there is more capacity expected to be in service during 2026 and 2027.
- 29% of planned projects between 2002 and 2021 have been successful on a project count basis (26% on a capacity Basis)

2026 Reliability Assessment Activity Update

Reliability Assessment Assumption Status

- Table at right is not intended to cover all assumptions that may be documented in ERCOT's Assumptions filing

Assumption	Status/Comments
Load forecast	Expect to use the fall 2025 forecast ("ERCOT Adjusted"), with option to use a 2026Q1 forecast if timing allows it
Weatherization impacts on forced outages	Working with the Weatherization and Inspection Dept. on a methodology update; considering adopting a declining effectiveness curve by Weatherization Zone; the curves would be tied to realized (SERVM modeled) wind chill temperatures above and below the temperature thresholds at which sustained performance is required
Probability weighting of historical weather years/number of weather years	Propose a discussion for the September 19th or October 24 SAWG meeting; will be coordinating analysis and methodology option evaluation with the Load Forecasting & Analysis Dept.
Distribution Voltage Reduction	Issuing an RFI this fall to acquire updated DVR capabilities, focusing on availability during high-risk hours
Cost of New Entry (CONE)	Propose a limited study that focuses on updating the CONE model as opposed to doing a full bottom-up study
Value of Lost Load (VOLL)	Propose no changes to the current VOLL
Dispatchable Reliability Reserve Service (DRRS)	Will be working with the Commercial Operations Dept. to define modeling requirements, and the PowerGem team to provide model implementation guidance
Ancillary Services	Standard refresh of AS product parameters
Demand Response Resources	Standard refresh of DR product parameters
Firm Fuel Supply Service	Update FFSS parameters based on August 1 procurement results for November 2025-March 2026 procurment period
System topology	Eight zones with transfer limits based on TARA clustering analysis and Transmission Planning Dept. consultations
Senate Bill 6 Large Load requirements	Modeling methodologies TBD; dependencies on PUC proceedings and NPRRs filed and/or under development
Generation resource portfolios and planned retirements (2026/2029)	Portfolios will be based on the December 2025 CDR; 2029 portfolio will be augmented based on Generator Interconnection Status (GIS) reports

SERVM = Strategic Energy & Risk Valuation Model
TARA = Transmission Adequacy and Reliability Assessment tool

Questions?

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