What Really Happened this Summer in ERCOT

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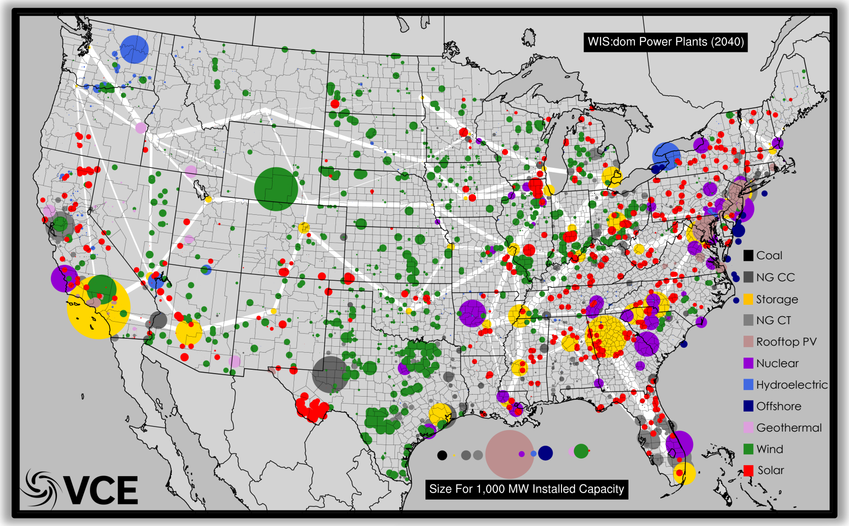
Who Are We: Vibrant Clean Energy (VCE®)



Purpose of Vibrant Clean Energy, LLC:

- ***Reduce the cost of electricity*** and help evolve economies to near zero emissions;
- ***Co-optimize*** transmission, generation, storage, and distributed resources;
- Increase the understanding of how ***Variable Generation impacts and alters the electricity grid*** and model it more accurately;
- ***Agnostically determine the least-cost portfolio*** of generation that will remove emissions from the economy;
- Determine the ***optimal mix of VG*** and other resources for efficient energy sectors;
- Model the ***electrification*** of industry, heating & transportation;
- License ***WIS:dom® optimization modeling suite*** and/or perform studies using the model;
- Ensure ***equitable compensation and costs*** for energy companies within a modernized grid;
- Assist clients ***unlock and understand the potential*** of high VRE scenarios, as well as zero emission pathways.

So what happened in ERCOT this summer?

UTILITY DIVE

BRIEF

ERCOT reserves drop below 2,300 MW, forcing Texas grid to call for energy emergency

Bloomberg

Climate Changed

Power Blows Past $9,000 Cap in Texas as Heat Triggers Emergency

HOUSTON CHRONICLE

OPINION // OUTLOOK

How to fix Texas' Soviet-style electricity market [Opinion]

The Dallas Morning News

BUSINESS › ENERGY

Does Texas need to build more power plants? State's electricity use puts focus on record demand

Joshua Rhodes Aug 15, 2019

AXIOS

EXPERT VOICES

Summer price spikes are a feature of Texas' power market, not a bug

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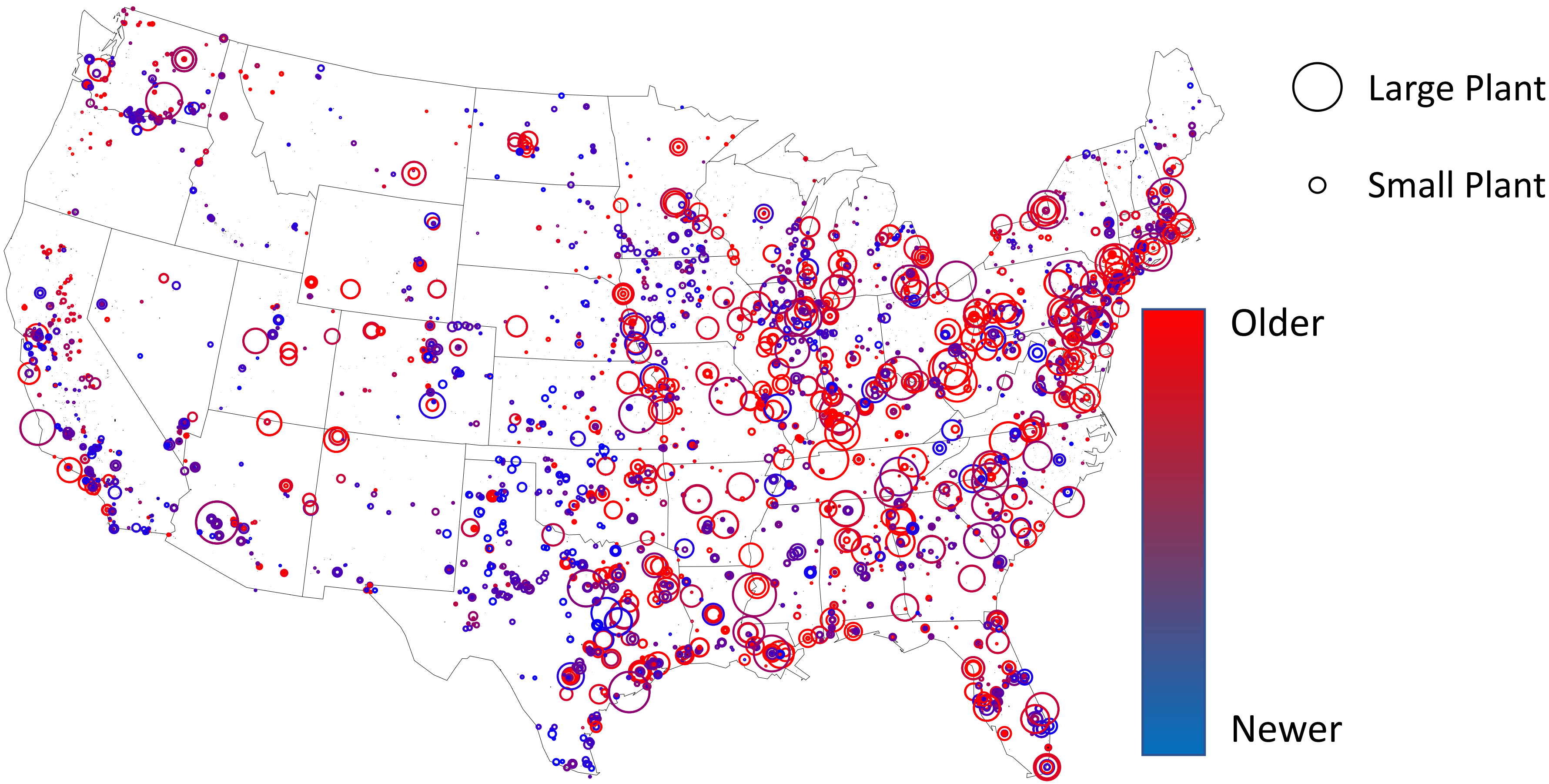
So what happened in ERCOT this summer?

- The reserve margin was low, about 8.4%
- Demand was high due to high temperatures in the major metro areas
  - About 1/2 peak demand driven by residential air-conditioning
- As demand rose, wholesale market prices also rose, hitting the market cap
  - These prices are normal, how the system works
- The market functioned as designed
  - Even with EEA 1 calls (like an insurance policy)

Why was the reserve margin was low this summer?

- Large coal retirements, mostly driven by low natural gas prices
  - Older, larger plants
- Additions are different, lots of renewables
  - Wind only gets 15% credit towards peak (58% coastal)
  - Solar gets 74% credit
  - Gas is built at smaller-scale than retiring coal

Bigger plants tend to be older, so when they retire it makes a difference



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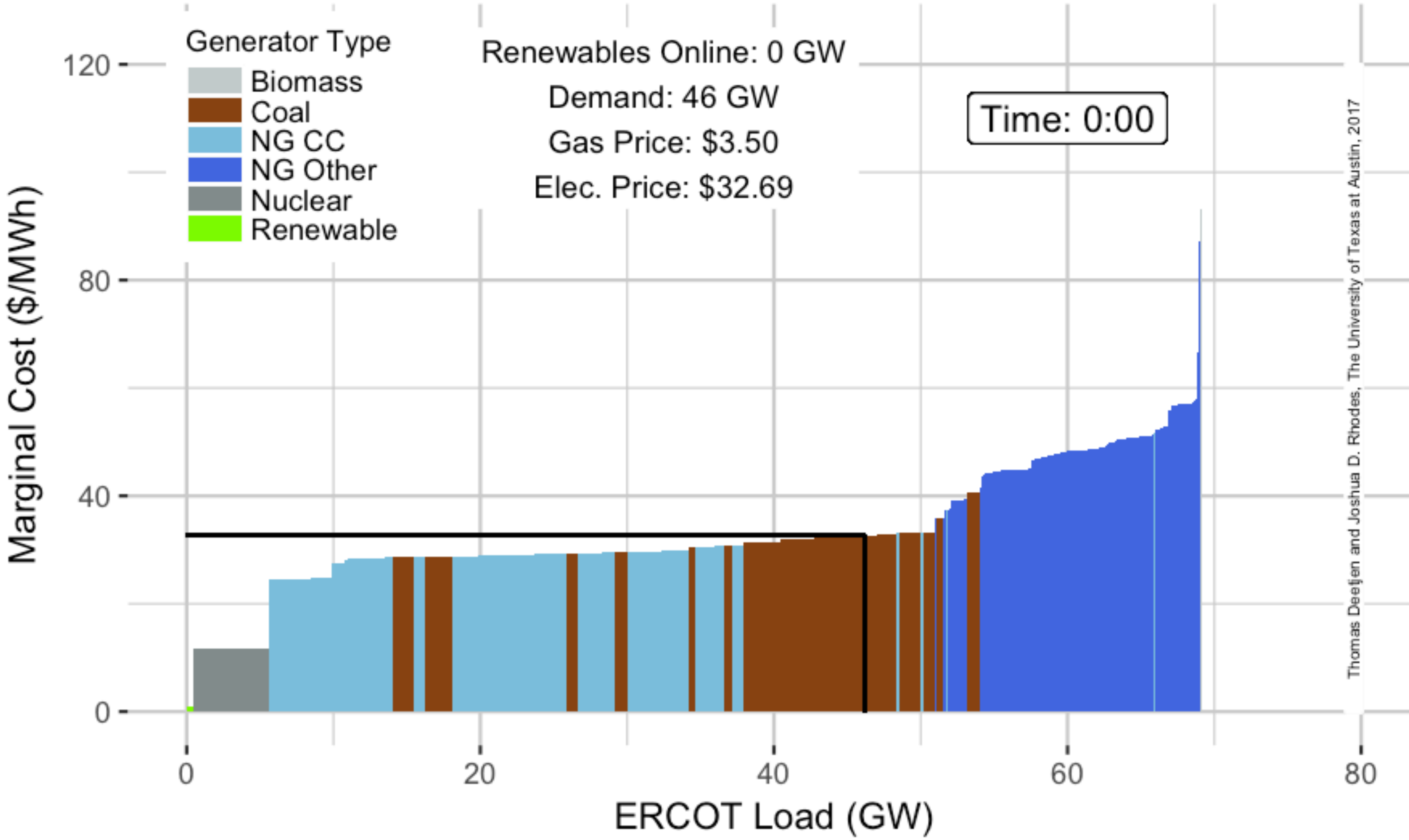
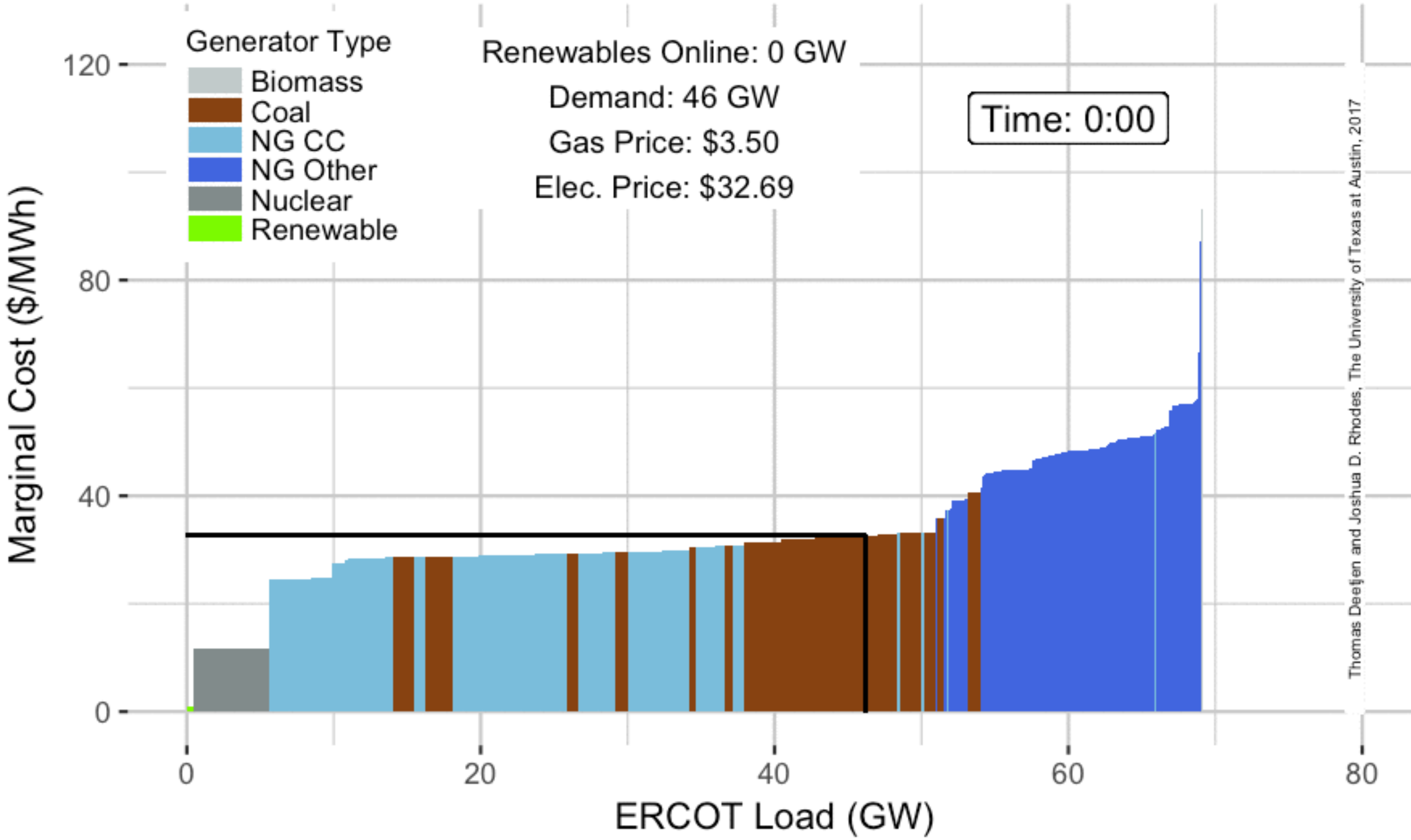
ERCOT is an energy-only market

- Power plants are only (mostly) paid for producing energy
- Other markets have capacity markets that pay plants to be available
- Power plants in ERCOT rely on revenues from energy production to make them whole

ERCOT dispatches the cheapest power plants to meet demand



And that price changes as demand changes throughout the day



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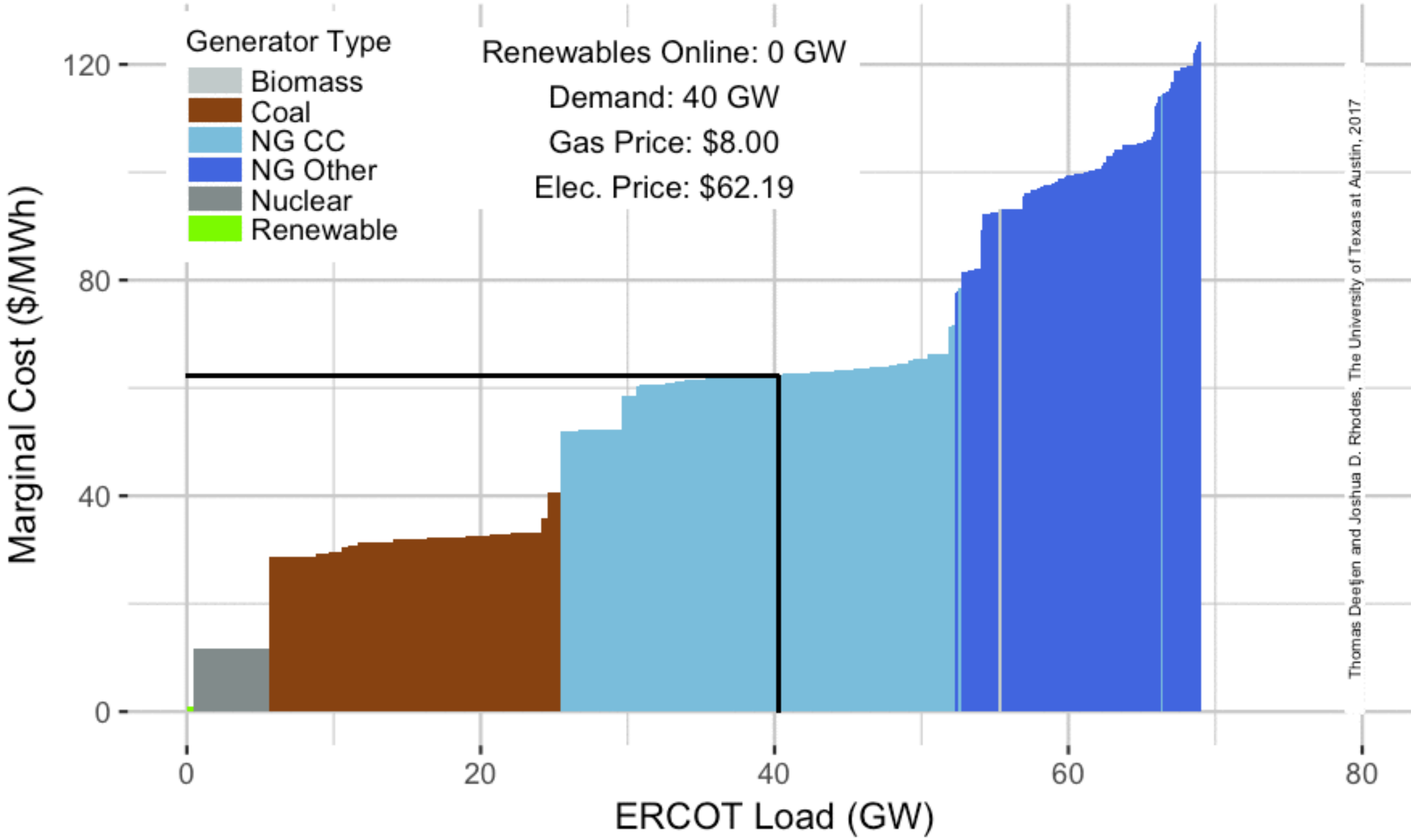
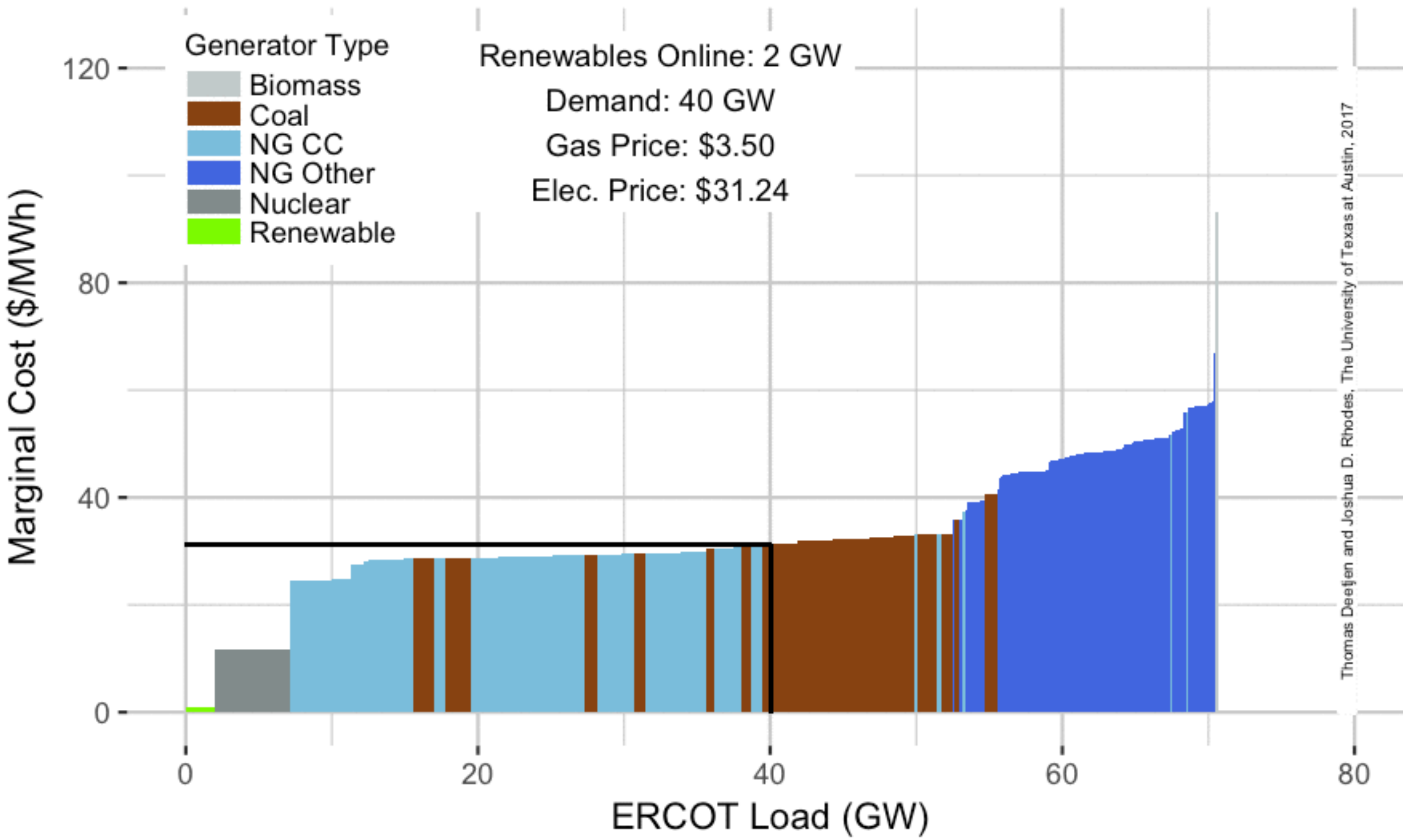
Fuel price changes can also impact ERCOT market prices

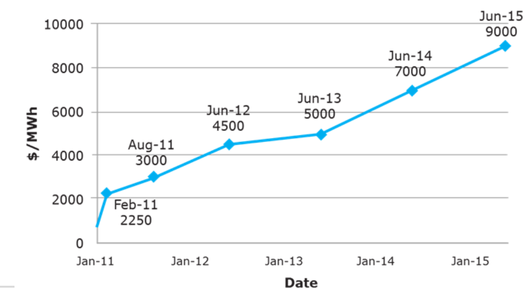


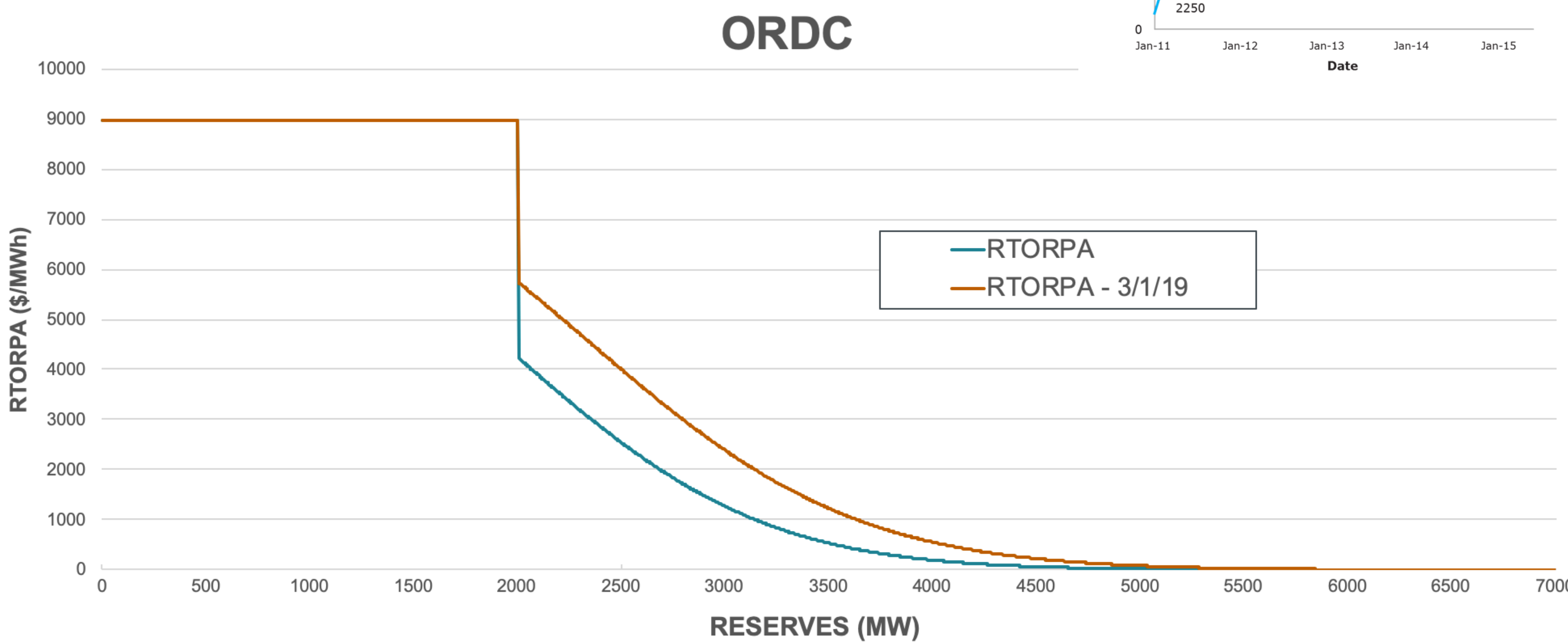
Renewables can impact prices too



But why did prices get so high this summer?

VOLL

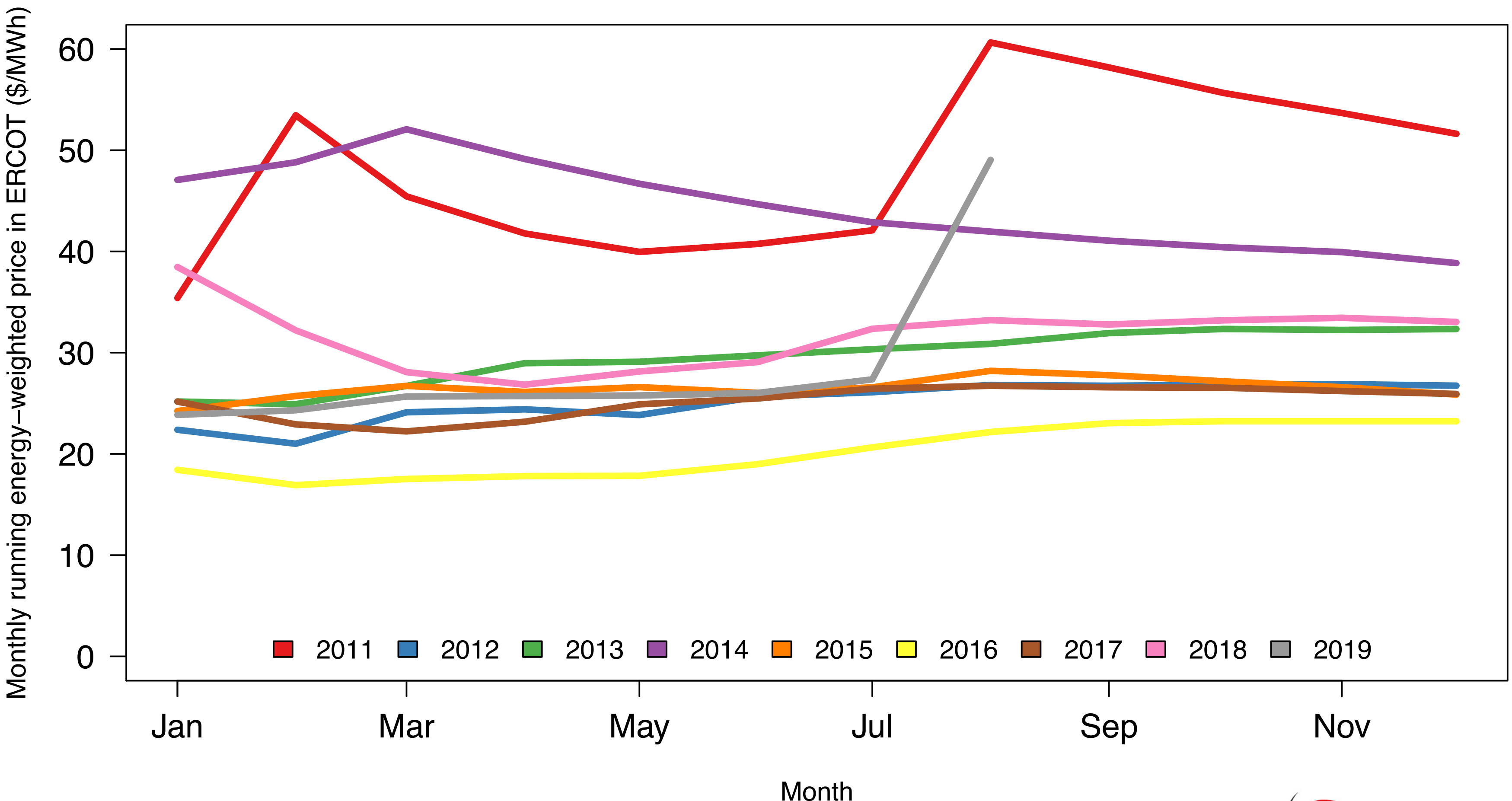




High (scarcity) prices are a feature of the ERCOT market, not a failure

- Generators rely on scarcity prices in energy-only markets
- Not having scarcity price formation **would** be a market failure
- The right scarcity prices send a market signal as to what needs to be where and when
  - Other mechanisms, such as capacity markets can be less efficient

Prices have been low in ERCOT for some time, they need to recover



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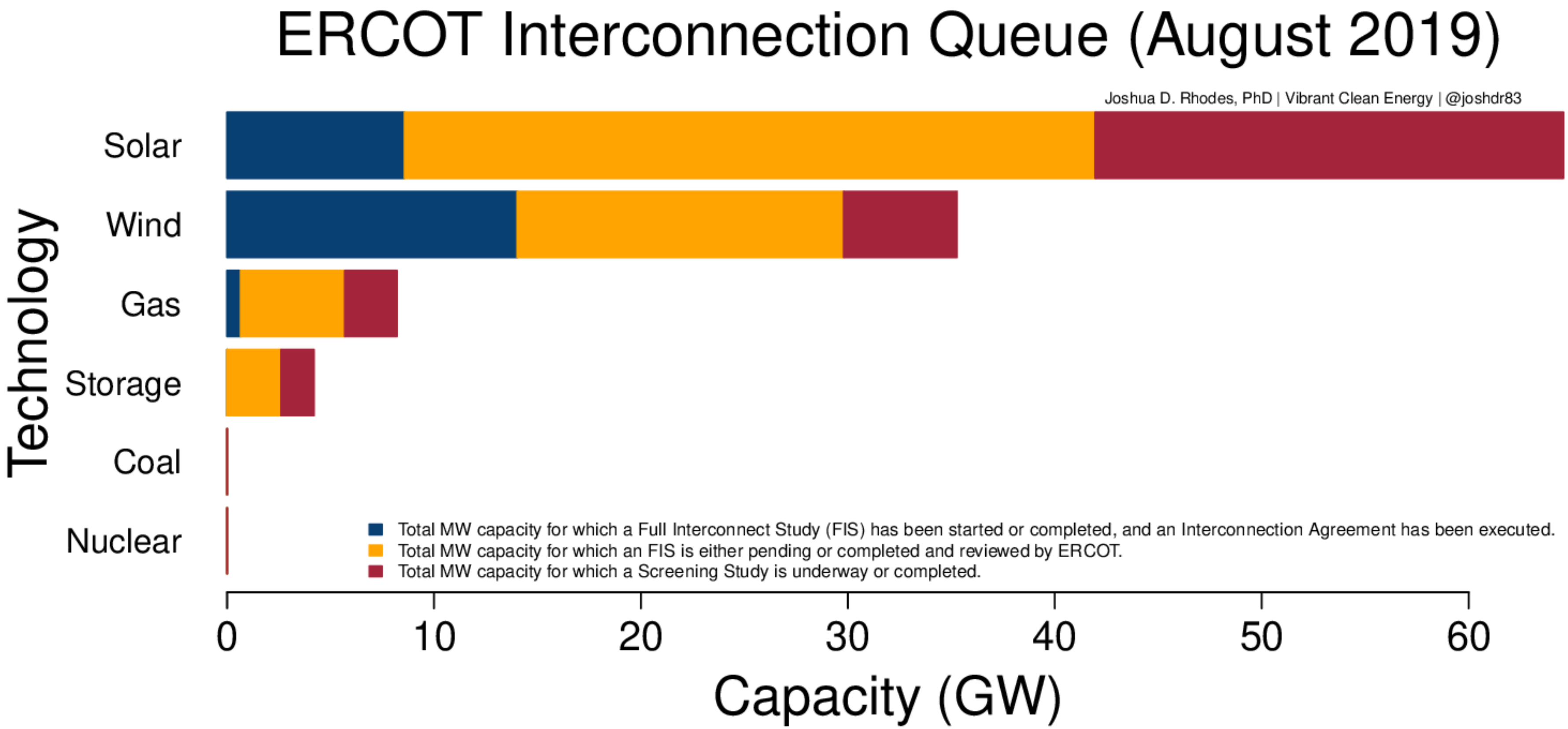
There are projects in the ERCOT interconnection queue



The reserve margin is set to recover

- The market equilibrium reserve margin* for ERCOT is about 10.25%

Report on the Capacity, Demand and Reserves in the ERCOT Region — Summer Summary: 2020-2024					
Load Forecast, MW:	**2020**	**2021**	**2022**	**2023**	**2024**
Summer Peak Demand (based on normal weather)	76,845	78,824	80,590	82,506	84,121
plus: Energy Efficiency Program Savings Forecast	1,764	2,065	2,285	2,592	2,821
Total Summer Peak Demand (before Reductions from Energy Efficiency Programs)	78,609	80,888	82,875	85,098	86,943
less: Load Resources providing Responsive Reserves	-1,173	-1,173	-1,173	-1,173	-1,173
less: Load Resources providing Non-Spinning Reserves	0	0	0	0	0
less: Emergency Response Service (10- and 30-min ramp products)	-749	-749	-749	-749	-749
less: TDSP Standard Offer Load Management Programs	-219	-219	-219	-219	-219
less: Energy Efficiency Program Savings Forecast	-1,764	-2,065	-2,285	-2,592	-2,821
Firm Peak Load, MW	**74,705**	**76,683**	**78,449**	**80,365**	**81,981**
Total Capacity, MW	**82,521**	**88,359**	**88,644**	**88,644**	**88,389**
Reserve Margin	**10.5%**	**15.2%**	**13.0%**	**10.3%**	**7.8%**
(Total Resources - Firm Load Forecast) / Firm Load Forecast					

*http://www.ercot.com/content/wcm/lists/143980/10.12.2018_ERCOT_MERM_Report_Final_Draft.pdf

Thank You

Questions?

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