



Summer 2022 Natural Gas Market Outlook

Executive Summary

Prepared for Natural Gas Supply Association

April 2022

Authors

Ai Wang

Rob DiDona



1901 N. Moore St., Suite 1200

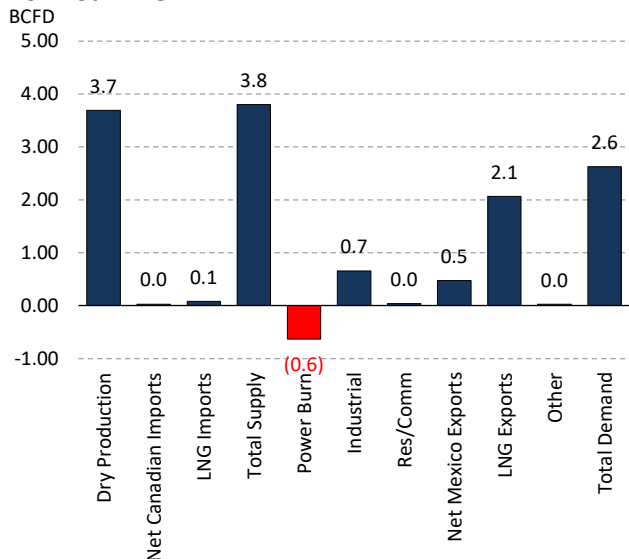
Arlington, VA 22209

(703) 276 8900

www.evainc.com

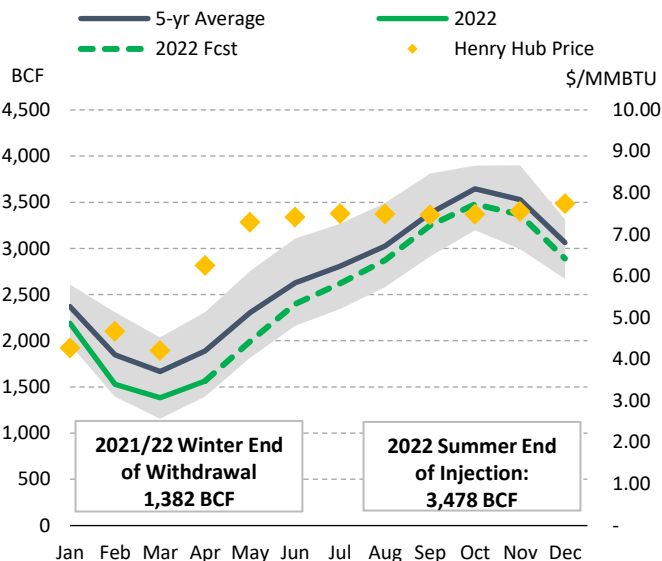
Modest production growth will keep L48 storage below 5-year average through Summer 2022—

Natural Gas Supply and Demand, 2022 Summer vs 2021 Summer



Source: Energy Ventures Analysis

U.S. Working Gas in Underground Storage



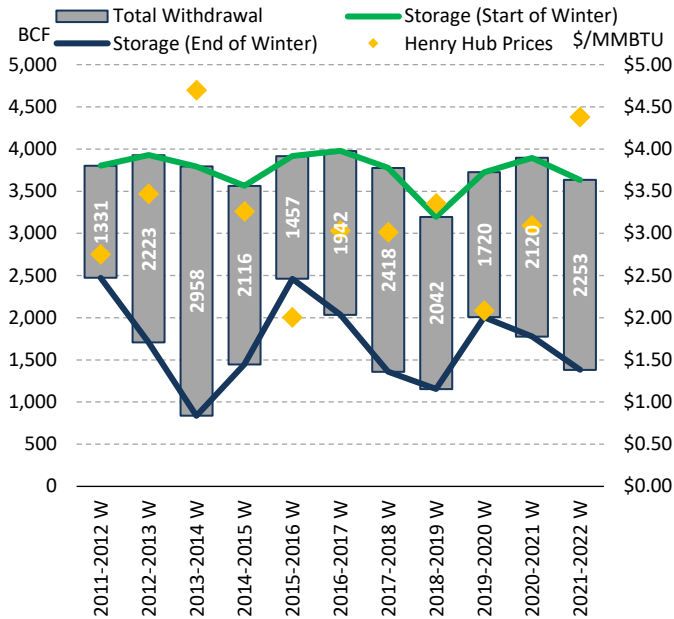
Henry Hub prices are NYMEX settlements as of 4/14.
Source: EIA, Energy Ventures Analysis

Summer Natural Gas Supply and Demand Summary	2022 Summer	2021 Summer	Difference vs Last Summer	Difference vs Last Three Summers
Supply (BCFD)				
Dry Production	96.6	92.9	3.7	5.3
Net Canadian Imports	4.8	4.8	0.0	0.4
LNG Imports	0.1	0.0	0.1	0.0
Total Supply	101.5	97.7	3.8	5.7
Demand (BCFD)				
Power Burn	32.4	33.0	(0.6)	(1.0)
Industrial	22.0	21.3	0.7	0.7
Res/Comm	11.2	11.2	0.0	(0.2)
Net Mexico Exports	6.7	6.2	0.5	1.0
LNG Exports	12.7	10.7	2.1	5.4
Other	6.7	6.6	0.0	0.1
Total Demand	91.7	89.0	2.6	6.1
Average Injection (BCFD)	9.8	8.6	1.2	(0.4)
Total Injection (BCF)	2,096	1,857	239	(88.7)
CDDs	1,299	1,372	(73.0)	(90.0)

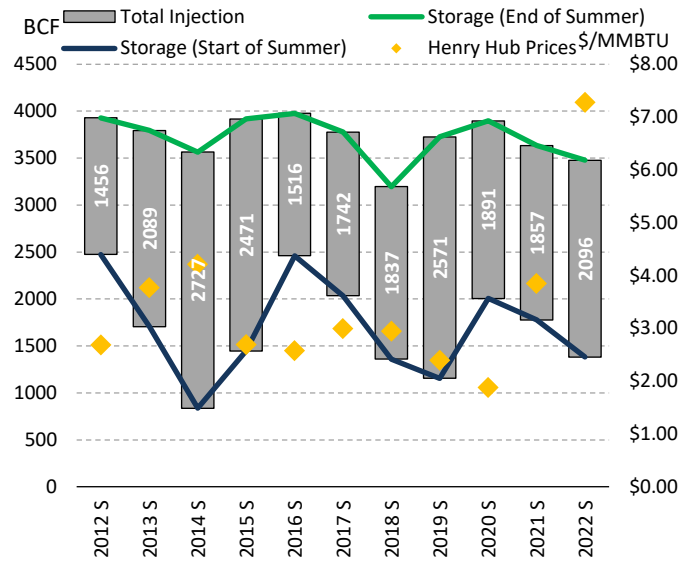
- Compared to last summer, U.S. natural gas dry gas production is expected to grow by 3.7 BCFD in Summer 2022, primarily driven by increased associated gas output. Canada imports remain nearly flat, but the widened US-Canada basis differentials could lead to higher Canadian supply.
- On the demand side of the ledger, the estimated power burn for Summer 2022 is lower by 0.6 BCFD YoY, while the decline will be largely offset by higher industrial demand. Export sectors will continue to lead the growth, with LNG feedgas demand expanding by 2.1 BCFD and Mexico pipeline flows up by 0.4 BCFD.
- The latest forecast for summer weather is milder than last year and the past three summers. However, as the La Nina climate pattern still has over a 50% chance of prevailing through June-August, there is a significant risk of an active hurricane season.

U.S. natural gas markets will remain tight this summer—

U.S. L48 Winter Gas Storage Withdrawal



U.S. L48 Summer Gas Storage Injection

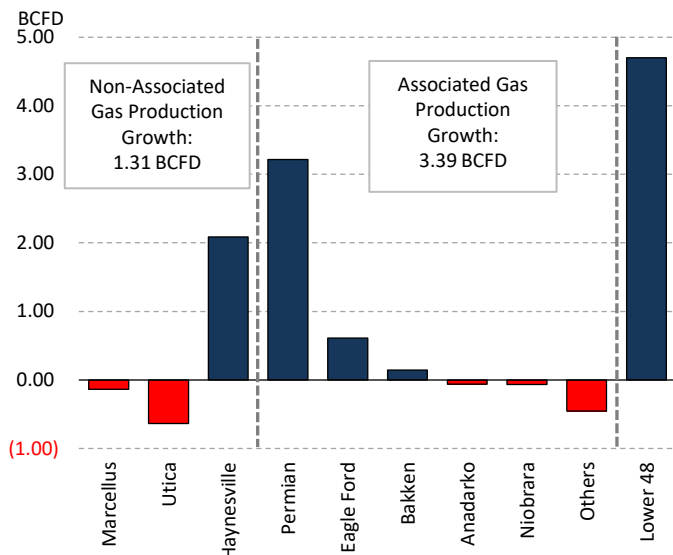


- The U.S. natural gas markets finished the 2021-22 winter with a tighter balance. Although reliability was not impacted, freeze-offs during extreme cold events briefly limited natural gas production and simultaneously added heating demand. On the other side of the balance sheet, the ongoing coal supply shortages and the commissioning of 1.6 BCFD of LNG exporting capacity expanded the non-weather-related demand.
- Geopolitical tensions in Europe resulted in fuel reliability concerns for coal, oil and gas supply in international energy markets, driving increased price volatility.
- Henry Hub prices surged above \$8/MMBTU for the first time since 2008, reflecting a strong demand outlook and the inflationary shock from energy production to service sectors.

- Looking forward, U.S. natural gas markets will remain tight this summer. Elevated coal prices and limited inventories will discourage economically-motivated fuel switching and support gas-fired generation. Solid LNG demand overseas will also keep U.S. LNG terminals operating at or above the nameplate capacity. Phase II of Calcasieu Pass LNG will add 0.7 BCFD of capacity by Q4 2022. Beyond that, U.S. LNG exporting capacity will remain static at 13.5 BCFD until 2024, when the 0.7-BCFD Golden Pass Train 1 comes online.
- Although the extensive gain in oil and gas prices should signal for more drilling, increased price volatility, military conflict in Europe, and uncertainty around incorporating ESG concerns into environmental reviews are fueling uncertainty around the long-term demand. EVA expects a moderate near-term production growth as North American producers stick to financial disciplines to avoid over-investment.
- U.S. working gas inventory fell to 1,380 BCF at the end of March, extending the stockpile deficit against the 5-year average from 100 BCF to 285 BCF over the winter. The draw of 2,250 BCF in Nov-Mar 2021/22 was the largest in the past three years and the third tightest since 2011. EVA projects an injection of 2,096 BCF for Summer 2022, 116 BCF looser than the 5-year average. U.S. working gas storage is expected to remain below the 5-year average throughout the year.

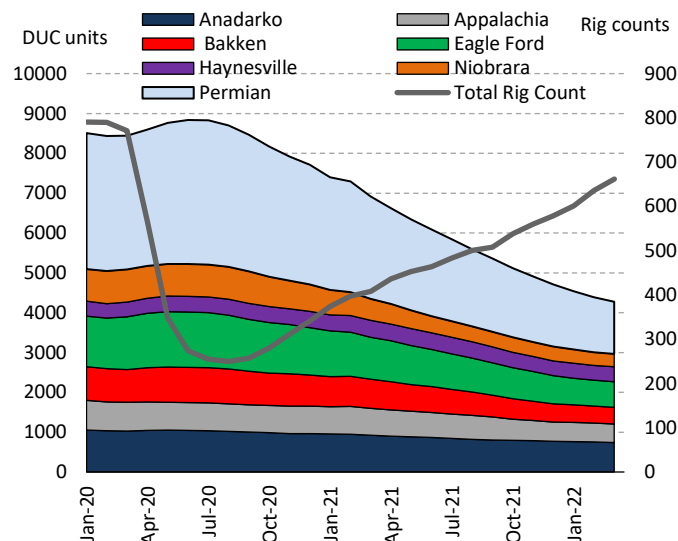
Despite stronger energy prices, major producers proceed with caution—

Year-over-year Production Change by Basin (Winter 2021/22 vs. 2020/21)



Source: EIA, Energy Ventures Analysis

Drilling but Uncompleted Wells Inventory vs. Rig Count

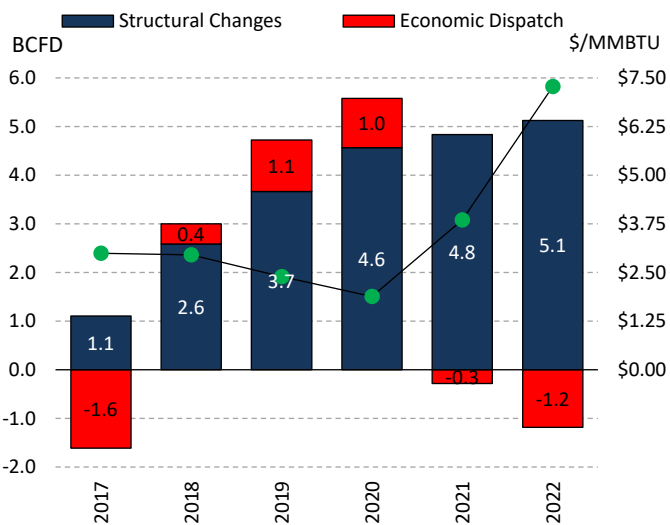


Source: EIA, Baker Hughes

- Natural gas output will likely resume the upward trend seen before the cold weather of January through March, although the magnitude of growth remains uncertain. U.S. dry gas production rose to 96 BCFD in Dec-2021, the highest level observed since the pandemic. Gas production in Winter 2021/22 was 4.7 BCFD higher YoY, with Permian and Haynesville leading the growth, underscoring strength in both associated and non-associated gas production.
- The price rally will likely incentivize more drilling activity in the short term, especially with the steady decline of the drilled-but-uncompleted wells (DUC) inventory. The number of DUC wells has been falling at a 4% monthly rate since April 2021. To maintain or expand the current output, new drillings is necessary.
- U.S. gas-weighted producers are forecast to increase CAPEX by 30% in 2022 while oil-focused producers are expected to raise spending by 17%. However, with the inflationary shock and a sharp decline in the DUC units, the published budget may only be able to support a moderate growth from the current production level. EVA expects U.S. dry gas output to average 96.6 BCFD in Summer 2022, 3% higher YoY.
- As of March, natural gas and oil rig counts jumped nearly 50% and 70% YoY, respectively, but were still below the pre-pandemic level as the upstream sector suffered from equipment/labor shortages and inflated costs.
- The development of takeaway capacity also plays a role in E&P investment. The certification of new gas projects, including pipelines and LNG terminals, will be subject to greater scrutiny if FERF finalizes the new permitting guideline, which requires the consideration of difficult-to-quantify indirect and cumulative GHG emissions.
- The 2-BCFD Mountain Valley Pipeline (MVP), already 94% completed, faced increased regulatory challenges after the federal court revoked a key permit in January. Because of the further delay, Northeast customers will not benefit from the cost reduction associated with MVP this summer. The mid-term Northeast gas production outlook will largely hinge on the development of this project.
- The robust production growth in Permian will also test the takeaway capacity limit in the next two years. Major pipelines Agua Blanca (1.8 BCFD), Gulf Coast Express (2 BCFD), and Whistler (2 BCFD) completed in the past three years were over 90% utilized in 2021. However, around 6 BCFD of regional takeaway pipeline projects are still on hold due to economic concerns.

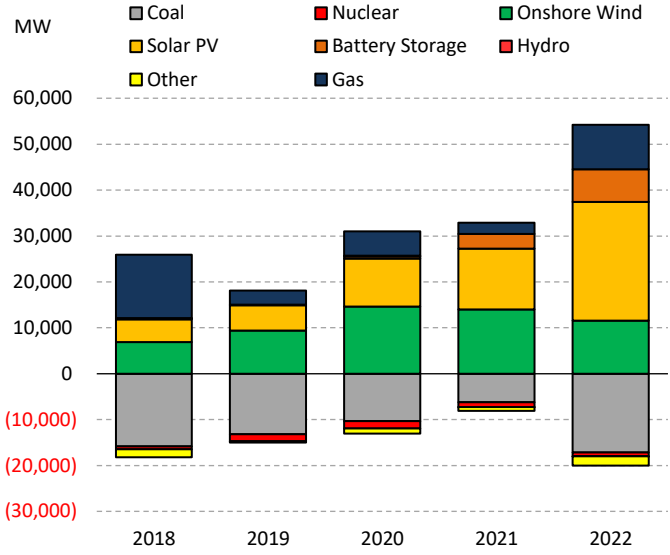
Summer natural gas-fired generation is supported by coal supply shortages and delayed renewable installation—

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



Source: Energy Ventures Analysis
 Note: 2022 Summer prices are NYMEX settlements as of 4/14

Net Change in U.S. Generating Capacity



Source: Energy Ventures Analysis, U.S. EIA

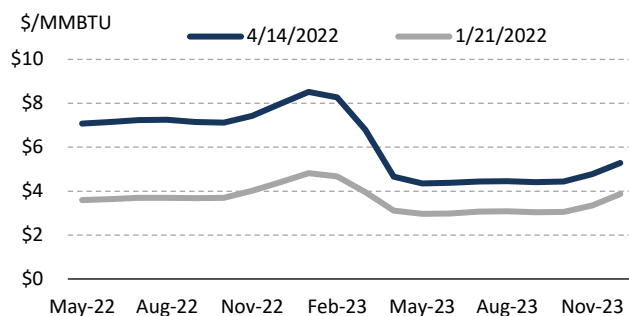
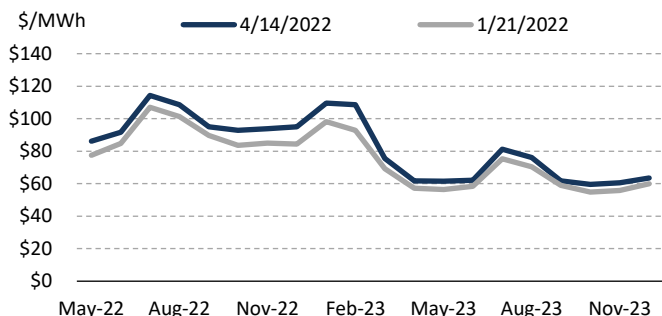
- With Henry Hub prices gaining over \$3/MMBTU year-over-year, power generation by natural gas is expected to decrease by 0.6 BCFD this summer compared to last summer. Comparing this summer to a baseline of 2015, a gain of 5.1 BCFD of long-term structural demand growth from new combined-cycle gas units (CCGT) will be offset by a short-term decline of 1.2 BCFD due to higher natural gas prices reducing the dispatch of natural gas-fired generation.
- However, higher prices for replacement coal due to spikes in international coal markets will keep the competition between coal and gas tight for the summer, especially in the eastern part of the country. Coal stocks and the average number of burns have been declining steadily since May 2020. A widespread ban on Russian coal increased demand for U.S. coal exports. With little additional coal available on the spot market, U.S. coal plant dispatch is likely to be limited by the amount of coal already contracted for delivery in 2022.

- According to EVA’s coal gas price sensitivity analysis, gas power burn could swing by 3 BCFD if natural gas prices move up or down by \$1/MMBTU at the current level. South Central and East regions are most sensitive to price changes.
- In 2022, nearly 17 GW of coal capacity will be retired while 10 GW of gas-fired units will be added - the biggest annual capacity shift for each resource category since 2019.
- 2022 will also be a milestone year for renewable installations. Nearly 45 GW of new wind, solar, and battery storage resources will be integrated into the generation mix. However, supply chain constraints owing to the pandemic delays, the Russia-Ukraine conflict, and the expected U.S. ban on Chinese panels allegedly produced using forced labor have increased uncertainties to the project timelines.
- The prediction of continued extreme drought in the West also poses a threat to hydropower generation. With the delayed renewable installation, rapid retirement in coal capacity, and restricted hydropower availability, gas-fired generators will become more important this summer to ensure grid reliability.

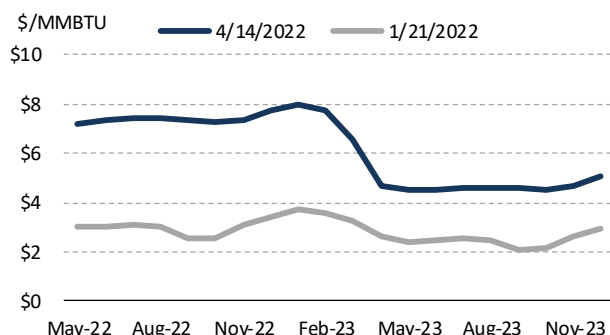
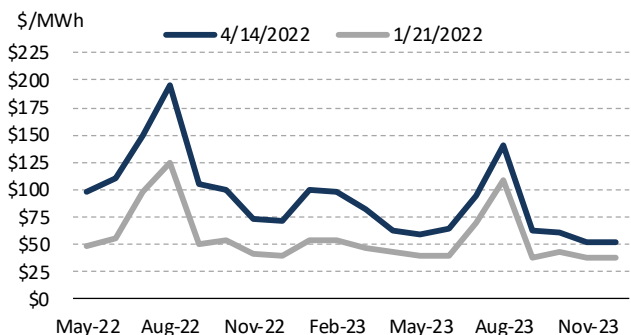
Reliability concerns were reflected on the price forefront of power and natural gas markets—

- Over the past three months, forward market prices at major U.S. power and natural gas hubs surged on escalated grid reliability concerns through 2023. Continued coal supply shortages, a substantial amount of coal capacity retirement, delayed renewable project timeline, and persistent drought in the West created significant upward pressure on natural gas and power prices. Natural gas supply will play an increasingly critical role in ensuring short- to mid-term U.S. grid reliability.

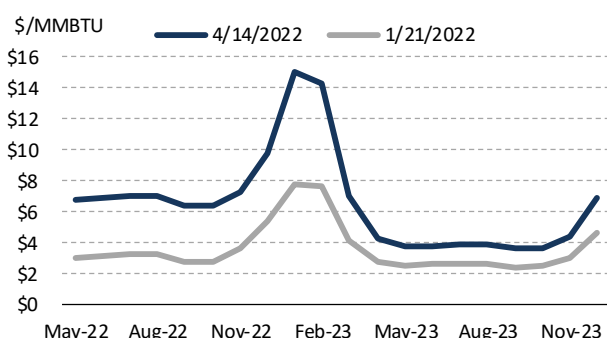
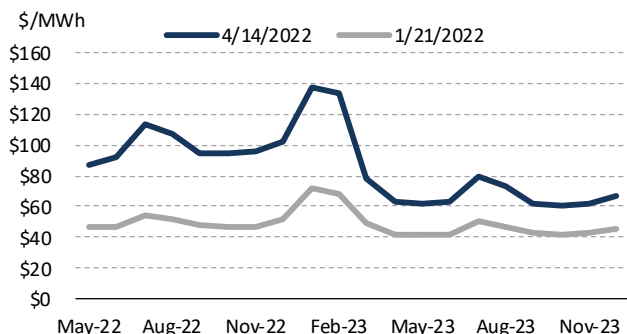
On-Peak MISO Illinois Hub Power Forwards vs Delivered Gas Prices at Chicago City Gate



On-Peak ERCOT Houston Power Forwards vs Delivered Gas Prices at Houston Ship Channel



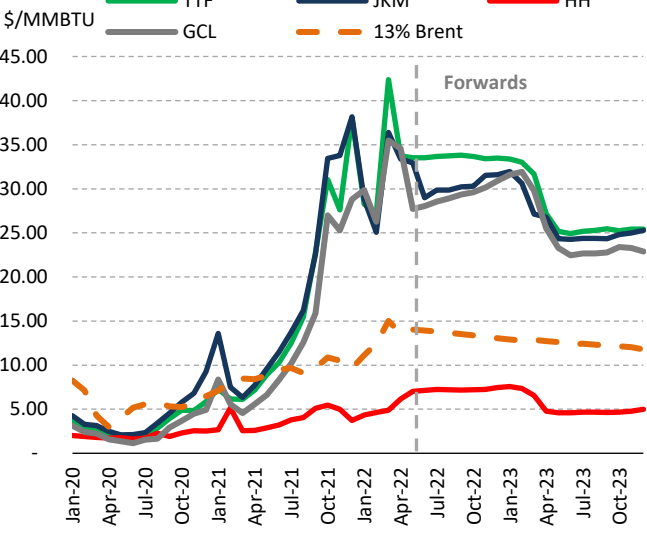
On-Peak PJM West Hub Power Forwards vs Delivered Gas Prices at TETCO M3



Source: On-Peak power prices and delivered gas prices are historical settlements on 4/14/2022 and 1/21/2022.

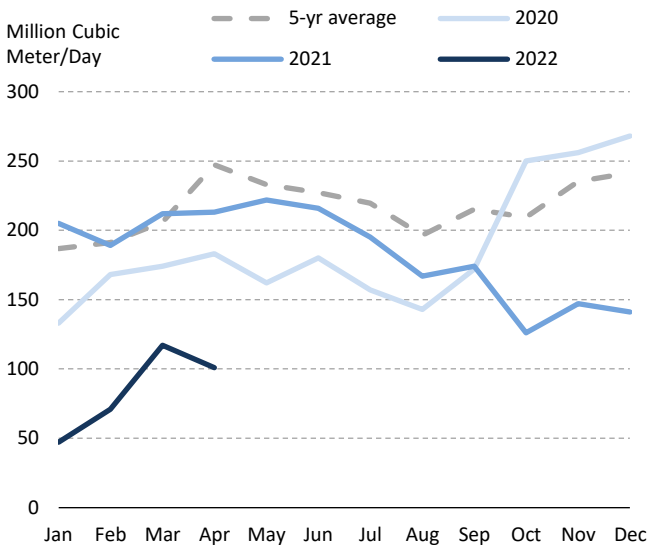
Sanctions on Russia’s invasion of Ukraine threaten energy reliability in Europe—

Global LNG Prices at Different Locations 2020-2023

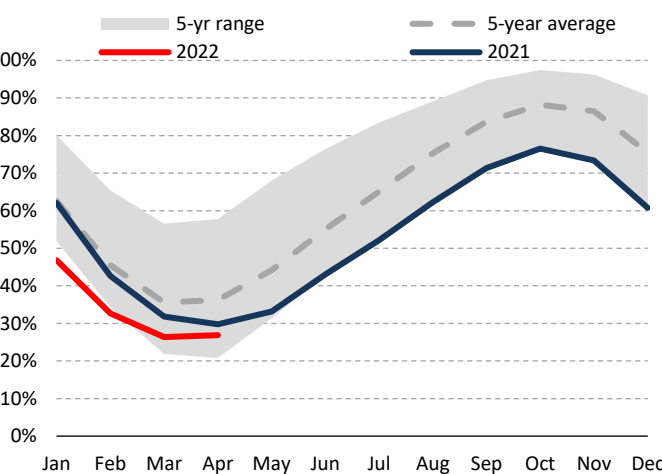


Source: ICE. Future curves are based on 4/14 settlements

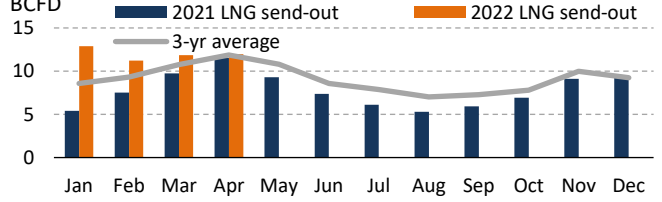
Russian Natural Gas Supply to Central & Eastern Europe 2022 vs. Historical



European Natural Gas Storage Utilization



European LNG send-out

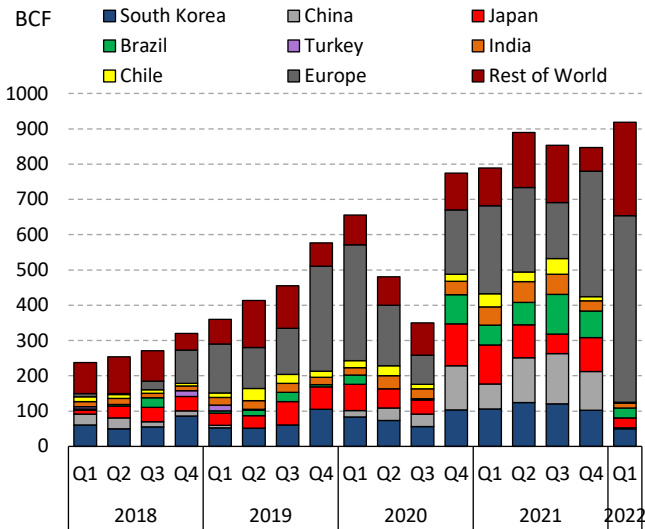


Source: GIE, Energy Ventures Analysis

- The uncertainty over Russian gas supply to Europe surged after Russia invaded Ukraine. The potential disruption of Russian pipeline gas threatens the economy of Europe as it supplies 40% of EU's natural gas imports. The risk premium could keep prices at TTF (European benchmark) trading above the JKM (Asian benchmark) index until Europe secures alternative sources. Although Gazprom still meets the minimal contracted volume, flows to Central and Eastern Europe slumped starting Q4 2021. The suspension of Nord Stream 2, originally scheduled online in 2022 to double Russian gas deliveries to Germany, created a substantial market share for spot LNG cargoes.
- European storage remained below the seasonal normal as of April, but the deficit against the 5-yr average has narrowed with increased LNG supply. The European Commission has announced a target to refill the EU gas storage to 80% of capacity by November 1 while reducing the purchase of Russian gas by two-thirds before the end of the year. However, the path to meeting those goals can be rocky. The intensified competition for LNG cargoes limited the availability of spot cargoes as buyers have been trying to maximize purchases through long-term LNG contracts, which are less expensive than the current spot LNG prices. The market share of spot cargo fell to just 25% of total LNG trade this spring from as high as 40% in 2020. Downstream pipeline bottlenecks in NW Europe are further complicating Europe’s energy woes and limiting the LNG send-out from regasification plants, even though the importing terminals are not fully utilized.

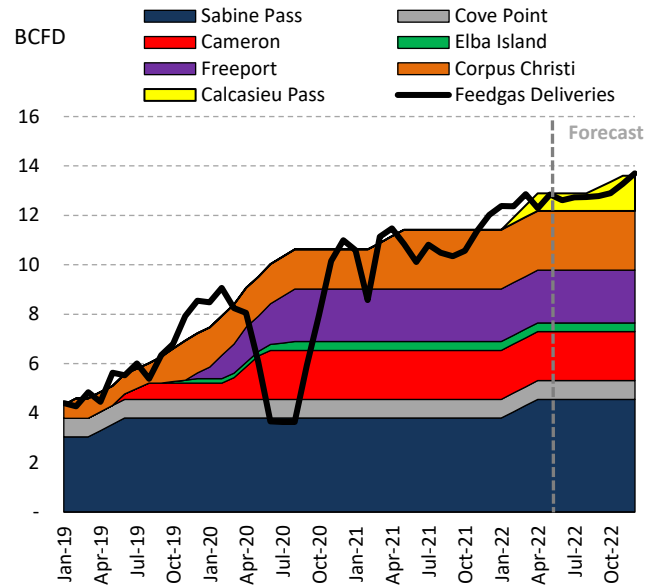
More U.S. LNG to flow into Europe while the total exports remain limited by U.S. LNG exporting capacity—

U.S. LNG Exports by Destination



Source: US DOE, Energy Ventures Analysis

U.S. LNG export capacity vs feedgas deliveries

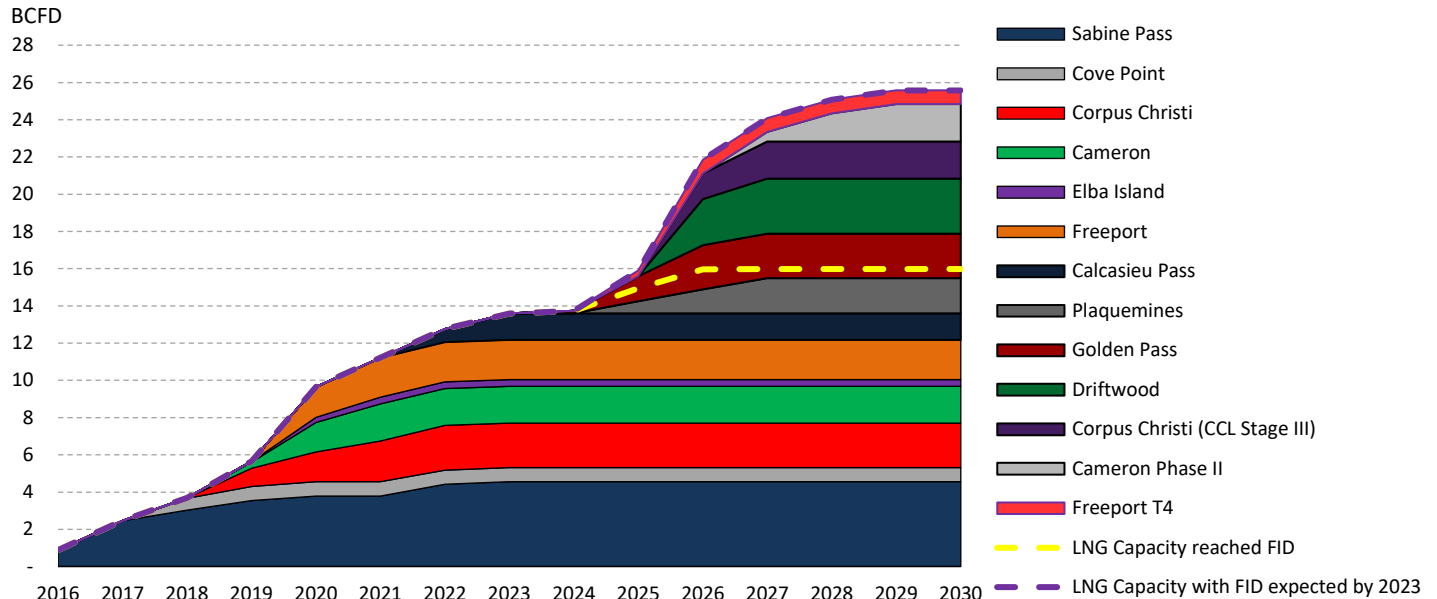


Source: Energy Ventures Analysis, EIA

- U.S. LNG has become an increasingly important strategic energy source in Europe. The percentages of U.S. LNG cargoes flowing to Europe expanded from 18% in Q3 2021 to over 50% in Q1 2022, as European gas prices gained strength on Russian supply risk, trading at a premium above the Asian LNG benchmark JKM.
- President Biden’s pledge to supply 15 billion cubic meters (BCM) more LNG (1.6 BCFD) to the EU in 2022 will not have a significant impact on U.S. LNG feedgas demand as all seven U.S. exporting plants were already operating at capacity (12.8 BCFD). Instead, the announcement could redirect more U.S. cargoes from other markets to Europe, which was exactly how the European price signals affected the shipments over the past two quarters. Due to unchanged U.S. exporting capacity since spring 2022, the war situation in Europe will not have a material impact on the U.S. domestic gas markets fundamentals this summer.
- As of March 2022, seven projects totaling 12.8 BCFD of exporting capacity are operating or are currently undergoing commissioning. Sabine Pass Train 6 (0.76 BCFD) began production in October 2021, and Calcasieu Pass Phase I (0.7 BCFD) followed in January 2022.
- Based on the current forward market settlements, estimated netbacks of U.S. LNG exports to NW Europe and NE Asia remained above \$15/MMBTU through 2023. In the near term, U.S. LNG feedgas demand will be constrained at the nameplate capacity (12.8 BCFD) until Calcasieu Pass Phase II (0.7 BCFD) starts service by Q4 2022. The next major expansion will wait until 2024 when the 2.4-BCFD Golden Pass LNG project comes online.
- EVA expects U.S. LNG feedgas demand to average 12.7 BCFD in Summer 2022, an increase of 2.1 BCFD since last summer, but essentially the same as in Fall 2021.

U.S. LNG projects advance as EU cuts dependence on Russian gas—

U.S. LNG Project Development



Source: Energy Ventures Analysis, EIA

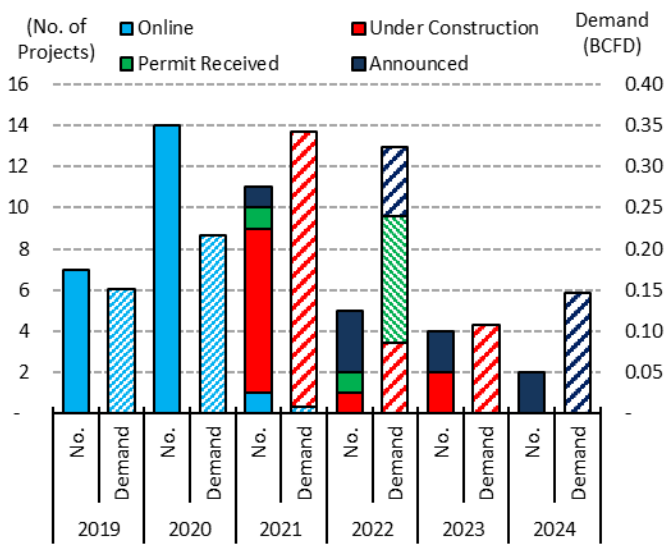
1 million metric tons of LNG per annum (MTPA) is equivalent to 0.13 billion cubic feet of natural gas per day (BCFD)

FID is the abbreviation of Final Investment Decision

- Europe’s efforts to cut the Russian gas supply could accelerate the next wave of LNG development. The White House and EU’s agreement to secure another 5 BCFD of U.S. LNG supply for Europe until at least 2030 could be an assurance of demand growth for U.S. developers.
- Several U.S. LNG projects advanced development in the past quarter but will not come online until 2025. Shell agreed to purchase another 2 MTPA of LNG supply from Venture Global’s proposed Plaquemines LNG project in Louisiana. With earlier deals signed with Polish Oil and Gas and China’s Sinopec, 70% of Plaquemine’s 20-MTPA capacity are under contract. The first stage is expected to come online by 2025, providing 10 MTPA of supply. In April, Tellurian began constructing the 11-MTPA Driftwood LNG project, on track to reach FID for this project in Q2 2022. Freeport LNG expects to secure enough financing for the 5-MTPA Train 4 expansion by early 2023. Additionally, Cheniere signed EPC contracts with Bechtel for the Corpus Christi Stage III project, which is expected to provide 12-MTPA of supply by 2025. The company anticipates reaching FID on the project this summer.
- Starting Q4 2021, Chinese buyers have shown a growing interest in U.S. LNG projects. In November 2021, Sinopec agreed to purchase 4 MTPA of LNG supply from the proposed Plaquemine plant for 20 years. In the same month, Sinopec’s trading arm Unipec also reached a deal to buy 3.8 MTPA of supply from Calcasieu Pass. China’s Sinochem also secured 1.8 MTPA of Cheniere’s LNG supply, which will start at 0.9 MTPA in July 2022 and rise to 1.8 MTPA over 17.6 years.
- Energy Transfer agreed to supply China’s ENN Energy Holding 2.7 MTPA of LNG for 20 years starting in 2026 from the proposed Lake Charles exporting facility. The same buyer also signed a 20-year contract with NextDecade for 1.5 MTPA of LNG from the proposed Rio Grande LNG export project.
- Four projects (Plaquemines, Corpus Christi Stage III, Driftwood LNG, Freeport LNG) totaling over 6.5 BCFD (50 MTPA) are expected to reach FID by 2023. If sanctioned, those projects will boost U.S. exporting capacity to 25 BCFD by 2030.

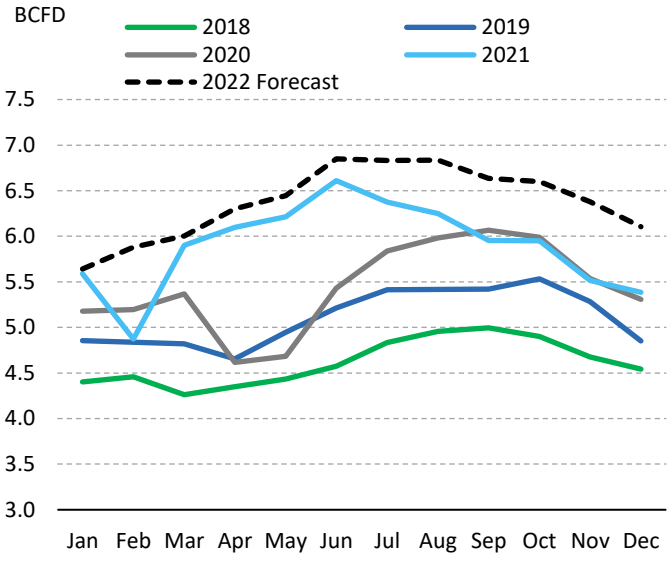
Structural growth expands natural gas demand from industrial customers and Mexico exports—

Industrial Projects and Gas Demand



Bars with stripes representing the demand estimate for new projects are indexed in the same color as the project status.
Source: Energy Ventures Analysis

U.S. Pipeline Exports to Mexico



Source: Energy Ventures Analysis

- Industrial natural gas demand has remained strong since 2022 due to increased heating demand and improved industrial utilization. According to the U.S. Federal Reserve, the industrial capacity utilization rate rose to 77.6% in February, 4.9 percentage points higher YoY. The index for mining remained nearly flat. Capacity utilization for manufacturing increased by 0.9 percentage points, 2.5 percentage points higher than the pre-pandemic level but marginally lower than the long-run average. Despite the increased risk of demand destruction by the soared natural gas prices, the growth of industrial activity will likely continue as manufacturers try to ease the bottlenecks in the supply chain. U.S. industrial gas demand is expected to rise by 3% this summer.
- The development of new industrial projects has supported the structural growth of weather-adjusted industrial demand. Despite delays associated with the pandemic, 53 projects came online during 2016-2020, solidifying 1.7 BCFD of natural gas demand. An additional 22 projects are expected to come online between 2021 and 2024, which could potentially add 1.0 BCFD of incremental gas demand.

- Mexico's demand for U.S. natural gas has increased by 40% in the past five years. As nearly half of Mexico's power generation came from natural gas in 2020-2021, the U.S. has become an increasingly critical supplier to Mexico's energy sector. U.S. natural gas exports to Mexico averaged 5.9 BCFD in 2021, 0.5 BCFD higher year-over-year, with expanded cross-border takeaway capacity that improved utilization of the downstream pipelines.
- EVA expects pipeline exports to Mexico to average 6.7 BCFD in summer 2022, 0.4 BCFD higher than last summer.
- TC Energy aims to start the Villa de Rey pipeline by Q2 2022, allowing U.S. natural gas to reach central Mexico power plants and industrial facilities. The service of this project will further improve the utilization rate on the Sur de Texas-Tuxpan pipeline that draws gas from the Permian basin to Mexico.