



Item 14.2: System Planning and Weatherization Update – **REVISED***

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Vice President, System Planning and Weatherization

Board of Directors Meeting

ERCOT Public

April 7-8, 2025

***04/04/25 Updates:
Slide 6 Added
Slide 7 Updated Graph
Slide 9 Updated Graph**

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 Board; for discussion only

- **Key Takeaways**

- ERCOT is preparing to process and study Inverter-Based Resource requests for extensions or exemptions from the NOGRR245 compliance requirements.
- Solar and Energy Storage Resources continue to account for the vast percentage of generation requesting new interconnection. All Texas Energy Fund projects recommended for due diligence by the PUC are registered with ERCOT and in various phases of the generation interconnection process.
- The large load interconnection queue continues to increase at a record pace.
- Transmission buildout and project endorsement continues at a record pace to meet the needs of increased load and generation.
- The fourth season of winter weatherization inspection work since program inception successfully completed.
- Probabilistic modeling results indicate a low risk of having to declare an Energy Emergency Alert under normal system conditions during the months of April and May.

NOGRR245, Inverter-Based Resource Ride-Through Requirements, Update

- NOGRR245 requires all new and existing Inverter-Based Resources (IBRs) and Type 1/Type 2 Wind-Powered Generation Resources (WGRs) to **maximize** Voltage Ride-Through (VRT) and Frequency Ride-Through (FRT) capability.
Maximization requires implementing settings, parameterization, software, and firmware modifications.
- Resources with a Standard Generation Interconnection Agreement (SGIA) signed **before** 8/1/24 must *at least* meet legacy VRT and FRT requirements.
These Resources may request by 4/1/25 an extension to the compliance deadline or submit a notice of intent to request an exemption from some or all requirements.
- IBRs with a SGIA signed **on or after** 8/1/24 must meet FRT and IEEE2800-2022 requirements.
These Resources may request by 4/1/25 an extension to comply with certain requirements.

Key Dates

October 1, 2024 – NOGRR245 effective date

April 1, 2025 - Deadline to submit a request for extension or a notice of intent to request an exemption

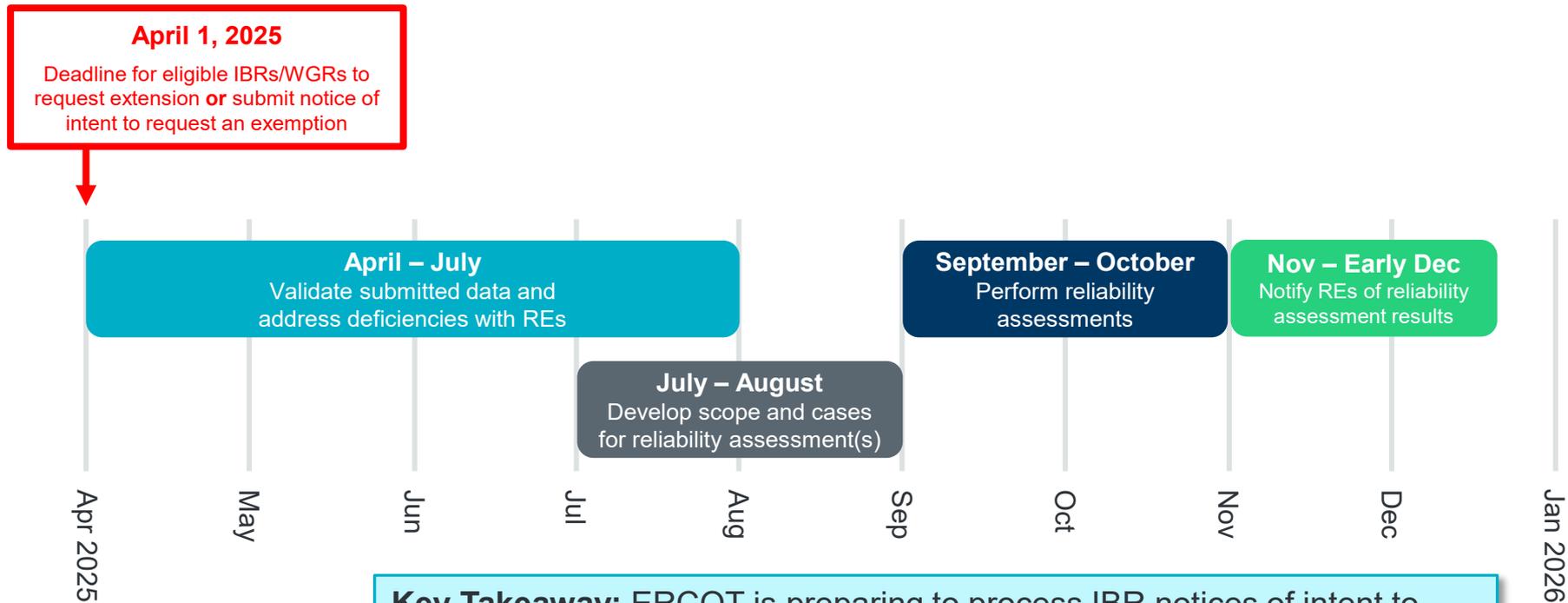
December 31, 2025 – Deadline for existing units to complete maximization unless extension granted by ERCOT

December 31, 2027 – FRT requirement extensions cannot go past this date

December 31, 2028 – VRT requirement extensions cannot go past this date

NOGRR245 Review and Exemption Process

- ERCOT must assess reliability impacts of updated IBR model information to determine where there is any risk to the system.
 - Will perform one or more assessments to evaluate reliability impact of related IBRs simultaneously.
- ERCOT expects reviewing the technical data and addressing deficiencies with Resource Entities (REs) will take several months. Reliability assessments should commence early September 2025.

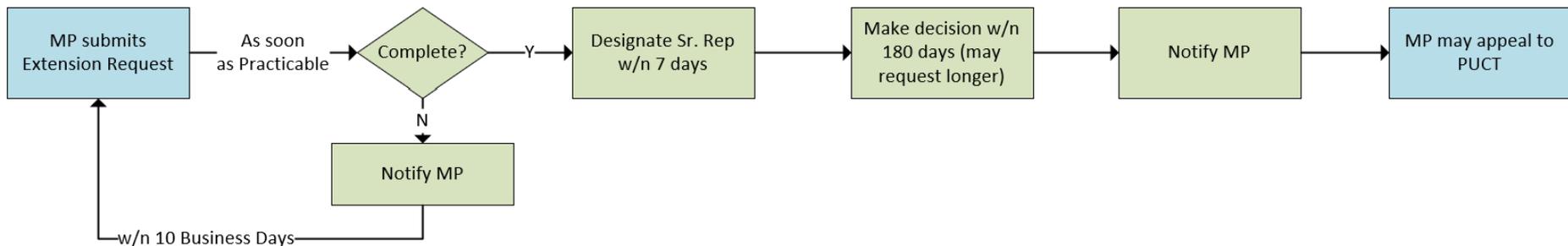


Key Takeaway: ERCOT is preparing to process IBR notices of intent to request an exemption.

NOGRR245 Extension Process

- As soon as practicable, ERCOT reviews Market Participant requests to extend the December 31, 2025 deadline for existing units to complete maximization
- ERCOT informs Market Participant if extension request is complete
 - If not complete, Market Participant has 10 Business Days to remedy
- Once request is complete:
 - ERCOT designates senior representative within 7 days
 - ERCOT makes decision within 180 days (may request longer)
 - ERCOT notifies Market Participant of decision
 - Market Participant may appeal decision to Public Utility Commission of Texas (PUCT)

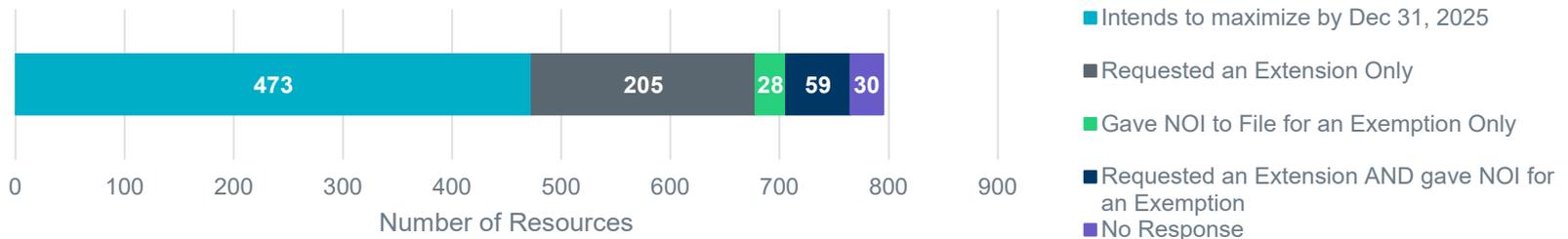
Extension Request Process



Key Takeaway: ERCOT is preparing to handle extension requests for the 12/31 deadline for NOGRR245 maximization compliance requirements.

Key Metrics from IBR Ride-Through Data Request*

- ERCOT sent RFIs to REs for 795 Resources in the Network Operations Model and near commissioning or already commissioned
 - 765 responses received by 4/1/25 deadline (4 late responses)
 - 292 requested extension and/or submitted Notice of Intent to request an exemption
 - ERCOT will accept late submissions through 4/15/25



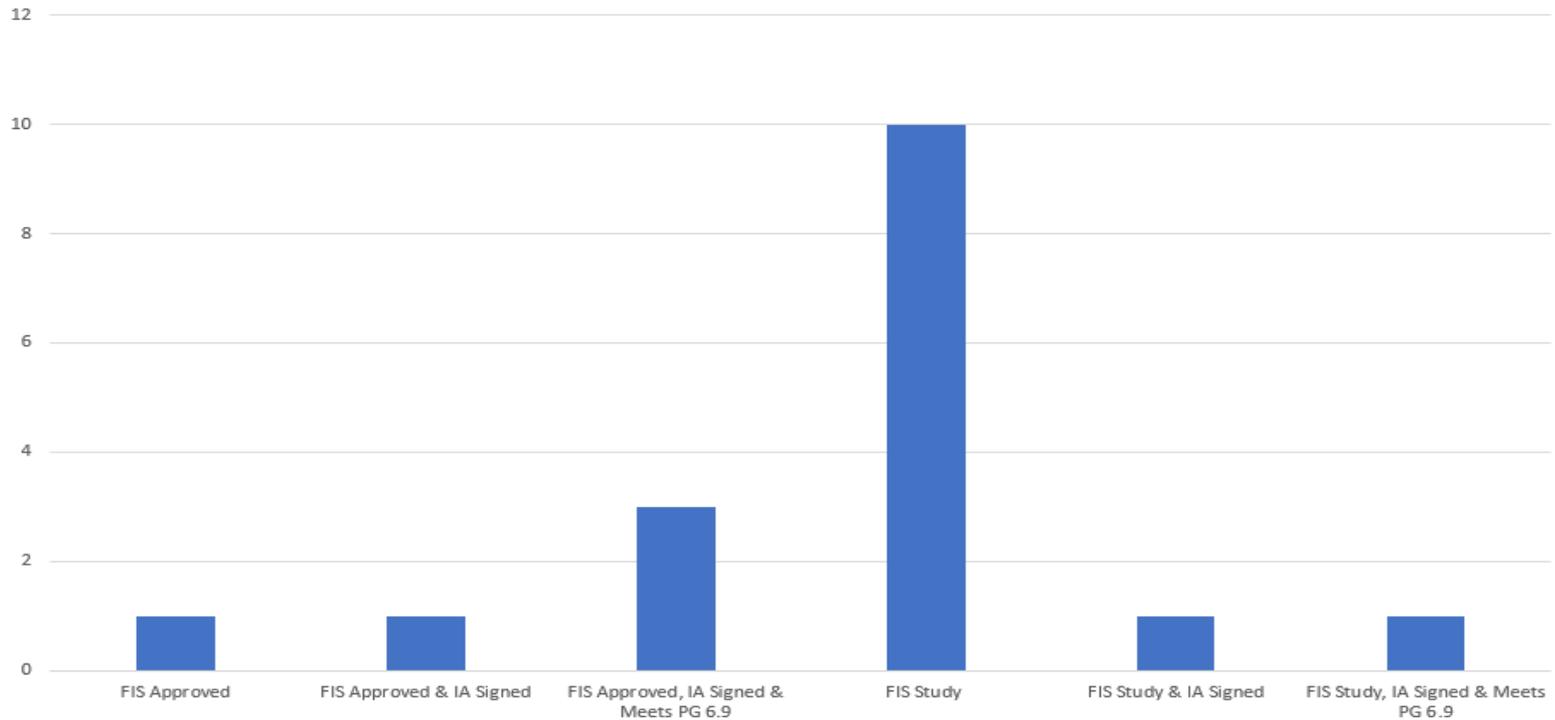
- IEs and REs in early stages of the interconnection process had to respond to RFIs only if requesting extension or submitting Notice of Intent to request an exemption
 - 104 responses received by 4/1/25 (29 late responses)
 - 19 requested extension and/or submitted Notice of Intent to request an exemption



Texas Energy Fund Status (as of April 2, 2025)

All sixteen projects recommended for Due Diligence by the PUC are in various phases of the generation interconnection process.

Status of TEF Projects approved for Due Dilligence

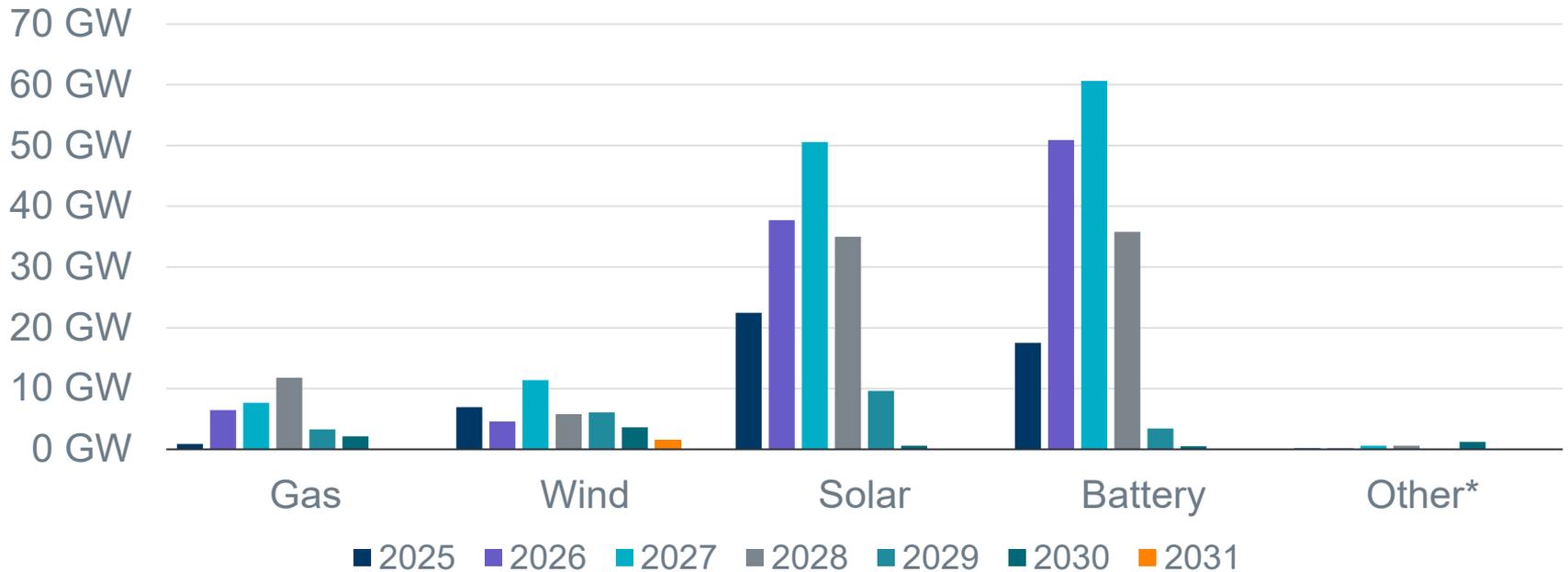


Key Takeaway: All sixteen projects which represent just over 8k MW have submitted Full Interconnection Study (FIS) applications with ERCOT and are advancing through the interconnection process. Seven projects have completed all FIS studies.

Generation Interconnection Requests

1,987 active generation interconnection requests totaling 400 GW as of February 28, 2025
(Solar 156 GW, Wind 40 GW, Gas 32 GW, Battery 169 GW, and Other 3 GW)

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



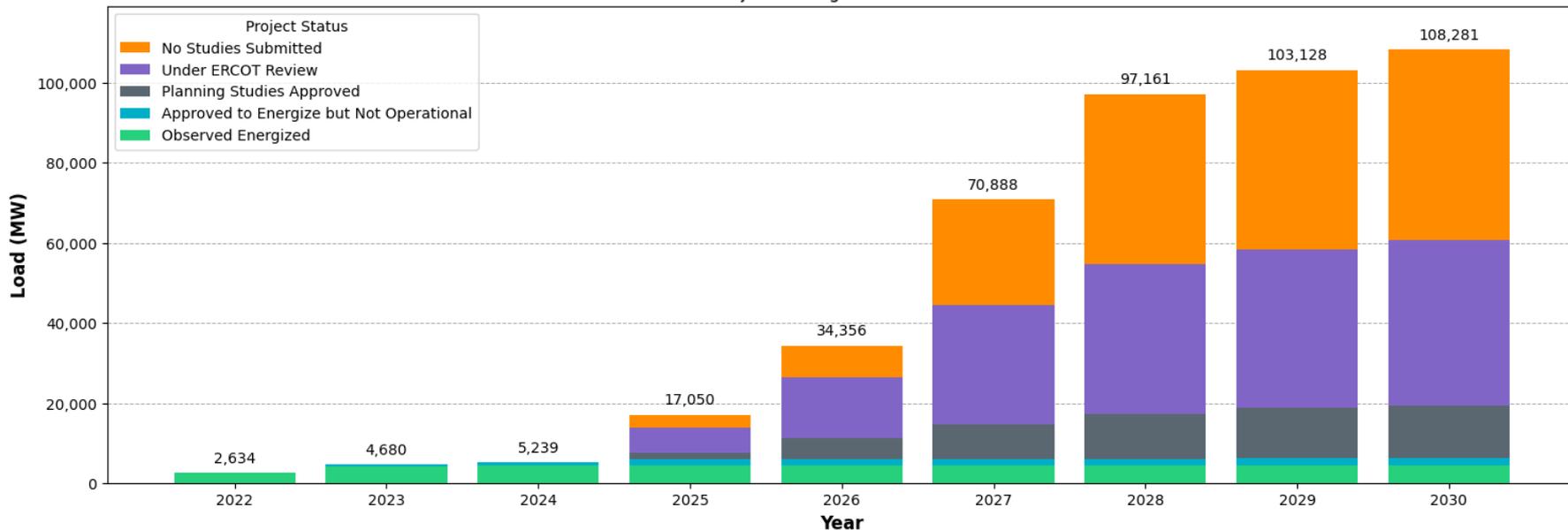
* Other includes petroleum coke (pet coke), hydroelectric, fuel oil, geothermal energy, other miscellaneous fuels reported by developers, and fuel cells that use fuels other than natural gas.

Key Takeaway: Solar and Battery Energy Storage continue to account for over 81% of the amount of generation seeking interconnection.



Current Large Load Interconnection Queue (as of April 7, 2025)

Actual and Projected Large Load Growth 2022-2030



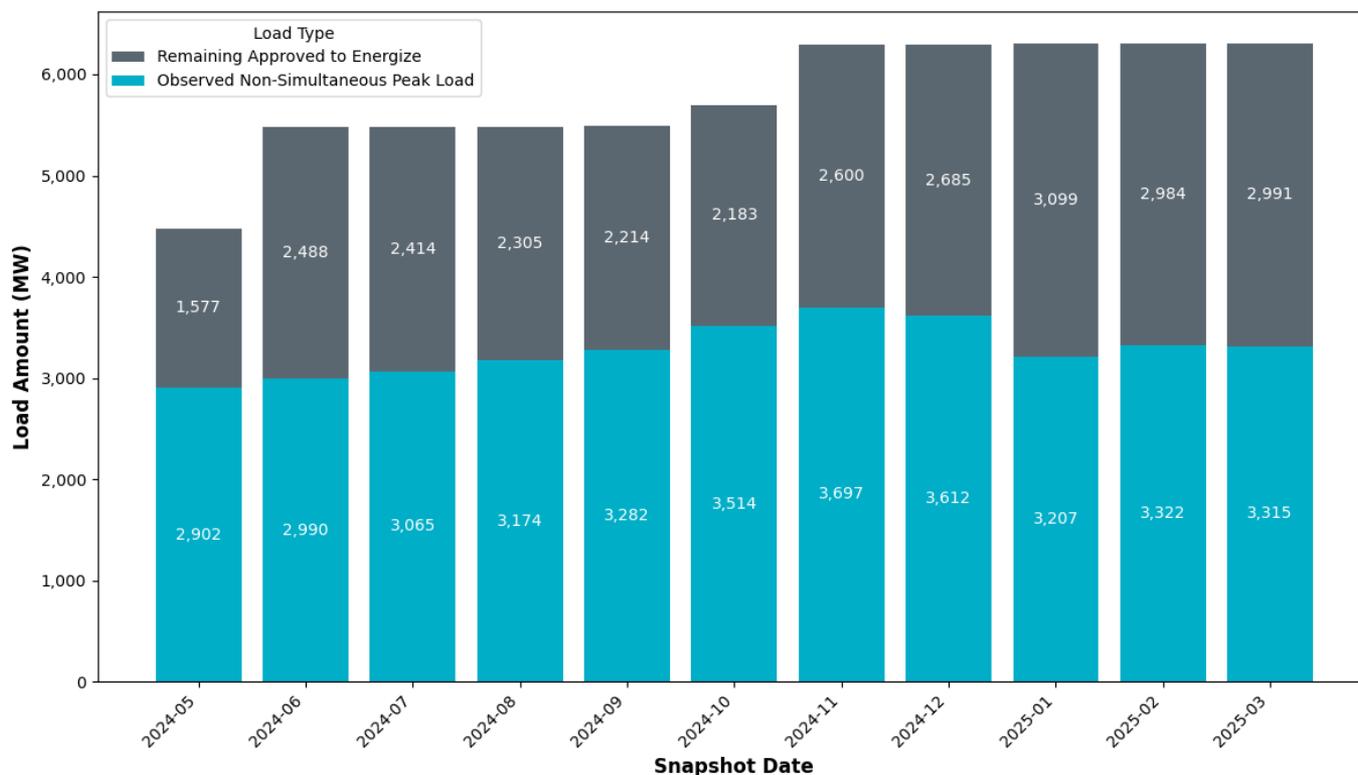
Project Status	2022	2023	2024	2025	2026	2027	2028	2029	2030
No Studies Submitted	0	0	0	3,034	7,846	26,311	42,348	44,752	47,581
Under ERCOT Review	0	0	0	6,403	15,188	29,931	37,573	39,386	41,191
Planning Studies Approved	0	0	0	1,607	5,316	8,641	11,234	12,684	13,203
Approved to Energize but Not Operational	0	569	623	1,390	1,390	1,390	1,390	1,690	1,690
Observed Energized	2,634	4,111	4,616	4,616	4,616	4,616	4,616	4,616	4,616
Total (MW)	2,634	4,680	5,239	17,050	34,356	70,889	97,161	103,128	108,281

Key Takeaway: ERCOT is tracking approximately 108k MW of Large Loads seeking interconnection compared to 63k MW in December.



Loads Approved to Energize – Observations

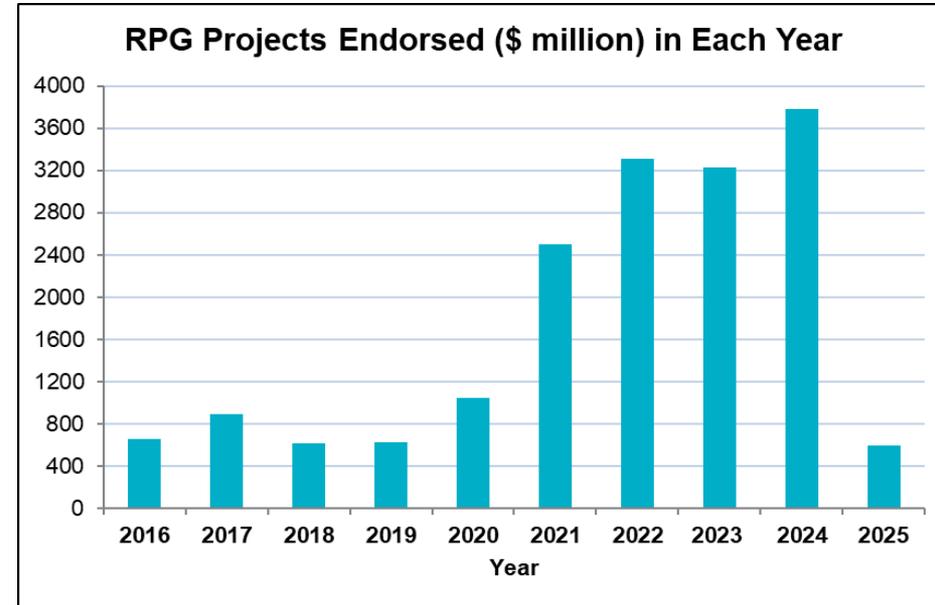
- Of the 6,306 MW that have received Approval to Energize, ERCOT has observed a **non-simultaneous** monthly peak consumption of 3,315 MW in March 2025 which is a slight decrease since February 2025.
 - This is calculated as the sum of the maximum value for each individual load per month
 - This value represents how much approved load ERCOT believes is now operational



Key Takeaway: ERCOT has reviewed and approved studies for the interconnection of over 18,000 MW of Large Loads in the past two years of which approximately 1/3 have received Approval to Energize.

Transmission Planning Summary

- As of February 1, 2025, projects energized in 2025 total about \$386.8 million.
 - \$1.553 billion energized in 2023
 - \$2.435 billion energized in 2024
- As of February 28, 2025, ERCOT has endorsed transmission projects totaling \$596.9 million in 2025.
 - Total endorsed transmission projects in:
 - 2023 equaled \$3.231 billion
 - 2024 equaled \$3.785 billion
- As of February 1, 2025, projects in engineering, routing, licensing, and construction total about \$16.866 billion.



Key Takeaway: Transmission buildout and project endorsement continues at a record pace with \$3.785 billion endorsed in all of 2024.

Permian Basin Reliability Plan Update

- Equipment vendors and Transmission Service Providers discussed current supply chain considerations at the March 7, 2025 PUC Workshop; no major concerns were noted between the two import path voltage options (345-kV or 765-kV).
- Since it has been almost a year since original cost estimates were provided, ERCOT filed updated cost estimates with the PUC.
- PUC is scheduled to make an import path decision at its April 24th Open Meeting.

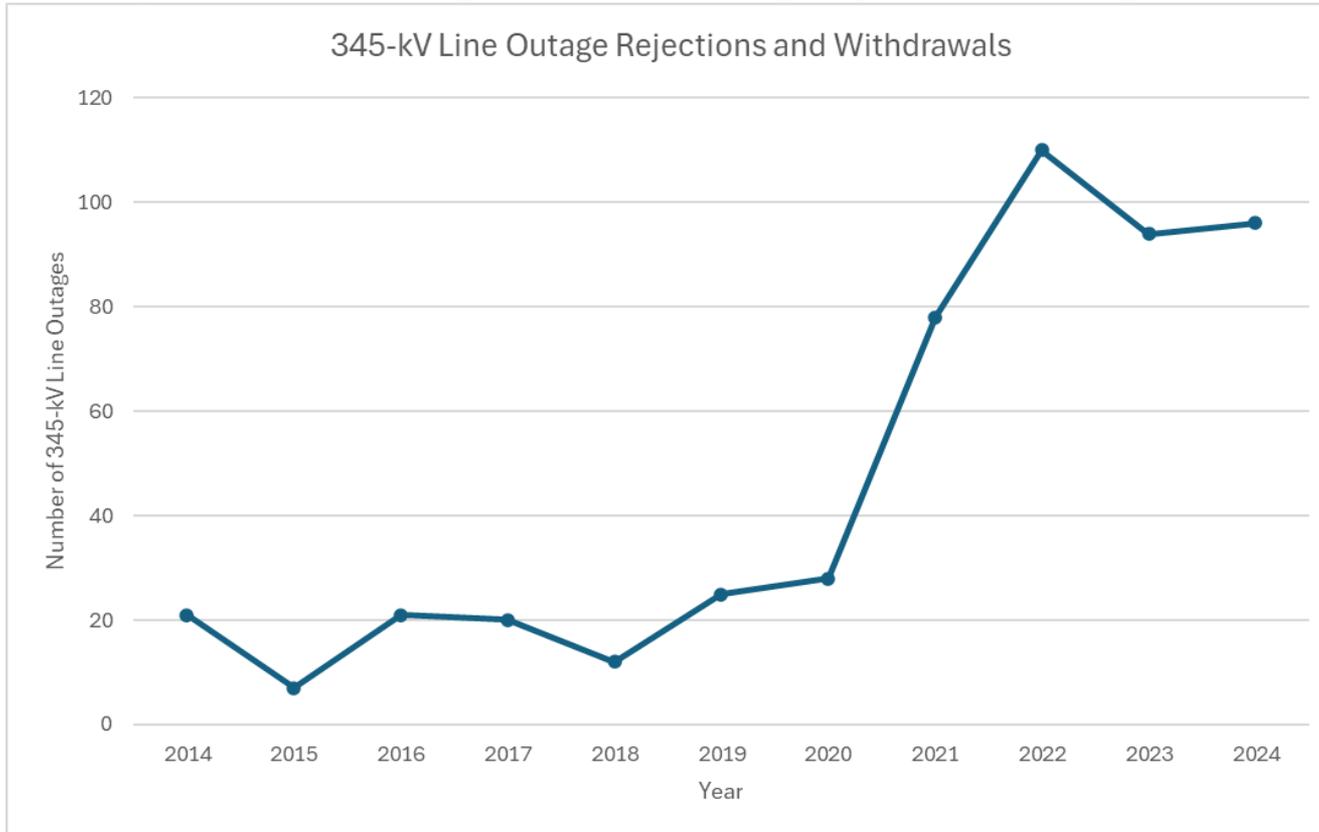
	345-KV Import Path Projects		765-kV Import Projects	
Cost Estimates (\$M)	Initial 345-kV Cost Estimates provided by TSPs in 2024	Updated 345-kV Cost Estimates provided by TSPs in 2025	Initial 765-kV Cost Estimates derived from MISO estimates	Updated 765-kV Cost Estimates provided by TSPs in 2025
Transmission (including ROW)	6,773	7,144	7,656	7,772
Substations (including transformers and shunt reactors)	921	1,133	1,404	2,342
Total	7,694	8,277	9,060	10,114
Change from 2024 Estimate	+7.6%		+11.6%	

Key Takeaway: Cost estimates for both voltage options have increased in the past year. TSP estimates for 765-kV construction are in line with the generic MISO cost estimates.



Permian Basin Reliability Plan Update

Chart reflects the number of requests for 345-kV line outages that were either rejected or withdrawn by ERCOT's Outage Coordination group after working with the TSP.



Key Takeaway: It has become increasingly difficult to support planned outages of 345-kV transmission lines. There is a need for additional transmission capacity to facilitate continued maintenance and outages to support state's growth.



Weatherization and Inspection – Winter Recap

- ERCOT has completed its fourth winter season inspection of Generation Resources and Transmission facilities.
- Winter weatherization inspection totals as well as since-program-inception totals are in the chart below:

	Generation Resources	TSP Facilities	Inspection Totals
December 2024	141	8	149
January 2025	106	63	169
February 2025	62	80	142
Total Winter 2024-2025 Inspections	309	151	460
Total Since Program Inception	2,222	1,140	3,362

- Winter Storms Cora (Jan 6-11), Enzo (Jan 19-23), and Kingston (Feb 19-22) had limited impact in the ERCOT territory with consistently low levels of outages and adequate reserve margins maintained throughout.

Key Takeaway: Winter weatherization inspection activity for the fourth season since program inception successfully completed.

Monthly Outlook on Resource Adequacy (MORA)

Probabilistic modeling results indicate a low risk of having to declare an Energy Emergency Alert (EEA) for April and May.

April

Hour Ending (CDT)	EMERGENCY LEVEL		
	Chance of Normal System Conditions	Chance of an Energy Emergency Alert	Chance of Ordering Controlled Outages
	Probability of CAFOR being above 3,000 MW	Probability of CAFOR being less than 2,500 MW	Probability of CAFOR being less than 1,500 MW
1 a.m.	100.00%	0.00%	0.00%
2 a.m.	100.00%	0.00%	0.00%
3 a.m.	100.00%	0.00%	0.00%
4 a.m.	100.00%	0.00%	0.00%
5 a.m.	100.00%	0.00%	0.00%
6 a.m.	100.00%	0.00%	0.00%
7 a.m.	100.00%	0.00%	0.00%
8 a.m.	99.98%	0.00%	0.00%
9 a.m.	99.99%	0.00%	0.00%
10 a.m.	100.00%	0.00%	0.00%
11 a.m.	100.00%	0.00%	0.00%
12 p.m.	100.00%	0.00%	0.00%
1 p.m.	100.00%	0.00%	0.00%
2 p.m.	100.00%	0.00%	0.00%
3 p.m.	99.99%	0.00%	0.00%
4 p.m.	99.98%	0.01%	0.00%
5 p.m.	99.96%	0.00%	0.00%
6 p.m.	99.71%	0.05%	0.03%
7 p.m.	97.05%	0.86%	0.42%
8 p.m.	98.70%	0.32%	0.13%
9 p.m.	98.68%	0.23%	0.12%
10 p.m.	99.00%	0.18%	0.07%
11 p.m.	99.96%	0.00%	0.00%
12 a.m.	100.00%	0.00%	0.00%

Note: Probabilities are not additive.

May

Hour Ending (CDT)	EMERGENCY LEVEL		
	Chance of Normal System Conditions	Chance of an Energy Emergency Alert	Chance of Ordering Controlled Outages
	Probability of CAFOR being above 3,000 MW	Probability of CAFOR being less than 2,500 MW	Probability of CAFOR being less than 1,500 MW
1 a.m.	100.00%	0.00%	0.00%
2 a.m.	100.00%	0.00%	0.00%
3 a.m.	100.00%	0.00%	0.00%
4 a.m.	100.00%	0.00%	0.00%
5 a.m.	100.00%	0.00%	0.00%
6 a.m.	100.00%	0.00%	0.00%
7 a.m.	100.00%	0.00%	0.00%
8 a.m.	100.00%	0.00%	0.00%
9 a.m.	100.00%	0.00%	0.00%
10 a.m.	100.00%	0.00%	0.00%
11 a.m.	100.00%	0.00%	0.00%
12 p.m.	100.00%	0.00%	0.00%
1 p.m.	100.00%	0.00%	0.00%
2 p.m.	100.00%	0.00%	0.00%
3 p.m.	100.00%	0.00%	0.00%
4 p.m.	100.00%	0.00%	0.00%
5 p.m.	100.00%	0.00%	0.00%
6 p.m.	100.00%	0.00%	0.00%
7 p.m.	100.00%	0.00%	0.00%
8 p.m.	99.94%	0.00%	0.00%
9 p.m.	98.37%	0.73%	0.47%
10 p.m.	98.54%	0.67%	0.47%
11 p.m.	99.57%	0.12%	0.06%
12 a.m.	99.98%	0.00%	0.00%

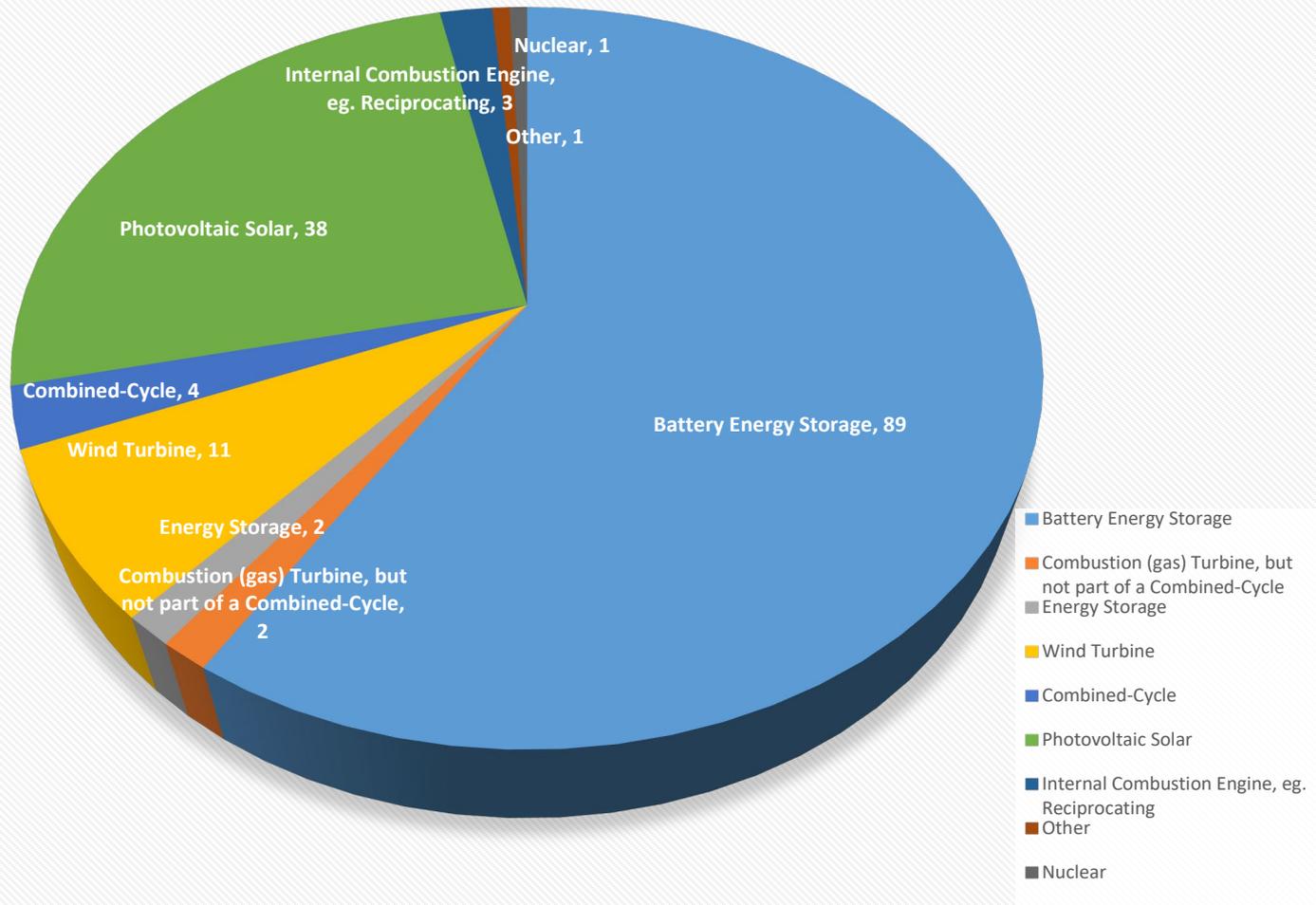
Note: Probabilities are not additive.



Appendix

Generation Interconnection Activity (as of March 19, 2025)

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 March 19, 2025)

Key Takeaway: Solar and Battery Energy Storage represent the majority of current MWs within the interconnection queue, and most current projects are within the Full Interconnection Study (FIS) phase, which is where critical reliability analysis is completed.

