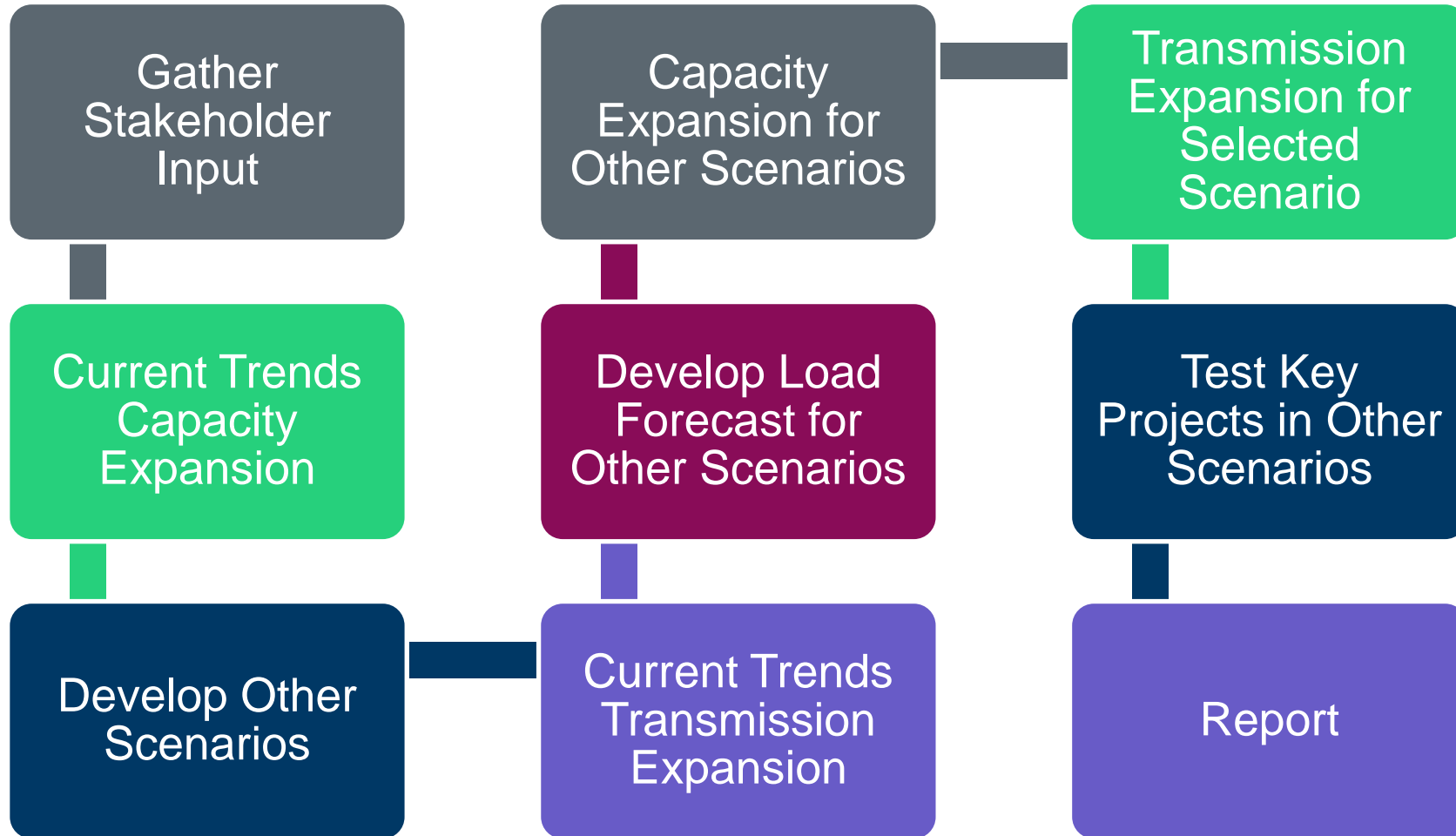




# 2024 Long-Term System Assessment (LTSA): High Load Growth and Environmental Regulations Scenario

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# 2024 LTSA Process Review



# Status of Studies

- March 2023 RPG meeting

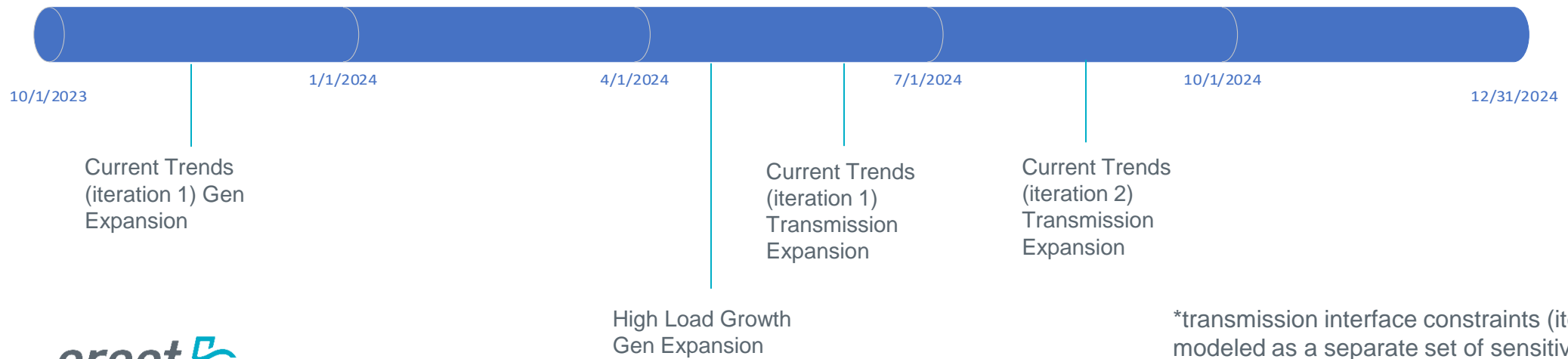
[2024 LTSA Overview](#)

- May 2023 RPG meeting

[2024 LTSA Stakeholder Survey Results and Current Trends Capacity Expansion Input Assumptions](#)

- September 2023 RPG meeting

[Preliminary Generation Expansion and Retirement Results for 2024-LTSA Current Trends](#)



# High Load Growth and Environmental Regulations Scenario

- ERCOT developed a High Load Growth and Environmental Regulations scenario in the 2024 LTSA in addition to Current Trends scenario
  - Objective: to assess and evaluate impacts of a high load growth and environmental regulations scenario over the future grid reliability need
  - ERCOT contacted TSPs to obtain a list of the loads seeking interconnections that have not signed an interconnection agreement but are likely to be connected in the next 10 to 15 years
    - The request for information was issued on Oct. 12, 2023 and all the responses from TSPs were received before Nov. 15, 2023
  - TSPs projected a total of 70,273 MW additional load (Price Responsive Load: 4,050 MW\*, Flat Load: 66,223 MW) in the next 10 to 15 year, which has not been included in Current Trends
  - This scenario also considers potential more restrictive environmental regulations, e.g., Green House Gas (GHG) Rule

\*TSPs estimated that 4,050 MW of new loads will be price responsive based on the limited information presented to them

# Current Trends vs. High Load Growth and Environmental Regulations: Comparison for 2039

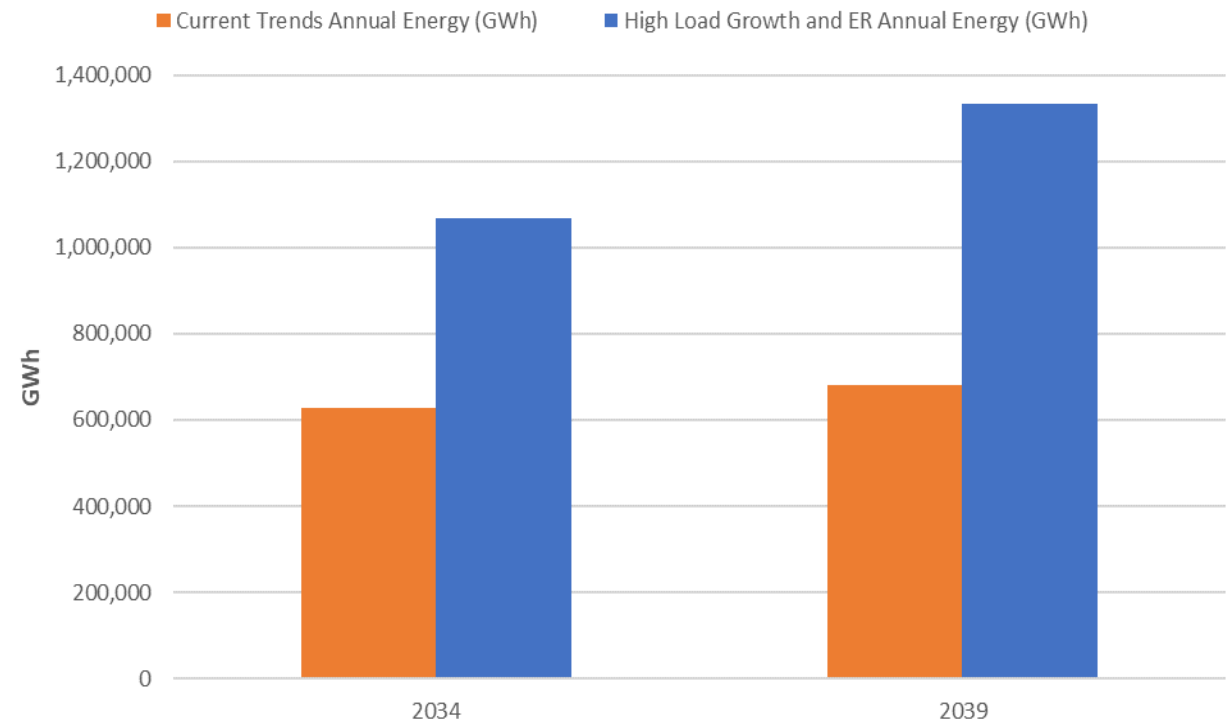
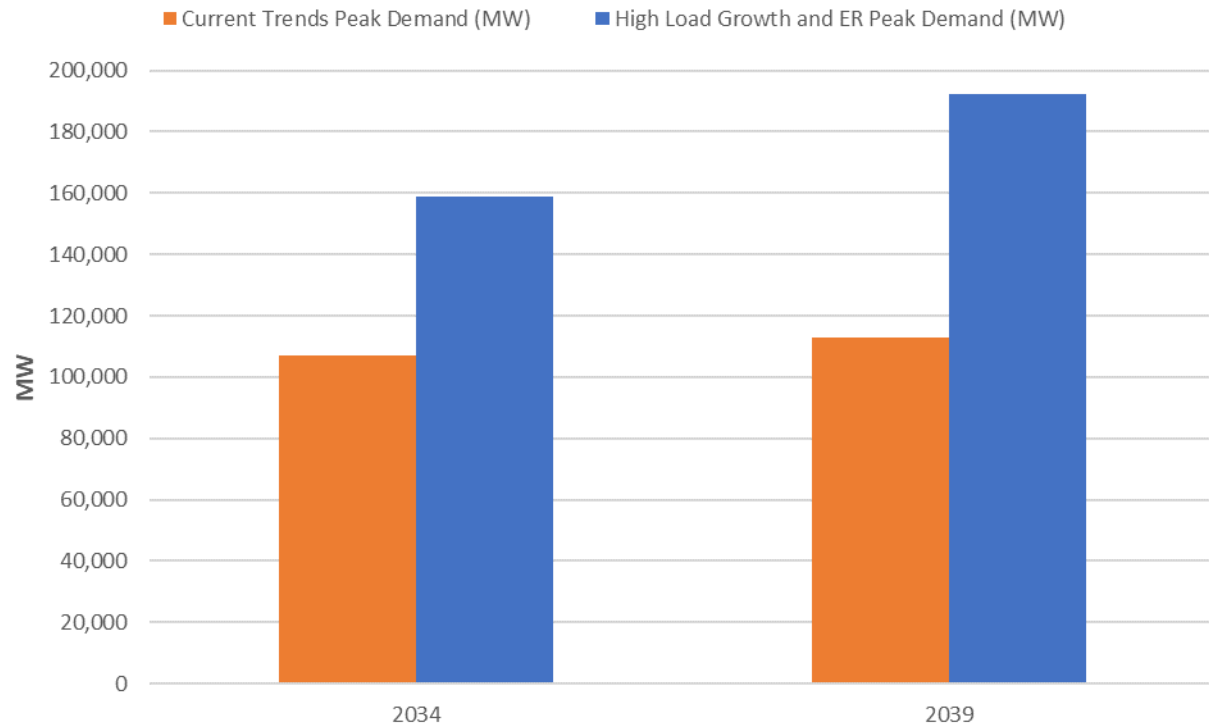
2039		Current Trends (iteration 1)	High Load Growth/Environmental Regulations Scenario
Gross Load	Weather Condition	2013 weather condition (96,959 MW Peak Demand/563,841 GWh Annual Energy)	2011 weather condition (99,900 MW Peak Demand/581,012 GWh Annual Energy)
	Adjusted for IHS Load in Far West	None	Applied
	Gross Peak Demand /Annual Energy After IHS Load Adjustment	96,959 MW/563,841 GWh	104,106 MW/615,329 GWh
Roof-top PV/EV/LFL/Flat Load	Roof-top PV	6,011 MW	6,011 MW
	EV (LDV) Annual Energy	21,228 GWh	26,012 GWh
	EV (MHDV) Annual Energy	24,844 GWh	32,387 GWh
	Price-responsive Load (LFL)	4,479 MW <sup>1</sup> +2,881 MW <sup>5</sup>	4,479 MW <sup>1</sup> + 4,050 MW <sup>6</sup>
	Additional Flat Load from TSPs Load Projection	0 MW	66,223 MW
Environment Rules	Carbon Price	0\$/ton	0\$/ton
	Impact of EPA Rules for Gas Units	None	1) CCS <sup>2</sup> needed for new CCs 2) existing CCs (>300 MW/unit) capacity factor < 50% <sup>3</sup> 3) new CTs capacity factor < 20%
	Coal Retirement	10,228 MW coal retirement by 2032 and 10,987 MW by 2038 <sup>4</sup>	12,697 MW coal retirement before 2035

<sup>1</sup> in operation as of Feb. 2024 <sup>2</sup> carbon capture and storage (CCS)

<sup>3</sup> only two existing CCs impacted <sup>4</sup> 951 MW of retirement due to economics

<sup>5</sup> estimated new LFL <sup>6</sup> from TSP load projection

# Current Trends vs. High Load Growth and Environmental Regulations (ER)



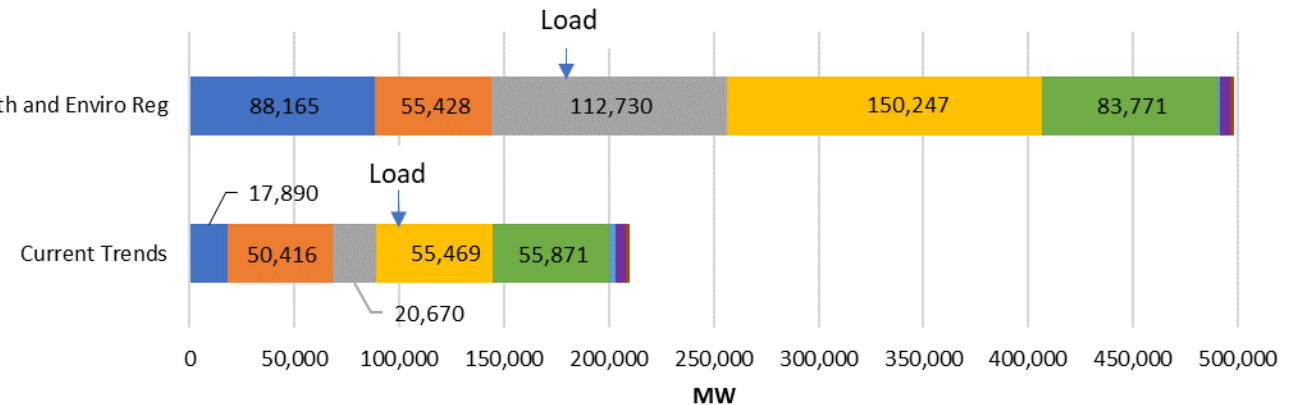
<sup>1</sup> Peak Demand and Annual Energy include gross load, EV, roof-top PV, 100% of price-responsive load (LFL) and incremental loads from TSPs if applicable

# 15-Year Total Capacity Mix Comparison (2025 to 2039)

				2024LTSA - Current Trends (MW)			High Load Growth and Environmental Regulations Scenario (MW)		
	Operational Resources	Planned Resources	Total Starting Capacity Mix	Retirements	Capacity Expansion	Net Total	Retirements	Capacity Expansion	Net Total
Battery	2,335	6,523	8,858	-	9,032	17,890	-	79,307	88,165
Combined Cycle	40,138	551	40,689	4,352	14,079	50,416	2,226	16,965	55,428
CT & IC	11,733	900	12,633	1,206	9,243	20,670	865	100,962	112,730
Gas Steam	11,155	60	11,215	10,766	-	449	10,766	-	449
Solar	9,940	23,312	33,252	-	22,217	55,469	-	116,994	150,247
Wind	31,495	7,276	38,771	-	17,100	55,871	-	45,000	83,771
Coal	13,630	-	13,630	10,987	-	2,643	12,697	-	933
Hydro	593	-	593	-	-	593	-	-	593
Nuclear	5,153	-	5,153	-	-	5,153	-	-	5,153
Other	790	-	790	105	-	685	105	-	685
<b>Total</b>	<b>126,961</b>	<b>38,622</b>	<b>165,583</b>	<b>27,416</b>	<b>71,671</b>	<b>209,838</b>	<b>26,659</b>	<b>359,228</b>	<b>498,152</b>

- In High Load Growth and Environmental Regulations scenario:
  - The same starting capacity mix (operational and planned resources)
  - Compared to Current Trends, additional 1710 MW of coal retired, and 2,126 MW more of CCs remaining in operations
  - All the new CCs have Carbon Capture
  - It requires the large-scale buildout of Solar, Battery and CTs to serve the load

■ Battery ■ Combined Cycle ■ CT & IC ■ Solar ■ Wind ■ Coal ■ Nuclear ■ Gas Steam/Hydro/Other



\*Other resource types include distributed and biomass capacities

# Preliminary Results of 2024 LTSA High Load Growth and Environmental Regulations Scenario

Description	Units	2025	2029	2034	2039	Total
CC Adds	MW	-	-	-	16,965	16,965
CT Adds	MW	4,740	24,411	45,267	26,544	100,962
Storage Adds	MW	10,228	18,116	29,306	21,657	79,307
Solar Adds	MW	8,890	34,957	50,491	22,655	116,994
Wind Adds	MW	3,000	12,000	15,000	15,000	45,000
Annual Capacity Additions	MW	26,858	89,484	140,065	102,822	
Cumulative Capacity Additions	MW	26,858	116,342	256,407	359,228	
Retirements	MW	12,287	3,775	7,703	2,895	
Cumulative Retirements	MW	12,287	16,061	23,764	26,659	
Coincident Peak	MW	105,112	129,604	161,266	195,976	
Annual Energy	GWh	630,376	840,089	1,099,024	1,363,494	
Peak Net Load (1)	MW	88,607	102,956	119,968	145,535	
Minimum Net load (1)	MW	9,648	9,078	9,414	9,486	
Average Market Price	\$/MWh	44.4	55.4	70.5	65.5	
Natural Gas Price	\$/MMbtu	3.80	3.35	4.75	5.64	
Natural Gas Generation	%	41.3	40.4	37.0	39.9	
Coal Generation	%	8.9	3.3	1.7	0.5	
Wind Generation	%	26.5	27.9	28.7	29.4	
Solar Generation	%	16.2	23.0	27.8	26.8	
Scarcity Hours	HRS	14	14	-	-	
Unserved Energy	GWhs	82	115	-	-	
Large Flexible Load Curtailment Hours	Hours	124	695	1,612	804	
Large Flexible Load Curtailment Energy	GWhs	452	2,904	9,110	5,612	

(1) Hourly Net Load = Total Demand – Hourly Wind Output – Hourly Solar Output



# Observations for High Load Growth and Environmental Regulations Capacity Expansion Results

- The new battery resources include 78,951 MW of 2-hour and 356 MW of 8-hour batteries.
- The result shows a small amount of unserved energy in earlier years until enough resource capacity to be built to meet the load. This is due to the impact of extreme weather year and high load-growth modeled in this scenario.
- Small Modular Reactor was also provided as an option in capacity expansion analysis, but it was found uneconomic under current market conditions and without subsidies in High Load Growth scenario.
- The model builds both Co-Located Resources and Standalone Batteries/Solar as shown below

	Battery	Solar
Co-Located	19,330	19,330
Stand Alone	59,977	97,665
Total	79,307	116,994

## Next Step

- ERCOT is working on the transmission expansion assessment of Current Trends, and will bring the results to future RPG meetings for stakeholder discussion

# Questions

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