

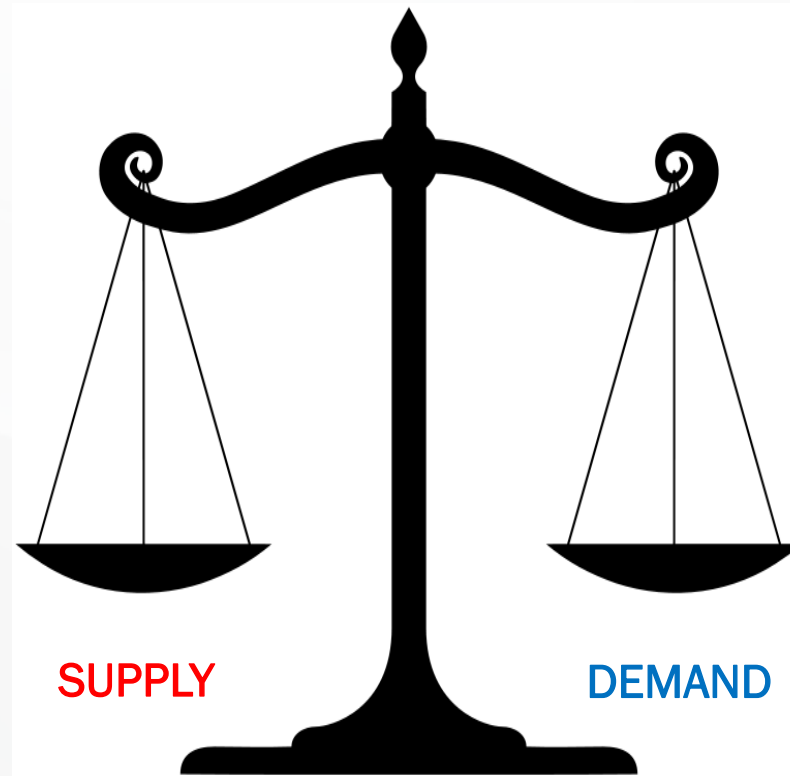


AOBA Market Update

February 7, 2023

Factors Affecting a Balanced Market

- Natural gas production
- Gas storage inventories
- Pipeline capacity
- Coal supply
- Pipeline imports
- Gov. regulation



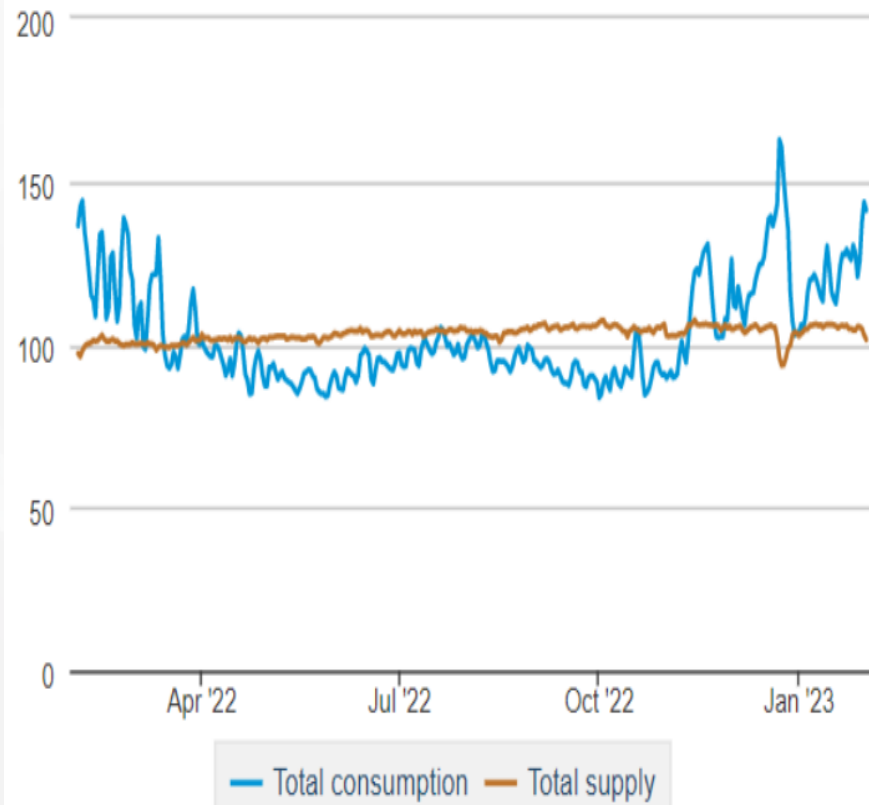
- Weather
- Economy?
- LNG Exports
- Pipeline exports
- Fuel switching/
coal floor
- Coal retirements
- Generation
outage season

Customer Takeaway: Significant changes to both supply and demand can result in an imbalance in the market. This presents energy buyers with both upside risk and downside buying opportunities when considering a risk mitigation strategy for energy.

Current Supply and Demand

Total supply/demand balance (last 365 days)

billion cubic feet per day



Natural Gas Supply

U.S. natural gas supply - Gas Week: (1/26/23 - 2/1/23)

	Average daily values (billion cubic feet)		
	this week	last week	last year
Marketed production	110.3	112.5	107.0
Dry production	98.2	100.0	95.1
Net Canada imports	5.8	5.2	7.1
LNG pipeline deliveries	0.1	0.1	0.3
Total supply	104.1	105.4	102.5

Natural Gas Demand

U.S. natural gas consumption - Gas Week: (1/26/23 - 2/1/23)

	Average daily values (billion cubic feet)		
	this week	last week	last year
U.S. consumption	106.6	99.9	110.7
Power	33.5	32.9	31.5
Industrial	25.9	25.3	26.5
Residential/commercial	47.2	41.8	52.7
Mexico exports	5.3	5.5	5.9
Pipeline fuel use/losses	7.8	7.7	7.7
LNG pipeline receipts	12.7	12.5	12.5
Total demand	132.4	125.6	136.8

Energy Market Overview

- U.S. natural gas futures drop to **25-month low** on strong gas production, weak winter heating demand, robust storage levels and a belief by the market, that the Freeport LNG facility won't return to exporting gas until March at the earliest. Currently at **\$2.49/MMBtu**.
- Strong warming this week will send temperatures well above normal in most areas. A back-and-forth pattern in the 11-15 day may introduce some cold shots back into the pattern, but it probably still averages above normal, especially in the East and South.
- Total US dry gas production averaged **100.1 Bcf/d** month to date, roughly **3.0 Bcf/d** higher MoM or **5.8 Bcf/d** higher YoY.
- Working gas in storage was 2,583 Bcf as of Friday, January 27, 2023, according to EIA estimates. This represents a net decrease of 151 Bcf from the previous week. Stocks were 222 Bcf (**9.4%**) higher than last year at this time and 163 Bcf (**6.7%**) above the five-year average of 2,420 Bcf.
- Growing belief that Freeport LNG export facility (**2.3 Bcf/d of natural gas export capacity**) will start pulling in gas, however they said that they don't believe it will be until Mid-March or later until they are exporting at full capacity.
- Power forward prices in PEPCO for the **2023-2027** term are still **+16%** higher, on average, over the past year but have fallen **-11%** this past month and are **-22%** lower than the all-time highs this past summer.

NYMEX Falls to 25-Month Low



Customer Takeaway: U.S. natural gas futures fell about 8% to \$3.56 mmBtu, their lowest in a year on Tuesday on rising output and forecasts for lower heating demand than previously expected for this week.

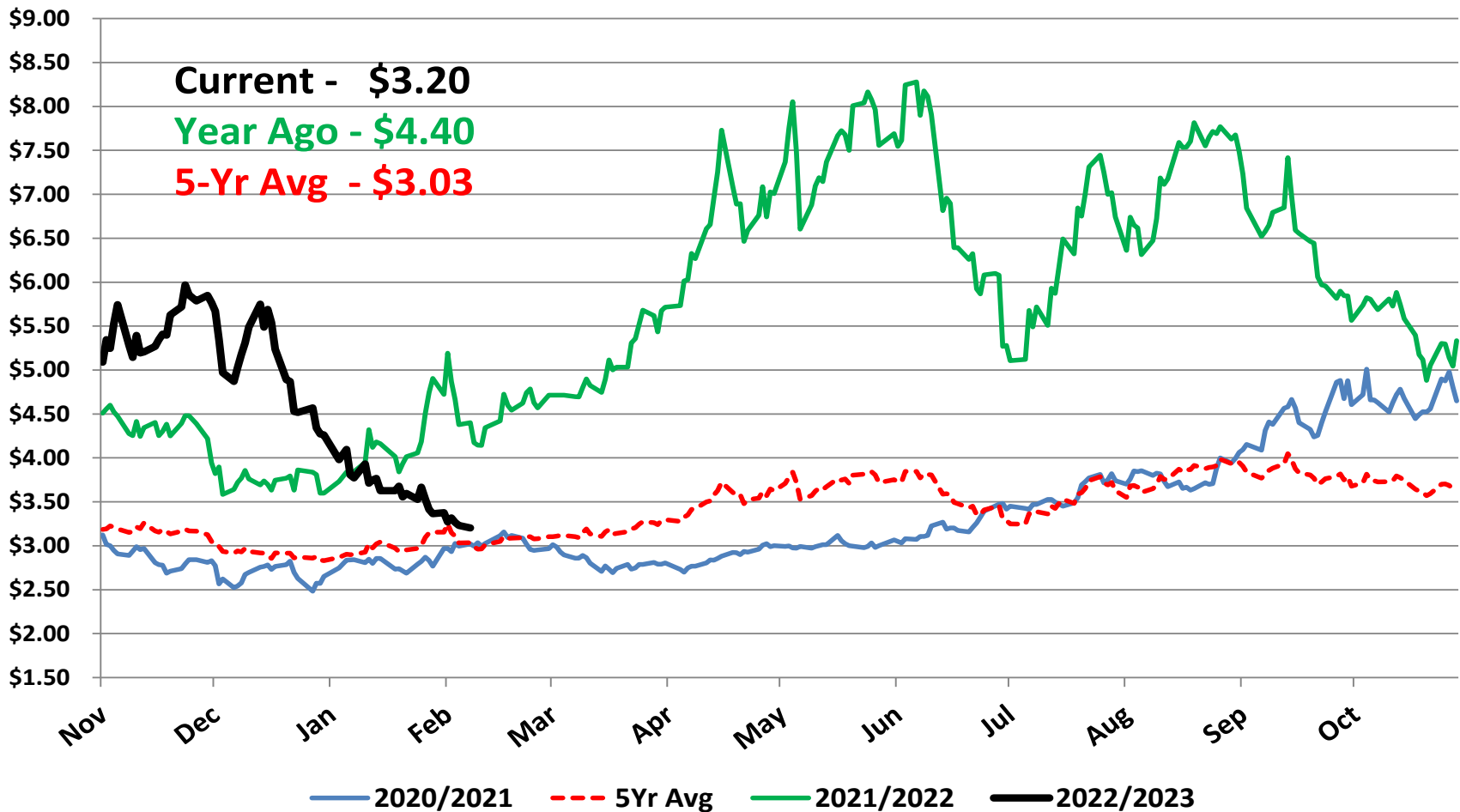
Source: CQG/NYMEX

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Forward Natural Gas Strip Back to 5-Year Average

NYMEX 12-Month Rolling Strip Nov-Oct Trend

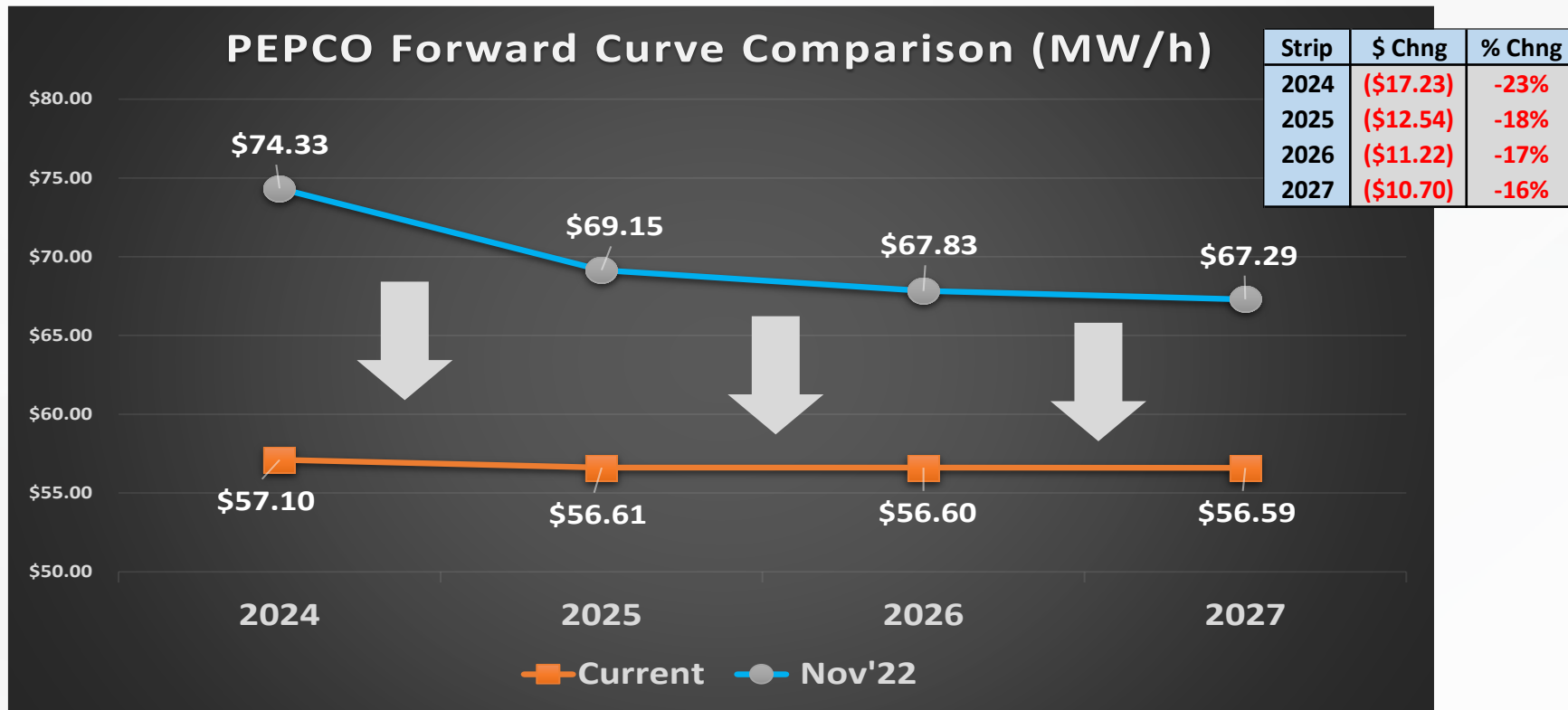


Source: Constellation Prices as of COB 1/9/2023

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PEPCO Current Forward Prices from 2022 Highs



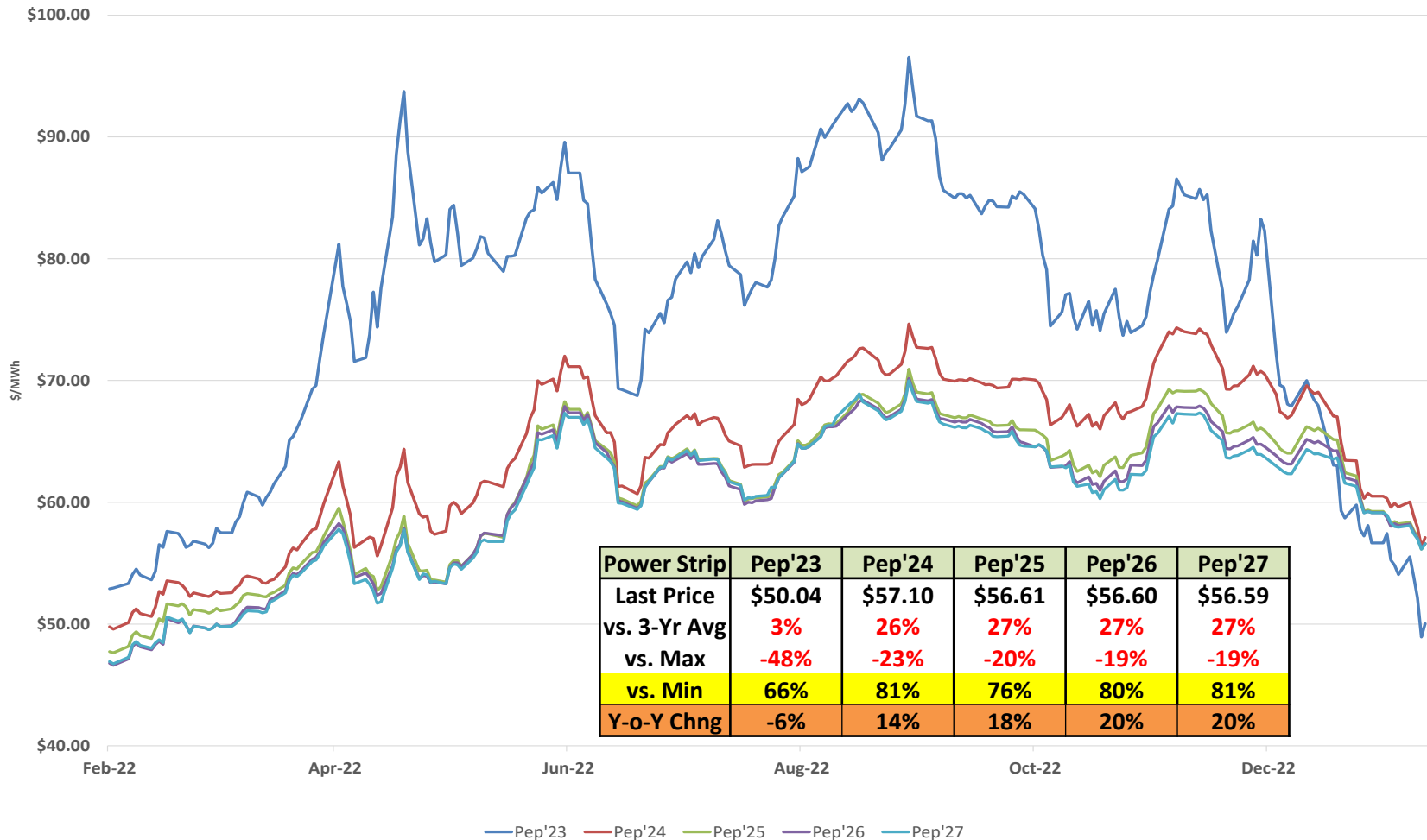
\$5.65/MMBtu natural gas X 10 Heat Rate (power plant factor) = \$56.50/MWh electricity prices

\$15.00/MWh X 20,000 MW's = \$300,000 electricity cost savings.

Customer Takeaway: Forward power prices have declined significantly since the Thanksgiving due to lower heating demand this winter, record natural gas production as well as the extra supply from the Freeport LNG fire that halted natural gas from being exported globally.

DC Area Forward Power Prices

PEPCO Forward Calendar Strips (1-Year Back)

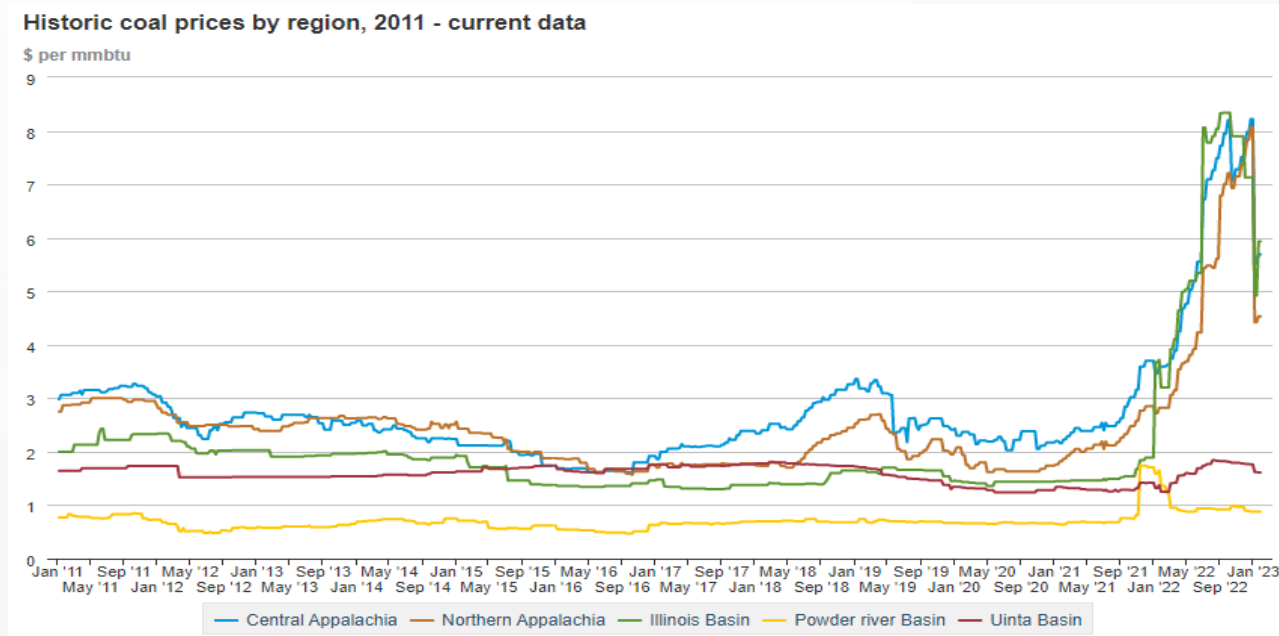


Source: Constellation

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“Why Doesn’t My Power Move Down as Fast as Gas Prices”



- **Heat Rate** = Power \$/Natural Gas \$
- If gas moves down faster than power, heat rates expand; if gas moves-up faster than power, heat rates contract
- Power prices are a function of all the fuels that are producing electricity on the grid at various costs.
- **Higher coal prices, retirements, demand growth and transmission bottlenecks** keep power prices more elevated than gas prices at times due to the congestion risk and the results have been wider heat rates at times.

Customer Takeaway: The relationship between nat gas and power prices have always been highly correlated due to that fuel being on the margin to serve that last incremental piece of power demand, but at times in which higher power price risk exists in the market than do those for natural gas, that relationship can changes based on market conditions

Source: EIA

PJM Capacity Update

PJM's 2025/2026 Capacity Auction Potentially Delayed

- The 2025/2026 BRA capacity auction in PJM, which was slated to be run this June of 2023, could be delayed as PJM sifts through the potential penalties and implications associated with the non-compliant generators that failed to perform during Winter Storm Elliott, that occurred right before this past Christmas.
- Another contributing factor to the potential delay could also be the fact that the results of the 2024/2025 auction, that was run this past December, had never posted their results due to a pending decision from FERC related to the DPL-South issue that officials believed produced inaccurate results.

Key dates to watch for 2025/2026 auction:

February 14th: Deadline to submit sell offer cap data

March 16th: IMM determination of offer cap

April 10th: PJM notification of determination of offer cap

June 14th: Auction bidding window opens

June 20th: Auction bidding closes

June 27th: Target auction results posting date

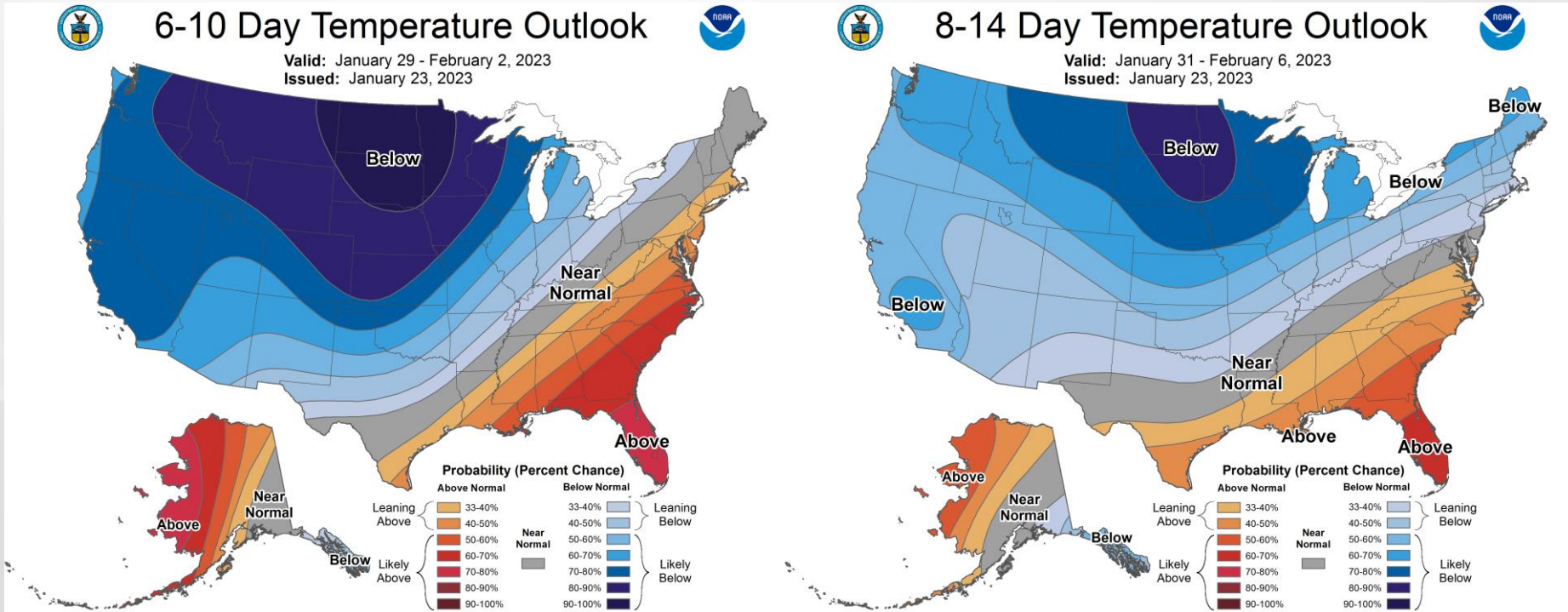
Delivery Year	Current BRA Schedule	Draft Revised BRA Schedule	IAs Cancelled
2023/24	Jan 2022	Jun 2022	1 st and 2 nd
2024/25	Aug 2022	Dec 2022	1 st and 2 nd
2025/26	Feb 2023	June 2023	1 st and 2 nd
2026/27	Aug 2023	Nov 2023	1 st
2027/28 (back on schedule)	May 2024	May 2024	

Customer Takeaway: The results of the latest capacity auction for the 2024/2025 is being delayed for a number of factors and is causing a potential delay in the 2025/26 auction that was slated for June of this year.

Source:, PJM, BOA

Appendix - Supply & Demand Fundamentals

Short-Term Weather Outlook



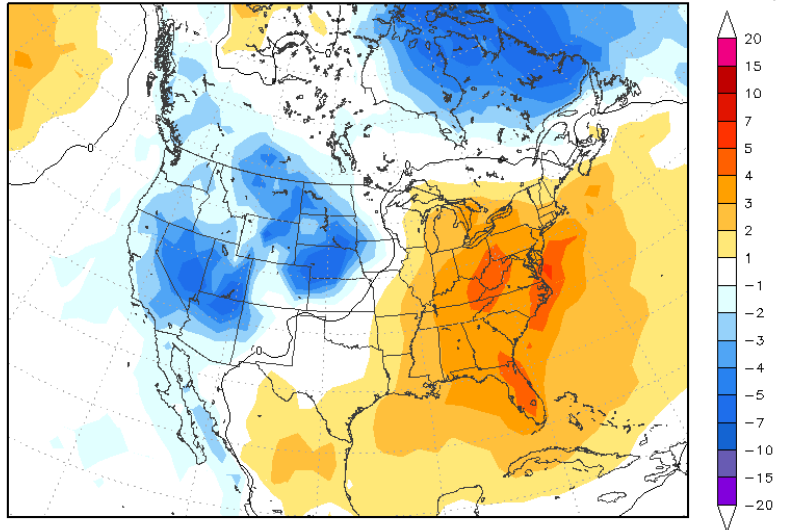
- A much colder weather pattern in store heading into February for much of the nation as Arctic air returns to Canada, then filters into the West, Rockies, Plains and Midwest.
- A storm track will run from the Rockies into Texas, then northeastward into the Ohio Valley and Northeast. Along the storm track, the pattern is going to be highly back in forth with strong cold shots followed by warm-ups in between storms. Although the cold will also reach into the South at times, the Bermuda ridge near Florida will help deflect the cold to the north through at least next week. A stronger outbreak of cold into the South (particularly Texas) cannot be ruled out in early February.

Sources: CPC / NOAA

Long Range Models Show Cold Relaxing

European 16-30 Day Forecast

2 m Temperature Anomaly (F) ECMWF-WEEKLY
Valid: 00z Tue 07 Feb 2023 – 00z Wed 22 Feb 2023 16-30 Day



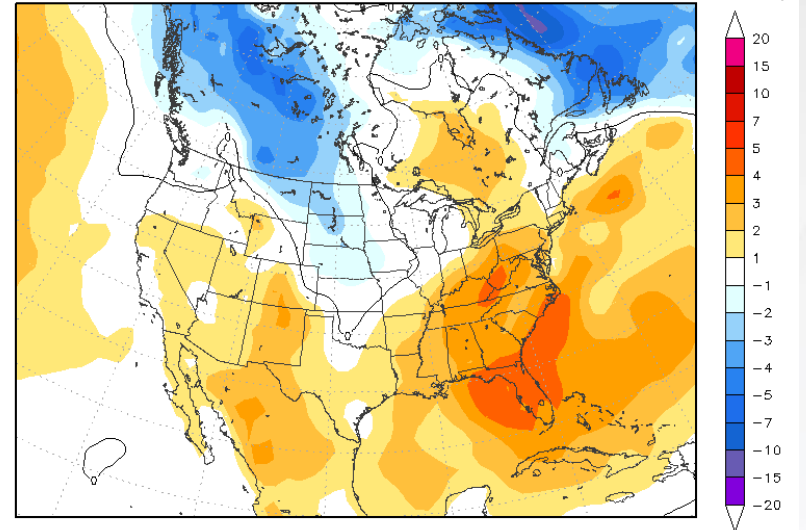
GRADS: COLA/IGES

StormVistaWxModels.com

Init: Mon 23 Jan 2023
2023-01-23-15:08 ET

American CFS 16-30 Day Forecast

2 m Temperature Anomaly (F) (16 mems, last 4 cycles) CFS-WEEKLY
Valid: 00z Wed 08 Feb 2023 – 18z Wed 22 Feb 2023 16-30 Day



GRADS: COLA/IGES

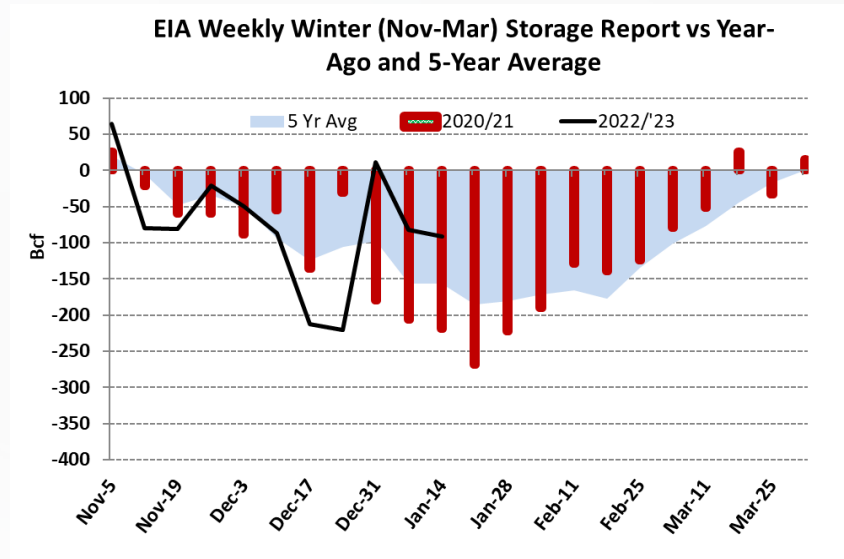
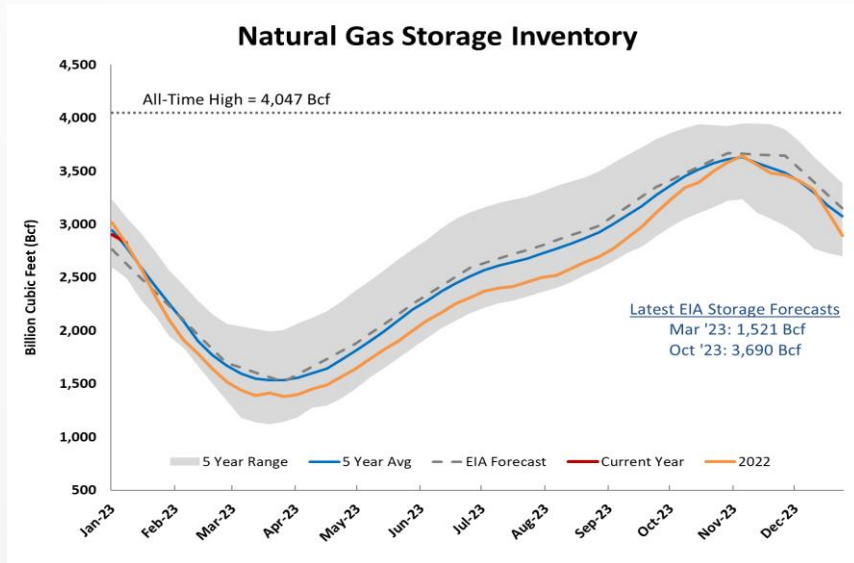
StormVistaWxModels.com

Init: 00z Tue 24 Jan 2023
2023-01-24-04:02 ET

- Both long range models (European, top left – American, top right) show a relaxation and shifting of the cold back into western Canada and the Western U.S. This fits nicely with the MJO going into warmer phases and the positive Arctic Oscillation in place.
- Confidence is lower than normal due to the intense cold air coming into the pattern over the next 2 weeks. If blocking materializes, and the storm track is weaker into the West, a longer period of colder than normal weather may still occur in parts of the East and South. The American would suggest some cold shots in the Midwest.
- An active storm track is expected to return to the West; additional increases in snow-pack are possible.

Sources: CPC / NOAA / ECMWF / Storm Vista

Storage Paints a Rosy Picture Heading into February

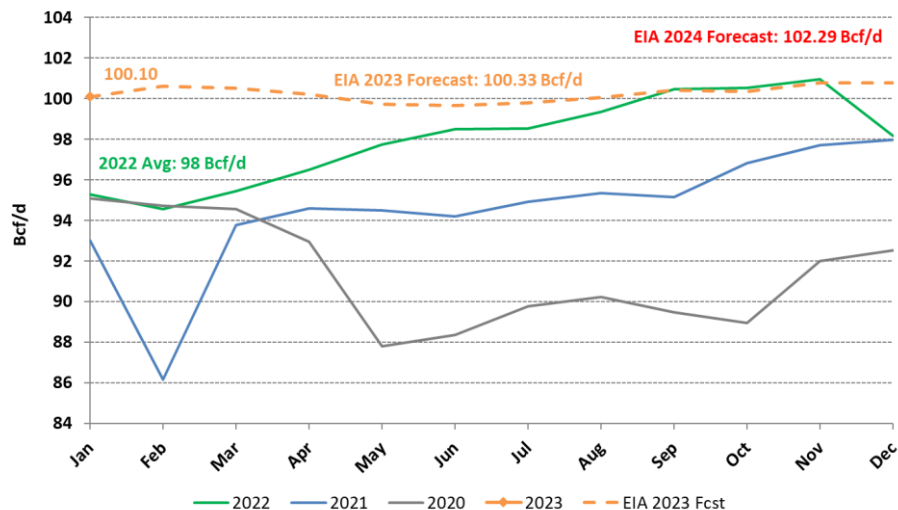


- Working gas in storage was 2,583 Bcf as of Friday, January 27, 2023, according to EIA estimates. This represents a net decrease of 151 Bcf from the previous week. Stocks were 222 Bcf **(9.4%)** higher than last year at this time and 163 Bcf **(6.7%)** above the five-year average of 2,420 Bcf.
- Current inventories sit at 2,729 Bcf, 4.1% above year-ago levels and 4.9% above the 5-year average.

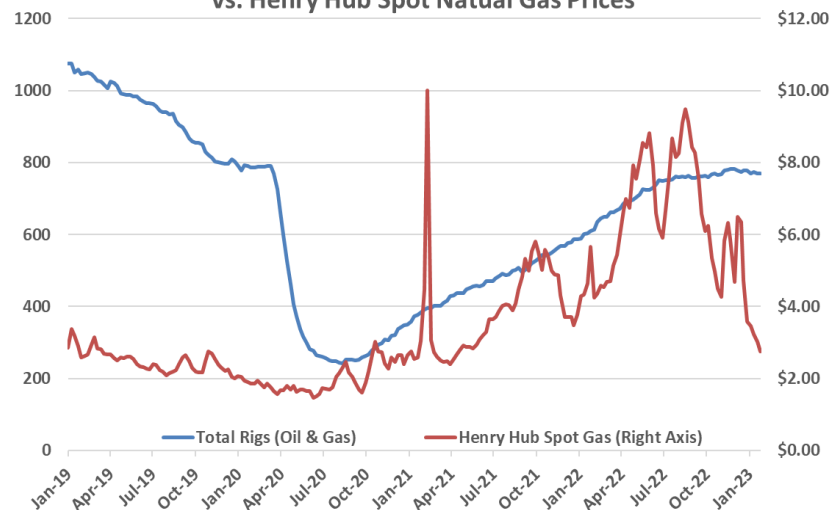
Customer Takeaway: Nearly two thirds into the winter season and the storage drawdown season-to-date has been ~30% below the five-year average, bringing inventory levels to a surplus relative to historic averages. This should curb volatility for the balance of the winter season barring any drastic shift in fundamentals.

Jan Production Holds Above ~100 Bcf/d Despite Intermittent Freeze-Offs

US Dry Gas Production (Bcf/day)



Baker Hughes Natural Gas Rig Count vs. Henry Hub Spot Natural Gas Prices



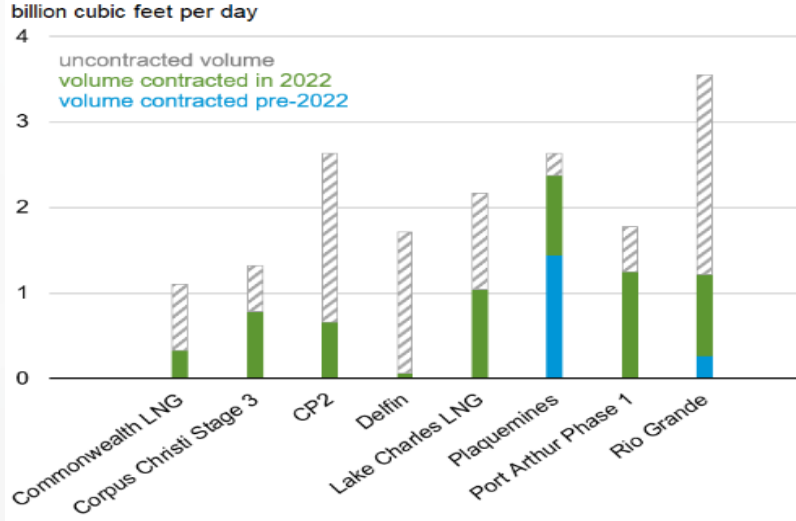
- Total US dry gas production averaged 100.1 Bcf/d month to date, roughly 3 Bcf/d higher MoM or 5.8 Bcf/d higher YoY, according third-party estimates.
 - Including this weekend, cumulative freeze-offs for the winter are ~112 Bcf to date, ~64 Bcf higher than this time last year and ~75 Bcf higher than the previous five-year average.
- The EIA is forecasting 2023 production to average 100.24 Bcf/d, right around current levels.
- U.S. L48 total rig count stayed flat WoW at 769 with 4 oil rigs lost offset by 4 gas rigs gained. Total rig counts have decreased since peaking at 782 in early Dec 2022, as Henry Hub prices continue their decline.

Customer Takeaway: As US natural gas producers begin firming up drilling and production plans for 2023, the recent selloff in Henry Hub futures prices could dampen already modest ambitions for growth this year.

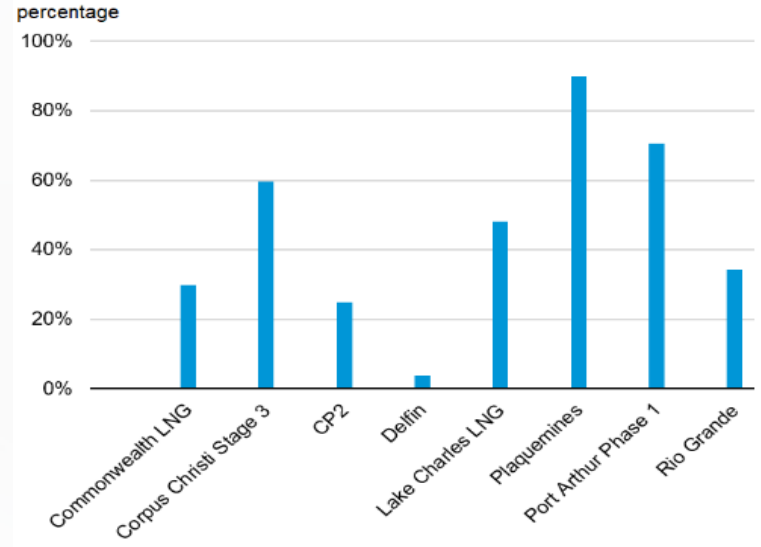
Source: EIA, Baker Hughes

U.S. LNG Sales and Purchase Agreements Grew in 2022

Prospective U.S. liquefaction projects and LNG production volumes contracted in SPAs



LNG volumes contracted as a percentage of production capacity (Dec 2022)



- According to data from the Department of Energy (DOE), U.S. LNG suppliers entered into sale and purchase agreements (SPAs) for roughly ~6 Bcf/d of new LNG capacity last year, with nearly ~75% of those being 20-year agreements, almost all of which require cargoes to be sold on a free-on-board (FOB) basis.
- The LNG volumes will come from eight prospective projects in various phases of development; two proposed (CP2 and Commonwealth LNG), four with regulatory approval (Delfin, Lake Charles LNG, Port Arthur Phase 1, and Rio Grande LNG), and two currently under construction (Corpus Christi Stage 3 and Plaquemines).
- The projects are contracted to deliver LNG cargoes to numerous destinations, including Asia and Europe.

Customer Takeaway: Russia's invasion of Ukraine in early 2022 raised concerns of fuel security in Europe and abroad and was the catalyst for an influx of new U.S. LNG agreements and projects set to come into service in the coming years, the first of which begin in 2024.

Source: EIA, DOE

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