



Item 10.1: System Planning and Weatherization Update

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Reliability and Markets Committee Meeting

ERCOT Public

October 9, 2024

Overview

- **Purpose**

Provide an update on recent activity related to planning, modeling, generation interconnection, resource adequacy and weatherization

- **Voting Items / Requests**

No action is requested of the Reliability and Markets (R&M) Committee or Board; for discussion only

- **Key Takeaways**

- The Reliability Standard recently approved by the PUC provides a quantifiable framework to evaluate reliability costs and benefits.
- New era of planning highlights include continued record project endorsement & transmission buildout; the PUC approval of the Permian Basin Reliability Plan; and stakeholder review of a potential Extra High Voltage Infrastructure (EHV) to reliably and efficiently facilitate large power transfer across Texas to meet the system's evolving characteristics.
- While Solar and Energy Storage Resources (ESRs) continue to account for the vast percentage of generation capacity requesting new interconnection studies, approximately 9 GW of gas has recently applied.
- The queue of large loads requesting to connect to the grid continues to increase.
- The Weatherization Inspection Program successfully met PUC rule requirements for required inspections for the three-year period since rule inception.
- ERCOT has concluded an initial step towards the transition to a single-model representation of ESRs with updates to its registration system.

ERCOT Reliability Standard Framework

Loss of Load Event

Defined as a period of time when firm load exceeds available generation capacity **+ 1,500 MW** of operating reserves, and ERCOT must use rotating outages as a balancing tool to maintain system stability.

Frequency

How often (#/yr) an event is expected to occur

Magnitude

Maximum size (MW) for an event

Duration

How long (hrs) event lasts

Framework Components

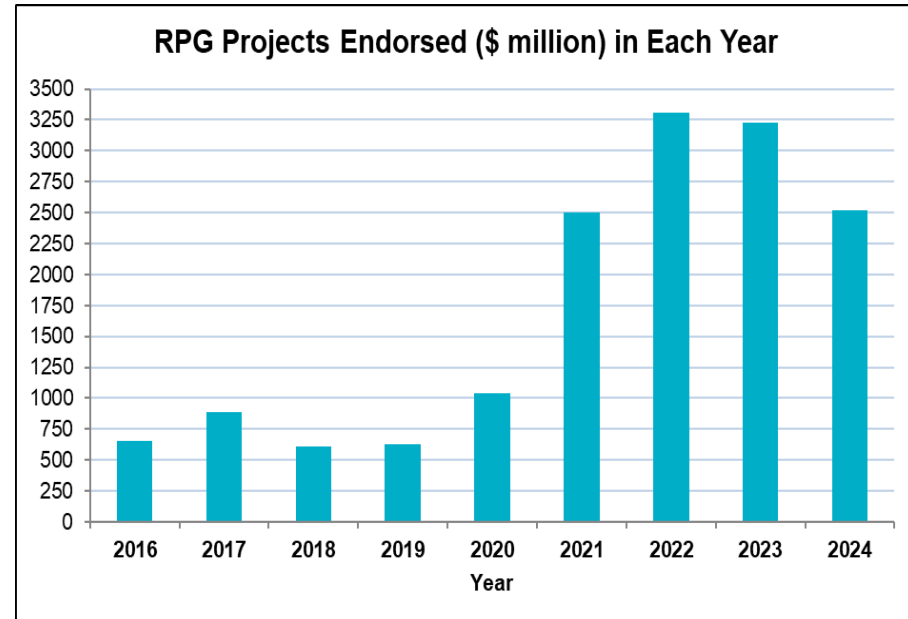
On August 29th, the PUC established a:

- ❖ Reliability Standard framework for the ERCOT region
- ❖ Value of Lost Load of \$35,000/MWh for ERCOT study purposes

- Criteria deficiencies to be determined by reliability assessments at least once every three years; deficiencies require ERCOT to develop market design options to address the expected deficiencies with independent IMM review.
- First reliability assessment will start in 2026, with simulations for years 2026 and 2029.
- Modeling assumptions must be developed and approved by the Commission (with a public review process) prior to conducting the assessment.

Transmission Planning Summary

- As of June 1, 2024, projects energized in 2024 total about \$2.160 billion.
 - \$1.553 billion energized in all of 2023
- As of July 31, 2024, ERCOT has endorsed transmission projects totaling \$2.518 billion in 2024.
 - Total endorsed transmission projects in 2023 equaled \$3.231 billion
- As of June 1, 2024, projects in engineering, routing, licensing, and construction total about \$14.183 billion.

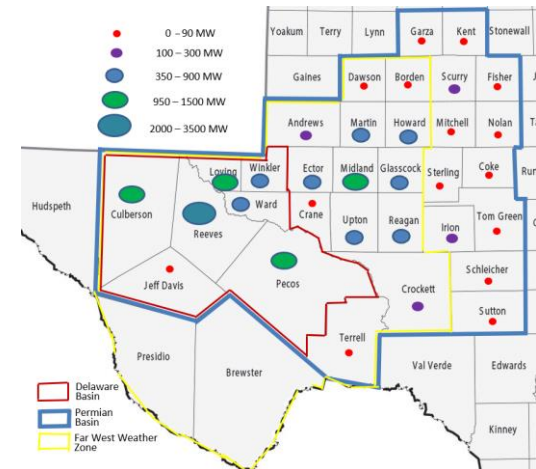


Key Takeaway: Transmission buildout as well as project endorsement continues at a record pace with more projects energized by June than were energized in all of 2023.

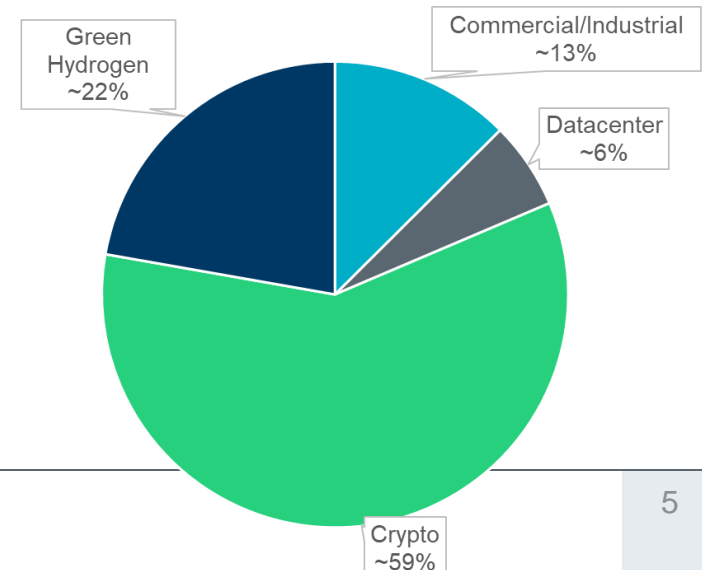
Permian Basin Reliability Plan Update

- Per House Bill 5066 (HB5066), the PUC directed ERCOT to develop a Permian Basin Reliability Plan and file a final plan at the Commission no later than July 2024.
- Based on Load forecast data provided by the TSPs, ERCOT studied a total Permian Basin Load for 2038 of 26,400 MW (14,705 MW oil & gas and 11,695 MW additional Load).
- ERCOT evaluated the transmission facilities needed to serve the Permian Basin region and filed the Permian Basin Reliability Plan to PUC on July 25, 2024.
- The Permian Basin Reliability Plan includes the local transmission projects to interconnect and serve the projected load as well as additional transmission capacity needed to import power to meet the forecasted demand in the Permian Basin region.

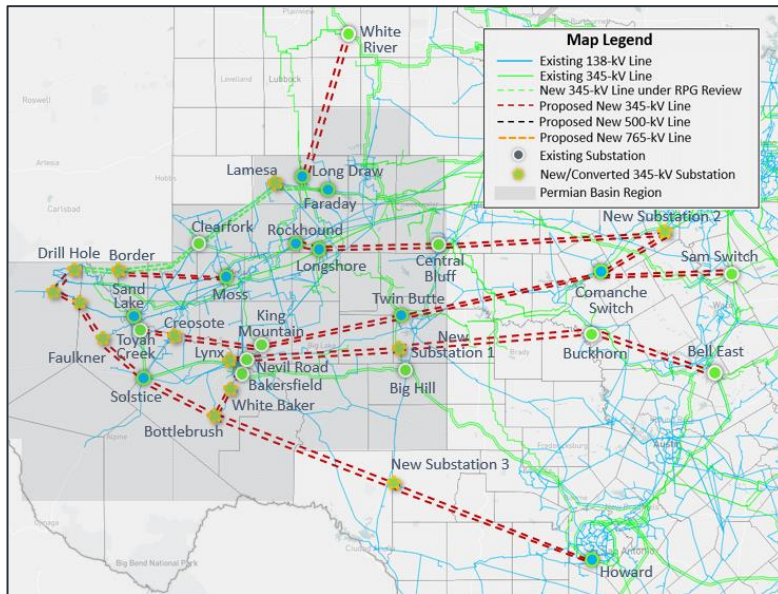
County-Level S&P Global Load Forecast



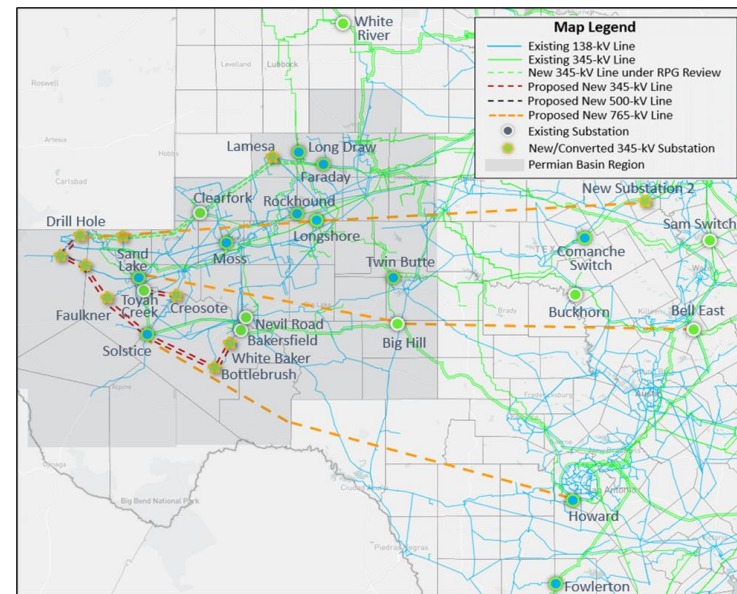
Breakdown for 11,695 MW of additional non-oil & gas load by type



Permian Basin Reliability Plan Update



Modified 345 kV Import Path option for 2038



765 kV Import Path option for 2038

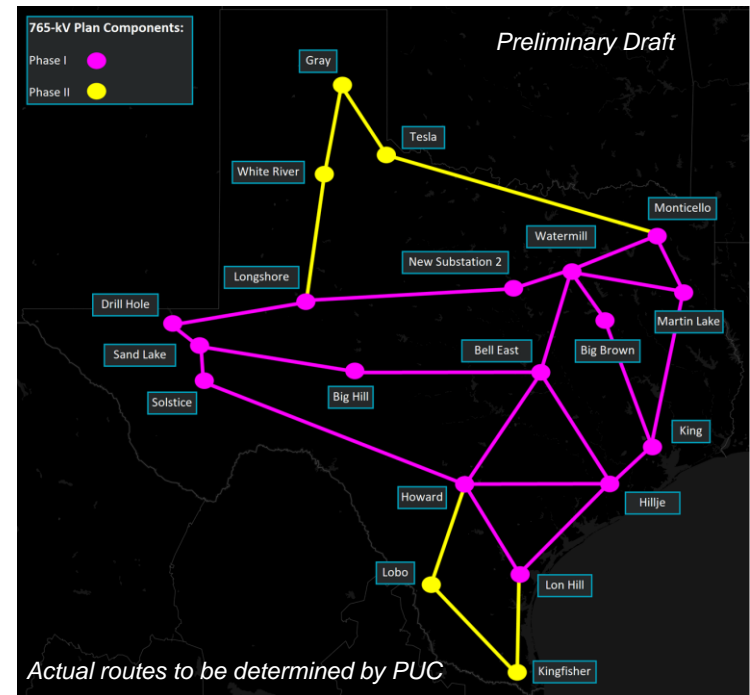
At its September 26, 2024 Open Meeting, the PUC took the following actions:

- Approved all the common local projects identified in ERCOT's study to serve 2038 load.
- Authorized applicable TSPs to start preparing CCN applications for all eight import paths identified in ERCOT's study to serve 2038 load (five 345-kV and three 765-kV)
 - Directed ERCOT to work with TSPs to identify import paths needed to serve load in 2030 so that the preparation of those CCN applications can be prioritized.
 - Set May 1, 2025 date certain for determining which import path voltage will be utilized.
- Directed ERCOT to identify TSPs responsible for ownership, construction and operation of the transmission lines and facilities.



New Era of Planning Update – EHV Considerations

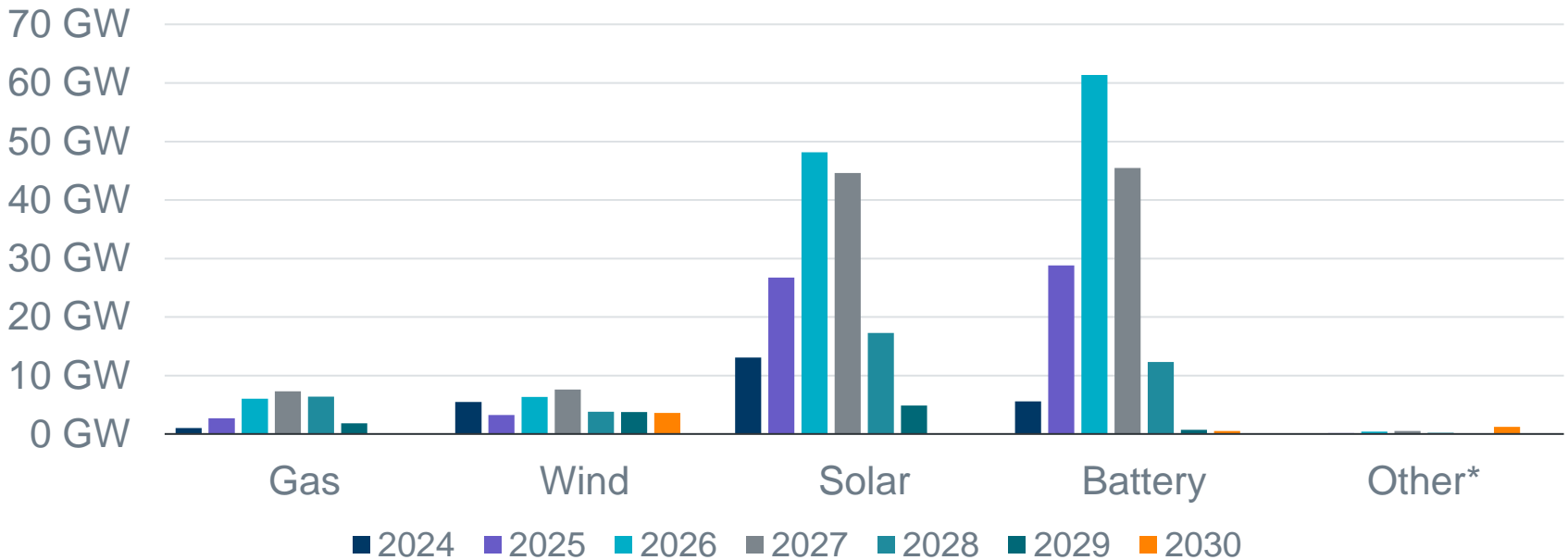
- An evolving generation mix has resulted in increased distance between generation sites and demand centers.
- With the increase in large loads projected to move to Texas, the preliminary 2024 Regional Transmission Plan (RTP) study results indicate a need for substantial new transmission infrastructure to serve the forecasted load growth.
- For stakeholder review, ERCOT included new EHV transmission lines (765-kV) as an alternative to only adding new 345-kV in the 2024 RTP.
- Benefits of higher voltage transmission include:
 - Increased transfer capability to load centers
 - Flexibility on Generation Resource siting
 - Outage coordination capacity
 - Reduced impact to Texas consumers due to less Right of Way requirements
 - Lower line losses
 - Possible retirement of series compensation devices
 - Potential exit strategy for some current Generic Transmission Constraints
- Stakeholder review & comment is underway within the Regional Planning Group process.
- The final 2024 RTP plan will be completed no later than December 2024 and will be shared with the Commission for consideration of next steps.



Generation Interconnection Requests

1,886 active generation interconnection requests totaling 371 GW as of August 31, 2024
 (Solar 155 GW, Wind 34 GW, Gas 25 GW, and Battery 155 GW)

(Excludes capacity associated with projects designated as Inactive per Planning Guide Section 5.2.5)



A break-out by zone can be found in the monthly Generator Interconnection Status (GIS) reports available on the ERCOT Resource Adequacy Page: <http://www.ercot.com/gridinfo/resource>

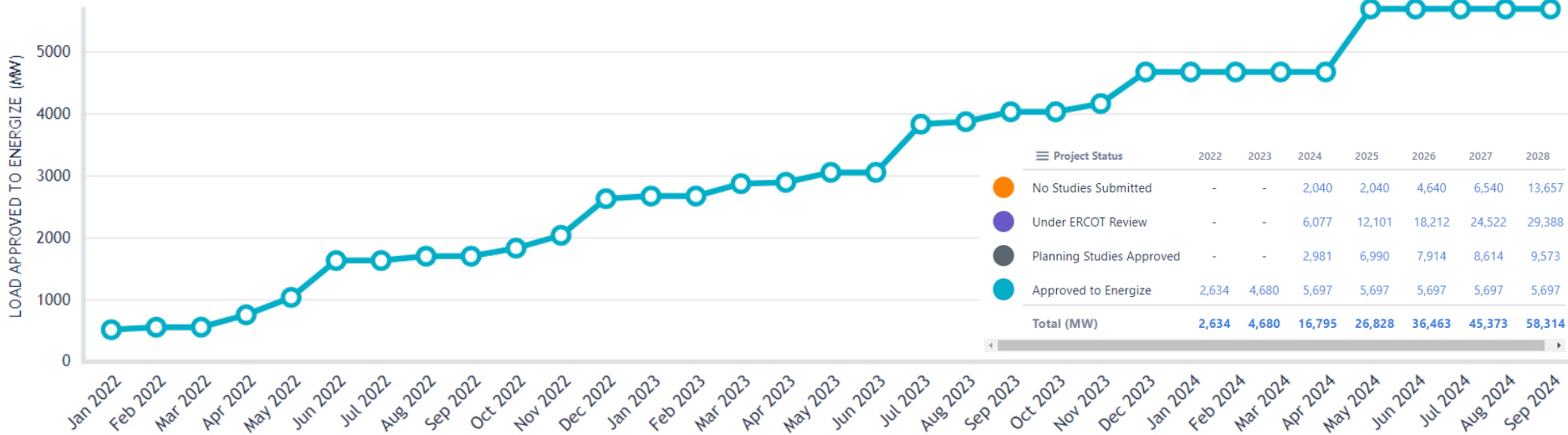
* Other includes petroleum coke (pet coke), hydroelectric, fuel oil, geothermal energy, other miscellaneous fuels reported by developers, and fuel cells that use fuels other than natural gas.

Key Takeaway: Approximately 9 GW of new gas generation requests have entered the interconnection queue since May 31, 2024.



Large Load Integration Overview

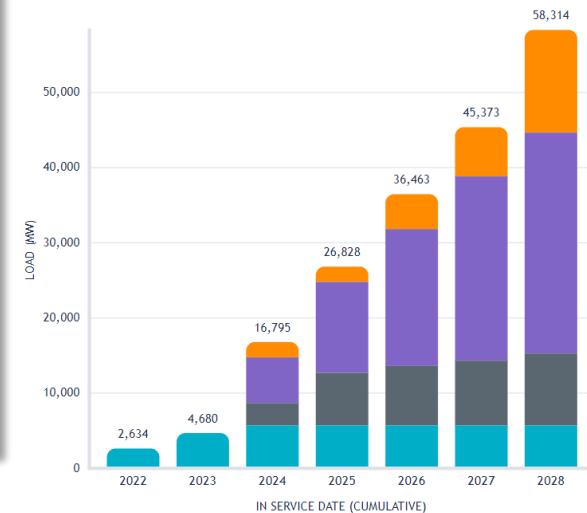
Large Loads Approved to Energize - Growth Since 2022



Key Takeaways

- Since August, ERCOT has expanded reporting through 2028. The total queue now includes approximately 7k MW more requests.
- ERCOT has reviewed and approved studies for the interconnection of over 15,000 MW of Large Loads in the past two years.
 - 5,697 MWs have been approved to energize
 - Of these, 3,281 MW is believed to be operational
 - Remaining 2,416 MW may energize at any time without additional approval

Actual and Projected Large Load Growth 2022-2028



Large Load approved to energize and observed Load

Amount (in MW) of Large Load that is Approved to Energize

5,697

Peak (non-simultaneous) observed consumption for approved loads

3,281.7

Approved to Energize Load by Project Type



Load Type	Load (MW)
Standalone	4,622
Co-Located	1,075
Total	5,697

Non-Simultaneous Peak Observed Load by Project Type



Load Type	Peak Observed Load (MW)
Standalone	2,214.8
Co-Located	1,066.9
Total	3,281.7

Weatherization and Inspection – Summer Recap

- Summer 2024 Weatherization inspections were completed using high Weather Emergency Preparedness compliance levels.
- All existing and new generation Resources that were fully commissioned prior to the end of Q2-2024 were inspected by the end of September.
- Focus will now turn to preparing for Winter declarations and preparedness.

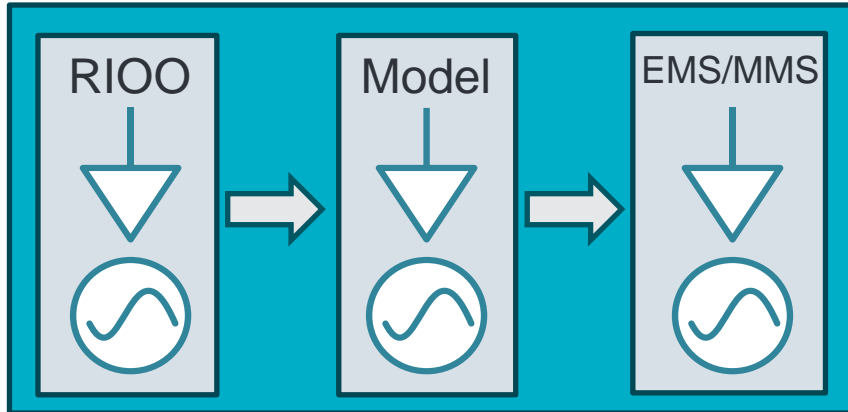
Summer 2024 Weatherization Inspections (as of September 27, 2024)

Month	Resources	TSP	Total
June	73	74	147
July	151	108	259
August	107	118	225
September	86	58	144
Total	417	358	775

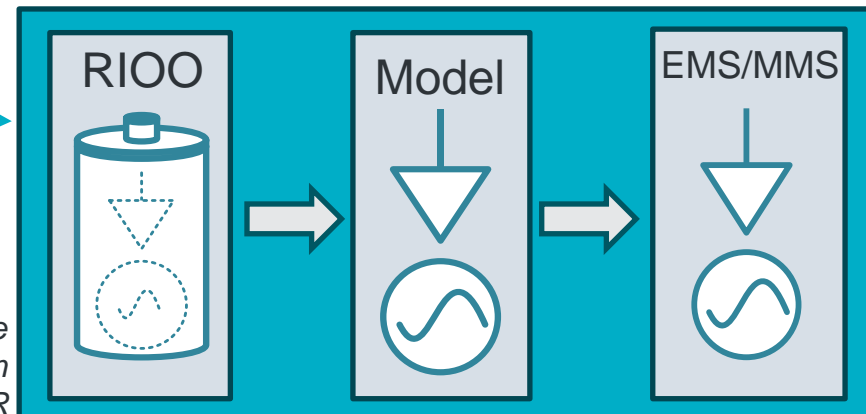
Key Takeaway: The Weatherization Inspection Program successfully met PUC rule requirements for required inspections in the three-year period since rule approval.

RIOO Updates to Support Single-Model ESR Registration

To support RTC+B, ERCOT's Resource registration application, RIOO, has transitioned to a single-model representation of Energy Storage Resources (ESRs).



Prior to the RIOO changes, all systems represented an ESR as a load/generator pair



Registration updates can now be made in a single submission addressing the single-model ESR

Until RTC+B go-live, core downstream systems will continue to utilize the combo-model

Appendix

Monthly Outlook on Resource Adequacy (MORA)

November

- November has a low risk of emergency conditions, with the highest risk hour shifting from Hour Ending 8:00 p.m. (October) to 7:00 p.m.
- Morning hours just prior to and during sunrise show some minimal risk due to the possibility of winter-like low temperatures when load is increasing.

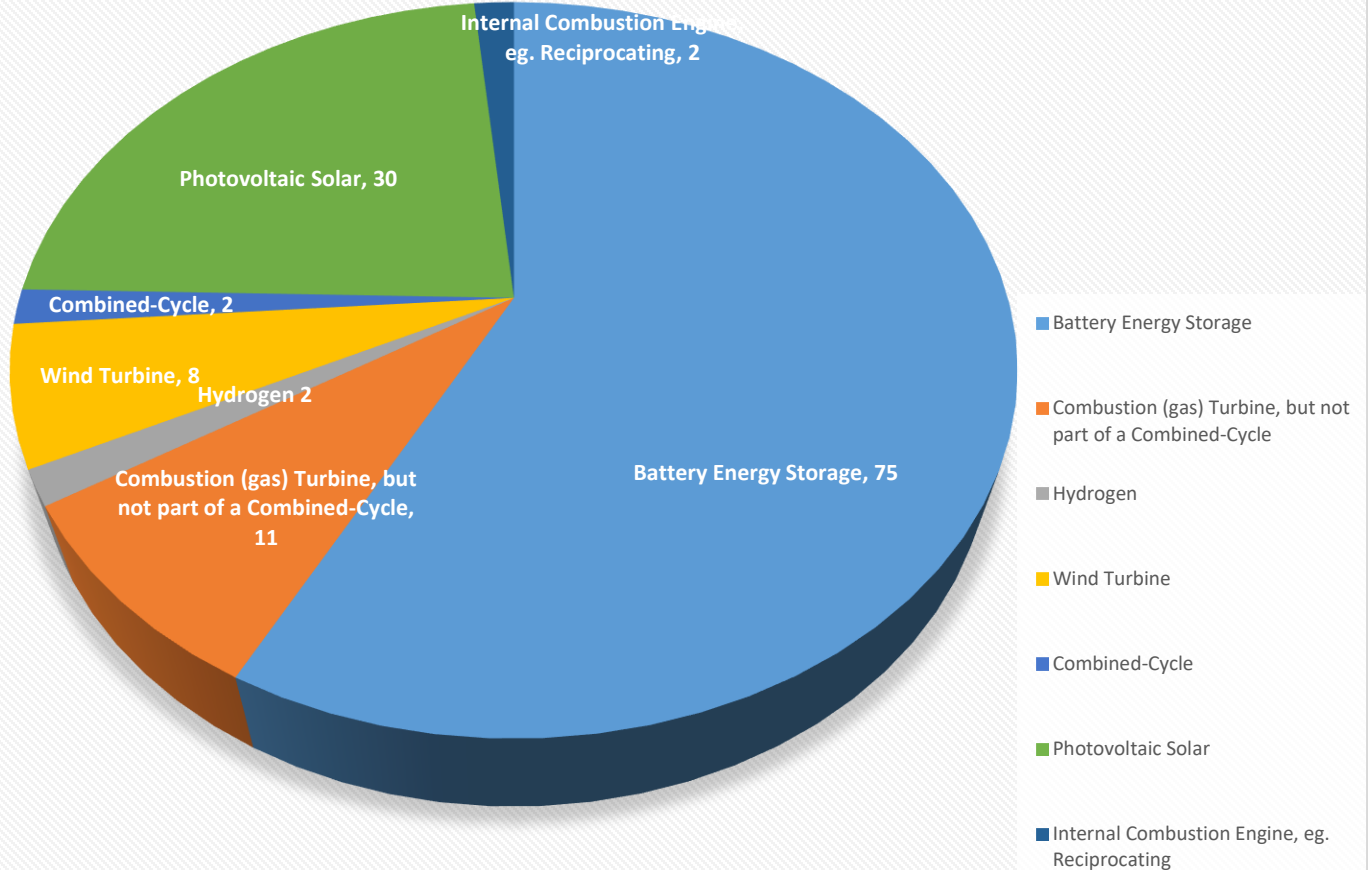


Hour Ending (CST)	Chance of Normal System Conditions Probability of CAFOR being above 3,000 MW	EMERGENCY LEVEL	
		Chance of an Energy Emergency Alert Probability of CAFOR being less than 2,500 MW	Chance of Ordering Controlled Outages Probability of CAFOR being less than 1,500 MW
1 a.m.	99.94%	0.00%	0.00%
2 a.m.	99.96%	0.00%	0.00%
3 a.m.	99.97%	0.00%	0.00%
4 a.m.	99.97%	0.00%	0.00%
5 a.m.	99.96%	0.00%	0.00%
6 a.m.	99.87%	0.03%	0.03%
7 a.m.	99.64%	0.18%	0.10%
8 a.m.	99.65%	0.09%	0.05%
9 a.m.	99.87%	0.02%	0.00%
10 a.m.	99.99%	0.00%	0.00%
11 a.m.	99.96%	0.01%	0.00%
12 p.m.	100.00%	0.00%	0.00%
1 p.m.	100.00%	0.00%	0.00%
2 p.m.	99.99%	0.00%	0.00%
3 p.m.	99.97%	0.01%	0.00%
4 p.m.	99.84%	0.06%	0.03%
5 p.m.	99.65%	0.09%	0.04%
6 p.m.	92.22%	2.52%	1.48%
7 p.m.	82.21%	8.65%	6.06%
8 p.m.	93.62%	2.70%	1.69%
9 p.m.	92.71%	3.61%	2.54%
10 p.m.	99.24%	0.20%	0.09%
11 p.m.	99.84%	0.04%	0.02%
12 a.m.	99.97%	0.00%	0.00%

Note: Probabilities are not additive.

Generation Interconnection Activity (as of September 16, 2024)

Applications Received in the last 60 days by Fuel



Key Takeaway: Battery Energy Storage continues to be the most active generation type requesting interconnection studies.

Generation Resource Project MWs by Fuel Type and Interconnection Stage (as of September 16, 2024)

