2022 LTSA Update and Input Assumptions

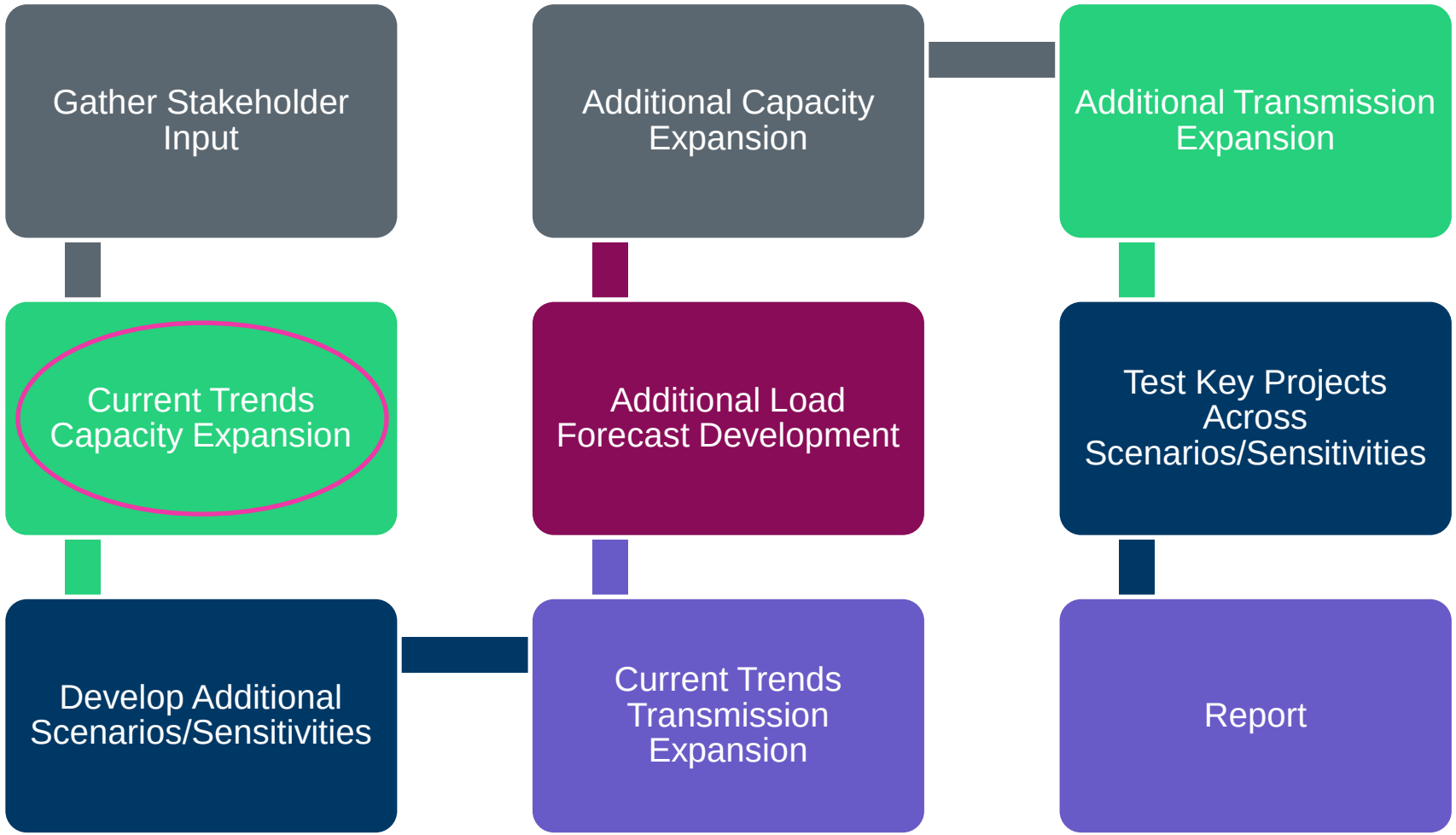
ERCOT System Planning

August 17, 2021

Process Update and Stakeholder Input Survey

John Bernecker

2022 LTSA Process



2022 LTSA Schedule

Task	Target Date
Stakeholder Input	Q1 2021
Scenario/Sensitivity Development	Q3 2021
Finalize Current Trends Capacity Expansion	Q3 2021
Finalize Scenarios	Q4 2021
Current Trends Transmission Expansion	Q1 2022
Other Scenarios Capacity Expansion	Q1 2022
Other Scenarios Transmission Expansion	Q3 2022

Updates to Base EV Assumptions

	Reference	Approximate Number of Light Duty Vehicles (Cars and Trucks)	% of Miles Driven by Buses	% of Miles Driven by Short Haul Trucks	% of Miles Driven by Long Haul Heavy Duty Trucks
2022 LTSA	2020 BNEF (Adjusted)	3.6M	71%	16%	10%
2020 LTSA	2018 BNEF	3M cars and 0.6M light duty trucks	N/A	N/A	N/A

Assumptions cited correspond to the 2035 study year for the 2020 LTSA and 2037 study year for the 2022 LTSA

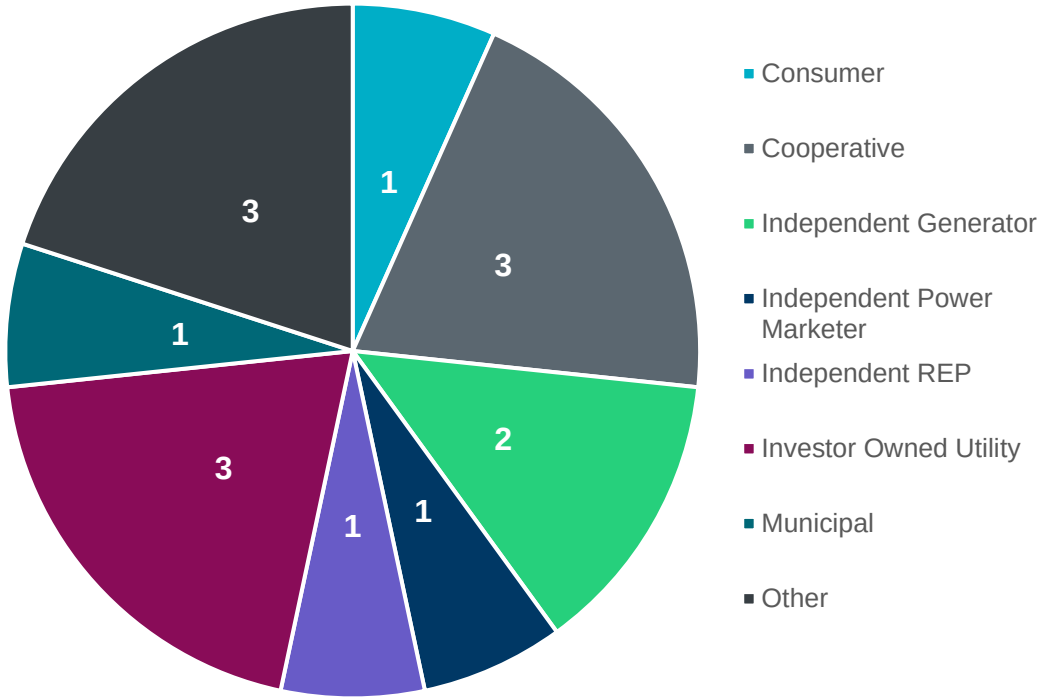
1. Light duty vehicles merges cars and pickup trucks and maintains different adoption rates for each
2. Assumed EV growth determined by adjusting BNEF projection (time-shifting curve to match actual sales 2015-2020)
3. Expands previous 3 categories to 4 categories by splitting out Short Haul trucks from buses due to charging patterns/metrics available
4. Includes estimate of miles driven by trucks since growth projections now exist that were not available in time for the 2020 LTSA
5. Electric load is based on miles driven which is based on TXDOT and TEA data for trucks and buses

Stakeholder Input Survey

- ERCOT solicited stakeholder input via a survey sent to the RPG listserv on March 12
- The survey link was also shared at the April 6, 2021 RPG meeting
  - http://www.ercot.com/content/wcm/key_documents_lists/213851/2022_LTSA_Planning_April2021.pdf
- This presentation provides a summary of responses to the initial stakeholder input survey and outlines next steps for the 2022 LTSA

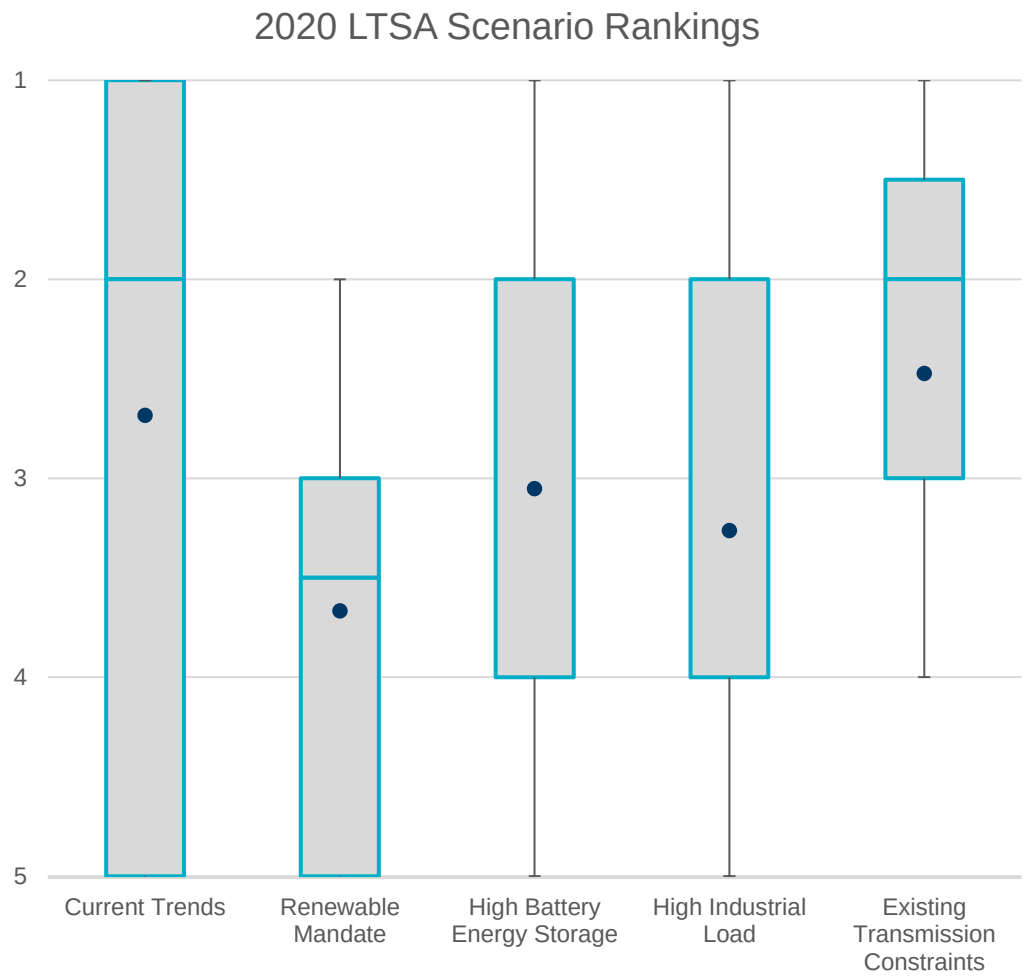
Respondents

- 20 individual responses received 15 separate entities
- Respondents represent a broad range of perspectives
- Other category includes a research institute and consulting firms



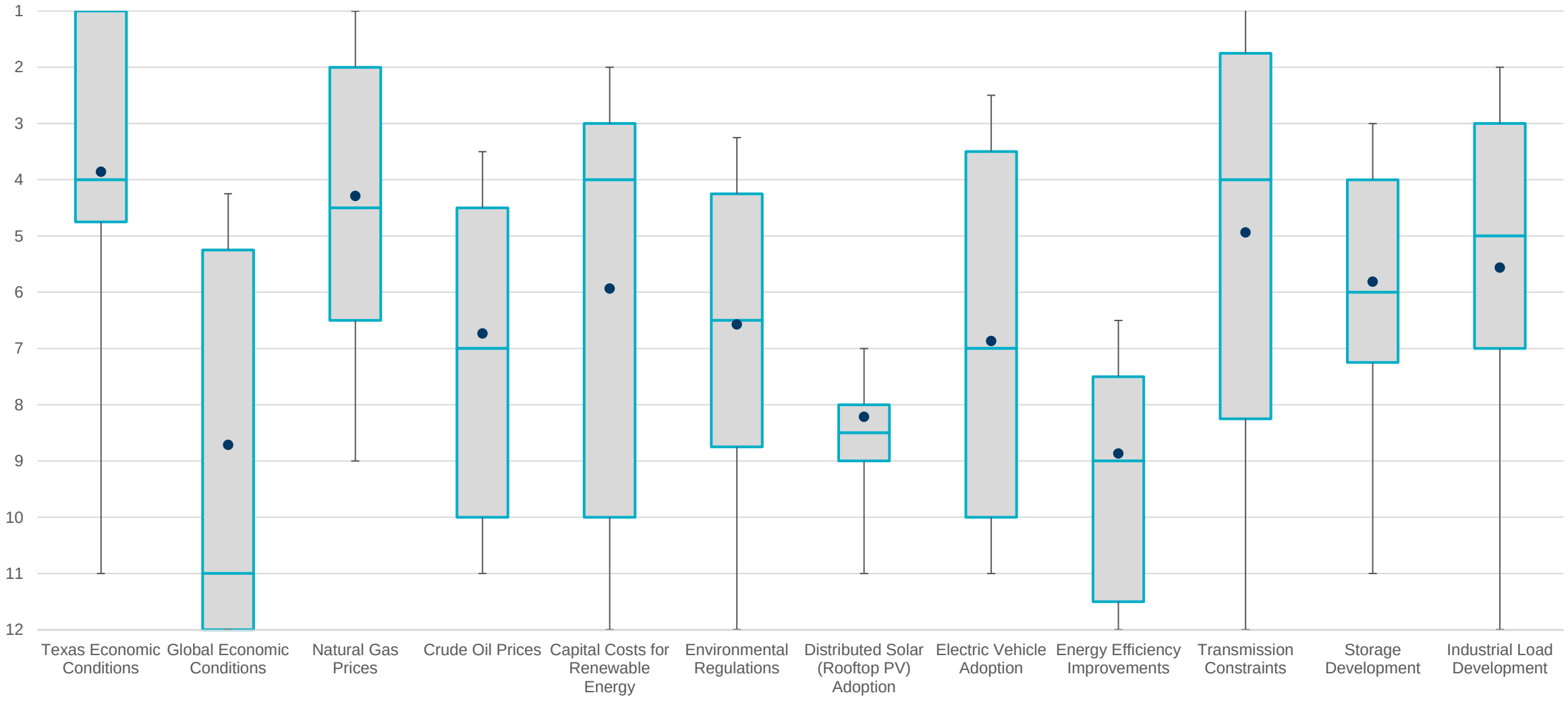
2020 LTSA Feedback

- Stakeholders were asked to provide feedback on what was most valuable from the 2020 LTSA
- Responses varied, but multiple responses expressed in considering emerging technologies and existing system constraints
- ERCOT is considering the feedback provided by stakeholders to inform the 2022 LTSA



Note: Dark blue dots represent average rankings.

Long-Term Drivers



Current Trends Capacity Expansion Input Assumptions

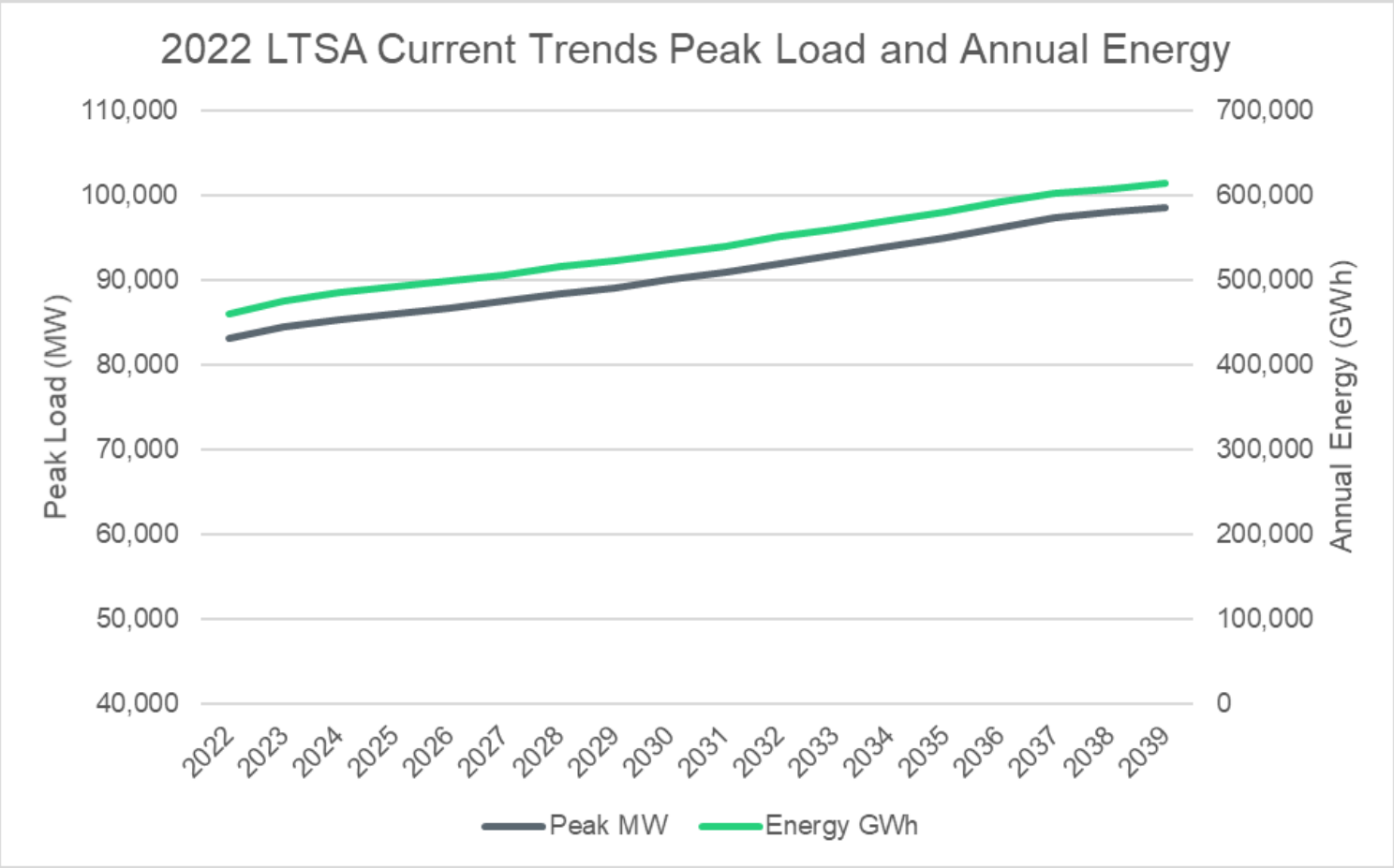
Julie Jin

Outline

- Load Forecast
  - Distributed Behind-the-Meter Solar Adoption
  - Electric Vehicle Adoption
- Settlement-Only Distribution Generators
- Price Responsive Demand
- Fuel Pricing
- New Unit Capital Costs

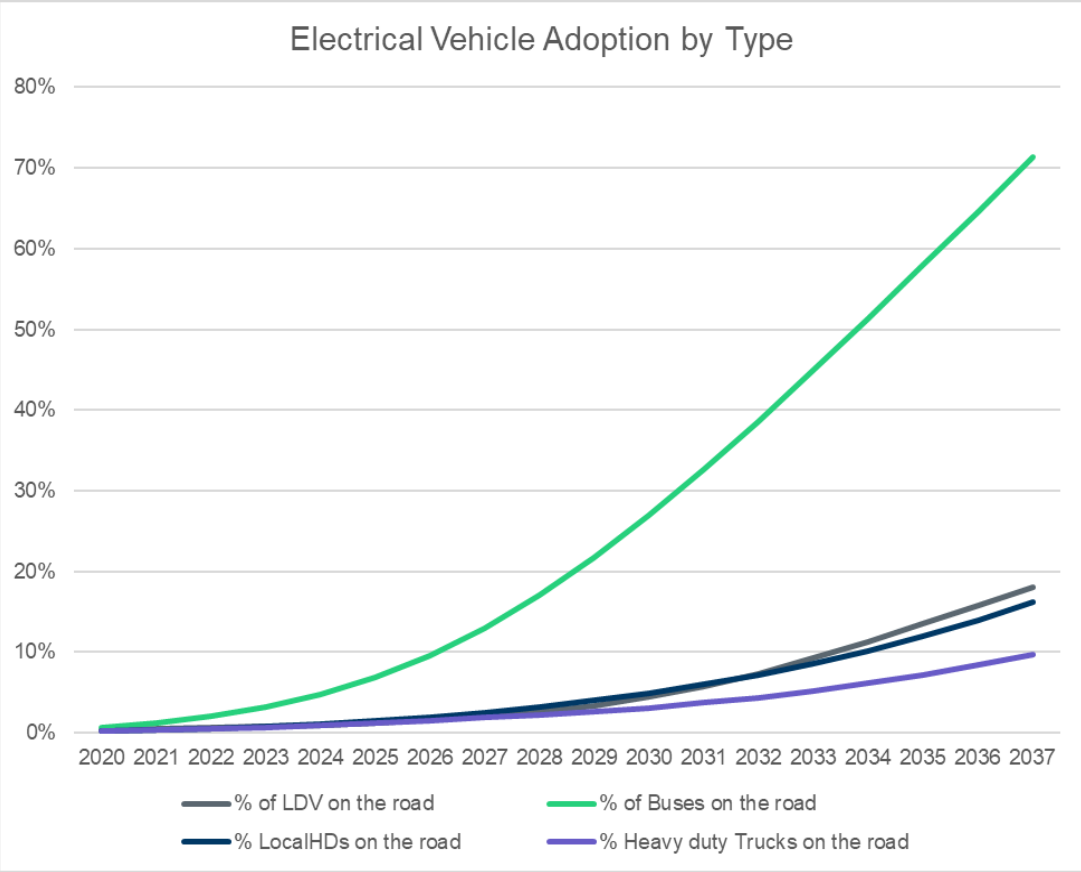
Current Trends Load Forecast

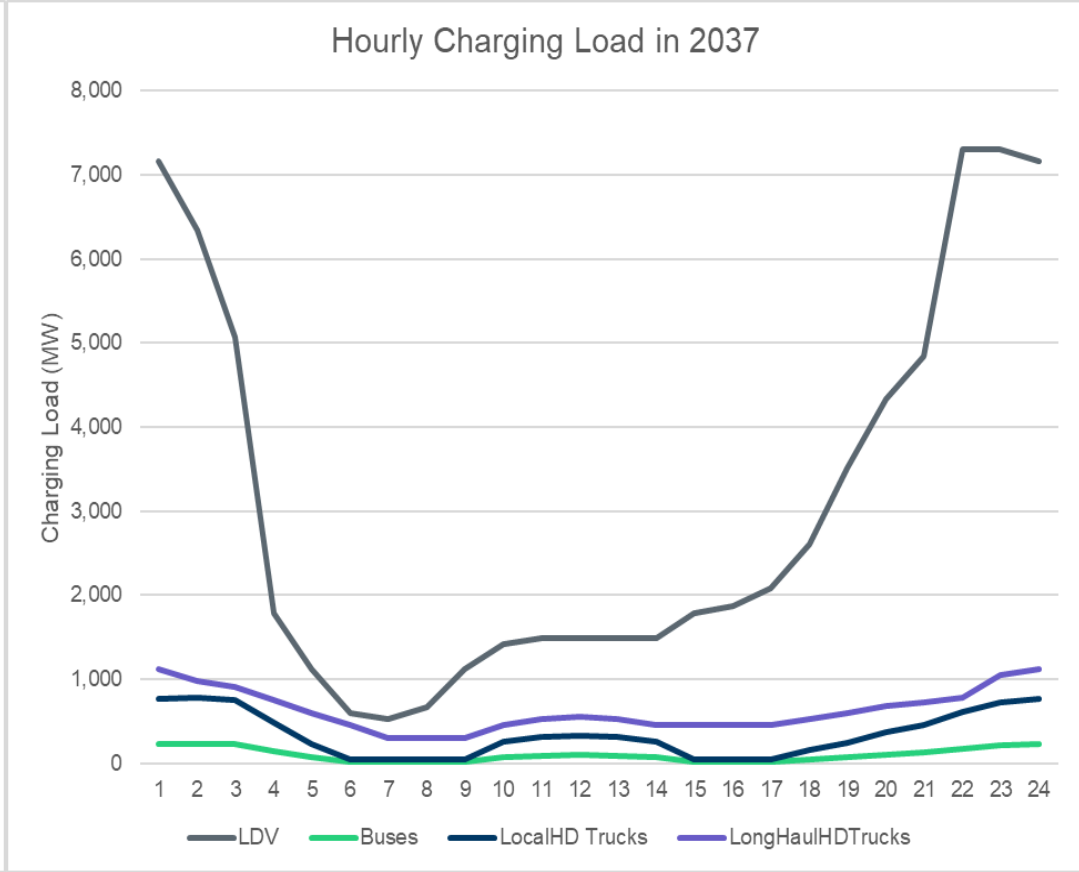
- The load forecast is based on the 2021 Long-Term Demand and Energy Forecast with the following adjustments:
  - Added electric vehicle charging load
  - Subtracted behind-the-meter distributed solar generation
  - Added existing Private Use Network (PUN) load



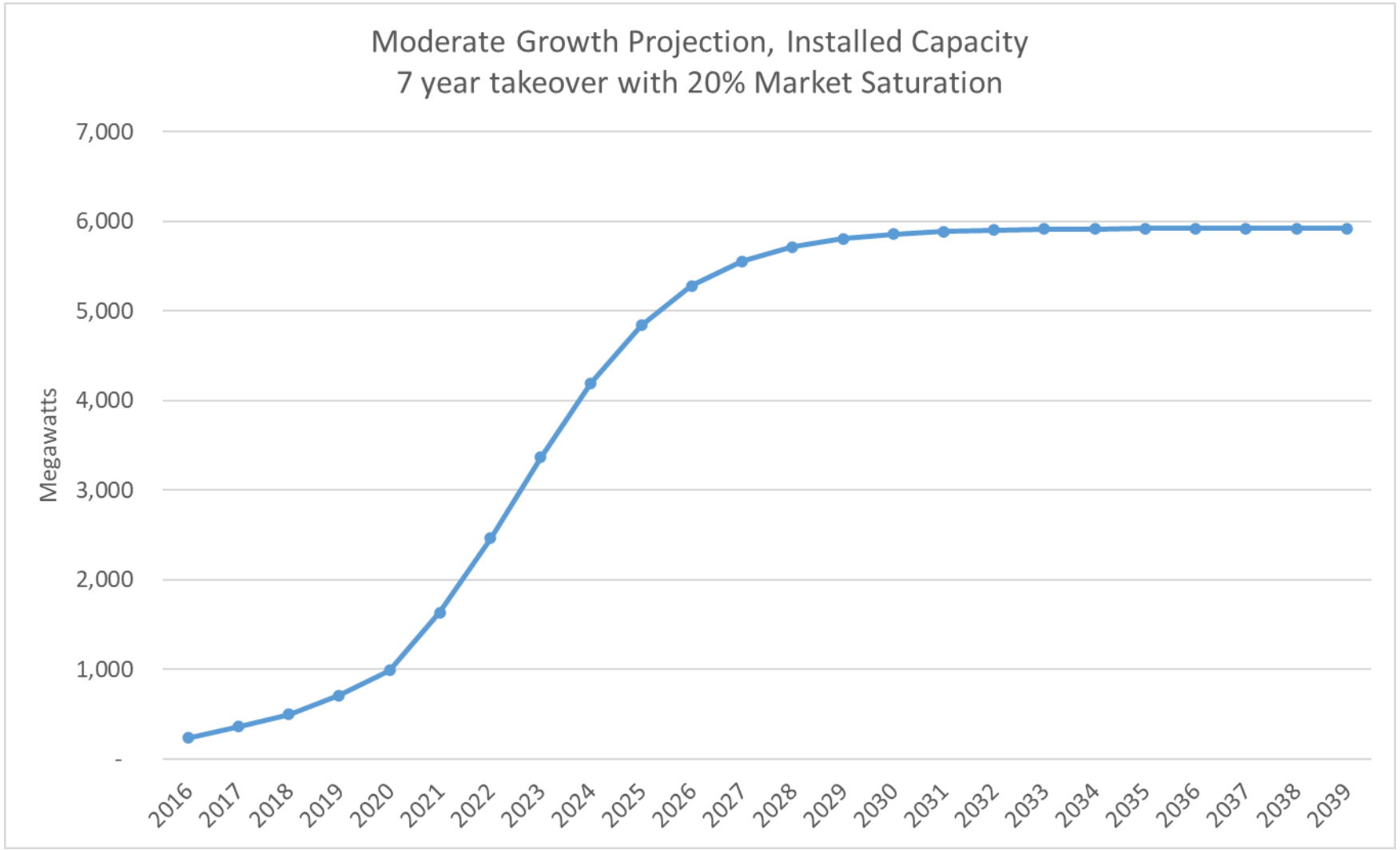
Electric Vehicle Adoption

- Electric vehicle adoption by type based on adjusted Bloomberg New Energy Finance (BNEF) 2020 projection and hourly charging load in 2037





Unregistered Distributed Solar

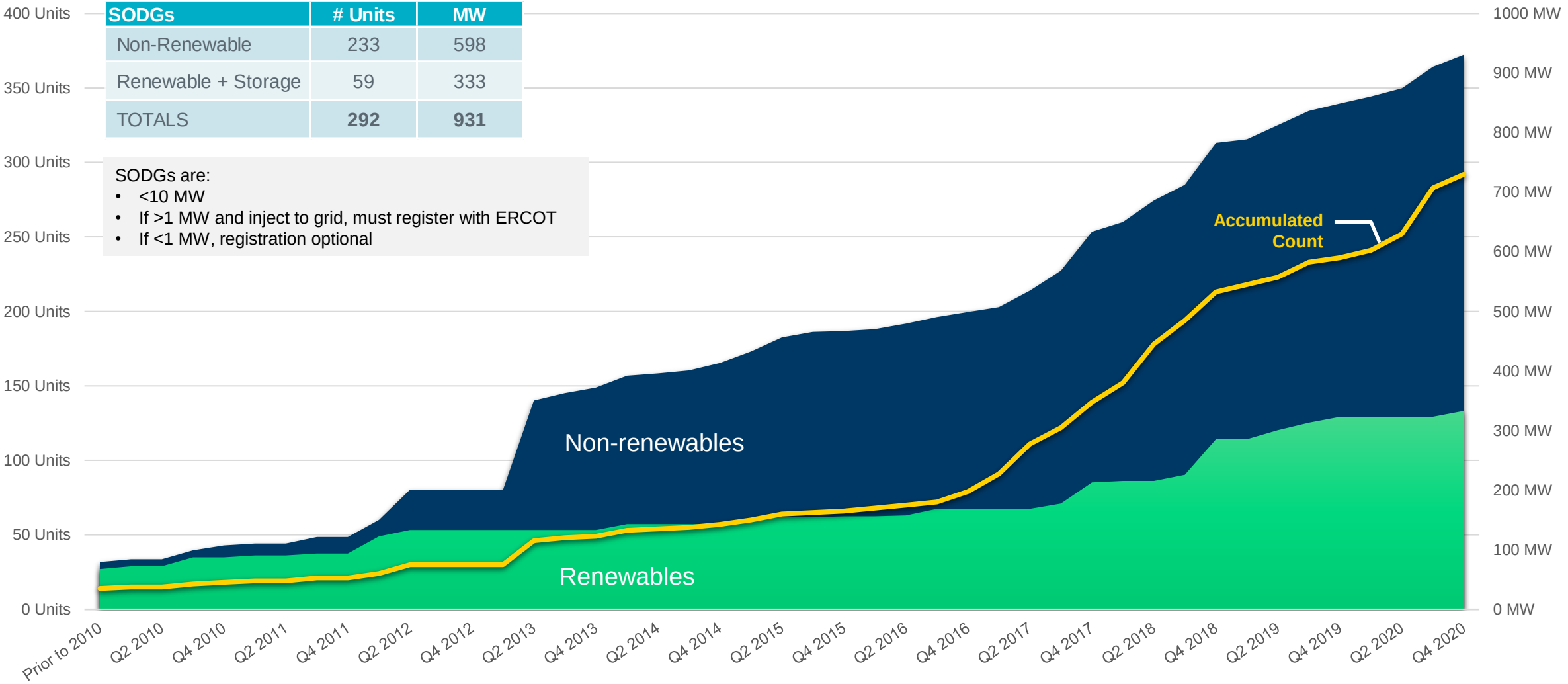


Source: http://www.ercot.com/content/wcm/key_documents_lists/215939/SAWG__Meeting_5-18-2021_Updated_Rooftop_Solar_Growth_Projectionsv3.pptx

Settlement-Only Distributed Generation in ERCOT

SODGs	# Units	MW
Non-Renewable	233	598
Renewable + Storage	59	333
TOTALS	**292**	**931**

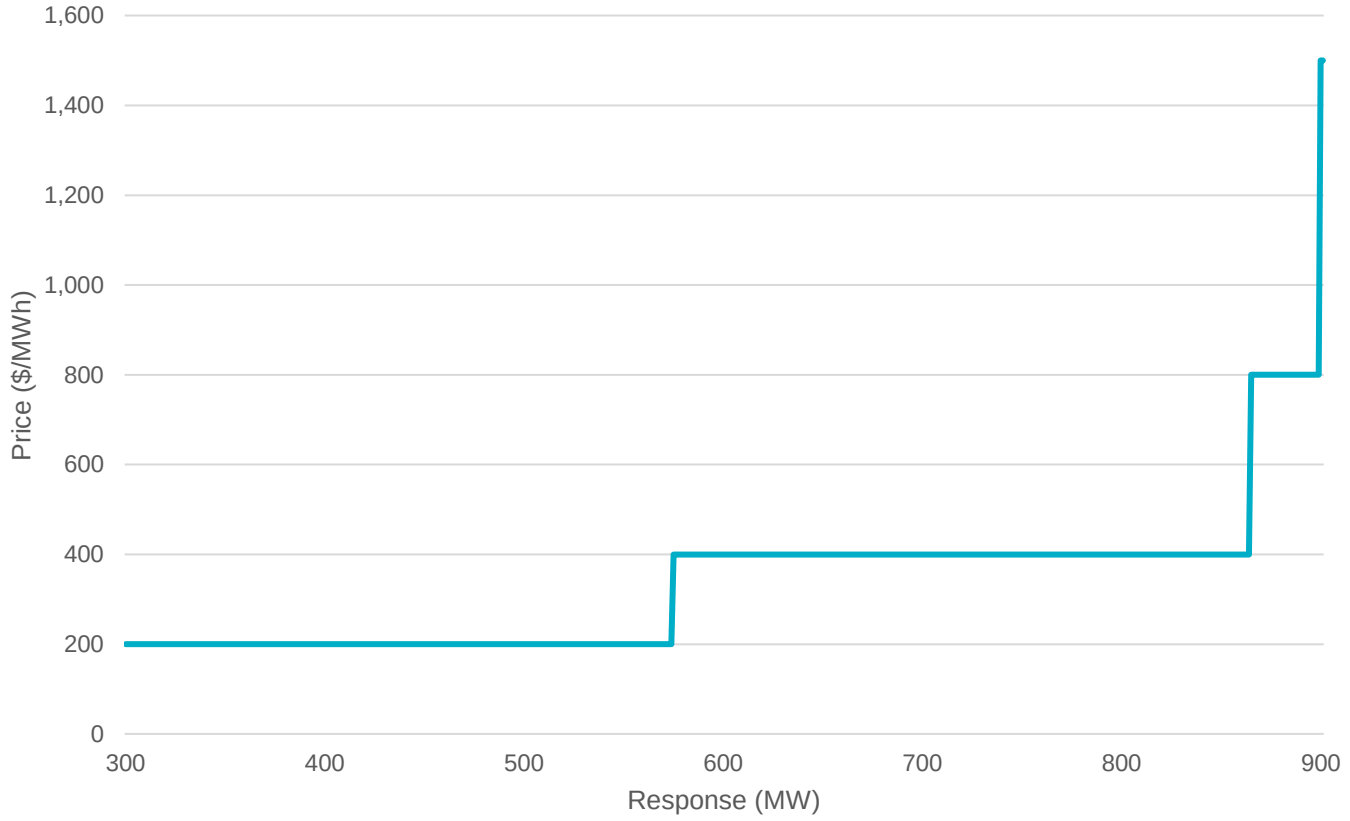
SODGs are:
- <10 MW
- If >1 MW and inject to grid, must register with ERCOT
- If <1 MW, registration optional



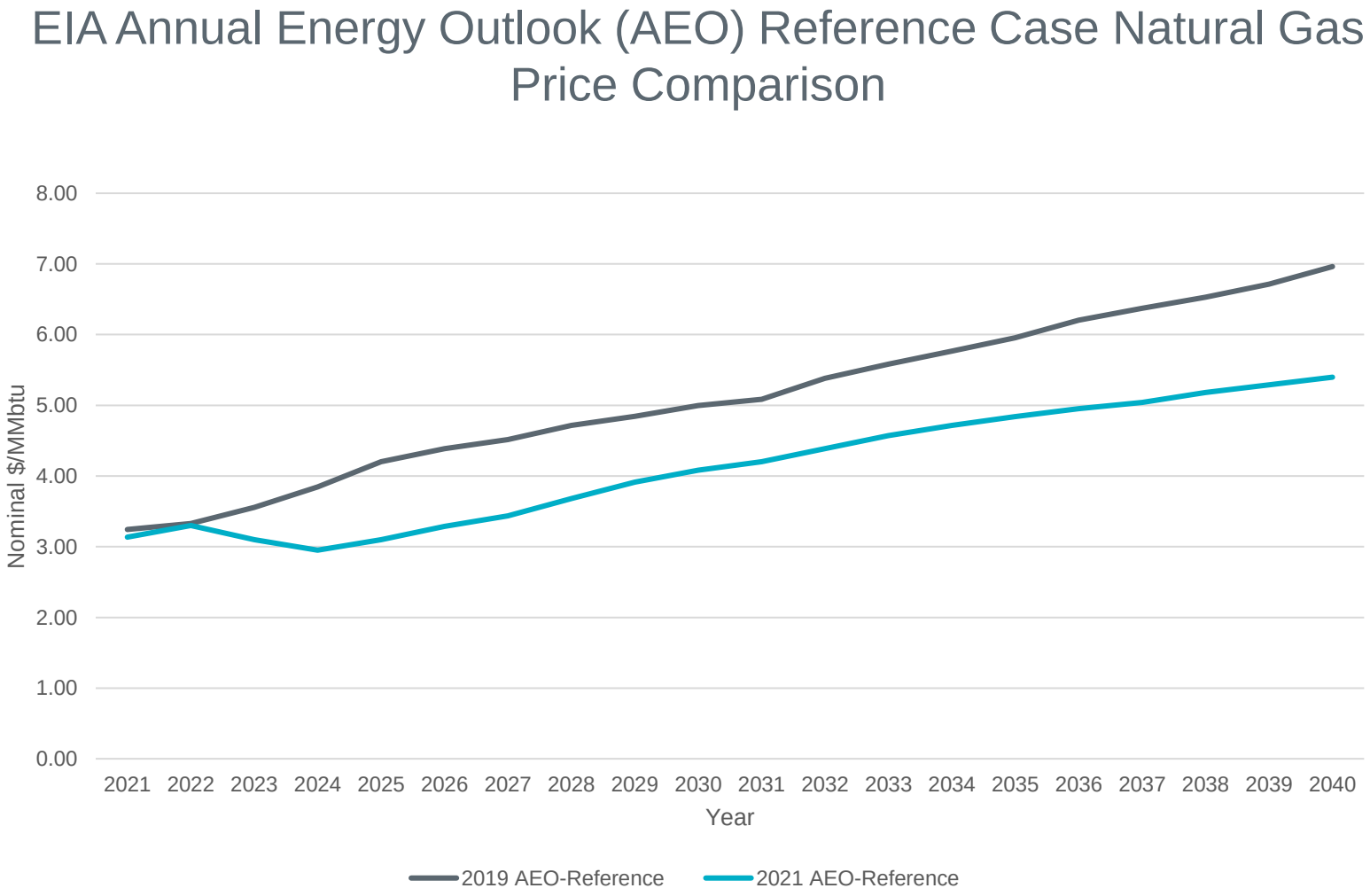
Source: http://www.ercot.com/content/wcm/key_documents_lists/215939/SAWG__Meeting_5-18-2021_Distributed_Generation_Trends_UpdateV0.pptx

Price Responsive Demand

- There was 900 MW PRD based on 2019 PRD Analysis
- 2% growth rate is assumed for PRD, the incremental PRD at each striking price is represented using generator models



Natural Gas Price Assumptions



New Unit Capital Costs for 2022 LTSA

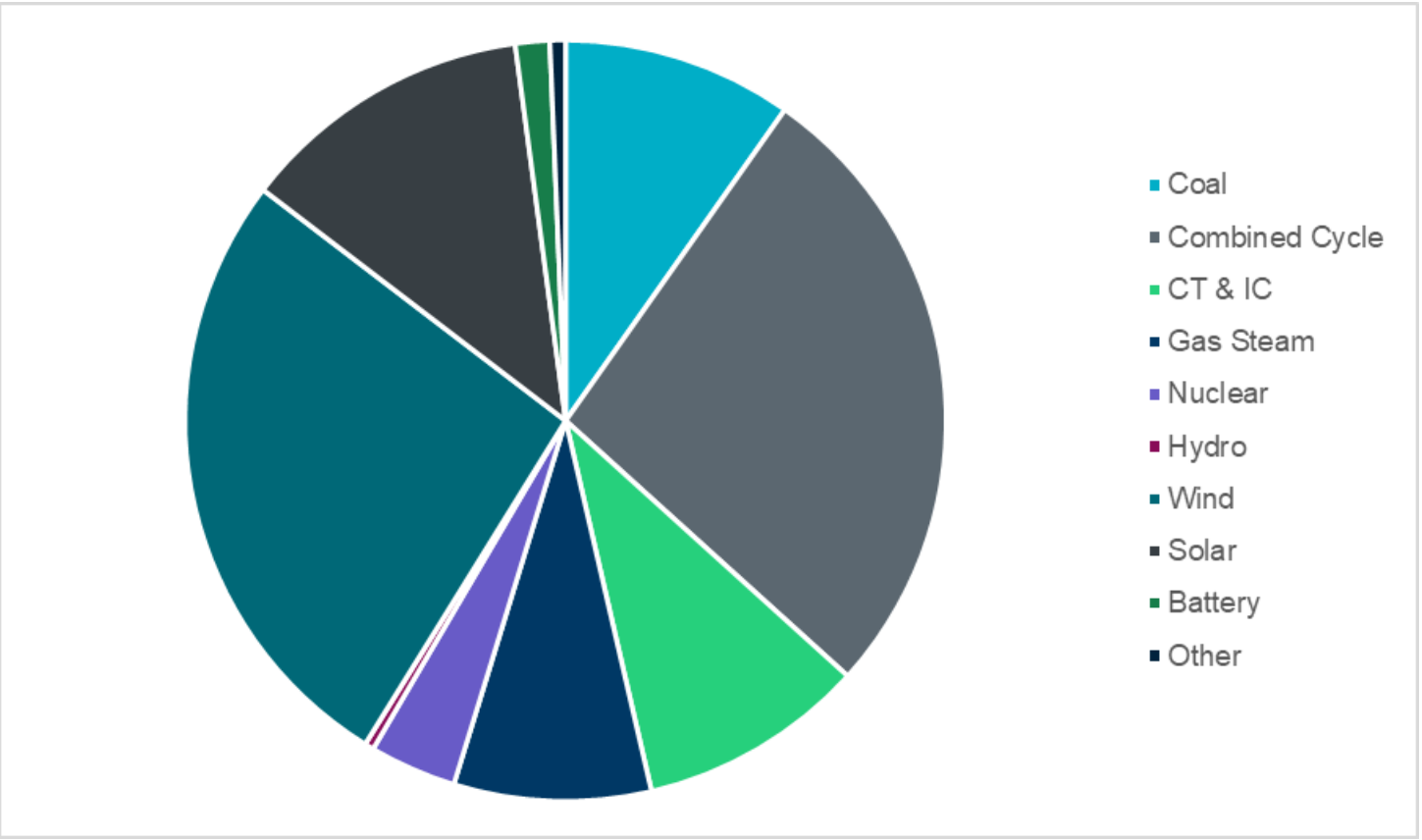
- Sources of capital cost assumptions:
  - Lazard's Levelized Cost of Energy Analysis, November 2020
  - EIA AEO 2020
  - NREL Cost Projections for Utility-Scale Battery Storage 2021
- Costs are $/kW in nominal dollar

Year	Combustion Turbine	Advanced CT	Combined cycle multi shaft	Combined cycle single shaft	Nuclear	Wind	Solar PV	Battery Storage	18.7 MW RE
2020	1,193	724	973	1,101	6,443	1,285	918		1,409
2021	1,189	720	969	1,097	6,398	1,280	920	788	1,424
2022	1,196	723	973	1,103	6,415	1,288	921	755	1,440
2023	1,204	722	976	1,111	6,429	1,297	923	720	1,454
2024	1,219	699	961	1,124	6,350	1,313	924	683	1,468
2025	1,232	690	959	1,136	6,396	1,327	926	645	1,480
2026	1,246	688	961	1,149	6,447	1,342	927	638	1,491
2027	1,258	684	962	1,161	6,490	1,355	929	631	1,502
2028	1,270	684	966	1,172	6,529	1,368	930	623	1,514
2029	1,281	687	972	1,181	6,560	1,379	932	614	1,525
2030	1,290	689	977	1,190	6,586	1,390	933	605	1,537
2031	1,300	692	982	1,199	6,612	1,400	935	611	1,549
2032	1,309	695	988	1,208	6,637	1,410	936	616	1,559
2033	1,319	697	993	1,217	6,664	1,421	938	622	1,571
2034	1,330	700	998	1,227	6,693	1,433	939	627	1,583
2035	1,340	705	1,006	1,236	6,717	1,443	941	632	1,594
2036	1,349	711	1,014	1,244	6,738	1,453	942	638	1,607
2037	1,360	717	1,022	1,254	6,765	1,464	944	643	1,621
2038	1,369	724	1,031	1,263	6,789	1,475	945	648	1,634
2039	1,379	730	1,039	1,273	6,812	1,486	947	653	1,647

Starting Capacity Mix

- Includes planned resources which meet Planning Guide 6.9(1) requirements based on May 2021 CDR and March 2021 GIS released on April 1st, 2021.

Technology	Capacity (MW)
Coal	13,630
Combined Cycle	37,564
CT & IC	13,476
Gas Steam	11,680
Nuclear	5,153
Hydro	536
Wind	37,024
Solar	17,427
Battery	2,042
Other	920



Questions

- Send questions or comments to:
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