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ERCOT Historical Overview of Loads, Generation and Market Impacts

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Overview

- As ERCOT prepares the 2026 Reliability Standard Roadmap, it is worthwhile to look back at where the ERCOT has been since the Zonal market went live.

- This presentation shows and discusses:
  - the actual loads and load forecasts,
  - the generation additions and retirements, and
  - the relationship between natural gas prices to ERCOT market caps, peaker net margin, and coal and natural gas retirements.

- Finally, it ponders if we should consider other market design options.

Loads

- Actual
- Forecasts without Large Loads
- Forecasts with Large Loads

Generation

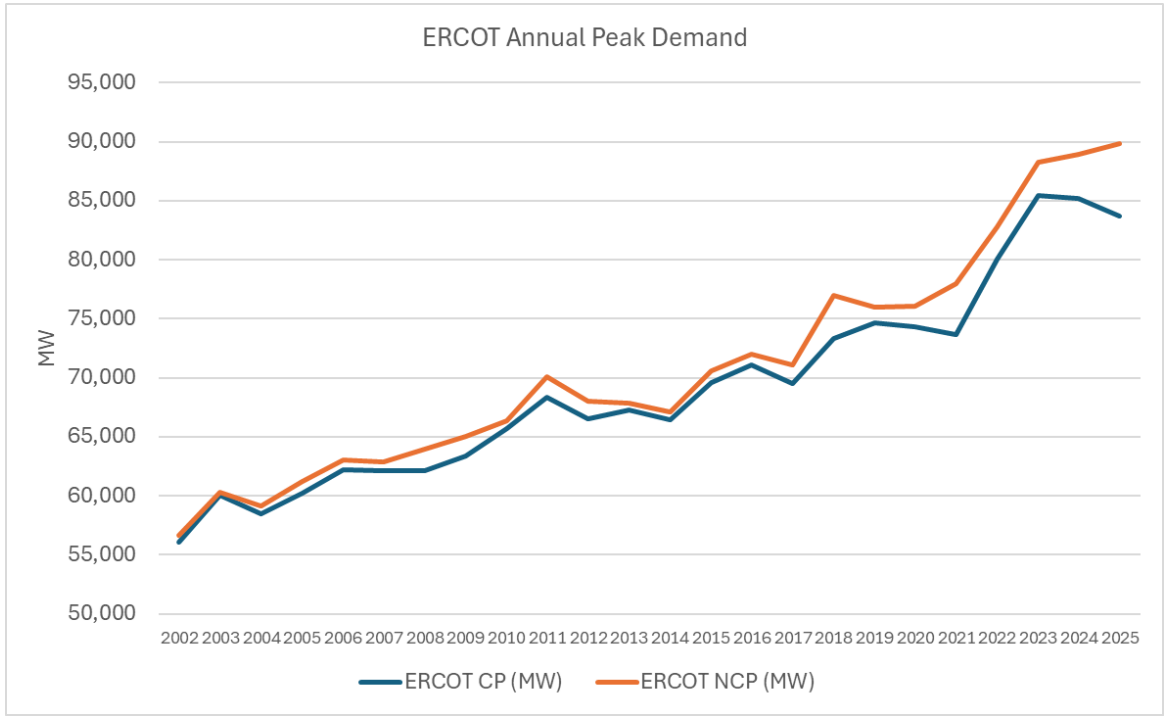
- Annual Capacity Changes (with Annual Henry Hub Natural Gas Prices)

Market Impacts

- Annual Henry Hub Natural Gas Prices and ERCOT System Market Cap Price
- ERCOT Peaker Net Margin and Annual Henry Hub Natural Gas Prices
- ERCOT Peaker Net Margin and Coal/Gas Retirements

Actual ERCOT Loads

- ERCOT load growth has been substantial system wide since COVID-19
- Additional growth is expected from oil and gas continued expansion and Data Centers
- Oil and gas and Crypto loads are curtailing which results in higher Non-Coincident Peaks (NCP)



AGR	COAST	EAST	FAR_WEST	NORTH	NORTH_C	SOUTHERN	SOUTH_C	WEST	ERCOT CP (MW)	
2002 to 2005	3.28%	1.95%	-0.32%	1.56%	1.26%	2.27%	2.60%	0.04%	1.85%	60,213
2005 to 2010	1.92%	0.20%	0.67%	-5.66%	2.33%	2.12%	1.50%	3.18%	1.83%	65,713
2010 to 2015	2.06%	0.29%	10.11%	-0.80%	0.04%	2.70%	1.25%	0.36%	1.19%	69,620
2015 to 2020	0.98%	3.31%	11.57%	-0.43%	0.76%	1.45%	1.63%	1.85%	1.35%	74,328
2020 to 2025	2.01%	5.75%	19.53%	18.48%	1.58%	4.46%	2.75%	0.56%	2.52%	83,679

Year	ERCOT CP (MW)	AGR		Annual Change	ERCOT NCP (MW)	Annual Change	NCP/CP
2000							
2001			Recession				
2002	56,068				56,659		101%
2003	60,030	7.07%		3,962	60,290	3,631	100%
2004	58,484	-2.58%		(1,546)	59,159	(1,131)	101%
2005	60,213	2.96%		1,729	61,257	2,098	102%
2006	62,203	3.31%		1,990	63,074	1,817	101%
2007	62,115	-0.14%		(88)	62,873	(200)	101%
2008	62,103	-0.02%		(12)	63,947	1,073	103%
2009	63,407	2.10%	Great Recession	1,304	65,063	1,116	103%
2010	65,713	3.64%		2,306	66,386	1,323	101%
2011	68,318	3.96%	Hottest Summer	2,604	70,070	3,684	103%
2012	66,558	-2.58%		(1,760)	68,042	(2,028)	102%
2013	67,253	1.04%		695	67,834	(208)	101%
2014	66,464	-1.17%		(789)	67,102	(732)	101%
2015	69,620	4.75%		3,156	70,609	3,507	101%
2016	71,093	2.11%		1,472	71,982	1,374	101%
2017	69,496	-2.25%		(1,596)	71,105	(877)	102%
2018	73,308	5.49%		3,812	76,993	5,888	105%
2019	74,666	1.85%		1,357	76,030	(963)	102%
2020	74,328	-0.45%	COVID-19 (shutdown starts 3/2020)	(338)	76,065	35	102%
2021	73,651	-0.91%	COVID-19 (shutdown ends 3/2021)	(677)	77,998	1,933	106%
2022	80,038	8.67%	Rebound from COVID-19 and Ukraine	6,387	82,776	4,778	103%
2023	85,464	6.78%	2nd Hottest Summer	5,426	88,270	5,494	103%
2024	85,199	-0.31%		(265)	88,908	639	104%
2025	83,679	-1.78%		(1,520)	89,812	904	107%

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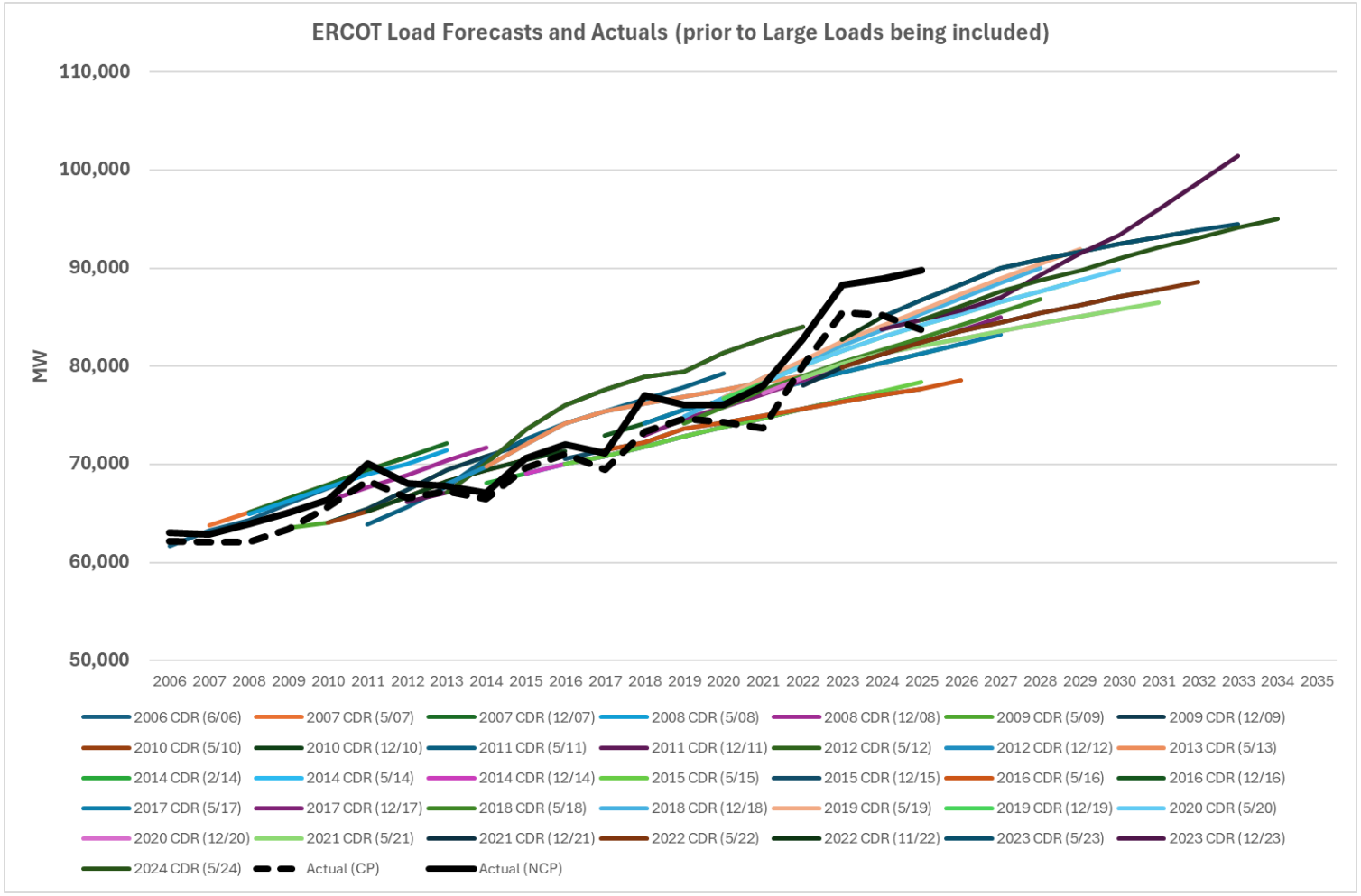
ERCOT Forecast without Large Loads

Typically, twice a year, ERCOT publishes their Capacity Demand and Reserve (CDR) report with a Load Forecast that covers the next 10 years.

They have missed the forecast for a few years with the rebound from COVID-19, the large load additions from crypto, and oil/gas additions. In addition, the heat wave of 2023 also impacted the actual peak load.



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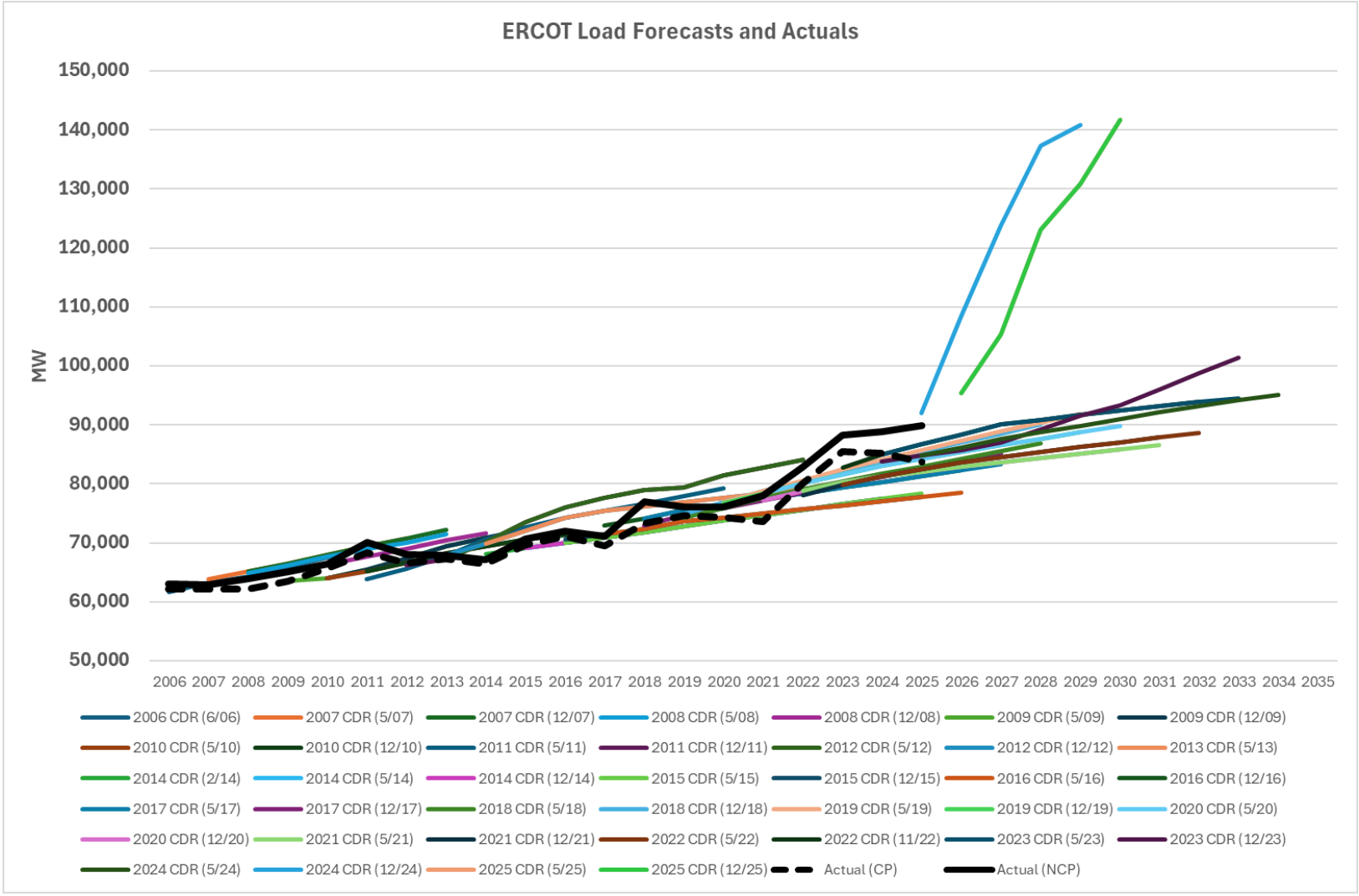
ERCOT Forecast with Large Loads

The inclusion of large loads has resulted in projections that seem impossible to achieve.

As PUCT Project 58481 is finalized with financial security requirements, it is possible that these forecasts will temper down.



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Annual Capacity Changes (with Annual Henry Hub Natural Gas Prices)

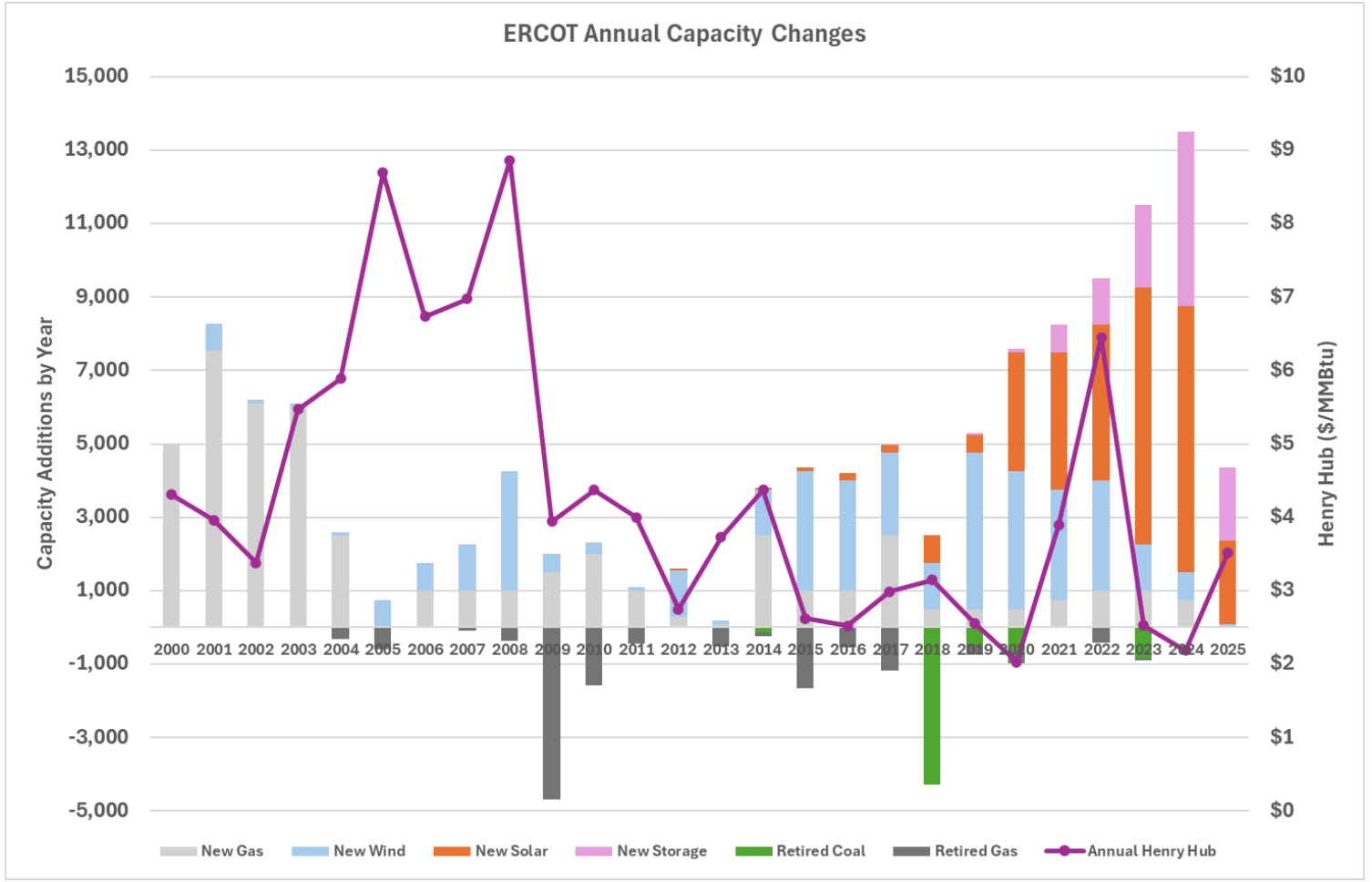
	New Gas	New Wind	New Storage	New Solar	Retired Coal	Retired Gas	ERCOT NCP Peak Load (MW) change (from 2002)	ERCOT CP Peak Load (MW) change (from 2002)
All Years	47,027	36,400	11,200	29,600	(6,371)	(13,218)	33,153	27,611
By 2018	42,027	19,050	50	600	(138)	(12,120)	20,334	17,240

From 2003 to 2005, Mirant (GenOn), Calpine, and NRG all filed for bankruptcy.

With high natural gas prices from 2005 to 2007, hedge funds created Energy Futures Holdings (EFH) and acquired TXU. As natural gas prices dropped because of the introduction of fracking, EFH filed for bankruptcy in 2014.

By 2011, a large amount of older natural gas generation were retired. This was mainly driven by expected lower natural gas prices from fracking, wind generation additions, and the large amount of newly added gas generation.

As low natural gas prices continued, more wind generation was added to the grid, and environmental regulations increased - coal plants in ERCOT started shutting down in 2018.



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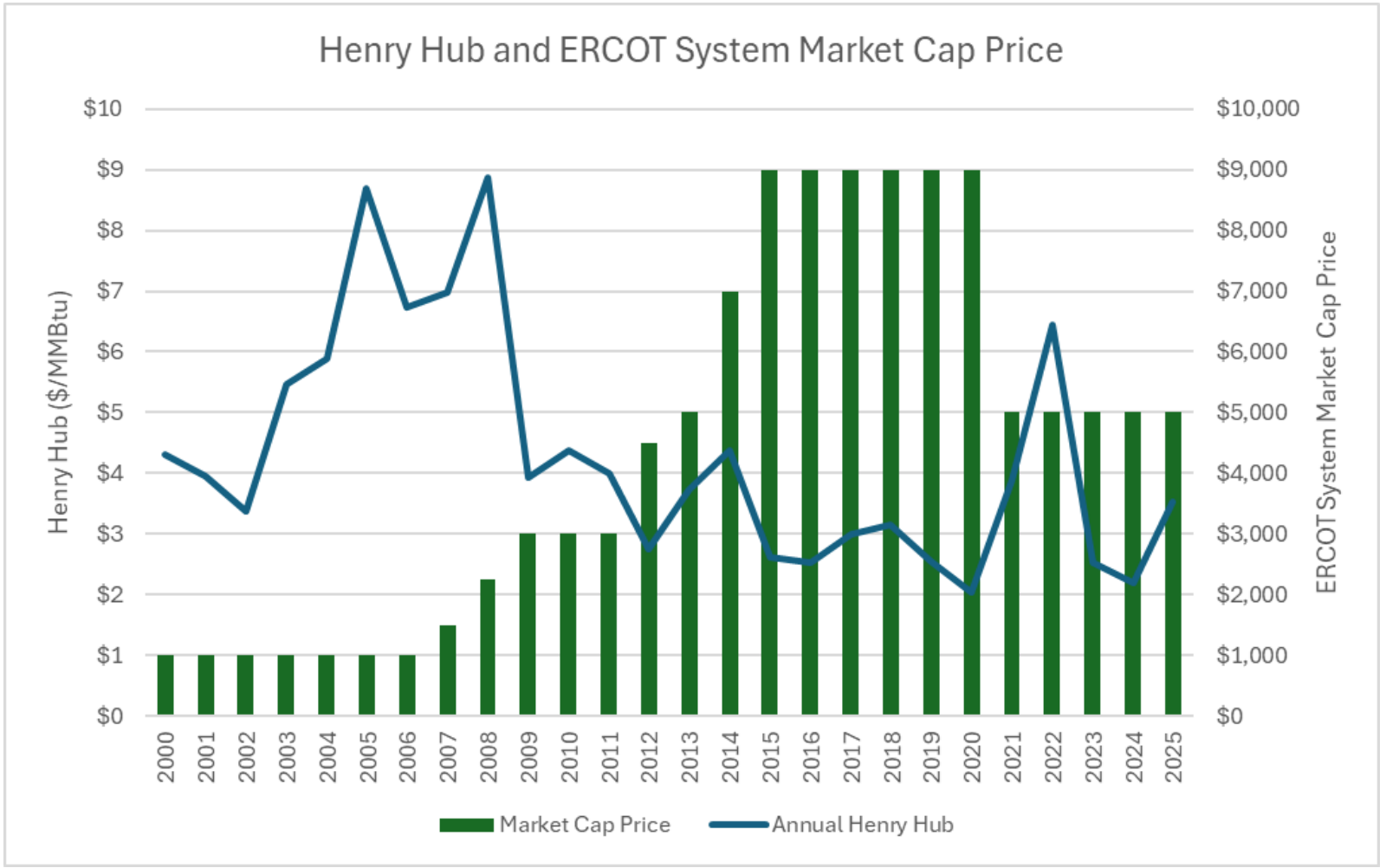
Annual Henry Hub Natural Gas Prices and ERCOT System Market Cap Price

With the collapse of natural gas prices, the PUC of Texas decided to raise the system market cap prices instead of adding a capacity market to ERCOT in 2012.

This same cap was reduced in 2021 after the financial fallout from Winter Storm Uri.



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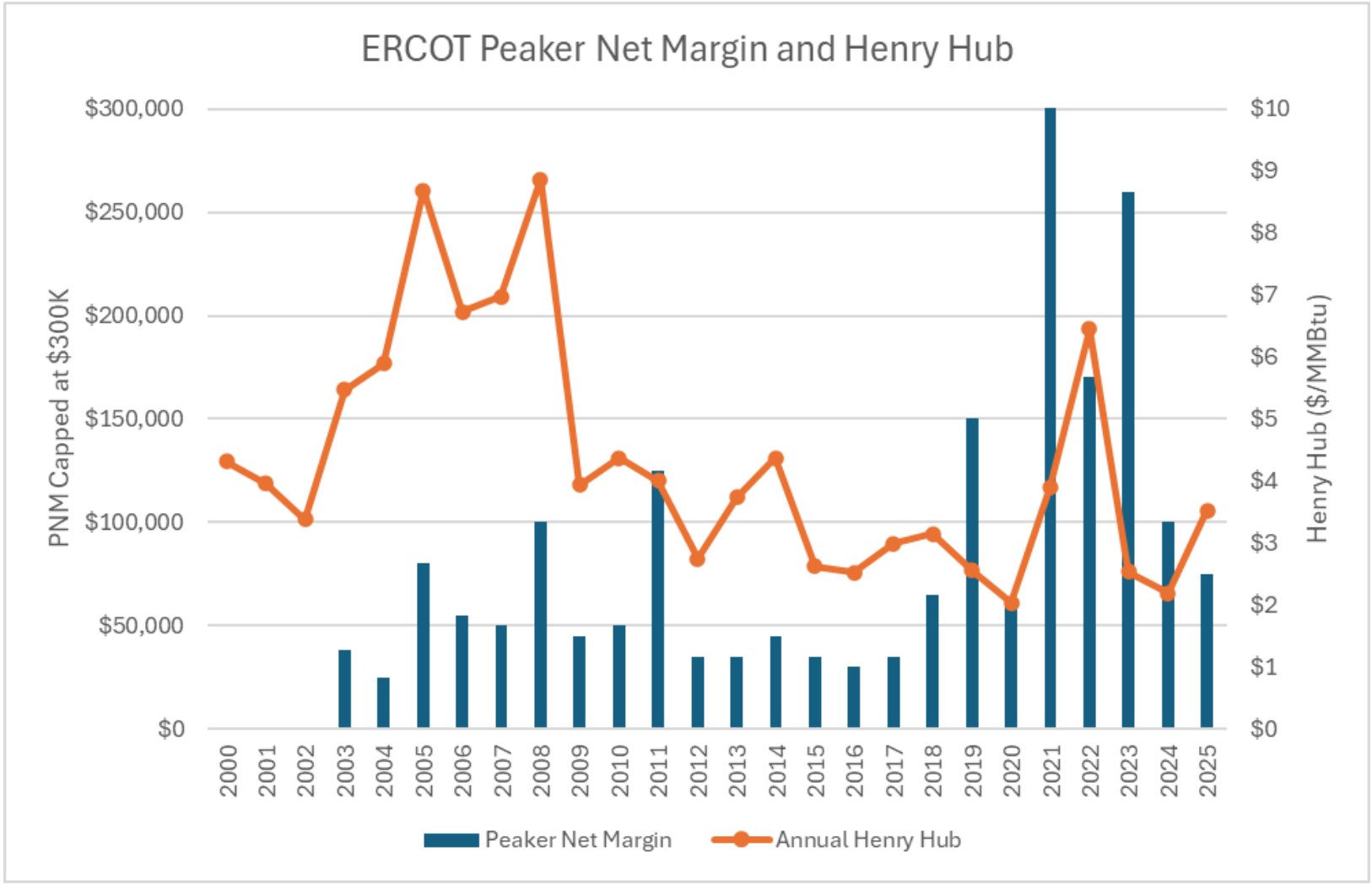
ERCOT Peaker Net Margin and Annual Henry Hub Natural Gas Prices

Even with the higher scarcity pricing starting in 2012, lack of significant weather events resulted in the Peaker Net Margin remaining low from 2012 to 2018.

With the retirement of the coal fleet, Winter Storm Uri, and the natural gas prices spike in 2022 tied to the Russia-Ukraine war, the Peaker Net Margin increased.



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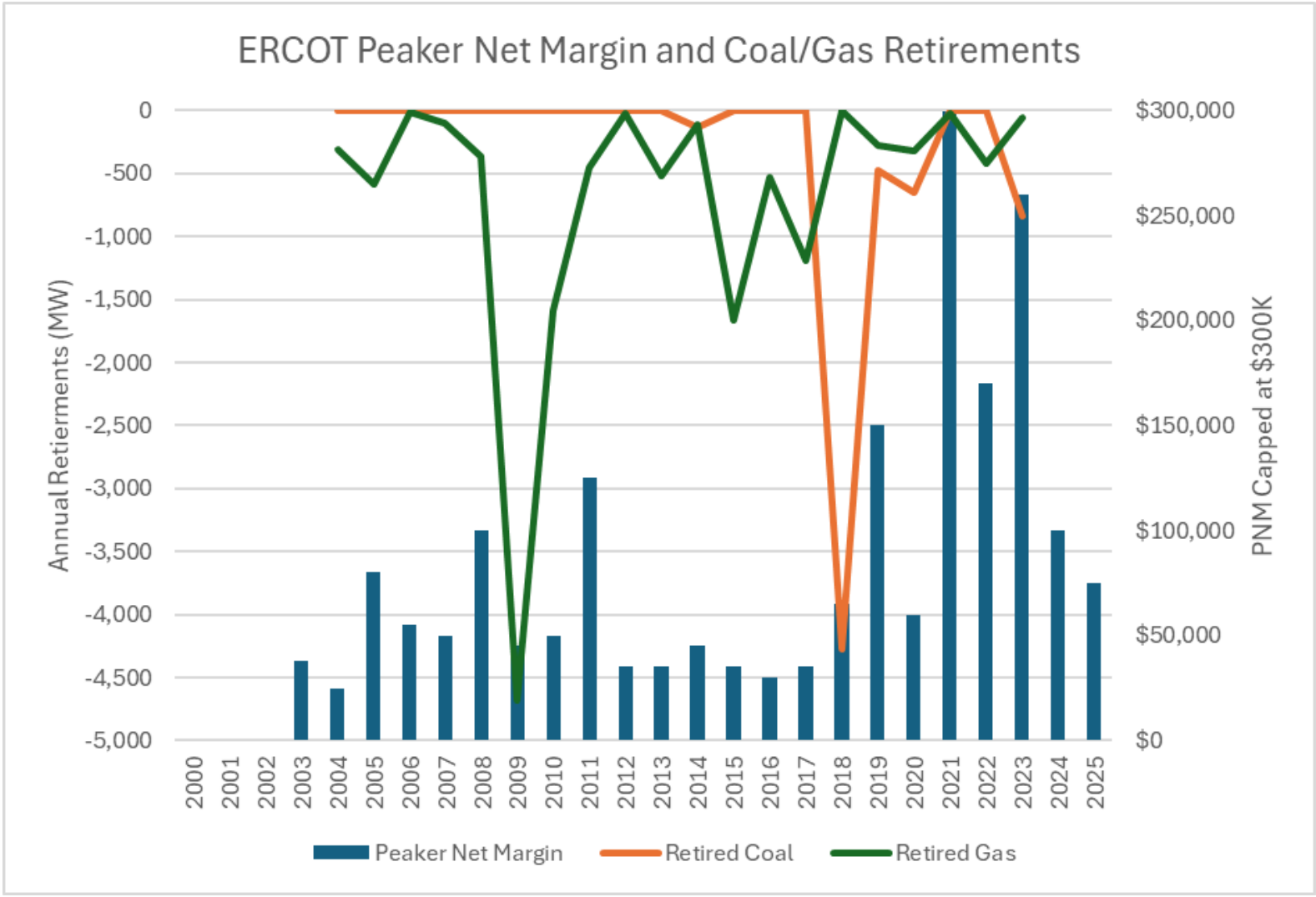
ERCOT Peaker Net Margin and Coal/Gas Retirements

Low Peaker Net Margins were strong signals to retire both older natural gas plants in 2009 and coal plants starting in 2018.

With the desire to not have a capacity market and with expanded environmental rules - other coal plants will probably retire over the next decade.



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Discussion: Should we consider other market design options?

- **Energy Only Market**
  - Currently, we have the Energy Only Market in place with a VOLL of $5,000/MWh ($35,000/MWh for studies only found here).
  - The IMM suggested with their filing at the PUCT (found here) that if we stay with this market, the VOLL should move to up $300,000/MWh to achieve a 1 in 10 reliability standard.
- **DRRS Plus (NPRR 1310)**
- **SPP Resource Adequacy Requirements**
  - Load Responsible Entities (LREs) must maintain sufficient capacity to meet their Resource Adequacy Requirement (RAR)
- **PJM Capacity Market**
  - PJM has a capacity market that operates through forward-looking competitive auctions. The main auction, called the Base Residual Auction (BRA), is held three years in advance of the delivery year.

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