



Summer 2023 Natural Gas Market Outlook

Executive Summary

Prepared for Natural Gas Supply Association

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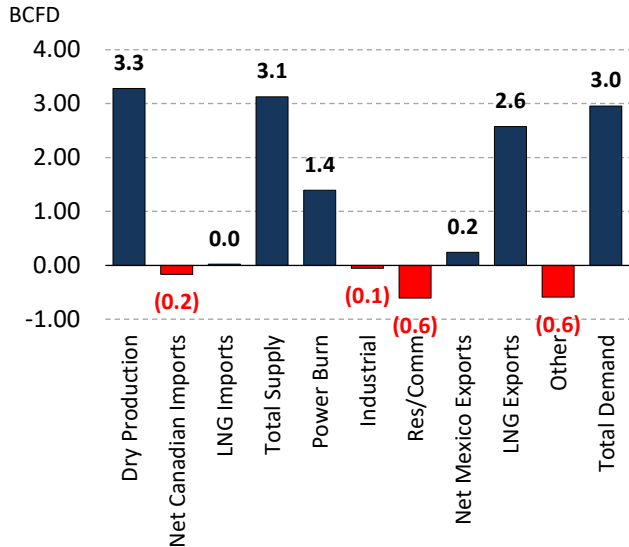
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Haynesville and Associated Gas Production drove supply growth over the mild winter, setting stage for this summer

Natural Gas Supply and Demand, 2023 summer vs 2022 Summer
BCFD

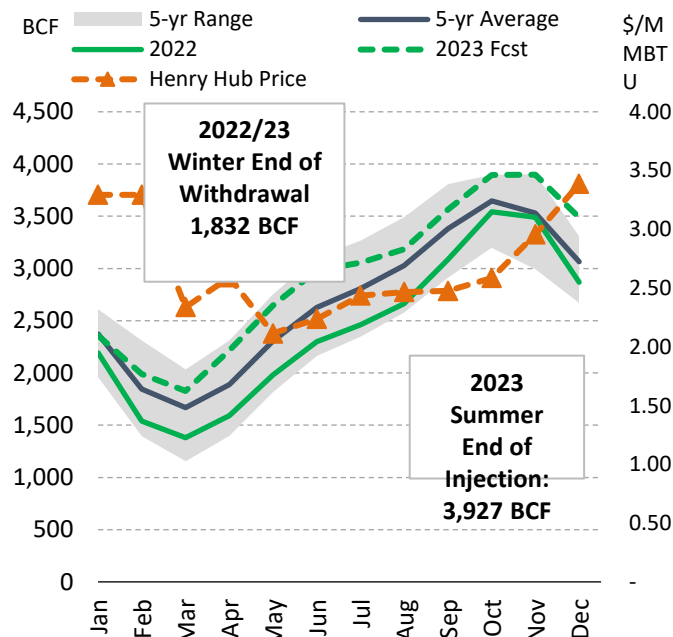


Source: Energy Ventures Analysis

- On the supply side, U.S. natural gas dry gas production is expected to grow by 3.3 BCFD in Summer 2023 on a YoY basis to a new all-time record of over 101 BCFD, primarily driven by increased associated gas output and Haynesville production gains to support Gulf Coast LNG feedgas demand gains. Canada imports are forecast to drop by 0.2 BCFD on a YoY basis. Canadian supply is at risk due to robust U.S. storage levels, wildfire in Canada and a perceived production overhang yielding relatively cheap U.S. natural gas prices.
- On the demand side of the ledger, the estimated power burn for Summer 2023 is higher by 1.4 BCFD YoY, largely due to increased gas-fired generation utilization driven by cost competitive advantages to coal-fired generation.
- Export sectors once again lead demand growth as LNG feedgas demand is expected to average a record 14.1 BCFD for Summer 2023 which is 2.6 BCFD higher YoY while Mexico pipeline flows are projected to actualize 0.3 BCFD higher YoY.
- U.S. LNG feedgas demand will remain dependent on European natural gas storage inventories throughout Summer 2023.

Summer Natural Gas Supply and Demand Summary	2023 Summer	2022 Summer	Difference vs Last Summer	Difference vs Last Three Summers
Supply (BCFD)				
Dry Production	101.3	98.1	3.3	8.1
Net Canadian Imports	5.3	5.4	(0.2)	0.5
LNG Imports	0.1	0.0	0.0	0.0
Total Supply	106.7	103.5	3.1	8.6
Demand (BCFD)				
Power Burn	37.2	35.8	1.4	2.9
Industrial	21.9	22.0	(0.1)	0.5
Res/Comm	11.3	11.9	(0.6)	(0.2)
Net Mexico Exports	6.1	5.8	0.2	0.2
LNG Exports	14.1	11.5	2.6	4.8
Other	6.3	6.9	(0.6)	(0.3)
Total Demand	97.0	94.0	3.0	8.0
Average Injection (BCFD)	9.7	9.5	0.2	0.6
Total Injection (BCF)	2,161	1,857	304.1	277.8
CDDs	1,278	1,372	(94.0)	(111.0)

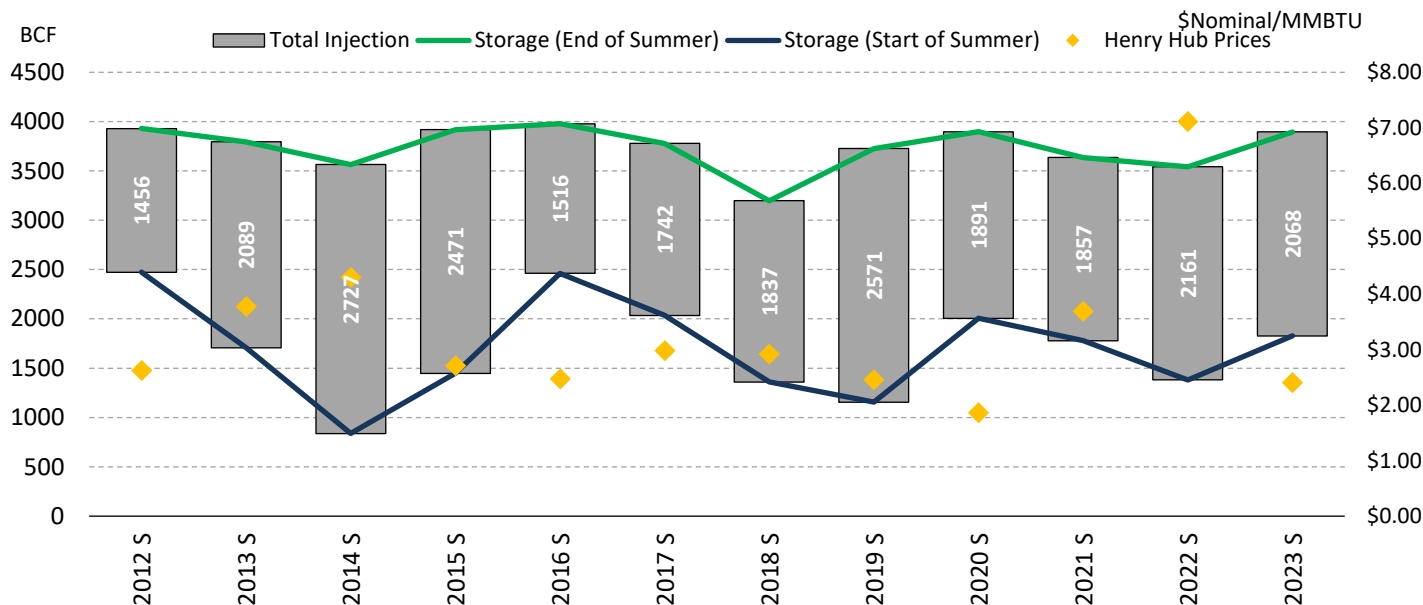
U.S. working gas in underground storage



Henry Hub prices are NYMEX settlements as of 4/14.
Source: EIA, Energy Ventures Analysis

U.S. natural gas storage is projected to remain at a surplus to the 5-yr average

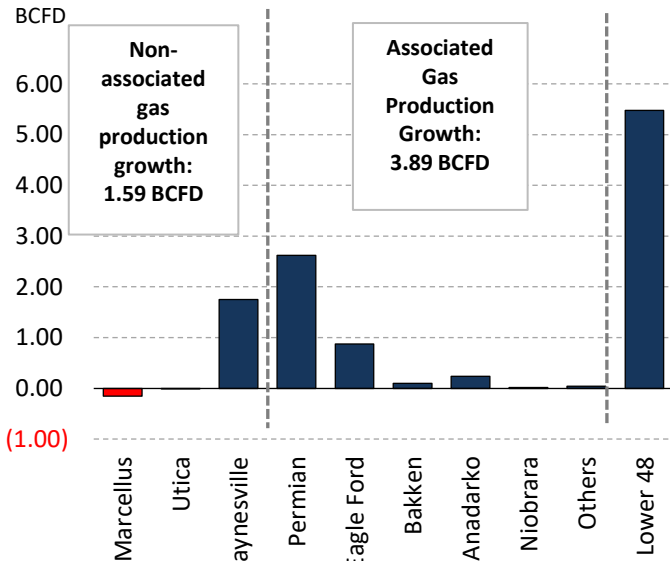
U.S. L48 Summer Gas Storage Injection



- The U.S. natural gas markets finished the 2022-23 winter heating season much looser than market expectation. Throughout 2022 summer and winter storage levels were projected to remain tighter than the 5-yr average. However, a lack luster Fall shoulder season along with a moderate winter heating season allowed for larger than expected storage injections.
- Additionally, the delayed return of Freeport LNG was a contributing factor to the looser balances given the ~2 BCFD of demand loss.
- After trading as high as \$10/MMBTU during Summer 2022, Henry Hub futures traded around \$7/MMBTU in December 2022 before falling to below \$2/MMBTU during the 1H 2023 on robust natural gas storage levels, healthy production, inflation concerns, ongoing geopolitical tensions, as well as financial crisis concerns.
- Looking forward, U.S. natural gas storage will remain at a surplus to the 5-yr average. Coal forwards have moved much lower as compared to the Q4 2022 curves but with the significantly lower Henry Hub price curve, gas-fired generation is benefiting from improved cost competitive advantages causing coal-to-gas switching. This switching has helped to buoy power burn demand and has brought some support to market balances.
- The return of Freeport LNG in Q1 2023 also provided a much needed lift to demand which helped to balance storage injections. The combination of stronger power burns and higher LNG partially offset the weaker RESCOMM demand due to the moderate winter heating season.
- Looking forward, gas-fired generation is expected to remain strong on a weather-adjusted basis throughout Q2 but should lose market share heading into Q3 as higher power prices and a seasonal lift to electric demand will open the door for increased coal-fired generation. The low coal stockpile concern from Summer 2022 does not appear to be an issue for Summer 2023. In fact, more coal plant retirements are scheduled to happen during 2023.
- U.S. working gas inventory fell to 1,830 BCF at the end of March, which was a surplus to the 5-year average of 298 BCF. As of late April 2023, EVA projects an injection of 2,068 BCF for Summer 2023.

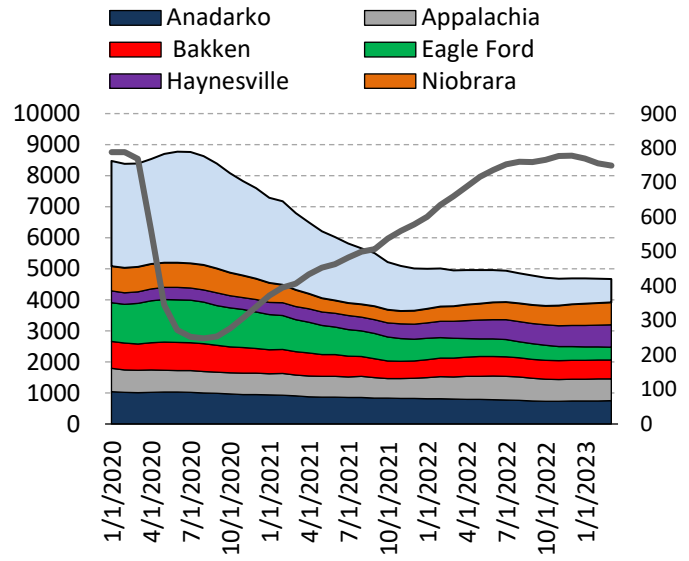
Summer 2023 features a different challenge for producers, yet the theme remains the same: “proceed with caution”

Year-over-year Production Change by Basin (Winter 2022/23 vs. 2021/22)



Source: EIA, Energy Ventures Analysis

Drilled but uncompleted wells inventory in major U.S. producing areas

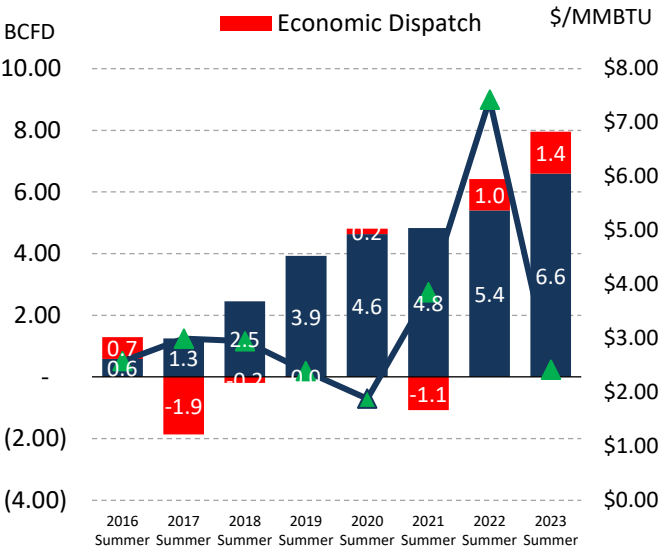


- Natural gas output increased through December 2022 but has been relatively flat since the increase and is likely to resume an upward trend. However, the rate of change will look much different on a YoY basis. The majority of the supply gains from associated supply or from Haynesville to support Gulf Coast LNG have already been realized. Small growth, despite recently declining rig activity from efficiency gains, is forecast for the remainder of Summer 2023. U.S. dry gas production sits near 101 BCFD and the Summer 2023 forecast is once again calling for a new record level.
- The YTD price decline and storage surplus will likely fuel concerns about production shut-ins, especially if summer weather is cooler than normal and coal-fired generation recovers.
- EVA expects U.S. dry gas output to average 101.3 BCFD in Summer 2023, over 3 BCFD higher YoY.

- Throughout 2022, natural gas and oil rig counts rose, supported by high prices driven by concerns of a global fuel shortage. However, drilled but uncompleted well inventories have been in decline as a much lower forward curve across all fuels after a weak winter demand season and healthy storage levels have increased the appeal of DUCs due to their lower capital expenditure.
- For natural gas, takeaway capacity plays a role in E&P investment. The path forward for new projects feature increased risk due to ESG compliance and ongoing litigation costs.
- The 2-BCFD Mountain Valley Pipeline (MVP) commercial online date (COD) continues to move backwards as legal challenges and rising costs threaten the success of the project. Despite the legal challenges, EVA assumes a COD for MVP in 2025.
- EVA assumes no new major pipeline projects will move forward with the exception of infrastructure needed to support Gulf Coast LNG expansion.

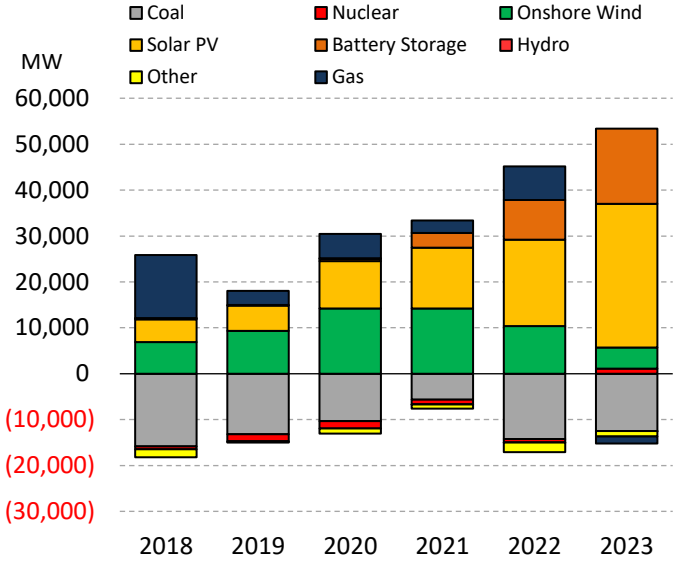
Summer natural gas-fired generation is supported by coal retirements, delayed renewable installations, and coal-to-gas switching economics

Power Burn Increase from 2015 Summer: Structural Growth vs. Economic Switching



Source: EVA

Net change in U.S. generating capacity



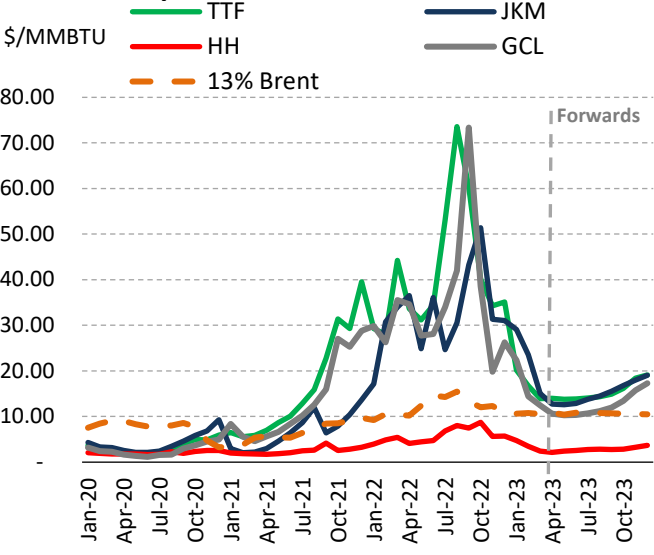
Source: Energy Ventures Analysis, U.S. EIA

- With Henry Hub prices falling by over \$5/MMBTU since the end of 2022, power generation by natural gas has been robust, well outperforming the first four months of 2022. On a YoY basis, weather-adjusted power burns are adjusting strong by nearly 2 BCFD. This trend is expected to continue given the current spark spread vs. dark spread comparison.
- Comparing this summer to a baseline of 2015, a gain of 6.6 BCFD of long-term structural demand growth from new combined-cycle gas units (CCGT) to an increase of 1.4 BCFD of economic switching due to lower natural gas prices increasing the dispatch of natural gas-fired generation. More coal plant retirements are on the horizon, which could allow for increased utilization of gas-fired generation in the near future.
- However, higher power prices for Q3 should allow for the displacement of natural gas fired generation by coal-fired power plants.

- In 2023, nearly 13 GW of coal capacity will be retired.
- 2023 features more of the same with regards to renewable installations. Over 52 GW of new wind, solar, and battery storage resources are expected to be installed by year end. However, the same considerations impacting all sectors will have to be considered: supply chain constraints, the Russia-Ukraine conflict, inflation concerns, banking crisis, etc.

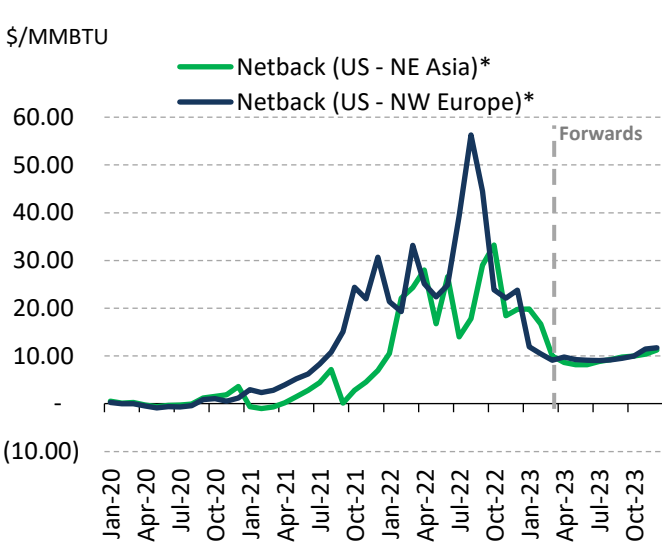
2023 European natural gas storage remains robust and prices are much lower on a YoY basis, but risks remain

Global LNG price



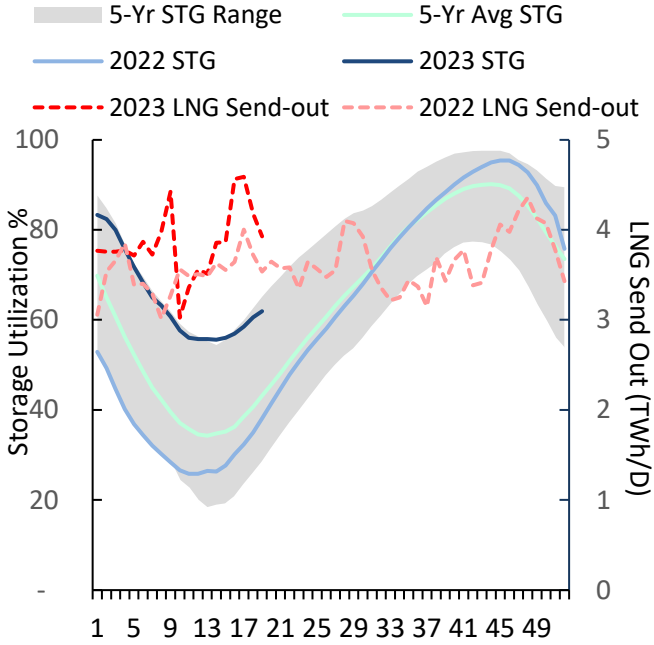
Source: ICE. Future curves are based on April 18 settlements

Netbacks for U.S. LNG exports



Source: Energy Ventures Analysis. Historical netbacks are based on cash settlements. Future netbacks are based on April 18 forward curves.

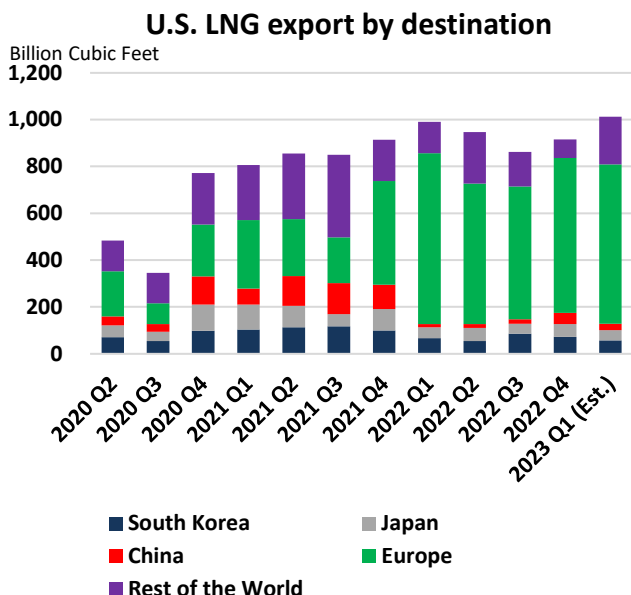
EU gas storage utilization & LNG send-out



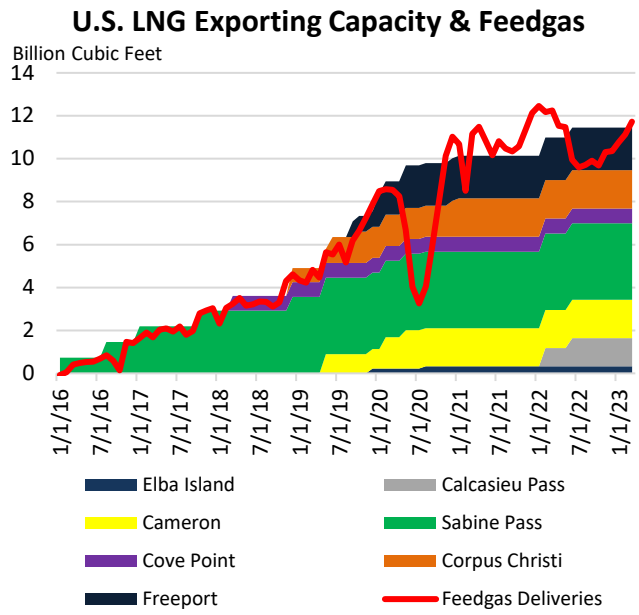
Source: Gas Infrastructure Europe

- Ongoing geopolitical tensions in Europe and the loss of both Nord Stream 1 & Nord Stream 2 resulted in high utilization of U.S. LNG. Europe was the primary consumer of U.S. LNG exports. China reopened from COVID-related restrictions but has yet to attract U.S. LNG supply from Europe. All eyes will remain focused on European natural gas storage levels given the direct correlation to U.S. LNG feedgas demand, especially if netbacks to Asia remain at parity with Europe.
- European storage is sitting well above the 5-yr average (20% higher) as of mid-May. As a result of EU price policy, demand reduction efforts, economic concerns and the warm winter European gas balances have loosened significantly. The EU Commission has confirmed that the 15% demand reduction plan will remain in effect throughout 2023 and lofty goals to fill storage before the start of the winter heating season will weigh on market participants. This will be the first year restocking without flow from Nord Stream 1. All eyes will remain focused on the netback of U.S. LNG which will remain a critical source of supply for Europe.

U.S. LNG continues to flow into Europe while the total exports remain limited by U.S. LNG exporting capacity



Source: EVA/KPLER



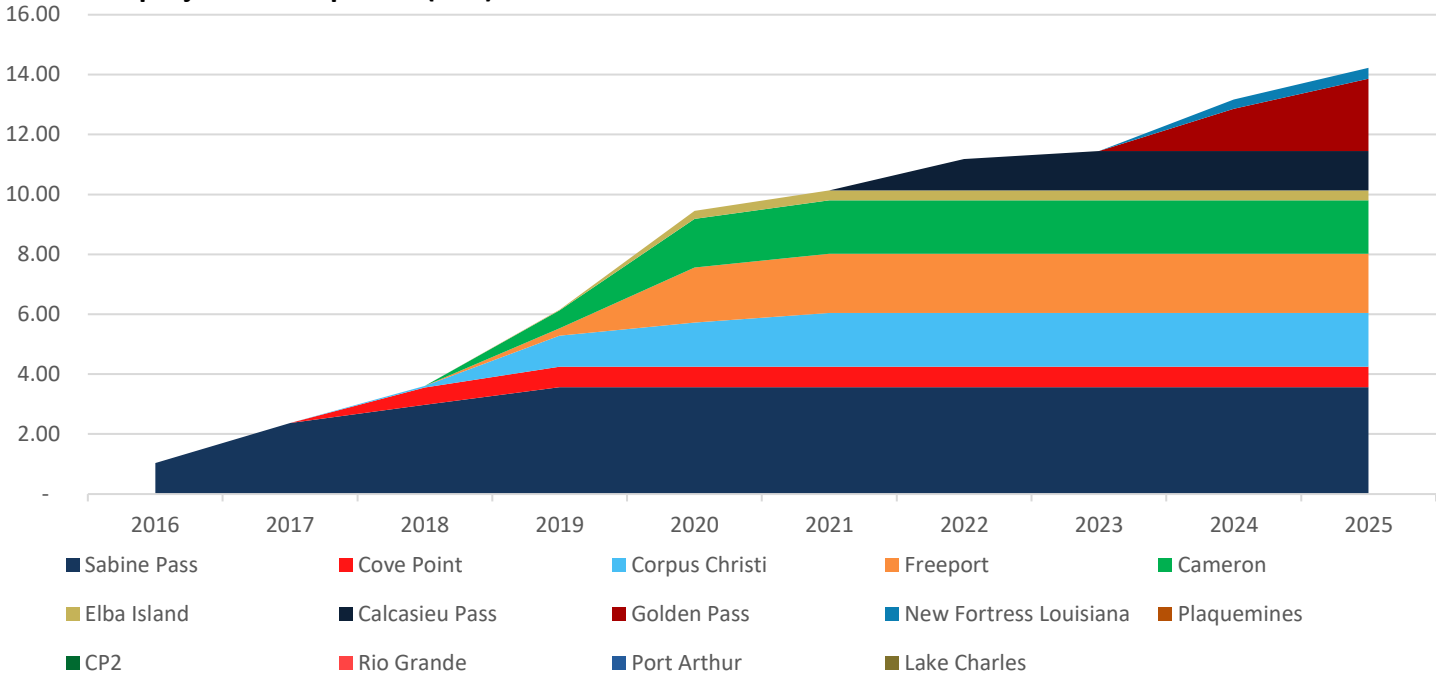
Source: EVA

- Europe will continue to rely on U.S. LNG for the foreseeable future, especially after the loss of the Nord Stream pipes. The percentage of U.S. LNG flowing to Europe has been averaging near 75%, much higher than in years past. Despite the recent decline in European gas prices, netbacks remain healthy and are trading near parity with Asian gas benchmarks.
- All seven U.S. exporting plants have been operating above nameplate capacity and should remain operating at/near 100% utilization for the remainder of 2023. The risk to U.S. LNG feedgas demand is European natural gas storage. Should conservation efforts and moderate demand support an accelerated injection schedule, the call on U.S. LNG could be at risk prior to the start of the traditional heating season.

- Based on the current forward market settlements, estimated netbacks of U.S. LNG exports to NW Europe and NE Asia remain near \$7/MMBTU for the remainder of 2023.
- Asian gas benchmarks will remain a key balancing point for European gas futures. Should the two regions separate, causing a shift in netbacks, global trade flows will be impacted as U.S. LNG will search for a new home.
- EVA expects U.S. LNG feedgas demand to average 14.1 BCFD in Summer 2023, an increase of 2.6 BCFD since last summer, primarily driven by the return of Freeport LNG.

U.S. LNG is a key supply source

U.S. LNG project development (BCF)

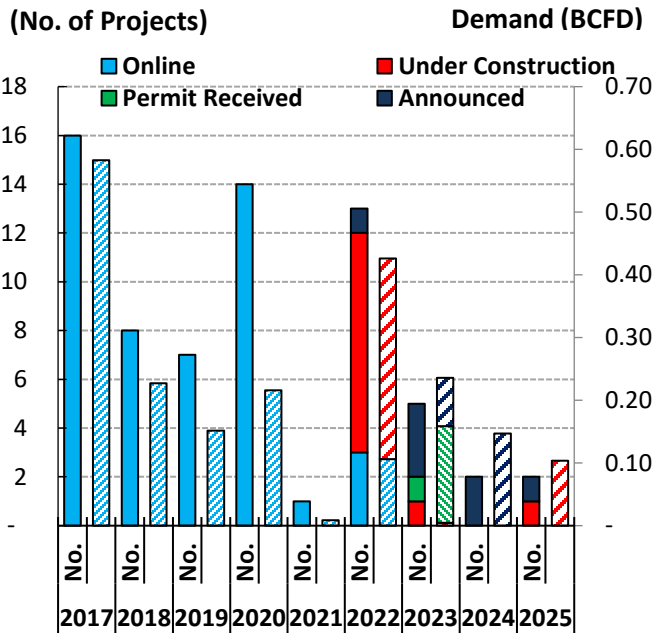


Source: Energy Ventures Analysis, EIA
 1 million metric tons of LNG per annum (MTPA) is equivalent to 0.13 billion cubic feet of natural gas per day (BCFD)
 FID is the abbreviation of Final Investment Decision

- Several U.S. LNG projects are expected to advance over the next few years. The next year or so represents the first leg of the next wave of LNG export capacity. EVA anticipates three new projects, New Fortress Altamira 0.37 BCFD, New Fortress Louisiana 0.37 BCFD, and Golden Pass 2.41 BCFD which has an assumed COD of mid-2024.
- The United States continues to be one of the top three LNG suppliers globally, along with Australia and Qatar. The potential exists for the U.S. to be the largest LNG exporter in the world by the end of 2023. European demand and Asia increasing LNG imports are key drivers of continued growth.
- Ongoing climate change policy goals are growing more ambitious. In April, Germany announced the shut down of its last nuclear plant. This will likely increase the call on coal and gas generation in the immediate future as Germany progresses towards a green future. As the rest of the world moves towards developing renewable resources, natural gas will remain a key resource in supporting this future.

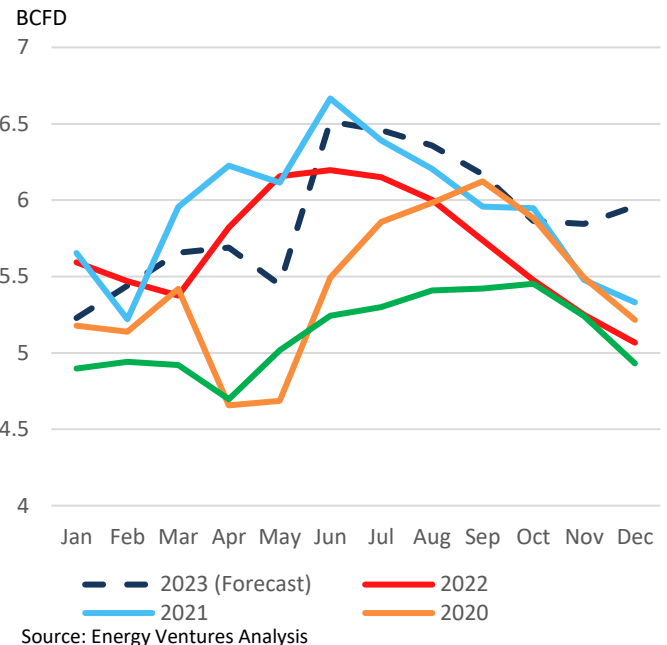
Structural growth from industrial customers and Mexican exports is on the horizon

Industrial Projects and Gas Demand



Source: EVA

U.S. Pipeline Exports to Mexico



Source: Energy Ventures Analysis

- According to the U.S. Federal Reserve, the industrial capacity utilization rate rose to almost 80% in March, < 1percentage points lower YoY. Economic factors are and will continue to impact industrial demand. Despite the economic slowdown and global concern, new projects are coming in 2023.
- The development of new industrial projects has supported the structural growth of industrial demand. Despite delays associated with the pandemic and economic factors, 28 new projects came online since the start of the pandemic in 2020 totaling nearly 1 BCFD of natural gas demand. For 2023, 5 new projects equivalent to 0.20 BCFD are expected.

- The U.S. is a critical supplier to Mexico's energy sector. U.S. natural gas exports to Mexico averaged 5.8 BCFD during Summer 2022 and are expected to rise to 6.1 BCFD for Summer 2023.
- U.S. natural gas exports are expected to grow in 2024 on the completion of new pipelines in Mexico. According to the EIA, new projects include Tula-Villa de Reyes, Guaymas-El Oro in addition to other smaller connections
- Mexico demand remains supported by industrial demand as well as gas-fired generation. However, in the upcoming years, LNG export facilities will support U.S. piped gas flows to Mexico