2022 LTSA Review

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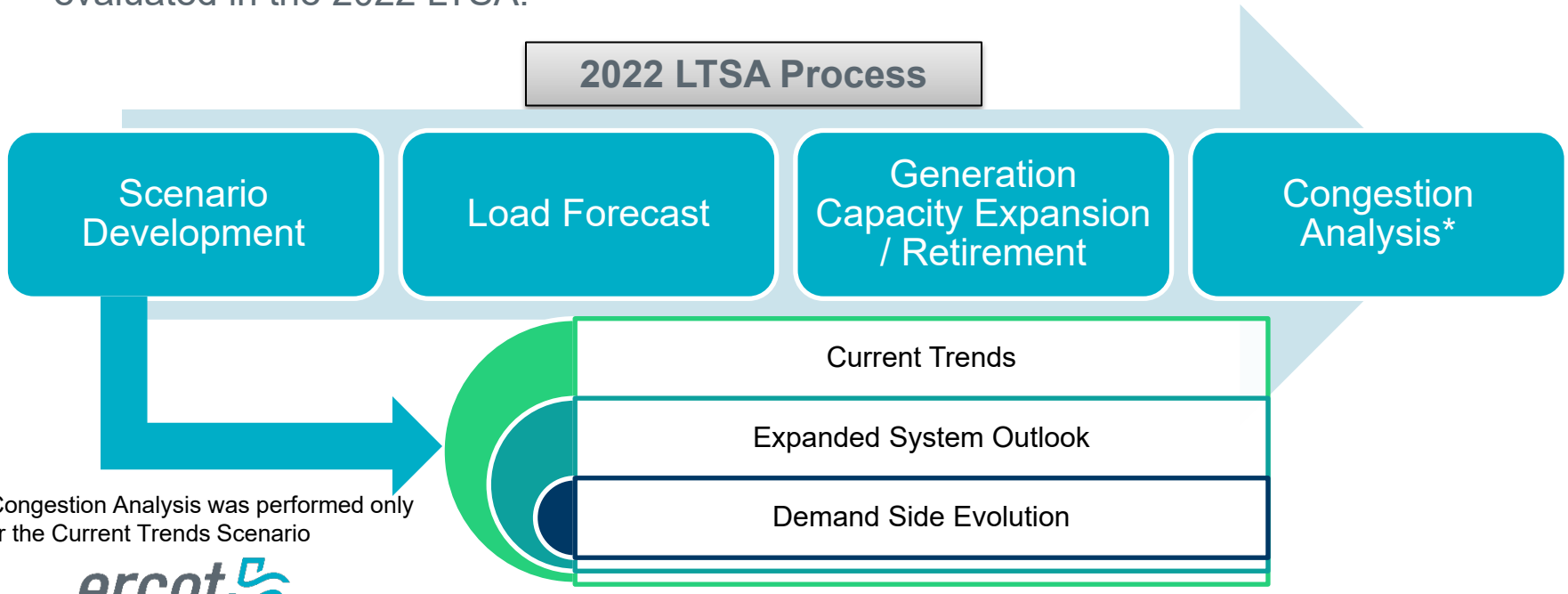
2022 Long-Term System Assessment (LTSA)

- ERCOT's 2022 LTSA analyzed potential system needs through **2037**.
- ERCOT analyzes different future scenarios in its long-term planning process to account for the inherent uncertainty of planning the transmission system **beyond** six years.
- The goal of using scenarios in the LTSA is to identify upgrades that are robust and economical across a range of scenarios, and a range of time horizons.
- At the time of this analysis, ERCOT's economic criteria for project evaluation was pending. As a result, potential economically driven transmission improvements were **not** evaluated in the 2022 LTSA.



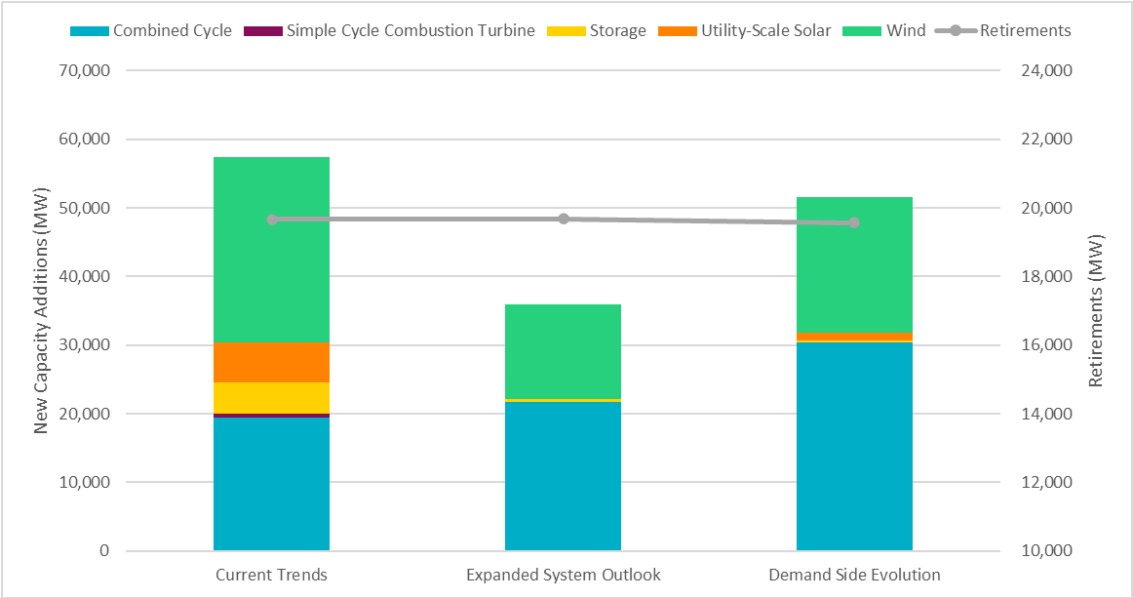
Key Findings

1. Significant growth of inverter-based resources (IBR) and more advanced natural gas generation with higher efficiencies than today's conventional generation technology was observed across all three scenarios.
2. Growth in renewable resources and electric vehicle adoption led to a **shift in scarcity hours** to later in the day. Also, a gradual shift in scarcity hours from primarily in the summer season to the winter season.
3. Annual capacity factors for conventional generators were significantly higher in the Demand Side Evolution scenario compared with the Current Trends and Expanded System Outlook scenarios.
4. Transmission challenges were identified for both the export from the renewable resource-rich region and the import into the demand centers.

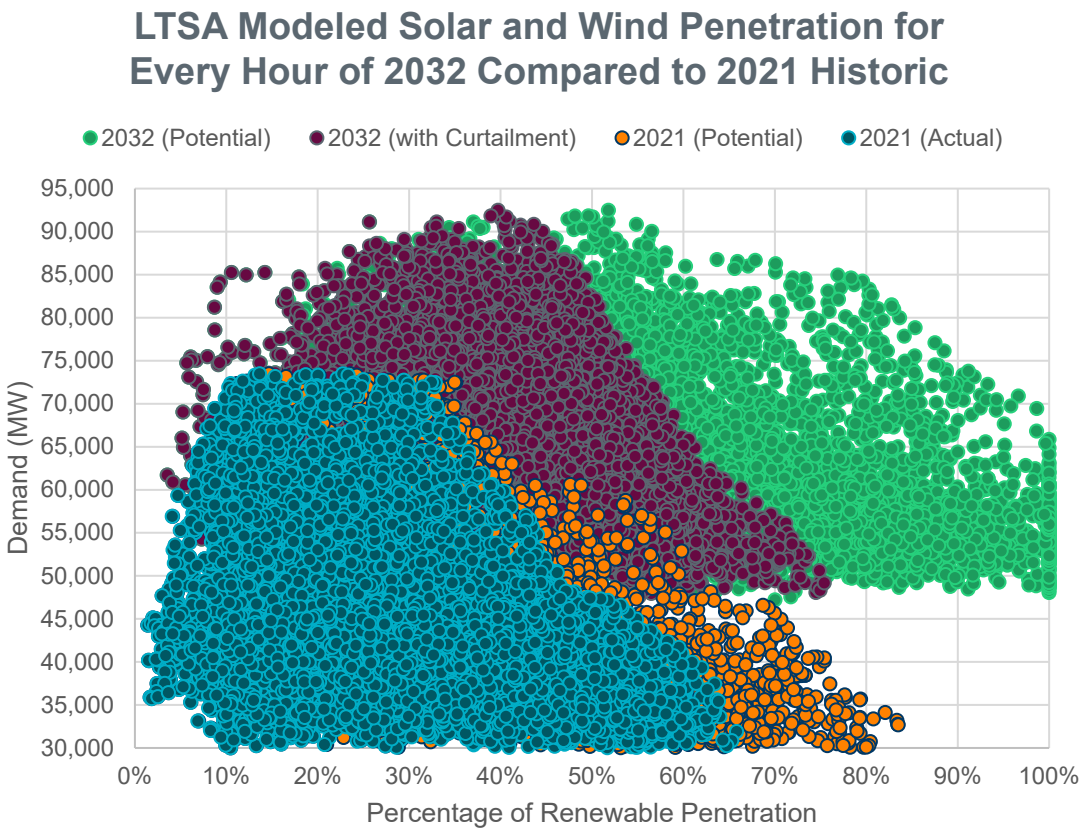
Capacity Expansion and Retirement Results

- Almost 20 GW of thermal capacity was retired by 2037 across all three scenarios.
- Significant growth was seen for combined-cycle, and renewable resources for all scenarios.
- Retired coal and natural gas generation was replaced by renewables, new natural gas generation, and battery energy storage.

Capacity Expansion Results (Capacity Additions by 2037)



2022 LTSA Renewable Generation Penetration



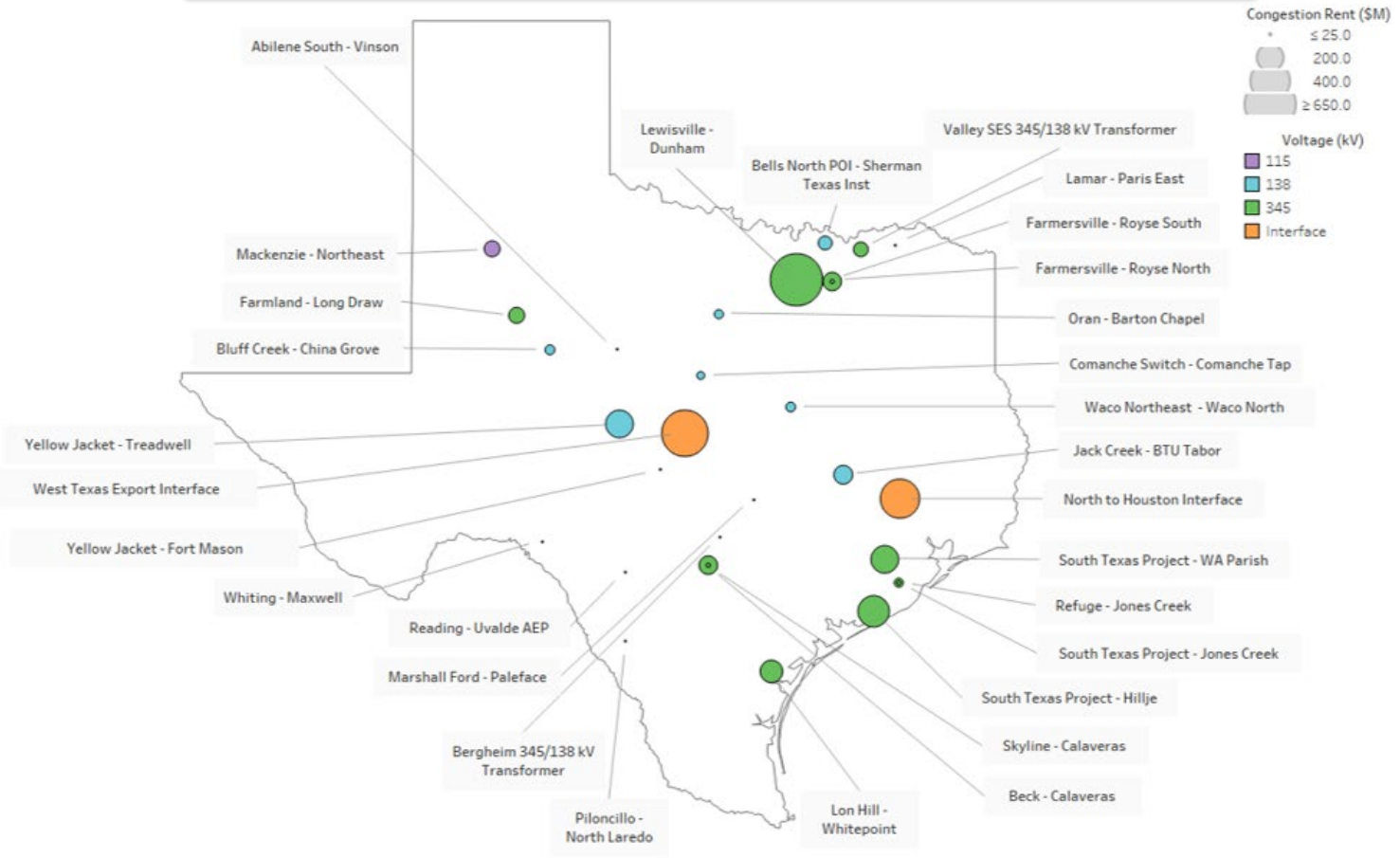
Renewable penetration is defined as the percentage of total demand at any given time that is being served by solar and wind generation. The "potential" penetration is based on the available wind speed and solar irradiance while the "actual" and "with curtailment" values include transmission constraints and other reliability limitations.

- The results for the LTSA capacity expansion and retirement analysis showed ~20 GW of thermal generation retired and significant growth of renewable generation and natural gas generation in all three scenarios.
- The growth in renewables caused significantly higher penetration of renewable generation compared to recent years.
- The growth in renewable resources and electric vehicle adoption led to not only a shift in stressed system conditions from summer afternoons to later in the day, but also a gradual shift of stressed system conditions to the winter season.

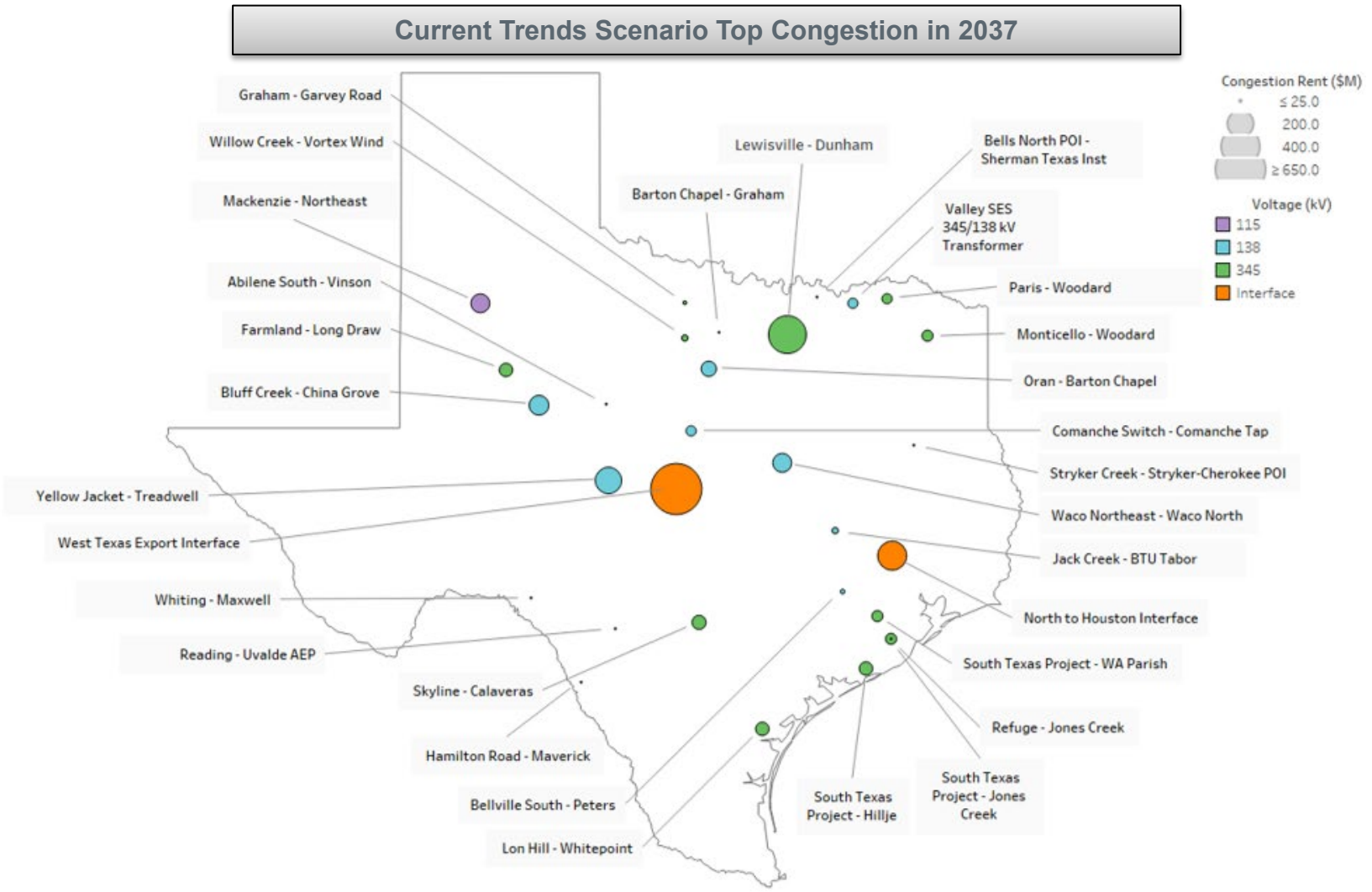
2022 LTSA Transmission Constraints-2032

- In 2022 LTSA (2032 and 2037), ERCOT identified the significant congestions on the West Texas Export interface and the import paths to demand centers such as Dallas-Fort Worth and Houston.

Current Trends Scenario Top Congestion in 2032



2022 LTSA Transmission Constraints-2037



Questions / Comments

- Please send questions and/or comments to
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Appendix

2022 LTSA Status Update References

- **April 2021 RPG**
  - *2022 Long-Term System Assessment-Update*
  - *https://www.ercot.com/files/docs/2021/03/31/2022_LTSA_Planning_April2021.pdf*
- **August 2021 RPG**
  - *2022 Long Term System Assessment (LTSA) Update*
  - *https://www.ercot.com/files/docs/2021/08/12/2022_LTSA_Update_InputAssumptions_August2021.pdf*
- **October 2021 RPG**
  - *2022 Long-Term System Assessment Update*
  - *https://www.ercot.com/files/docs/2021/10/13/2022_LTSA_CurrentTrendsUpdate_ScenarioDevelopment_10152021.pdf*

2022 LTSA Status Update References (Cont'd)

- **February 2022 RPG**
  - *2022 LTSA Update*
  - *https://www.ercot.com/files/docs/2022/02/14/2022_LTSA_Update_02152022.pdf*
- **August 2022 RPG**
  - *2022 LTSA Update*
  - *https://www.ercot.com/files/docs/2022/08/04/2022_LTSA_Update_08092022.pdf*
- **October 2022 RPG**
  - *2022 LTSA: Demand Side Evolution Update*
  - *https://www.ercot.com/files/docs/2022/10/17/2022_LTSA_Demand%20Side%20Evolution%20Update-Oct%202022%20RPG.pdf*