

Chart of the Week #2023-06

ERCOT: Freezin' Down in Texas - Mid-Winter 2022-2023 Generation Mix, Shortfalls, and Refinery Utilization



**Max Pyziur
February 8, 2023
Washington, DC**

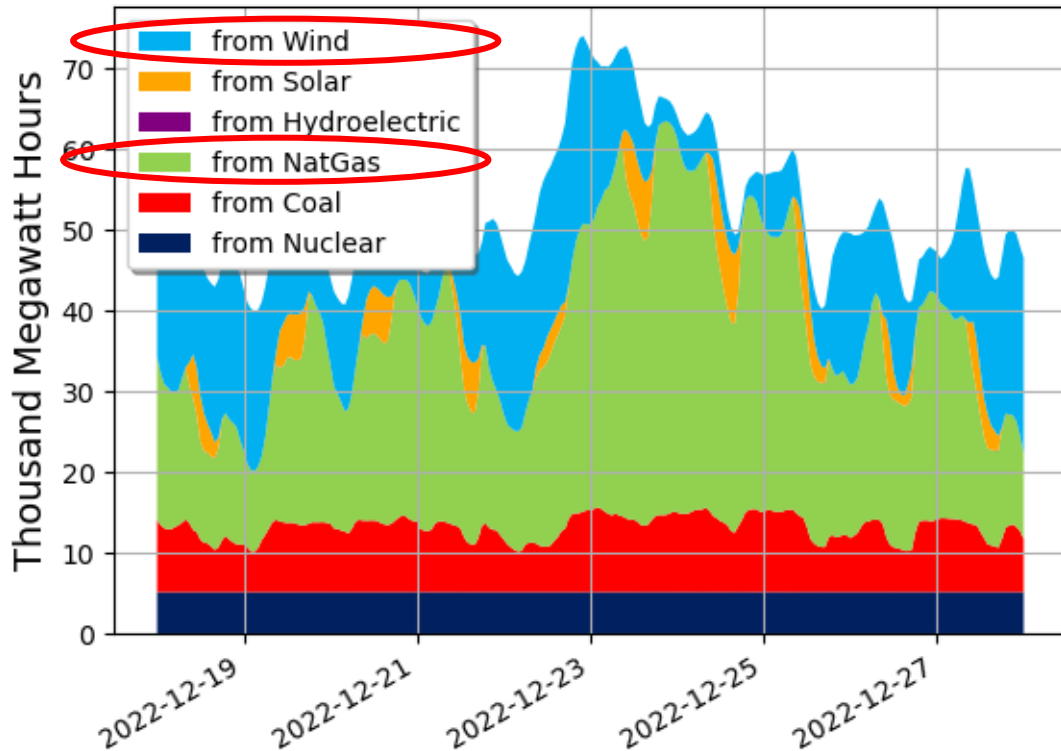
Texas / ERCOT Power Generation Shortfalls - 2022-2023



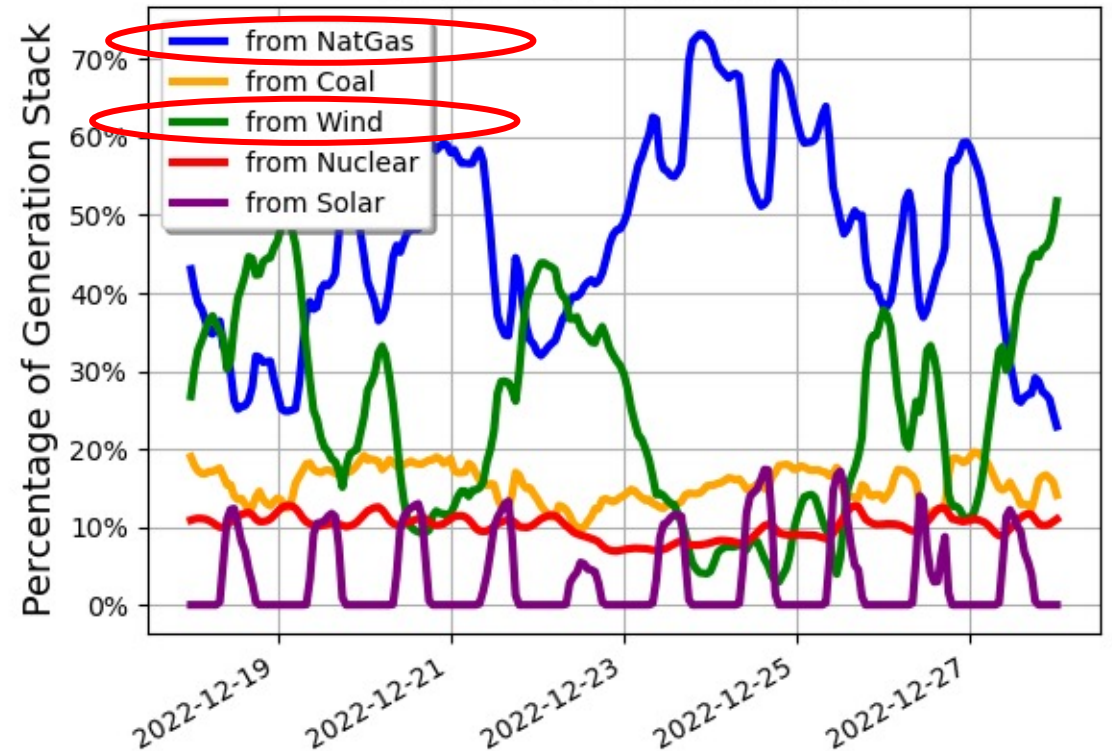
Late December 2022 – Winter Storm Elliott

In late December 2022, (unofficially named) Winter Storm Elliott caused electricity demand to peak at 74 GWHs from Texas' grid. At that peak, natural gas power produced 45 GWHs (gigawatt hours), or over 70% of what was generated, while wind delivered 10 GWHs, or 15%. With the emergency situation, grid operators were given limited air pollution exemptions allowing for greater use of coal power.

ERCOT of Texas Hourly Electricity Production:
12/18/2022 to 12/28/2022



ERCOT of Texas Hourly Electricity Production:
12/18/2022 to 12/28/2022



Analysis based on Hourly EIA Data

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Analysis based on Hourly EIA Data

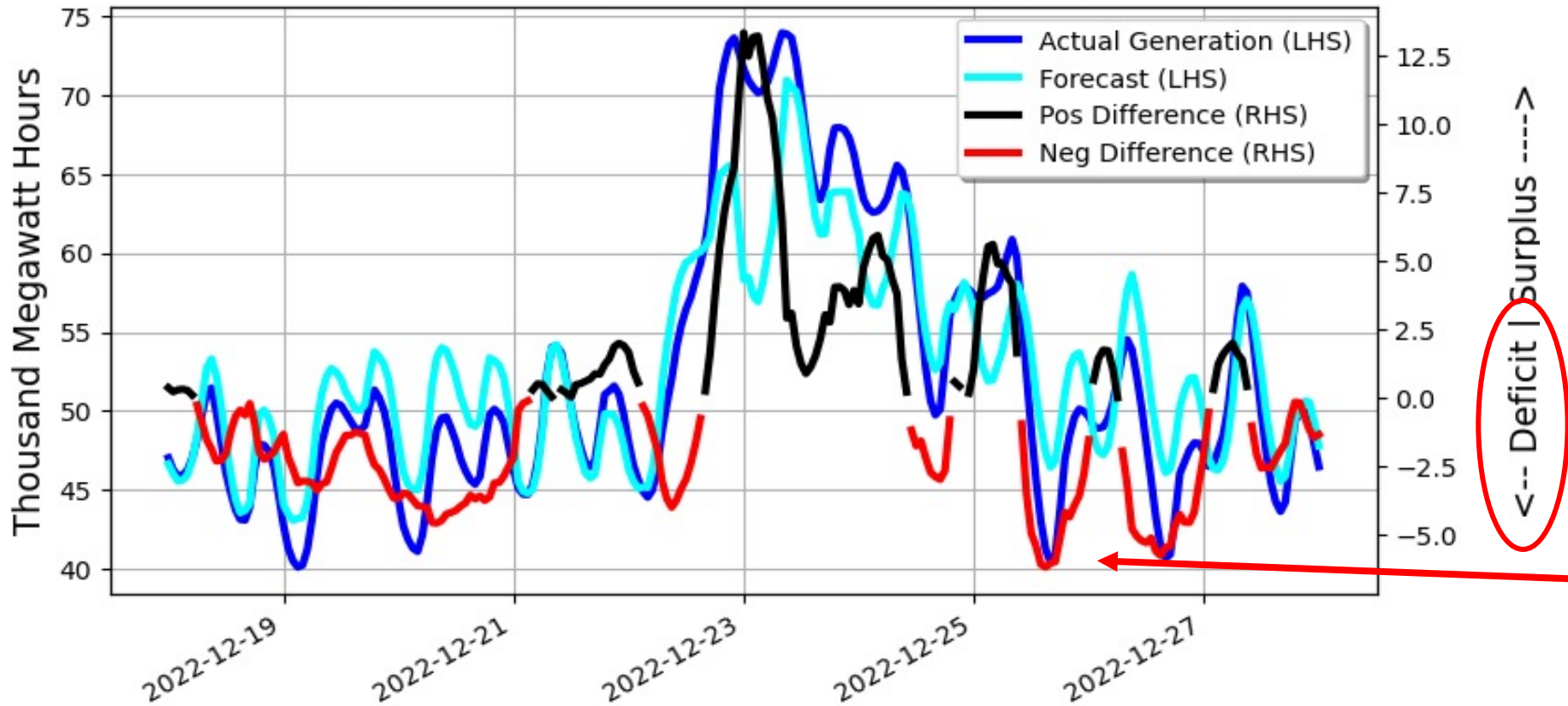
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Late December 2022 – Winter Storm Elliott

ERCOT of Texas Electricity Generation vs Forecast
Requirement: 12/18/2022 to 12/28/2022



With Winter Storm Elliott causing high demand, Texas/ERCOT experienced generation deficits of up to 5 GWs.

Analysis based on EIA Data

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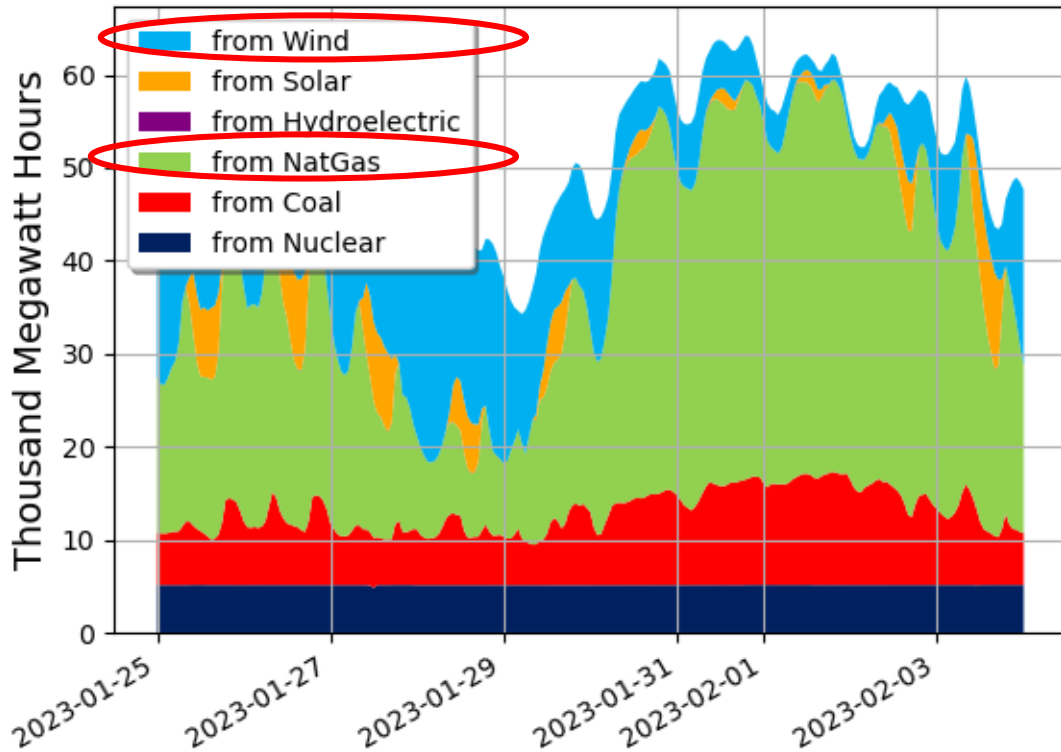
Texas / ERCOT Power Generation Shortfalls - 2022-2023



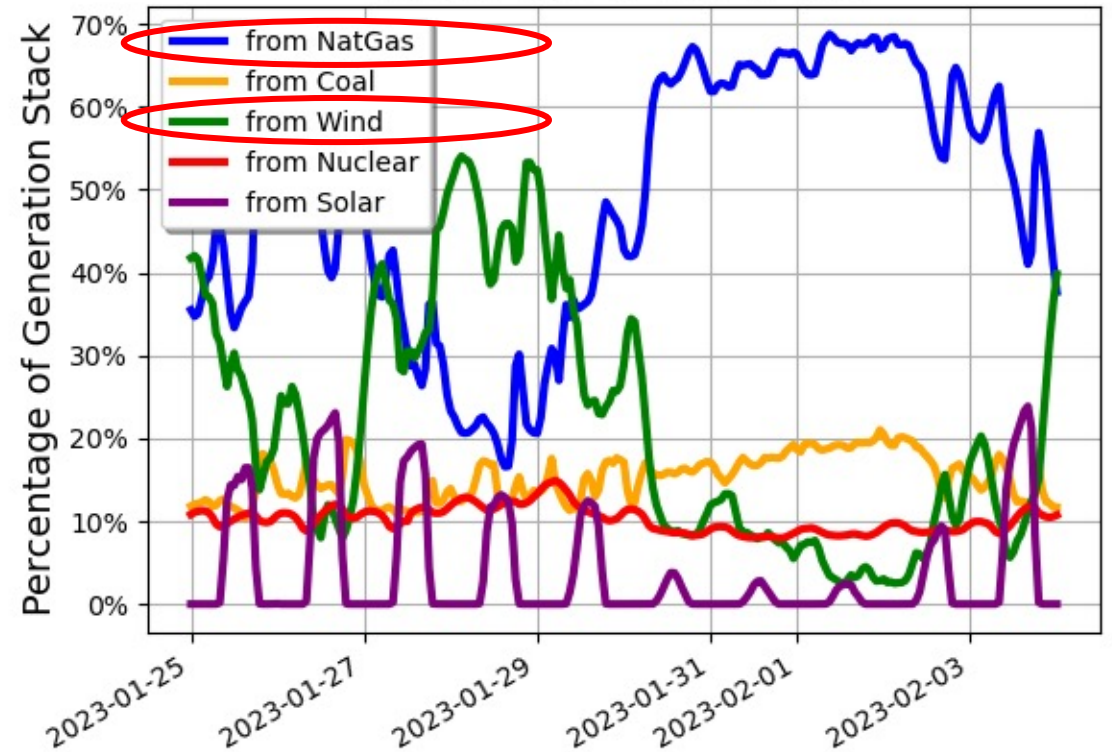
Early February 2023

In early February 2023, a second, more severe wave of cold weather hit Texas. While demand peaks were less than in December at 65 GWs, natural gas produced 65% of requirements at peak, coal almost 20%, while wind generated 0% due to many wind turbines freezing. During key intervals, there were shortages between 4.5 and 7 GWs leading to considerable load shedding (rolling blackouts). At peak on February 2nd, 430,000 households were without power in Texas.

ERCOT of Texas Hourly Electricity Production:
01/25/2023 to 02/04/2023



ERCOT of Texas Hourly Electricity Production:
01/25/2023 to 02/04/2023



Analysis based on Hourly EIA Data

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Analysis based on Hourly EIA Data

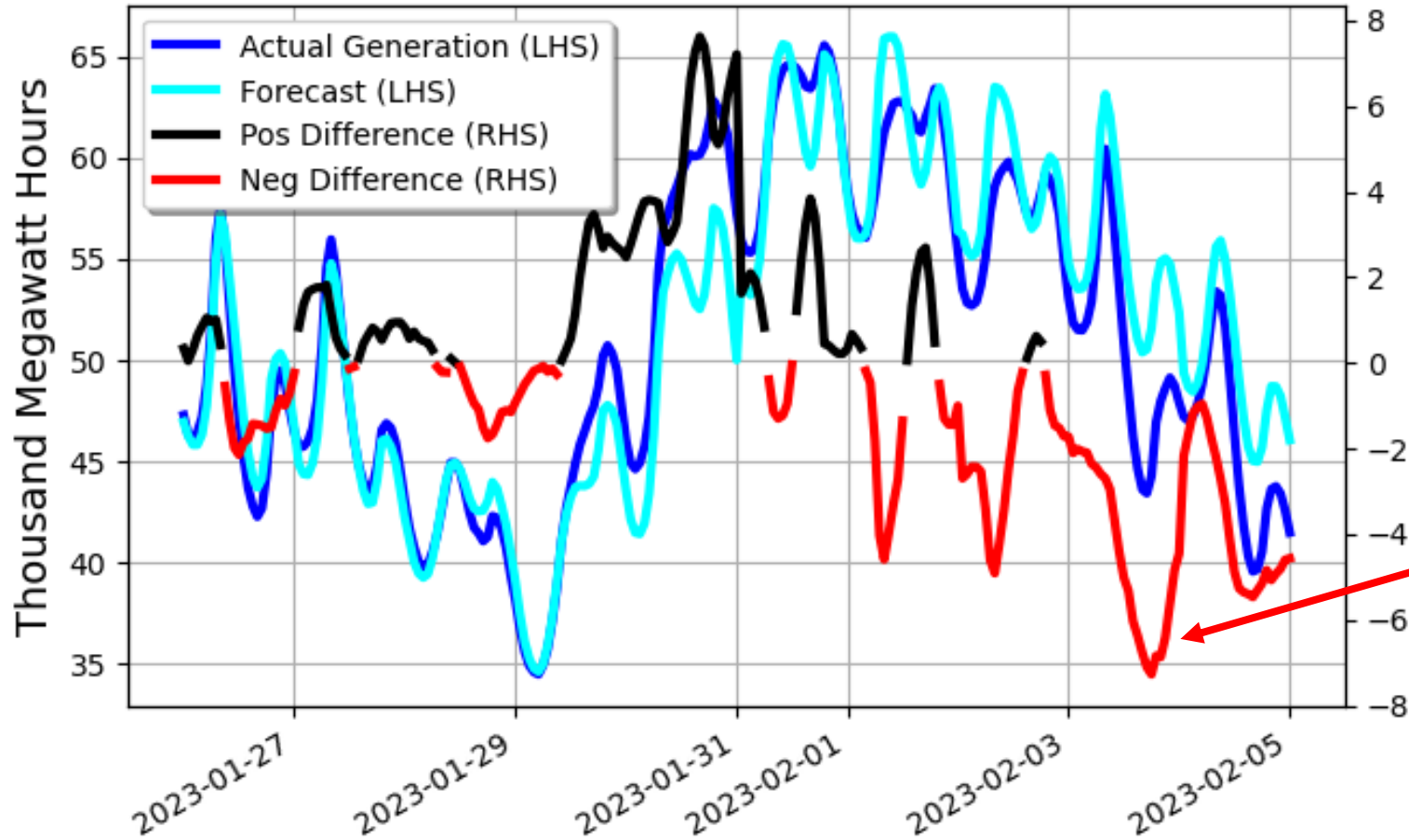
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Early February 2023

ERCOT of Texas Electricity Generation vs Forecast
Requirement: 01/26/2023 to 02/05/2023



<--- Deficit | Surplus ---->

During key intervals, there were shortages between 4.5 and 7 GWs leading to considerable load shedding (rolling blackouts). At peak on February 2nd, 430,000 households were without power in Texas.

Analysis based on EIA Data

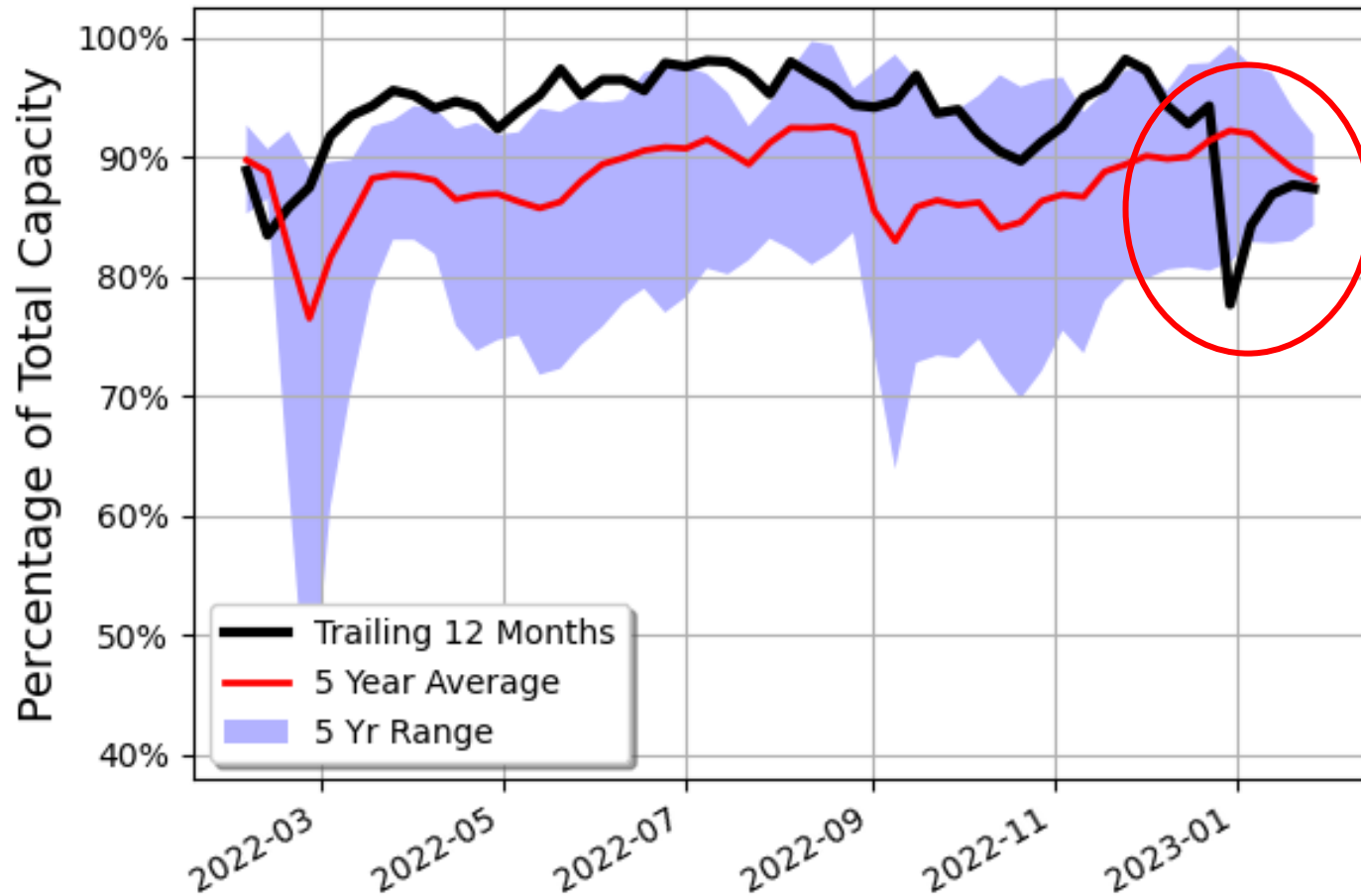
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Refining Utilization impact at the Gulf Coast



United States - Gulf Coast: Weekly Refinery Capacity Utilization trailing twelve months through 02/03/2023



During Winter Storm Elliott, there was a significant drop in U.S. Gulf Coast refining capacity utilization from 92% to 80%, or about 1.1 million barrels per day. Utilization partially recovered in January 2023, but February's cold blast kept things constrained.

Analysis based on EIA Data

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Texas / ERCOT Power Generation Shortfalls - 2022-2023



- In February 2021, Winter Storm Uri brought extreme freezing weather to Texas. With 62% of Texas' 10 million homes relying on electric space heating, demand rose quickly, peaking on February 16th at 75 gigawatt hours (GWhs) (where normal demand ranges from 40 to 50 GWhs).
- However, due to several factors, especially the severe freeze, the Texas electricity grid could not accommodate the demand, producing a shortfall at the worst moment of the crisis of a deficit of 25 GWhs. Along with several hundred deaths, Dallas Federal Reserve economists estimated that the storm and associated blackouts cost the state's economy between \$80 and \$130 billion.
- With Uri, seen as a one-in-ten year event, U.S. and Texas policymakers promised swift reviews and authoritative legislative action. The Texas state legislature passed laws, but many saw them as muted.
- Not heeding one-in-ten parameters, the Winter of 2022-2023 has brought freezing cold to Texas twice that have approached the extremes of February 2021. In late December 2022, (unofficially named) Winter Storm Elliott caused demand to peak at 74 GWhs from Texas' grid. At the peak, natural gas power produced 45 GWhs, or over 70% of what was generated, while wind delivered 10 GWhs, or 15%. With the emergency situation, grid operators were given limited air pollution exemptions allowing for greater use of coal power.
- *... continuing ...*

Texas / ERCOT Power Generation Shortfalls - 2022-2023



- In early February 2023, a second, more severe wave of cold weather hit Texas. While demand peaks were less than in December at 65 GWhs, Natural gas produced 65% of requirements at peak, coal almost 20%, while wind generated 0% due to many wind turbines freezing. At key intervals, there were shortages between 4.5 and 7 GWhs leading to considerable load shedding (rolling blackouts). At peak on February 2nd, 430,000 households were without power in Texas.
- In the interval between the two storms, the Public Utility Commission of Texas voted on January 20th to adopt an overhaul of Texas' electricity market instituting regulations labelled a Performance Credit Mechanism (PCM), allowing generators to earn credits, especially at times of peaking generation need.
- During Winter Storm Elliott, there was significant drop in U.S. Gulf Coast refining capacity utilization from 92% to 80%, or about 1.1 million barrels per day. Utilization partially recovered in January 2023, but February's cold blast kept things constrained.
- *... continuing ...*

Texas / ERCOT Power Generation Shortfalls - 2022-2023



Background:

- **By 1930, most U.S. urban areas had been electrified for the better part of two decades. However, rural areas had yet to receive the benefits of electrification.**
- **With the establishment of the Rural Electrification Administration (REA) in 1938, President Franklin Roosevelt vowed to bring electrification to rural homesteads.**
- **Representing rural Hill Country in the middle of Texas and in his first year as the elected congressman from the state's tenth congressional district, President Johnson lobbied hard to bring REA funds to his district. At the time, Texas had a population of 5 million in 1930, or 4% of the total U.S. population. The population has grown to 30 million in 2020, the 4th largest in the U.S. and having 9% of the country's total.**
- **In 1950, less than 1% of Texas homes used electric heating. By 2010, this proportion had grown to 62%. Low residential electricity prices in Texas incentivize the use of electric space heating.**
- **This slide deck is available on the [EPRINC Website](#)**
- **For more information on this chart, please contact Max Pyziur (maxp@eprinc.org).**