



Item 8.1: System Planning and Weatherization Update

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Reliability and Markets Committee Meeting

ERCOT Public

August 19, 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 Weatherization Inspection Program remains on track to meet PUC requirements with summer 2024 inspections ongoing.
- ERCOT timely completed the development of the PUC directed Permian Basin Reliability Plan which is now before the Commission for consideration.
- Forecasted load growth coupled with the evolution of generation types and locations have led to alternative infrastructure consideration to reliably and efficiently facilitate large power transfer across the system.
- While Solar and Battery Energy Storage continue to account for the vast percentage of generation capacity requesting new interconnection studies, approximately 6 GW of new gas generation requests have entered the interconnection queue since May 31, 2024.
- As ERCOT is tracking over 49 GW of Large Load interconnection requests, work with stakeholders continues to establish new interconnection and modeling requirements for large loads.
- ERCOT continues working with the PUC to make progress on the Reliability Standard, Value of Lost Load and Cost of New Entry studies.



Weatherization and Inspection – Summer Update

- Summer 2024 Weatherization inspections are ongoing with high Weather Emergency Preparedness compliance levels.
- ERCOT anticipates performing at least 300 generation resource and 300 Transmission Service Provider (TSP) facility inspections this summer.
- Anticipate all existing and new resources that were fully commissioned prior to the end of Q1-2024 will have been inspected by the end of the summer season.

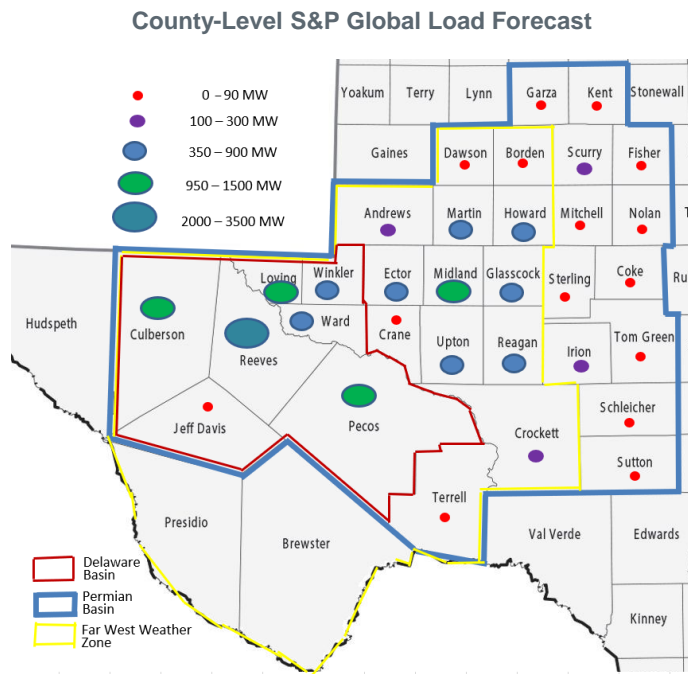
Summer 2024 Weatherization Inspections

Month	Resources	TSP	Total
June	73	74	147
July	152	108	260
Aug & Sept	In Process	In Process	
Total	225	182	407

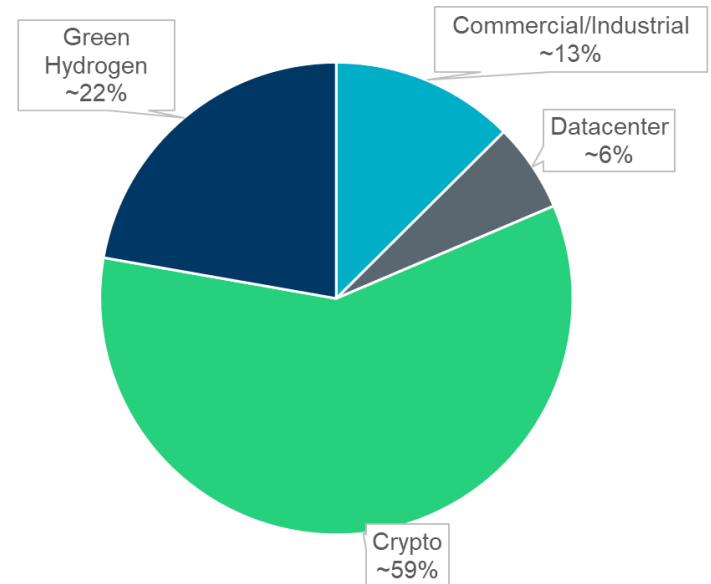
Key Takeaway: The Weatherization Inspection Program remains on track to PUC rule requirements as summer 2024 continues.

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 is studying a total Permian Basin Load for 2030 of 23,659 MW (11,964 MW oil & gas and 11,695 MW additional Load).
- ERCOT evaluated the transmission facilities needed to serve the Permian Basin region based on 2030 and 2038 load forecasts and filed the Permian Basin Reliability Plan to PUC on July 25, 2024.



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



Permian Basin Reliability Plan – Update

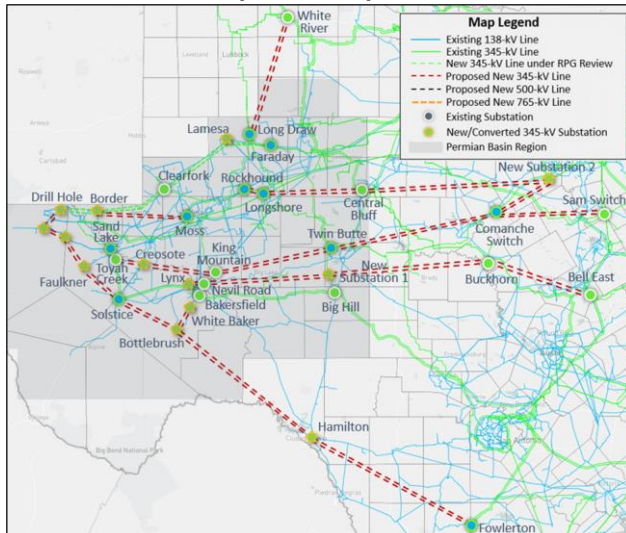
- The Permian Basin Reliability Plan includes the local transmission projects to interconnect and serve the projected load as well as additional transmission capacity needed to import power to meet the forecasted demand in the Permian Basin region.
- The local transmission projects are common projects needed to serve 2030 and 2038 Permian Region demand that is estimated to cost \$4.02 billion
- Summary of common local transmission projects:
 - Add approximately 174 miles of new 345-kV double-circuit transmission lines
 - Upgrade approximately 43 miles of existing 345-kV transmission lines and add second circuits
 - Upgrade approximately 98 miles of existing 345-kV double-circuit transmission lines
 - Add 8 new 345-kV/138-kV substations with 17 new 345-kV/138-kV transformers
 - Add approximately 186 miles of new 138-kV transmission lines
 - Upgrade approximately 221 miles of existing 138-kV transmission lines
 - Convert approximately 230 miles of existing 69-kV transmission lines to 138-kV
 - Add approximately 3,600 MVAR worth of reactive power devices

Key Takeaway: The Permian Basin Reliability Plan identified significant local transmission projects required to serve the forecasted load irrespective of the import path option chosen.

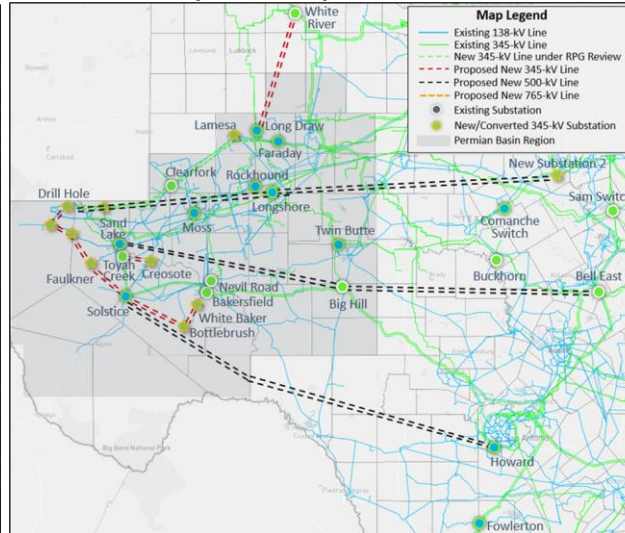
Permian Basin Reliability Plan – Update

- The plan includes three mutually exclusive import path options needed to transfer power into the Permian Basin region to serve the projected demand.

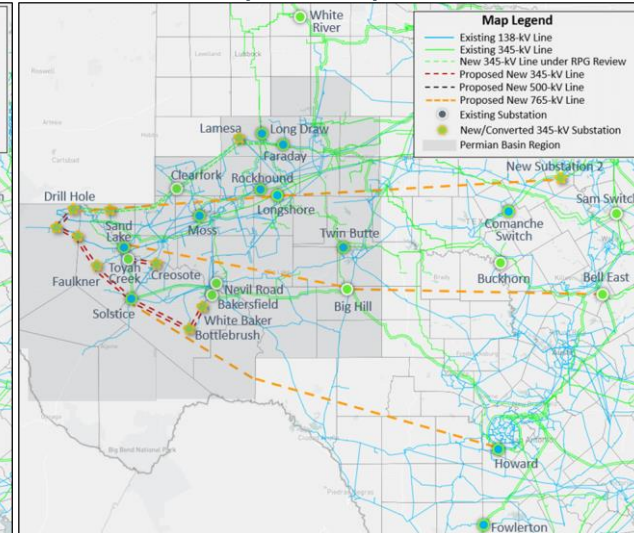
345 kV Import Path option for 2038



500 kV Import Path option for 2038



765 kV Import Path option for 2038



Summary of the Cost Estimates (\$Billion)

	2038		
	345-kV Option	500-kV Option	765-KV Option
Common Local Upgrades	4.02	4.02	4.02
Import Paths	7.69	10.61	9.06
Incremental Local Upgrades	1.23	0.69	0.69
Total	12.95	15.32	13.77

- The total new Right of Way for the import paths range from approximately 1676 miles (345 kV option) to 1255 miles (765 kV option).



Key Takeaway: The Permian Basin Reliability Plan identified significant local and regional transmission projects to serve the forecasted load.

Permian Basin Reliability Plan – Update

- Next Steps:
 - Opportunity for stakeholder feedback to the Commission via comments and a workshop on August 22
 - Commission review and consideration of the Permian Basin Reliability Plan
 - Applicable TSPs file the CCN applications at the Commission
- Special thanks to the ERCOT Planning, TSP, Consumer and PUC staff for the extraordinary work done to timely complete the plan.



Key Takeaway: The Permian Basin Reliability Plan is before the Commission for consideration and approval.

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.
- ERCOT is considering new EHV transmission lines (765 kV or 500 kV double circuit) as an alternative to only adding new 345 kV in the 2024 RTP. EHV additions are an effective option for moving power over long distances, reducing congestion, increasing grid stability, and addressing the uncertainty of future generation changes and location.
- EHV import paths transmission upgrades proposed for the Permian Basin region for 2038 is a subset of the initial holistic transmission expansion being evaluated in the 2024
- No later than early September, ERCOT will provide initial draft of the RTP including the EHV backbone options.
- The final 2024 RTP plan will be completed no later than December 2024.

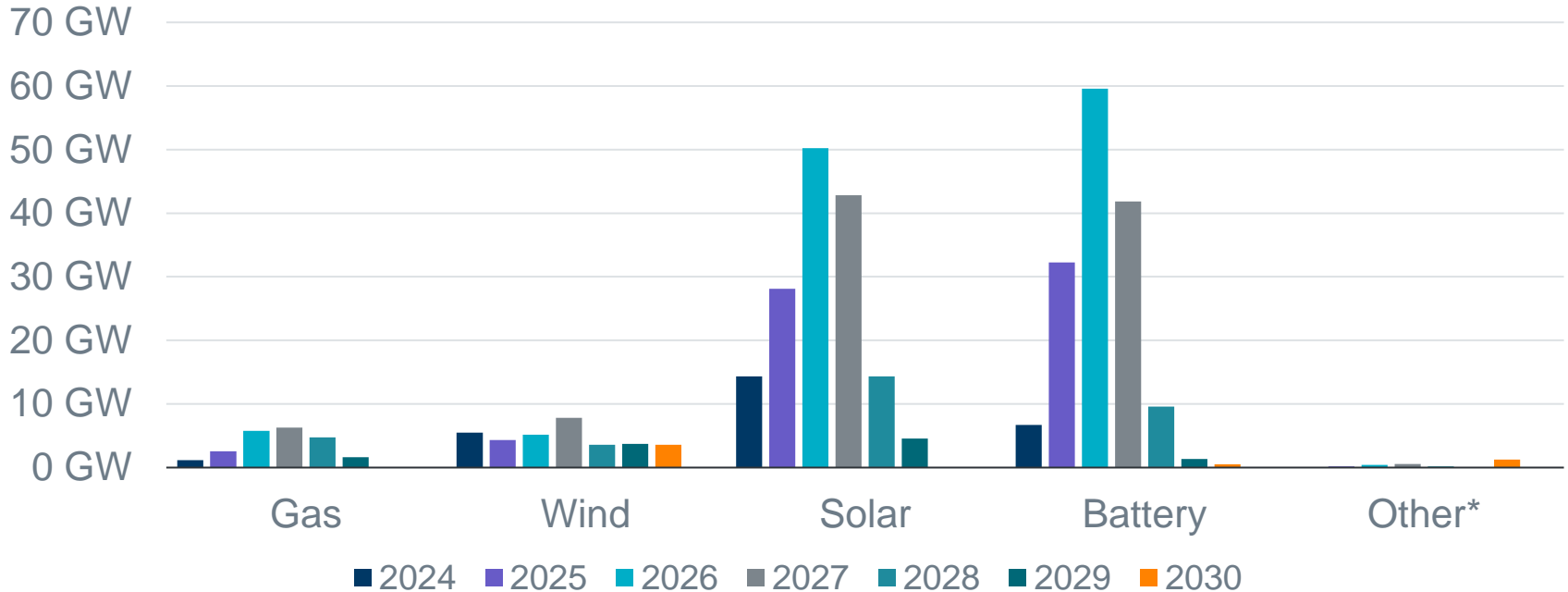


Key Takeaway: Forecasted load growth coupled with the evolution of generation types and locations have led to EHV infrastructure consideration to reliably and efficiently facilitate large power transfer across the system.

Generation Interconnection Requests

1,858 active generation interconnection requests totaling 365 GW as of July 31, 2024
(Solar 154 GW, Wind 34 GW, Gas 22 GW, and Battery 152 GW)

(Excludes capacity associated with projects designated as Inactive per Planning Guide Section 5.7.6)



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>

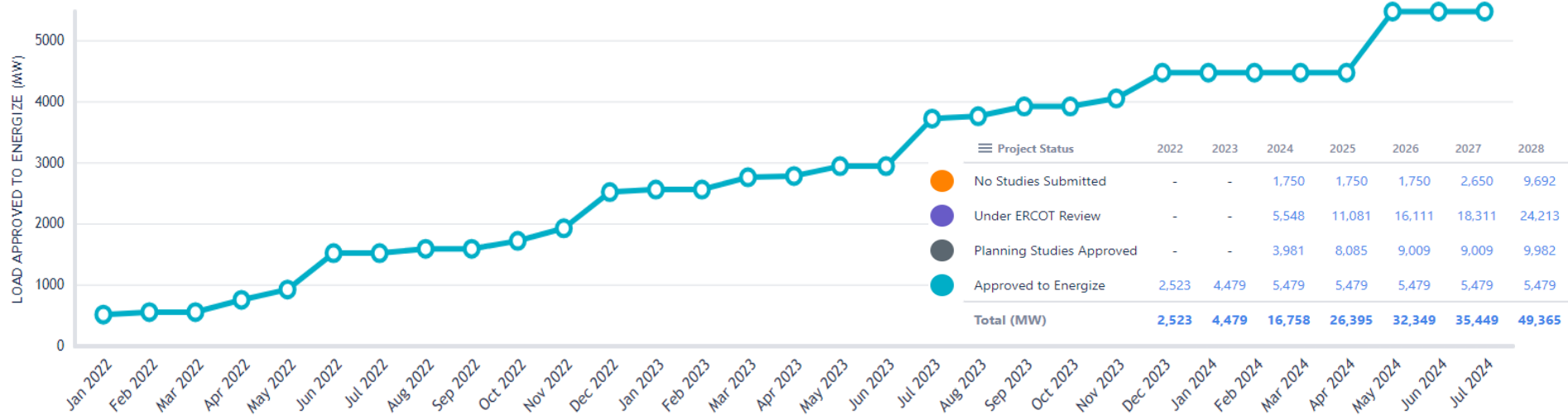
* Other includes petroleum coke (pet coke), hydroelectric, fuel oil, geothermal energy, other miscellaneous fuels reported by developers, and fuel cells that use fuels other than natural gas.

Key Takeaway: Approximately 6 GW of new gas generation requests have entered the interconnection queue since May 31, 2024.



Large Load Integration Overview

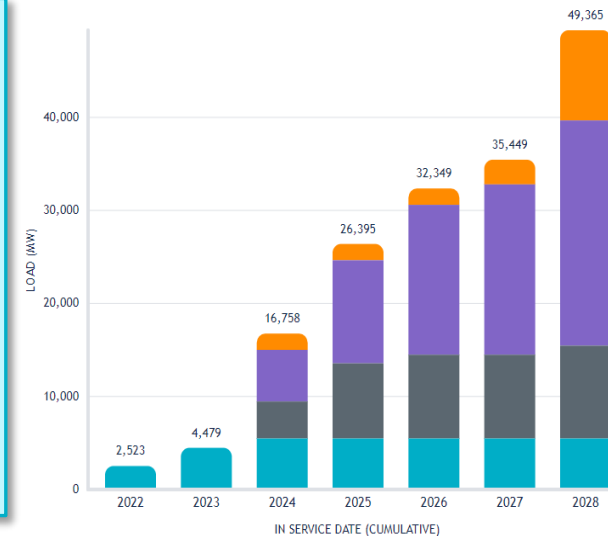
Large Loads Approved to Energize - Growth Since 2022



Key Takeaways

- NPRR1234 and PGRR115 continue to be discussed in the ERCOT stakeholder process to establish new interconnection and modeling requirements for large loads.
- 5,479 MW of Large Load have been approved to energize in the past 2 years.
 - Of these, 3,065 MW is believed to be operational
 - Remaining 2,414 MW may energize at any time without additional approval
- The amount of Large Load connected to the ERCOT grid is projected to continue growing rapidly.

Actual and Projected Large Load Growth 2022-2028



Monthly Outlook on Resource Adequacy (MORA)

September and October have a low risk of emergency conditions during the evening hours; October risk is higher than September mainly due to increasing expected unplanned and planned thermal unit outages.

Sept

Hour Ending (CDT)	Chance of Normal System Conditions	EMERGENCY LEVEL	
		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.	99.99%	0.00%	0.00%
5 p.m.	99.99%	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.	99.50%	0.02%	0.00%
9 p.m.	96.76%	0.68%	0.27%
10 p.m.	99.40%	0.07%	0.02%
11 p.m.	99.94%	0.00%	0.00%
12 a.m.	100.00%	0.00%	0.00%

Note: Probabilities are not additive.

Oct

Hour Ending (CDT)	Chance of Normal System Conditions	EMERGENCY LEVEL	
		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.	99.99%	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.	99.95%	0.00%	0.00%
8 a.m.	99.86%	0.03%	0.00%
9 a.m.	99.92%	0.04%	0.02%
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.	99.98%	0.01%	0.00%
4 p.m.	99.88%	0.05%	0.03%
5 p.m.	99.53%	0.18%	0.12%
6 p.m.	99.96%	0.00%	0.00%
7 p.m.	93.74%	2.86%	1.88%
8 p.m.	95.11%	1.99%	1.42%
9 p.m.	89.29%	5.74%	4.08%
10 p.m.	99.15%	0.23%	0.13%
11 p.m.	99.86%	0.04%	0.03%
12 a.m.	99.96%	0.01%	0.00%

Note: Probabilities are not additive.



Reliability Standard, VOLL, and CONE Study Updates

- Reliability Standard:
 - The Commission released its reliability standard Proposal for Publication on June 13; stakeholder comments were due July 15
 - Commission reliability standard approval is expected at the August 31 Open Meeting
- Value of Lost Load (VOLL):
 - ERCOT expects to receive the draft VOLL study report in early August
- Cost of New Entry (CONE):
 - ERCOT filed the CONE study report and CONE development model with the Commission on July 18
 - At the July 25 Open Meeting, the Commission agreed on a CONE of \$140/kW-year as proposed by Commission staff should be used for planning purposes; the value reflects a frame combustion turbine technology
 - A CONE review will be conducted in 2026 and then thereafter on a five-year cadence

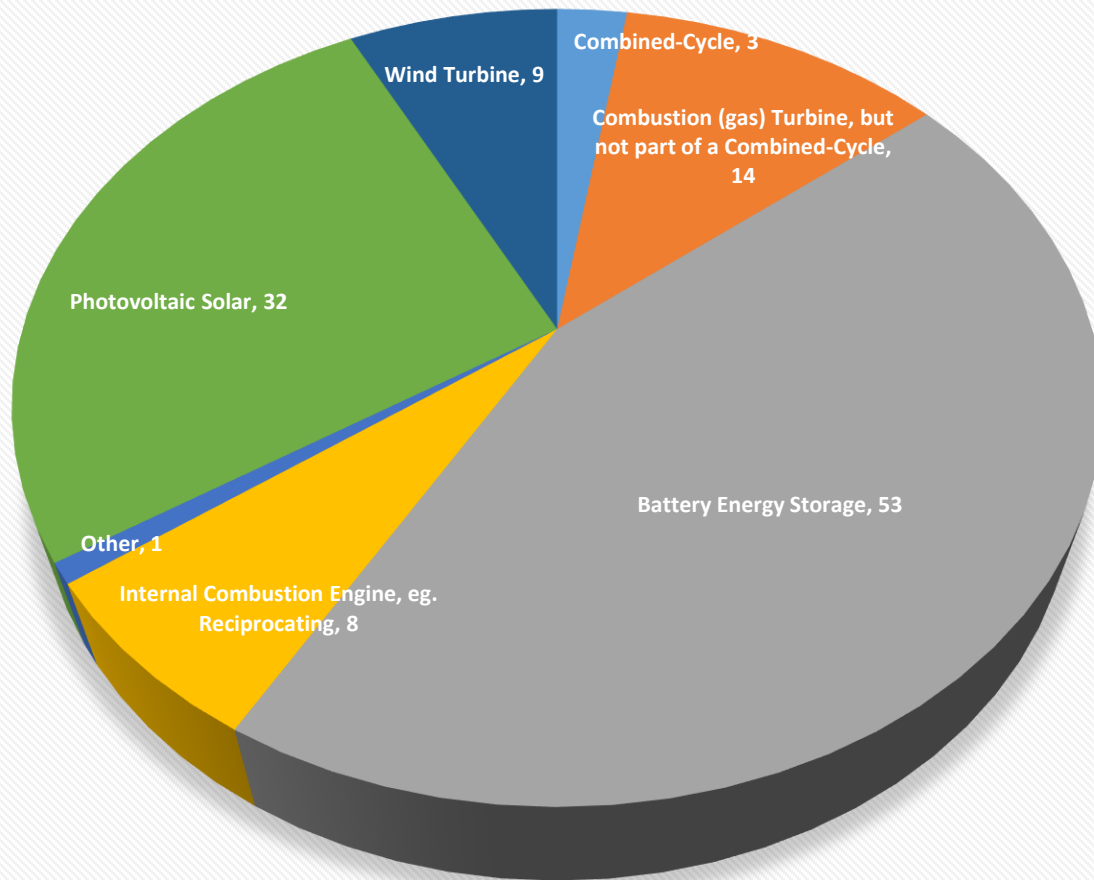
Key Takeaways:

- A reliability standard is expected to be finalized by the end of August.
- A CONE of \$140/kW-year was established for planning purposes.

Appendix

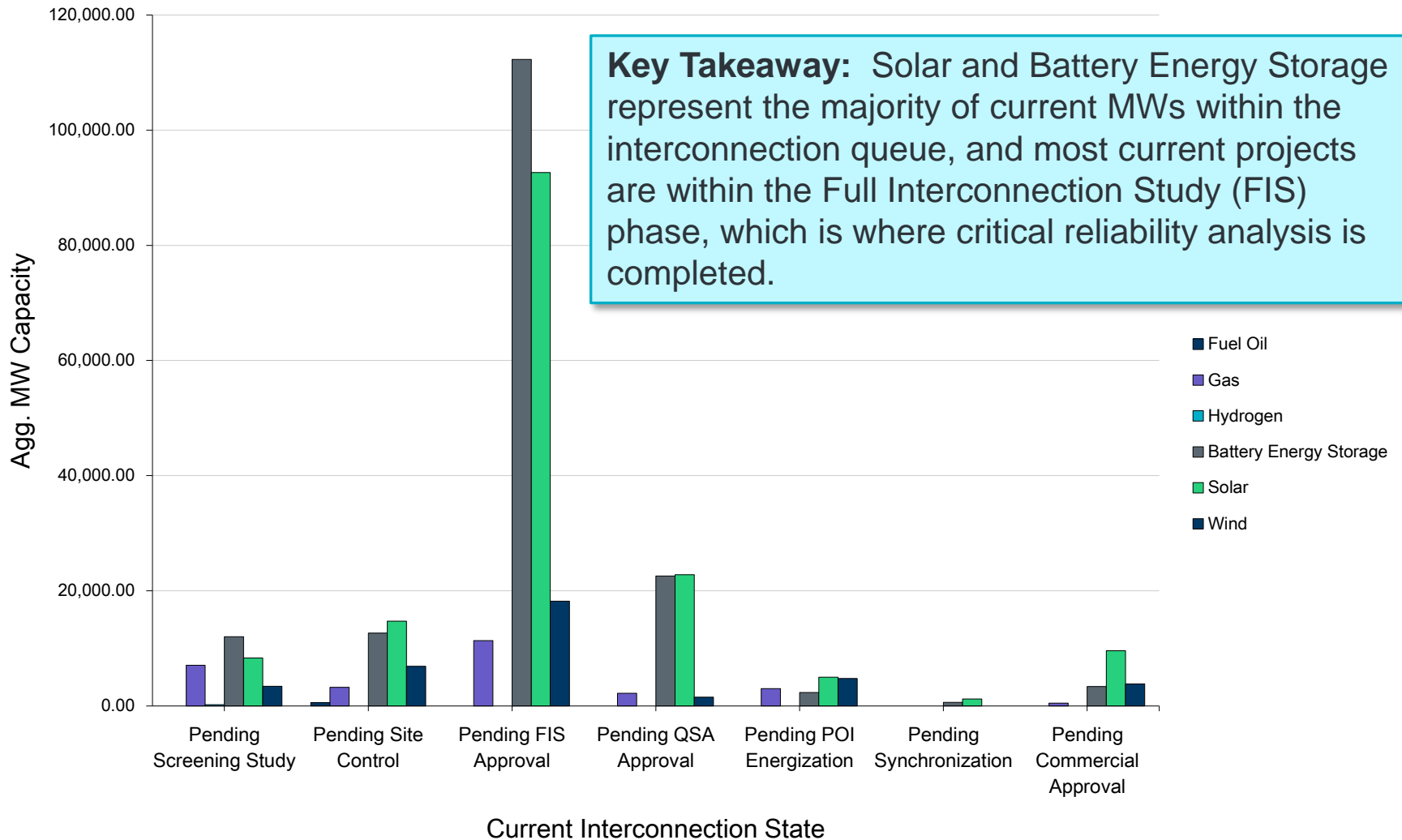
Generation Interconnection Activity (as of July 29, 2024)

Applications Received in the last 60 days by Fuel



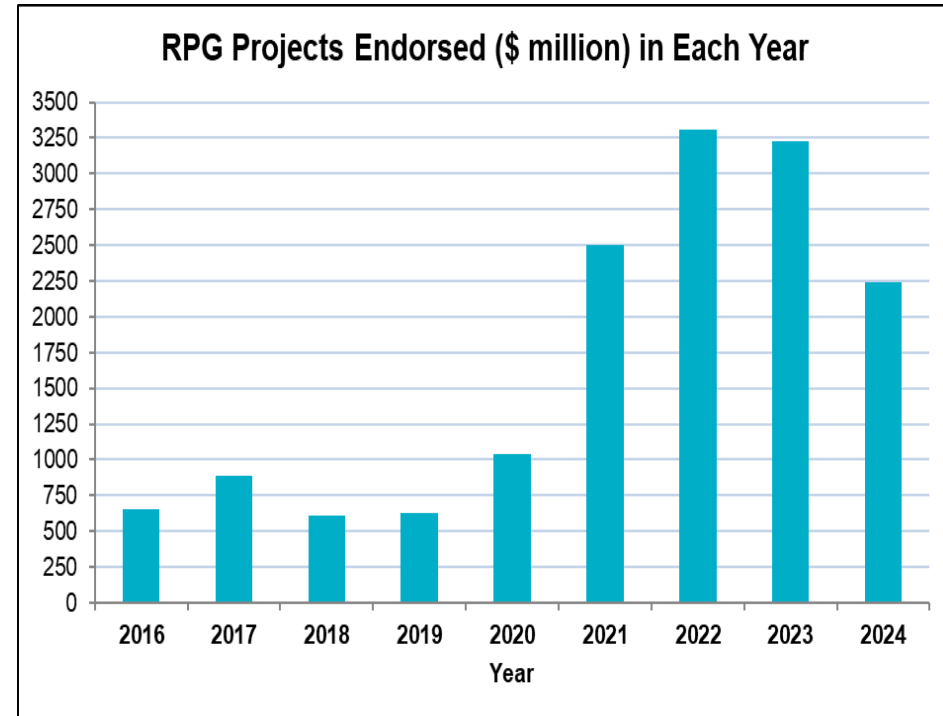
Key Takeaway: Battery Energy Storage continues to be the most active generation type requesting interconnection studies.

Generation Resource Project MWs by Fuel Type and Interconnection Stage (as of July 29, 2024)



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 June 30, 2024, ERCOT has endorsed transmission projects totaling \$2.245 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: Both the number of transmission projects being energized as well as seeking endorsement continue to increase.