2022 LTSA:
Current Trends Update and Scenario Development

ERCOT System Planning

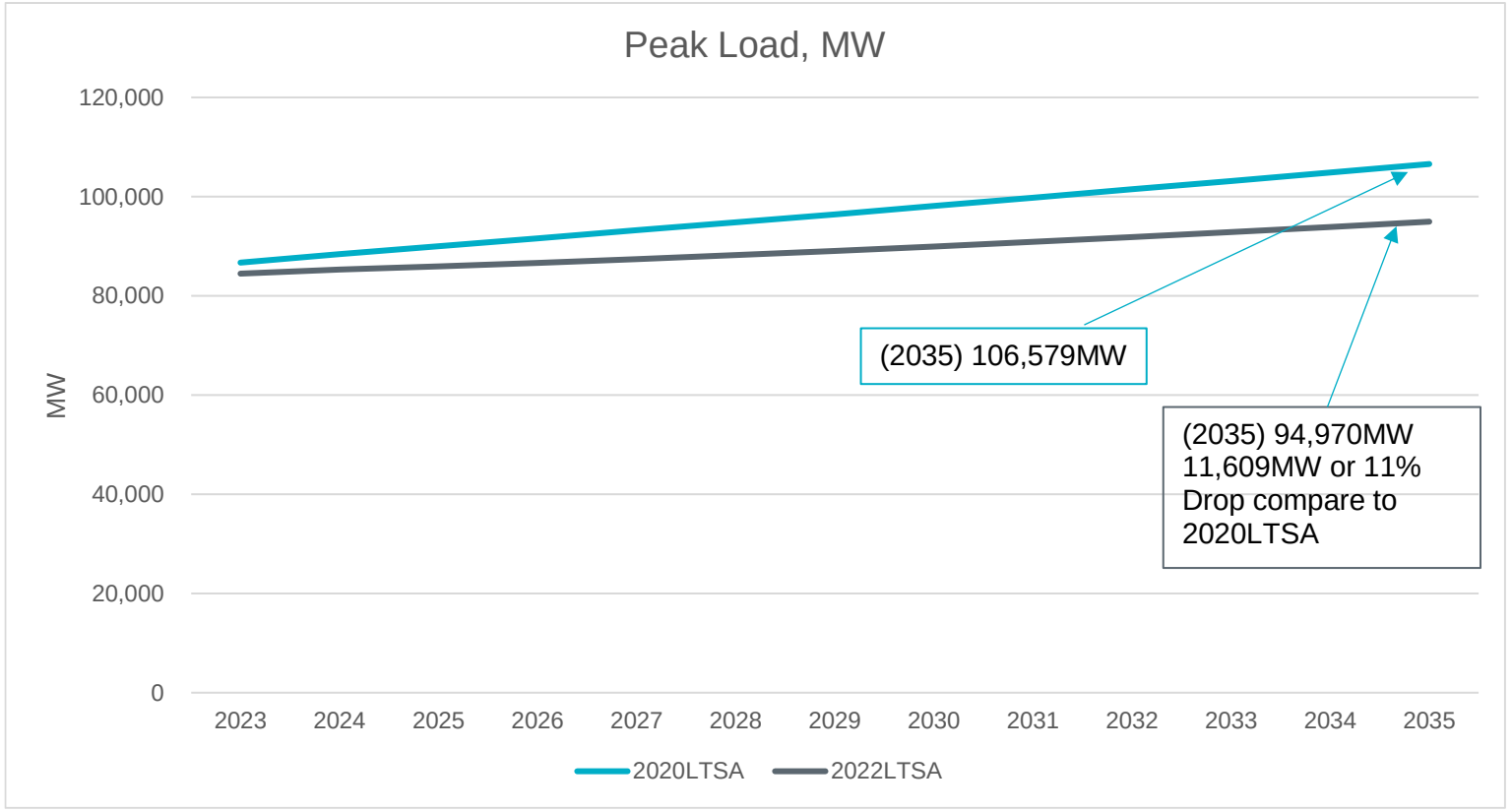
October 15, 2021

Current Trends Capacity Expansion Update

Fred Khodabakhsh

Current Trends Peak Load Forecast Comparison 2020 vs 2022 LTSA

- The peak load forecast is based on the 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

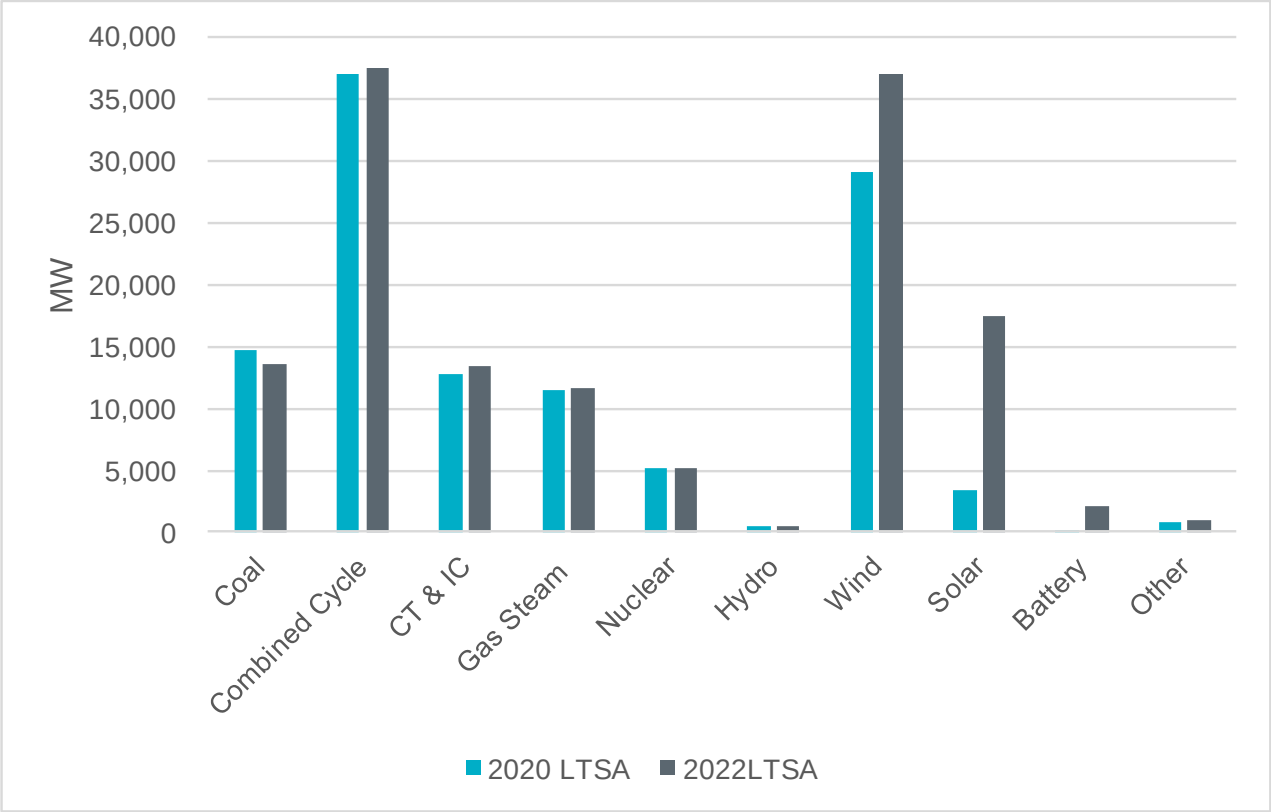


Starting Capacity Mix

- 2020 vs 2022 LTSA starting capacity mix includes planned resources which meet Planning Guide 6.9(1) requirements
- 24,410MW or 21% increase in starting capacity mix compared to 2020 LTSA

Capacity (MW)

	2020 LTSA	2022LTSA
Coal	14,722	13,630
Combined Cycle	37,025	37,564
CT & IC	12,782	13,476
Gas Steam	11,492	11,680
Nuclear	5,140	5,153
Hydro	535	536
Wind	29,075	37,024
Solar	3,323	17,427
Battery	84	2,042
Other	863	920
Total	115,041	139,451



Other Input Assumptions

- Minimum system inertia constraint is incorporated into the model
  - Minimum system inertia is modeled to be consistent with ERCOT operations
  - PUN resources have been modeled to meet their historic generation and minimum inertia contributions
- Recent market changes have not been incorporated into the analysis

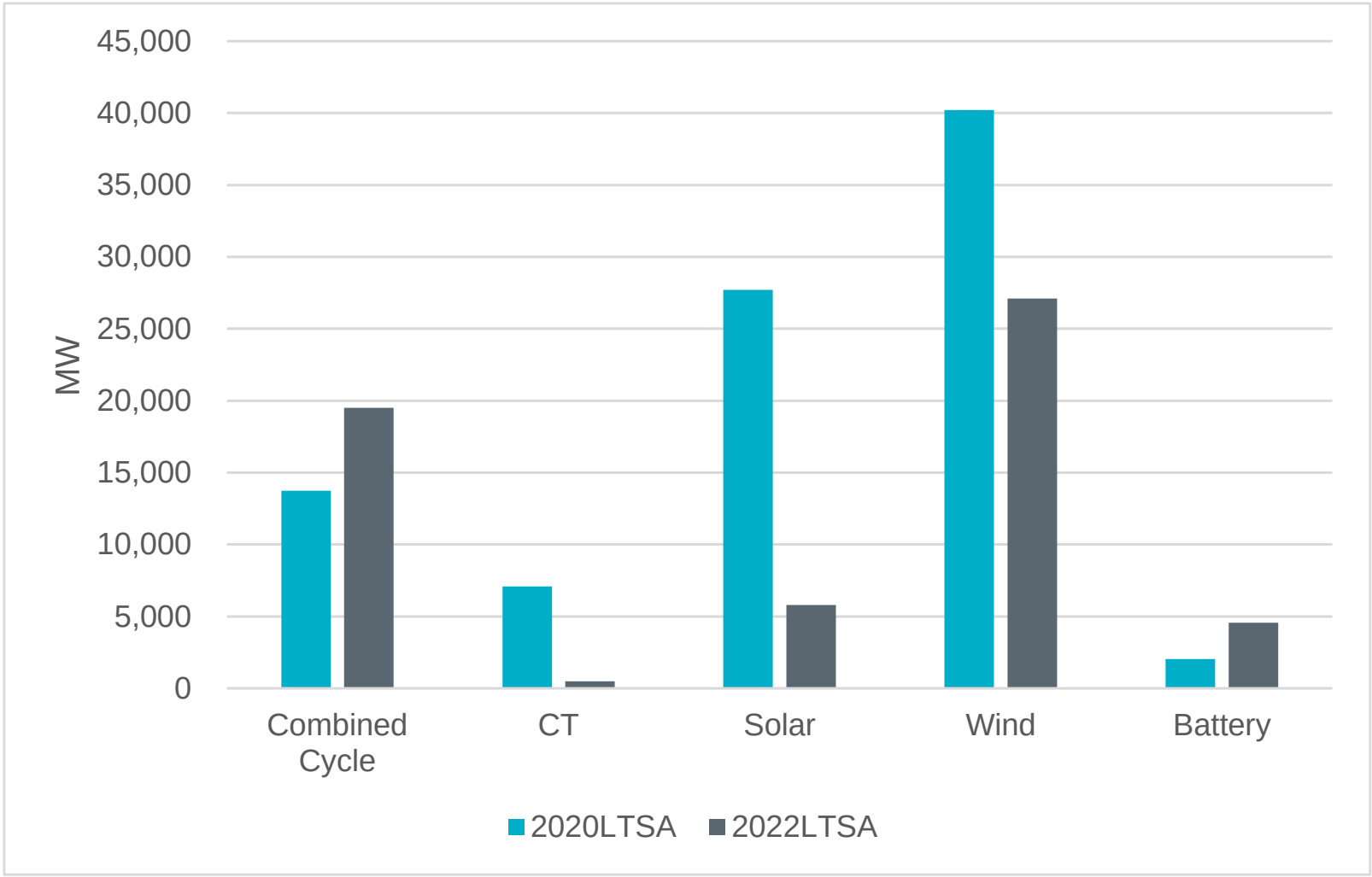
Preliminary Results for First Iteration of 2022 LTSA Current Trends

- In 2032 and 2037, out of 34 total scarcity hours, 6 occurred in summer and 28 occurred in winter
- Unserved energy in summer is between hours 3 to 8 PM
- Unserved energy during winter is between hours 6 PM to 1 AM

Description	Units	2023	2027	2032	2037	Total
CC Adds	MW	-	-	2,166	17,328	19,494
CT Adds	MW	-	-	474	-	474
Coal Adds	MW	-	-	-	-	-
Nuclear Adds	MW	-	-	-	-	-
Storage Adds	MW	-	800	3,180	577	4,557
Solar Adds	MW	-	-	5,800	-	5,800
Wind Adds	MW	600	9,300	13,100	4,100	27,100
Annual Capacity Additions	MW	600	10,100	24,720	22,005	
Cumulative Capacity Additions	MW	600	10,700	35,420	57,425	
Economic Retirements	MW	-	3,600	-	540	
Cumulative Economic Retirements	MW	-	3,600	3,600	4,140	
Reserve Margin	%	20	10	11	16	
Coincident Peak	MW	84,499	87,430	91,891	97,279	
Peak Net Load (1)	MW	69,651	71,840	76,458	86,558	
Minimum Net load (1)	MW	9,491	8,065	4,592	5,497	
Annual Energy	GWhs	475,132	506,060	550,505	601,975	
Average LMP	$/MWh	25.44	49.26	68.85	47.45	
Natural Gas Price	$/MMbtu	3.10	3.44	4.39	5.04	
Average Market Heat Rate	MMbtu/MWh	8.20	14.34	15.70	9.41	
Natural Gas Generation	%	43.14	40.35	35.03	38.03	
Coal Generation	%	9.36	6.85	4.91	3.97	
Wind Generation	%	28.80	35.16	41.49	41.00	
Solar Generation	%	8.41	8.00	9.80	8.99	
Scarcity Hours	HRS	-	12	23	11	
Unserved Energy	GWhs	-	21.77	71.64	37.63	

(1) Hourly Net Load = Hourly Load Forecast – Hourly Wind Output – Hourly Solar Output

15-Year Capacity Expansion Additions, First Iteration of 2020 vs 2022 LTSA



Scenario Development

John Bernecker

Background

- ERCOT has considered stakeholder feedback provided via survey and comments received at RPG meetings
- Multiple stakeholder responses to the survey expressed interest in considering emerging technologies and existing transmission constraints
- ERCOT is working on methods to consider additional operational constraints (e.g., minimum inertia requirements) in the 2022 LTSA analysis
- Full-fledged scenarios and sensitivities should both be considered

Scenario Development Discussion Goals

- Preview scenario and sensitivity concepts
- Elicit stakeholder feedback on:
  - The presented scenario and sensitivity concepts
  - Additional concepts for consideration
  - Scenario- or sensitivity-specific assumptions, including potential data sources

Scenario / Sensitivity Concepts

- Include additional resources from the interconnection process
  - Current Trends includes planned resources meeting the requirements of Planning Guide Section 6.9(1) in the base case used for capacity expansion and retirement analysis
  - Potential for better correlation with the GIS report, CDR, etc. in terms of both resource mix and siting
  - Help overcome challenges with under-selection of some resource types (i.e., batteries)
  - Serve as an expansion on / replacement for the 2020 LTSA High BESS scenario

Scenario / Sensitivity Concepts

- Evaluate the impacts of demand-side resources
  - Evolution and increased adoption of demand-side technologies, as well as increased flexibility of certain types of demand can have a significant impact on system needs
  - Considerations:
    - Increased distributed energy resources of all types
    - Increased distributed PV growth
    - Increased energy efficiency
    - Addition of large, flexible loads
    - Managed EV charging

Scenario / Sensitivity Concepts

- Mass electrification
  - Increased EV adoption and varied charging patterns
  - Transition from resistive heating to heat pumps
  - Replacement of gas heating with heat pumps (either all or new builds)
  - Assumptions may be informed by studies conducted by other ISOs and related university research

Scenario / Sensitivity Concepts

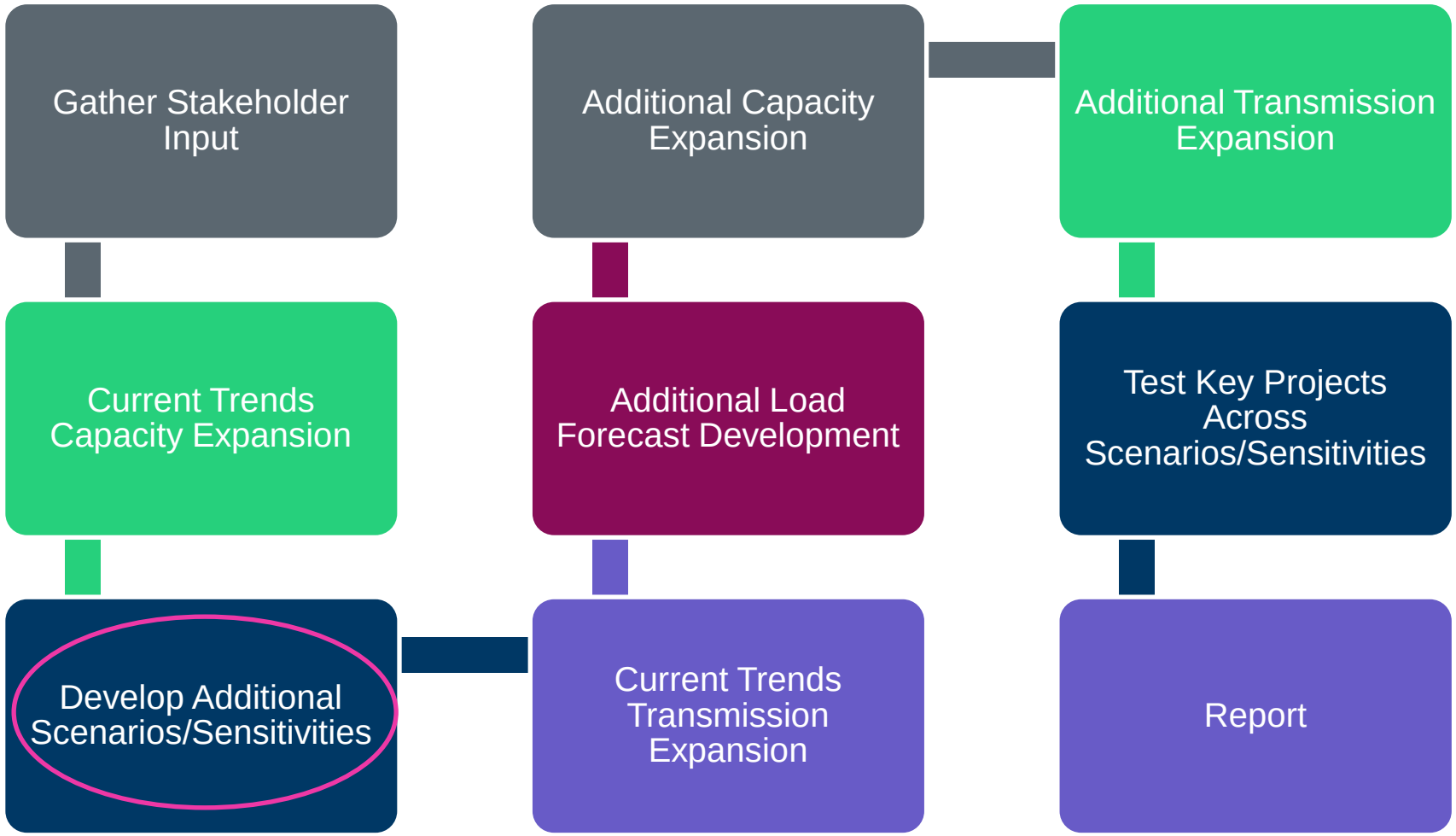
- Other concepts being considered by ERCOT staff include:
  - Include existing roadmaps / long-term plans in base cases
  - Consider extreme weather and events, including climate change impacts
    - Limited event duration poses a challenge for capacity expansion analysis
    - Potential for changing capital costs over time

Next Steps

- Please send comments to John.Bernecker@ercot.com by Friday, November 5, 2021
- Current Trends first iteration transmission expansion analysis
- Additional sensitivity/scenario capacity expansion and retirement analysis

Appendix

2022 LTSA Process



Natural Gas Price Assumptions