Item 7.1: System Planning and Weatherization Update – REVISED

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Reliability and Markets Committee Meeting

ERCOT Public
December 19, 2022

Revised 12/14/2022 and 12/16/2022 to correct wording on slide 12

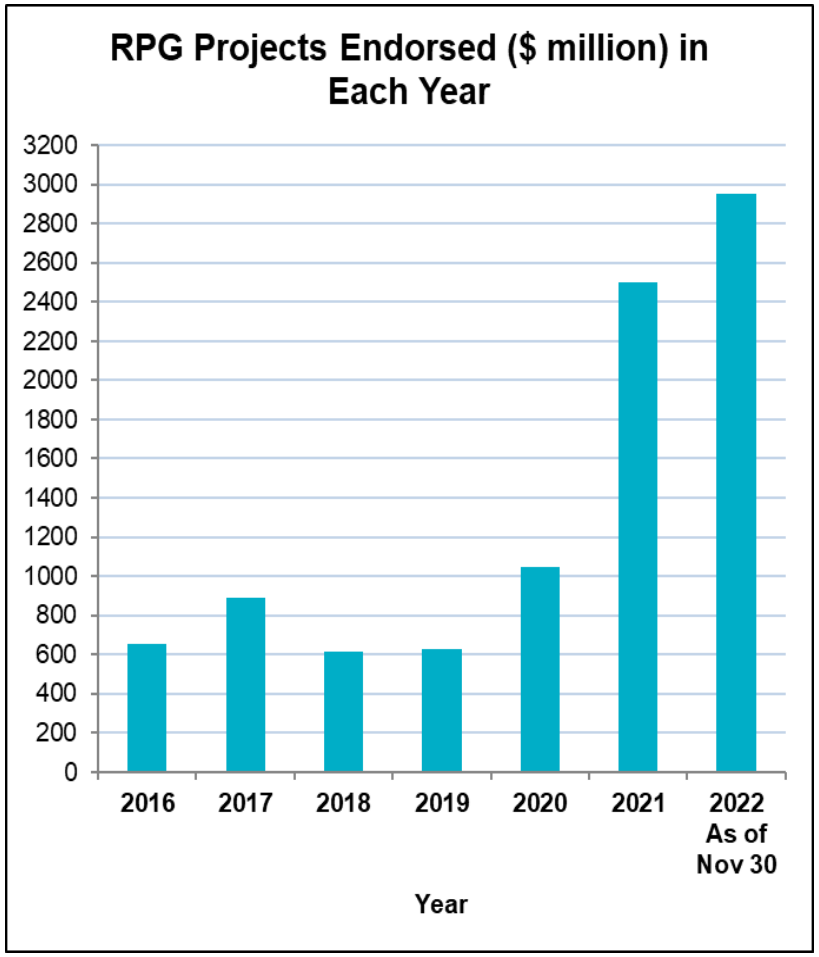
R&M Planning and Weatherization Report

This report will include information summaries that cover:

- Transmission Planning
- Modeling
- Resource Adequacy
- Generation Interconnection
- Weatherization
- Appendix
  - Highlights applicable to this update

Transmission Planning Summary

- As of October 1, 2022, projects energized in 2022 total about $1.198 billion.
  - $2.576 billion energized in all of 2021
- As of November 30, 2022, ERCOT has endorsed transmission projects totaling $2.957 billion.
  - Total endorsed transmission projects in 2021 equaled $2.498 billion
  - This year's work includes more than 30 projects
  - Highest amount in several years
- As of October 1, 2022, projects in engineering, routing, licensing, and construction total about $11.093 billion.

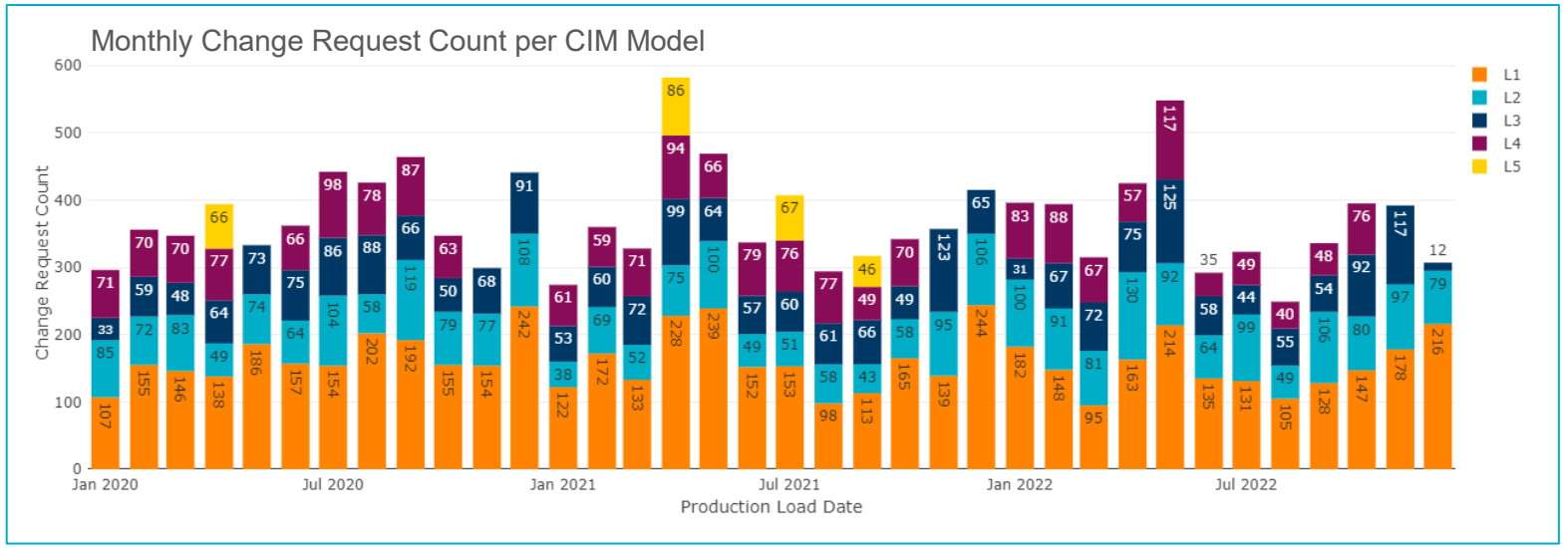


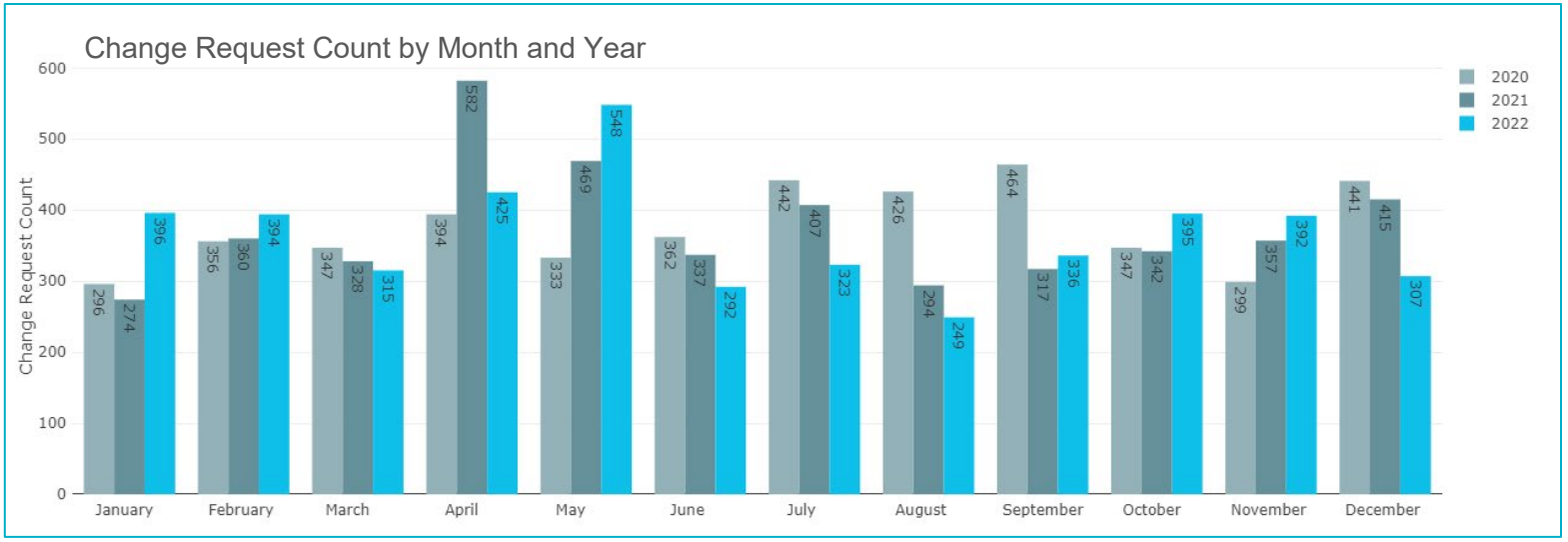
Elements Submitted for Operational Modeling (Monthly)

November 2022	December 2022	Rolling Average *Previous 12 Months*
Resources – 18 • 0 Thermal • 7 Wind • 9 Solar • 2 ESR	Resources – 12 • 1 Thermal • 0 Wind • 10 Solar • 1 ESR	Resources – 10 • 1 Thermal • 2 Wind • 4 Solar • 3 ESRs
Transmission • 26 Transformers • 251 Breakers • 92 Lines	Transmission • 2 Transformers • 10 Breakers • -4 Lines*	Transmission • 12 Transformers • 71 Breakers • 18 Lines
Contingencies • 178	Contingencies • 70	Contingencies • 65

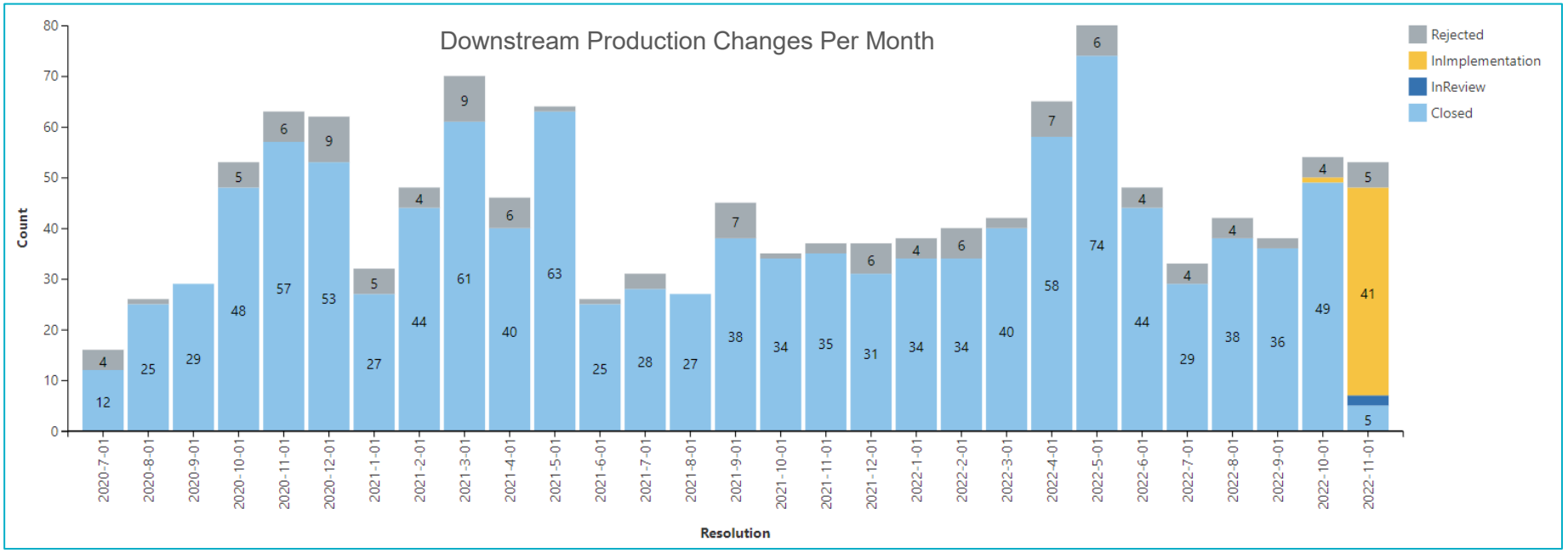
** Reduction of lines often associated with before/after modeling of new projects*

Changes Submitted for Operational Modeling





Notice for Operational Model Changes



Winter 2022-23 Seasonal Assessment of Resource Adequacy (SARA)

		Base & Moderate Risk Scenarios				Extreme Risk Scenarios		
Load and Resources	**Total Installed Capacity**	**Base**	**High Peak Load**	**High Unplanned Thermal Outages**	**Low Wind**	**Extreme Peak Load**	**High Peak Load / High Unplanned Thermal Outages (2)**	**High Peak Load / Extreme Unplanned Thermal Outages (2) / Extreme Low Wind**
Peak Demand		67,398	77,375	67,398	67,398	80,075	77,375	77,375
Resources, Winter-rated Capacity								
Thermal and hydro	74,835	60,354	60,354	56,905	60,354	61,182	57,733	55,540
Capacity from Private Use Networks (1)	9,575	3,348	3,348	3,348	3,348	3,348	3,348	3,348
Resources with co-located LFLs	2,996	1,715	1,715	1,715	1,715	1,715	1,715	1,715
Wind	35,344	8,736	8,736	8,736	5,085	8,736	8,736	640
Solar	14,062	1,530	1,530	1,530	1,530	1,530	1,530	1,530
Storage	2,787	947	947	947	947	947	947	947
Non-Synchronous Ties	1,220	720	720	720	720	720	720	720
Total Resources	140,819	77,350	77,350	73,901	73,699	78,178	74,729	64,440
Emergency Resources		0	3,701	0	0	3,701	3,701	3,701
Capacity Available for Operating Reserves (Less than 1,000 MW indicates EEA3 load shed risk)		9,952	3,676	6,503	6,301	1,804	1,055	(9,234)

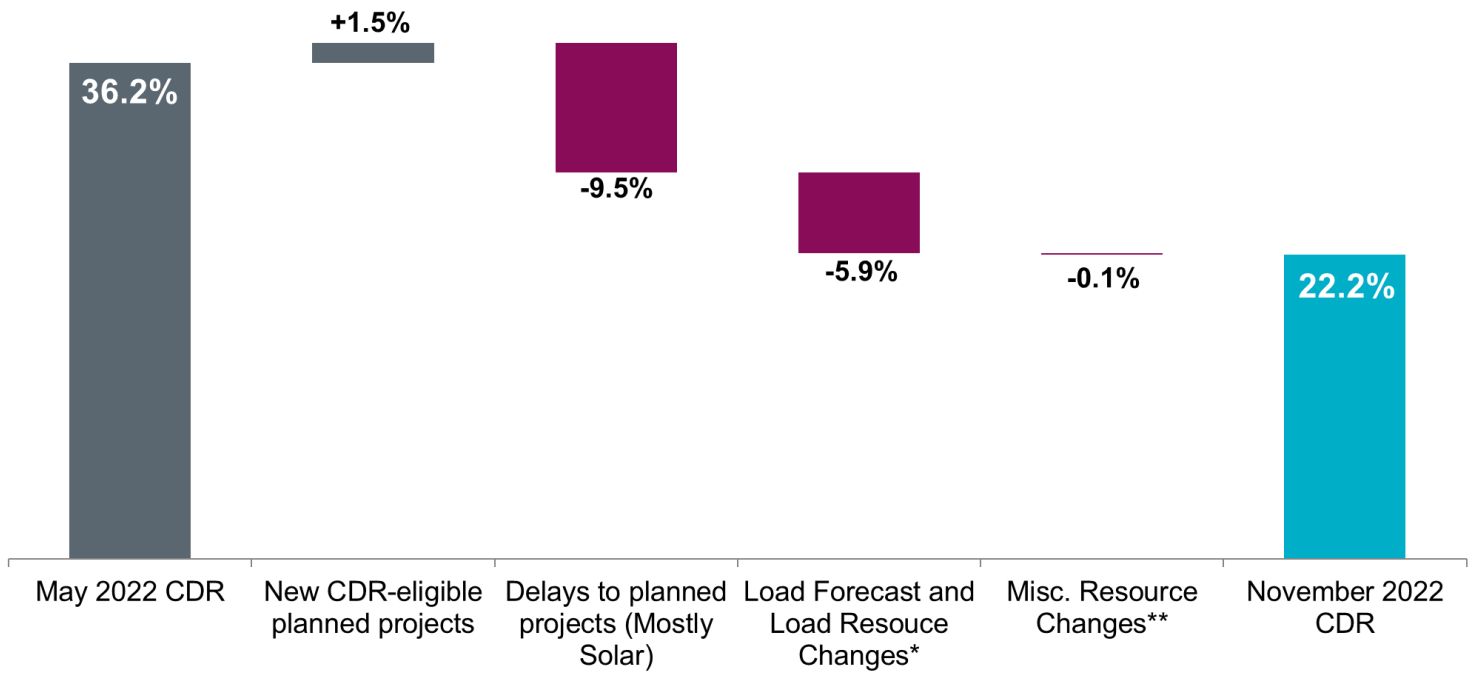
(1) Reflects only the installed capacity used to deliver power to the ERCOT grid.
(2) These scenarios assume resheduling of planned thermal outages to maximize unit availability during a severe weather event.

Main changes relative to last year's winter SARA:

- Increased peak load forecast, ~5.4 GW
- Increased operational solar, ~0.8 GW winter capacity contribution
- Increased EEA resources available during reserve scarcity conditions, ~0.9 GW from distribution voltage reduction and curtailable Large Flexible Loads (LFLs)

Summer 2023 Reserve Margin, Component Changes

May 2022 CDR to November 2022 CDR



Notes:

*Load Forecast Adjustments Update: Peak Load Forecast (+2,882 MW), Load Resources for Responsive Reserves (-681 MW), rooftop solar PV forecast (-97 MW), Emergency Response Service (-52)

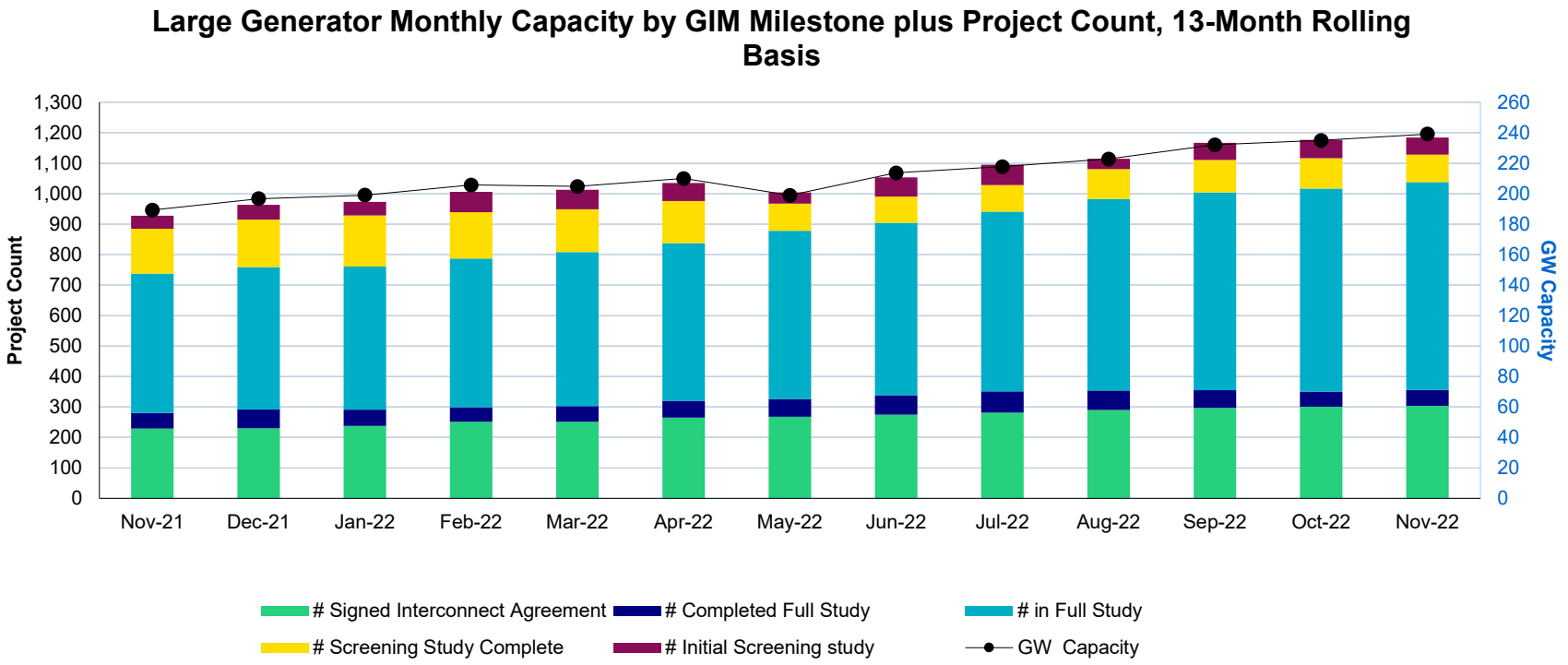
**Misc. Resource Changes (rating changes to operational and planned resources, planned project cancelations, project movement between planned and inactive status, units moved to indefinite mothball status, capacity contribution updates for hydro, PUNs, wind and solar to include summer 2022 data, change in reporting co-located Large Flexible Loads)

(Appendix)

Proposed Capacity Demand and Reserve (CDR) Report Modifications (subject to PUCT approval)

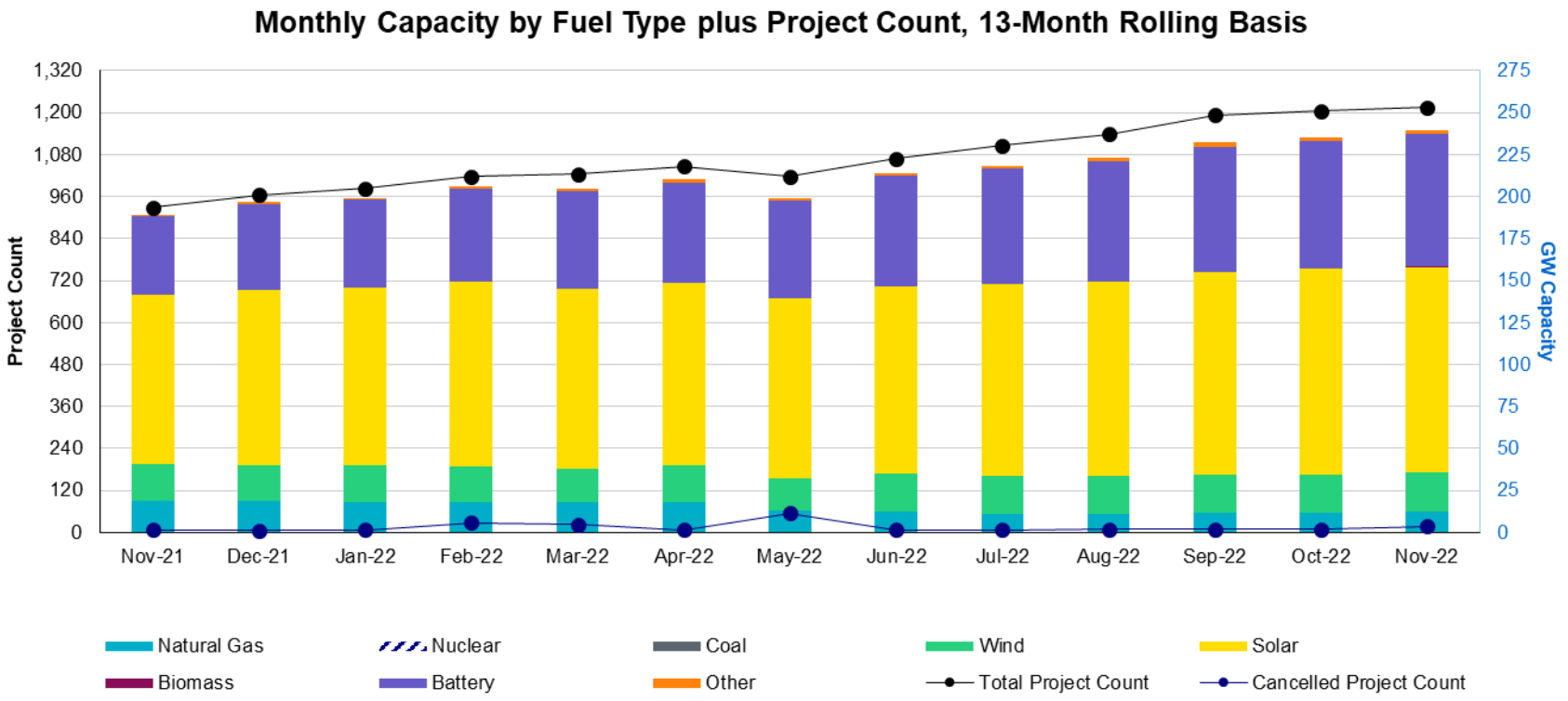
- Increase release frequency from twice-a-year to quarterly
- Provide forecast information for multiple hours of the peak demand day
- Expand the CDR to include additional resource adequacy risk measures, such as expected energy (MWh) shortages and indicators of the ability of dispatchable resources to cover extreme renewable generation ramps
- Switch to the Effective Load Carrying Capability (ELCC) method to determine the expected capacity contribution of wind, solar and energy storage during the hours with the highest capacity shortage risk
- Include a derating for thermal resources to account for historical average unplanned outages
- Include Reserve Margin scenarios based on alternative peak demand and resource capacity assumptions
- Incorporate reporting of Large Loads
- Reconstitute the CDR into a main report with a link to a dynamic dashboard with data visualization tools and access to supporting data tables

Future Generation Interconnection Projects by Interconnection Status



- Number of projects is almost 1200.
  - December 12, 2022, release of the Resource Integration and Ongoing Operations Project (RIOO) which provides a user interface for developers and owners to coordinate their resource data with ERCOT. *(Appendix)*

Future Generation Interconnection Projects by Fuel Type



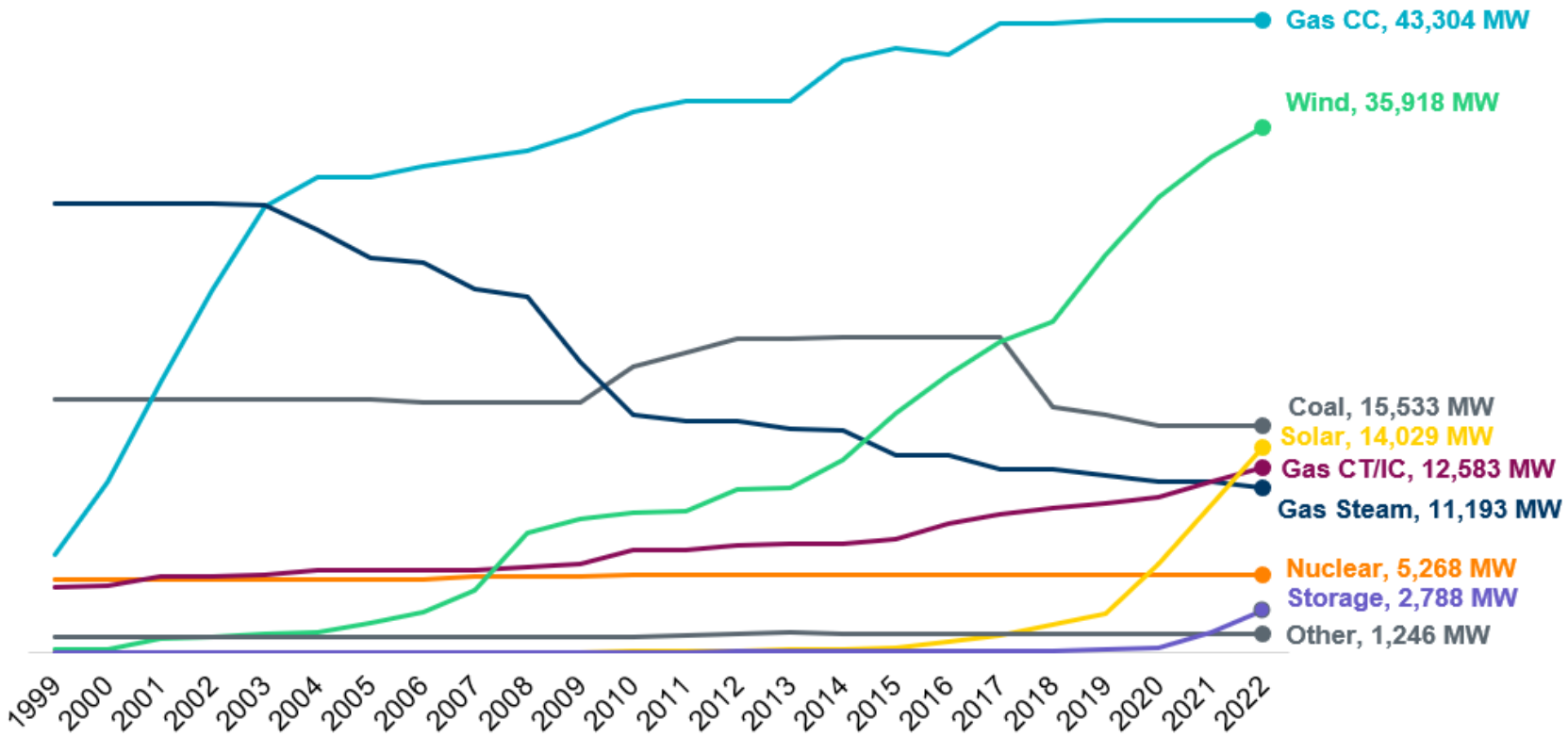
- Largest increases continue to be in Solar *(Appendix)* and Batteries *(Appendix)*

Weatherization and Inspection Update December 2022

- ERCOT received an on-time Winter Readiness Declaration from 95% of the facilities required to submit the declarations.
- Weatherization inspections for winter 2022/23 are currently underway utilizing ERCOT's team of 8+ inspectors supplemented with 2 contracting firms.
- December's inspection focus will include:
  - Units that are new to the grid and have not previously been inspected
  - Units that are under a 2023/23 Blackstart Contract
  - Units that have a firm fuel contract
  - Units that have had cold-weather performance issues
  - Transmission facility inspections will also be occurring
- The ERCOT goal by the end of February 2023 is to have half of the generating resources (over 500 units) inspected for winter readiness along with 40 transmission facilities.
  - Roughly 200 inspections completed to date
  - The PUCT rule requires each generation resource and 10% of transmission substations or switchyards be inspected at least once every 3 years.

Appendix

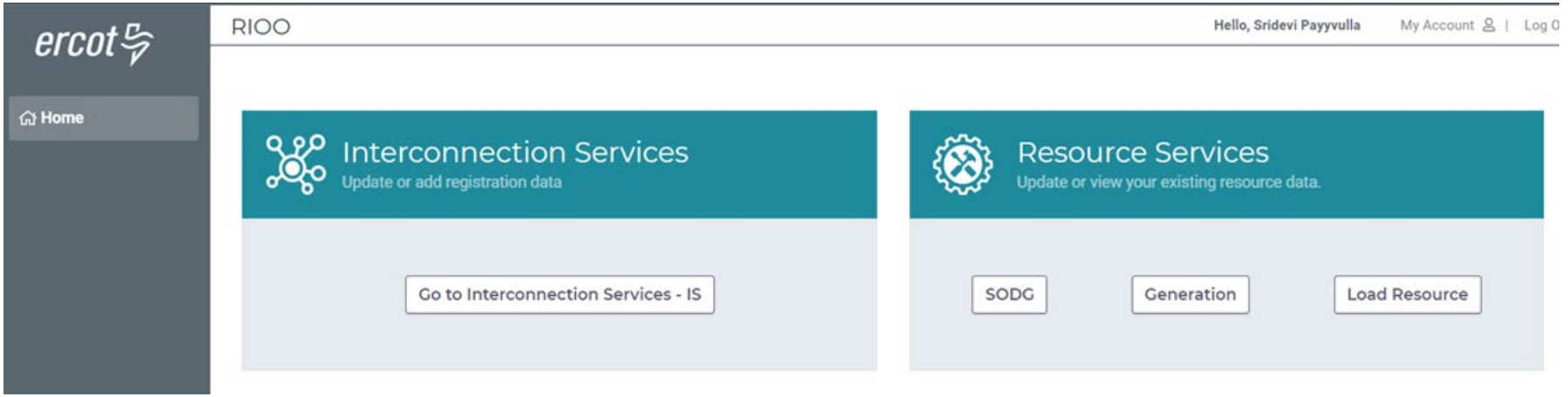
ERCOT Installed Generation Capacity Mix Trends

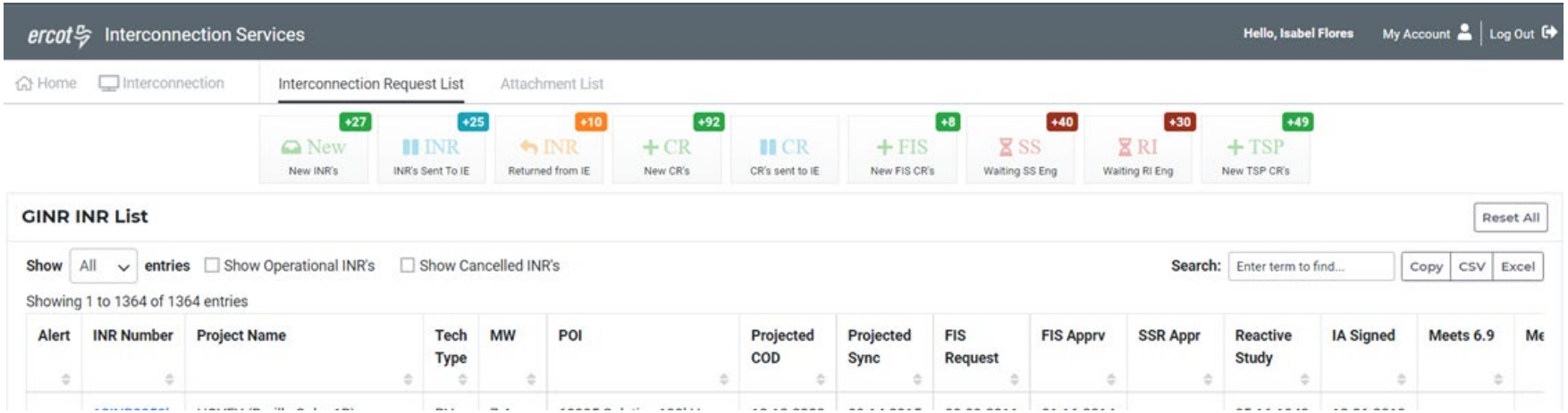


Disclaimer: This chart is intended to capture annual resource mix trends on an installed capacity basis and is not intended to represent the capacity expected to be available for upcoming seasonal peak conditions.

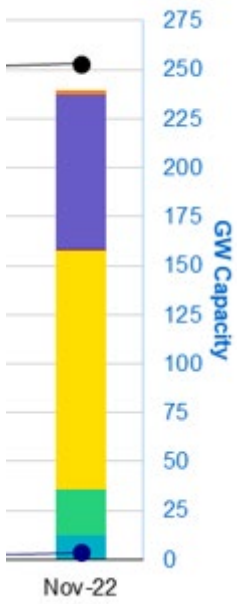
Notes: Capacity totals are based on the Installed Capacity Ratings for generating units. "Other" comprises of Biomass, Hydro, and Diesel.
- Planned generation projects are added to installed capacity after approval for synchronization to ERCOT Grid.
- Totals include Private-Use Networks (PUNs), Distribution Generation Resources (DGRs), Settlement-Only Distribution Generators (SODGs), Unavailable Switchable Capacity, Extended Outage Units, and Mothballed Units.
- Data snapshot from 11/30/22, the chart is updated by the ERCOT Resource Adequacy Department

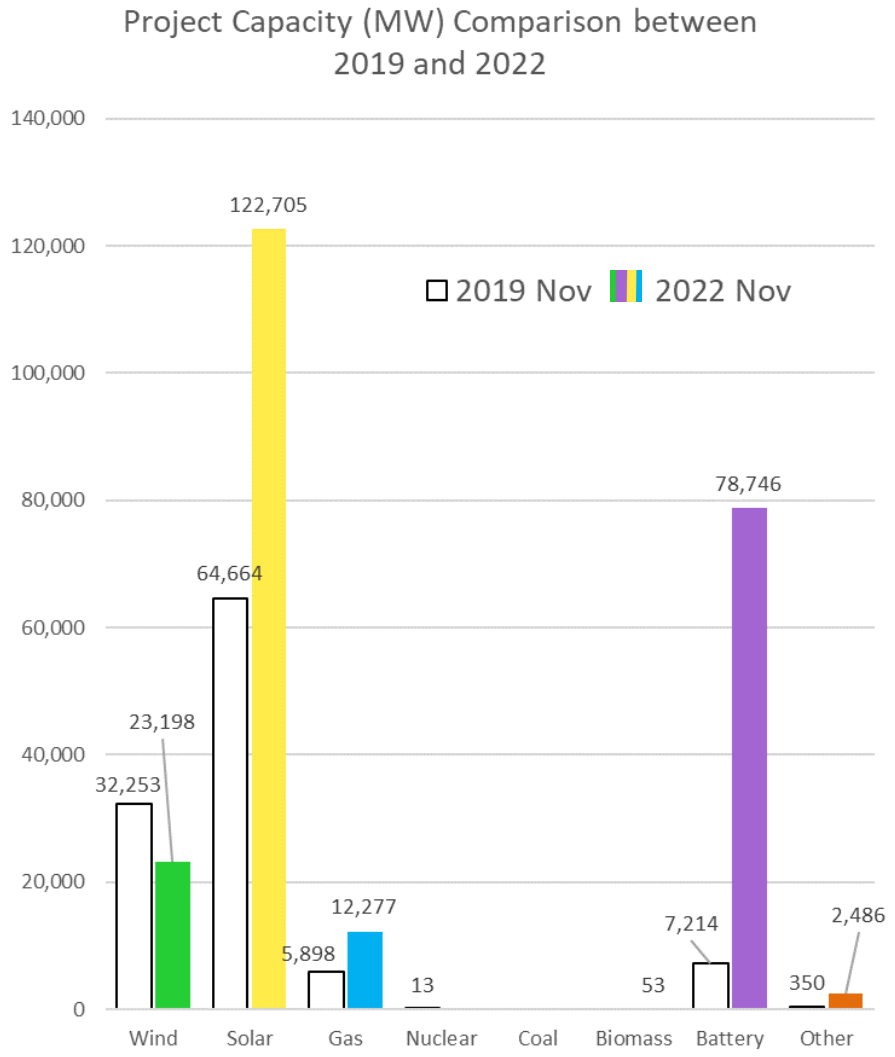
Resource Integration and Ongoing Operations (RIOO)





Future Generation Interconnection – 2019 vs 2022

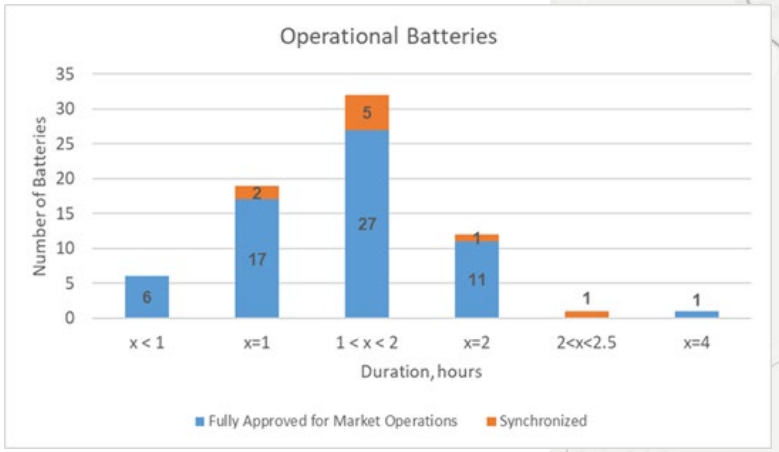


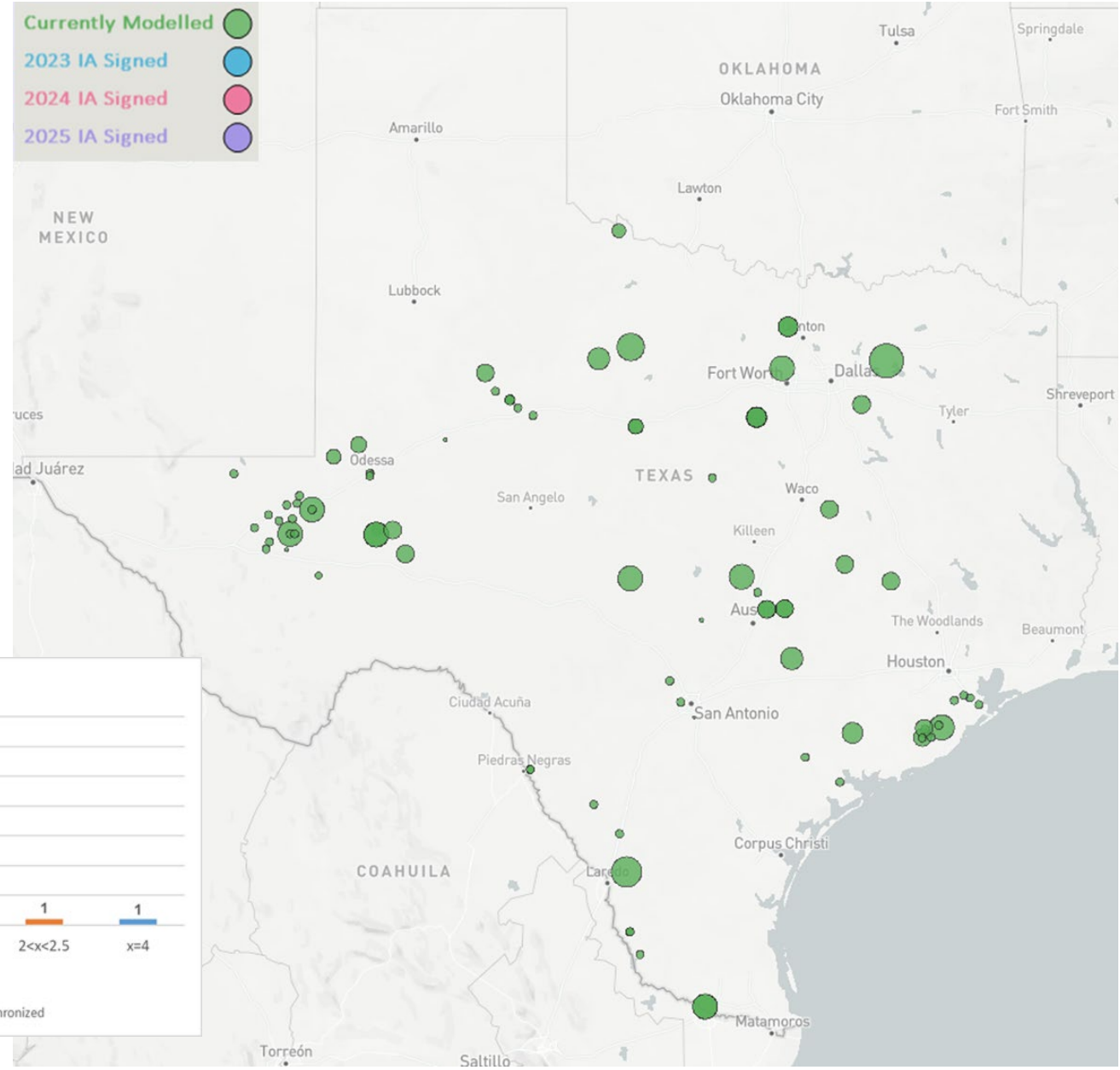


2019 total capacity = 110,392 MW
2022 total capacity = 239,466 MW

Operational Batteries

- There are about 70 batteries with 2022 or earlier in-service dates representing close to 3600 MWh of potential stored energy.
- Average interconnection size is 34.5 MW.
- The first battery was installed on the ERCOT system in 2013.





Planned Batteries

- There are about 150 batteries in-service or in the interconnection queue that have an Interconnection Agreement.
- Average interconnection size is 75 MW.