Characteristics of U.S. Natural Gas Transactions

INSIGHTS FROM FERC FORM 552 SUBMISSIONS AS OF JULY 17, 2024

CORNERSTONE RESEARCH

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The Federal Energy Regulatory Commission (FERC) receives and compiles the most comprehensive information on trading activity and pricing methods in U.S. natural gas trading markets. The information, collected from market participants' FERC Form 552 submissions, provides a database of trading activity that spans both physical and financial trading by a range of companies, from producers to end users.

By supplementing the data with proprietary classifications of market participants, Cornerstone Research adds deeper insight into market activities and characteristics across the various types of participants. See Appendix 1 for additional information.

Executive Summary

Form 552 data for 2023 continued the trends observed in recent years. Total trading volume increased for the ninth consecutive year, while the percentage of volume reported to indices as a share of reportable volume continued to decline.

In 2023, the volume of index-priced transactions was 22 times higher than the volume potentially reported to indices by the counterparties. The share of Form 552 index-priced transaction volume, and the breakdown between next-month and next-day transactions, remained stable.

FERC Submissions

- Trading activity in 2023 totaled 164,817 tBtu, approximately 2% higher than in 2022.[1] (page 7)
- In 2023, there were 676 respondents, slightly more than in 2022 (671 respondents).[2] (page 7)
- The top 20 companies accounted for approximately 40% of the total volume reported to FERC. (page 11)

Exchange Trading Activity

- Exchange trading of natural gas contracts increased by 7% on the Intercontinental Exchange (ICE) and by 22% on the Chicago Mercantile Exchange (CME). (page 8)

U.S. Natural Gas

- U.S. natural gas annual marketed production reached another record high in 2023, up 5% from 2022. (page 4)
- U.S. liquefied natural gas (LNG) exports continued to increase, with the majority of these exports going to Europe in 2023. (page 5)

"2023 saw a continuation of the trends established in previous years, with another record volume of index-priced transactions and the lowest volume potentially reported to indices by the counterparties since FERC began reporting Form 552 data."

Greg Leonard, Cornerstone Research

Reporting to Price Index Publishers

- Index-priced transactions comprised approximately 86% of all Form 552 transactions, an increase of 19 percentage points since 2008. (page 12)
- The ratio of next-day to next-month transactions was nearly unchanged from 2022, with next-day equaling 51% and next-month at 49%. This represents a 12 percentage point decline in next-month transaction volume since 2008. (page 13)
- Starting in calendar year 2023, FERC requires companies to disclose whether they report daily and monthly transactions to price index publishers separately on Form 552. (page 14)
- Between 2022 and 2023, the volume of index-priced transactions increased by 2% while the fixed-price volume potentially reported to indices—aside from transactions captured by indices through data-sharing agreements with exchanges—decreased by 13%. (page 14)
- For the ninth consecutive year, companies that chose not to directly report transactions to price index publishers represented more than half of the reportable fixed-price volume (71% of volume in 2023). (page 15)
- In 2023, approximately 13% of Form 552 respondents directly reported transaction information to price index publishers for themselves or at least one affiliate. These respondents accounted for 29% of the reporting-eligible, fixed-price volume in 2023, compared to 33% in 2022 and over 62% in 2008. (page 15)

Natural Gas Balance Sheet

Domestic production and demand for U.S. natural gas increased in 2023. The routes of natural gas trade flows stabilized in 2023 and U.S. exports increased by more than 10%.

Domestic Production and Consumption

- Annual marketed production of natural gas increased by 5% between 2022 and 2023, while dry production increased by 4%. In 2023, natural gas was the largest source of energy production in the U.S., ahead of crude oil and coal.[3]
- Over the same period, natural gas consumption increased by 1%, while the total U.S. energy consumption declined slightly.[4]
- As of November 2024, the U.S. Energy Information Administration (EIA) anticipates U.S. natural gas production and consumption will remain relatively stable between 2023 and 2025.[5]

Domestic Storage

- After decreasing for two consecutive years, natural gas in U.S. storage increased in 2023, with U.S. production and U.S. imports exceeding U.S. net exports and U.S. consumption by 633 tBtu.
- For each month in 2023, the volume of natural gas in storage was above the 10-year average.

"After the upheaval caused by the Ukraine War, global natural gas trade flows stabilized in 2023, with Europe remaining the largest importer of U.S. LNG."

Nicole Moran, Cornerstone Research

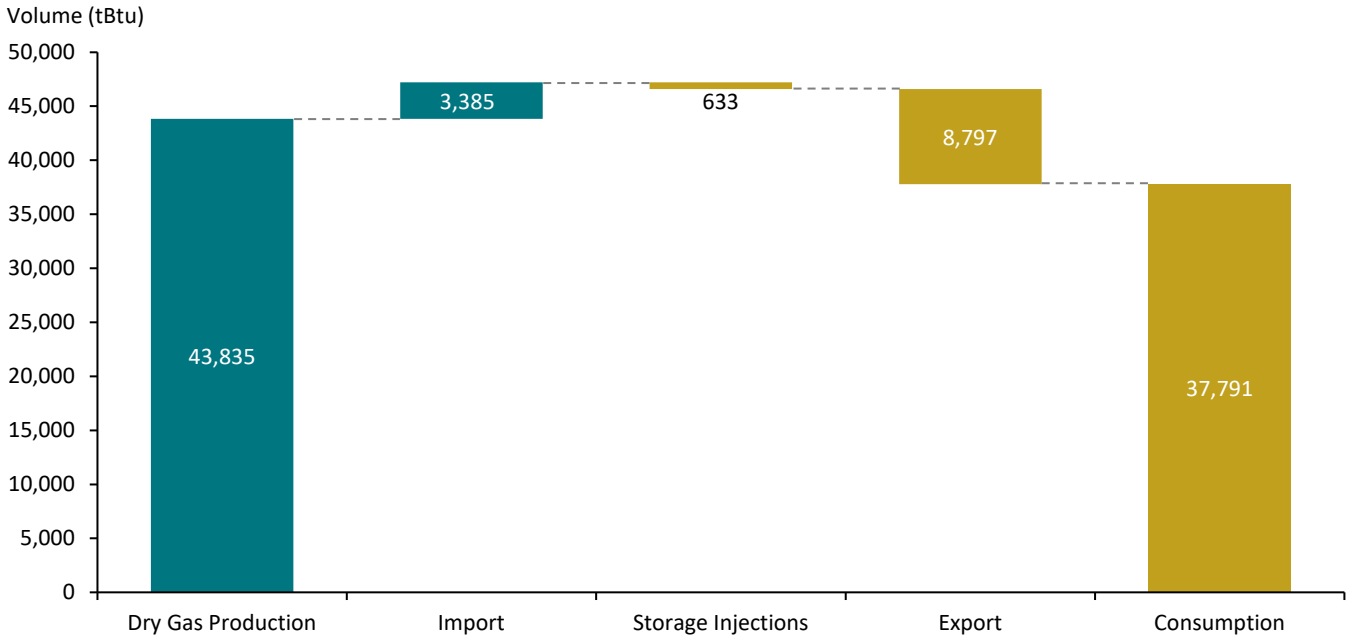
Global Demand

- Global demand for natural gas grew by an estimated 0.5% in 2023, after decreasing by 1.5% in 2022.[6] Demand growth in 2023 was primarily driven by China, North America, Africa, and the Middle East.[7]
- The International Energy Agency (IEA) expects the global gas demand for natural gas to increase by 2.5% in 2024.[8]

U.S. Exports

- U.S. natural gas total exports increased by more than 10% between 2022 and 2023 and by more than 140% since 2017, driven primarily by an increase in LNG exports.[9]
- LNG's share of total U.S. natural gas exports continued to rise in 2023, reaching 57%, up from 56% in 2022 and 22% in 2017. The remaining 43% was exported via pipeline.[10]
- After increasing from 29% to 64% between 2021 and 2022, the share of U.S. LNG exports to Europe decreased slightly to 62% in 2023.[11] Natural gas consumption in Europe fell by 7% in 2023 to its lowest level since 1995.[12]
- As of November 2024, the EIA anticipates U.S. LNG gross exports will increase by 16% and pipeline gross exports will increase by 8% between 2023 and 2025.[13]

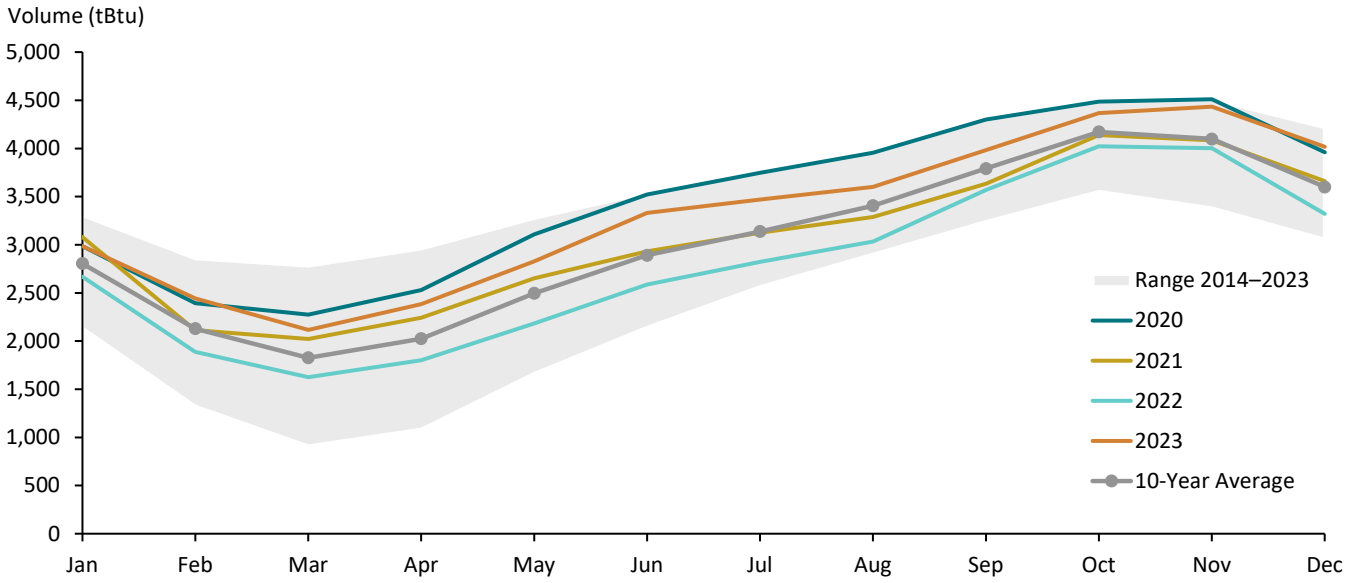
Figure 1: U.S. Natural Gas Balance Sheet
2023



Source: U.S. Energy Information Administration (EIA)

Note: Numbers may not add up to indicated values due to rounding. Values are converted using the 2023 Marketed Production conversion rate of 1,156 Btu per cubic foot of natural gas. Dry Gas Production is Marketed Production (47,750 tBtu) less NGPL Production (3,915 tBtu). The Dry Gas Production value also includes "Supplemental Gaseous Fuels." Consumption value also includes the "Balancing Item" used by the EIA to reconcile volume measurements.

Figure 2: U.S. Natural Gas in Underground Storage
2014–2023



Source: U.S. Energy Information Administration (EIA)

Note: Volumes are converted from billions of cubic feet to tBtu using the Marketed Heat Content reported by the EIA. The recent 10-year average is calculated between the years 2014 and 2023. The 2014–2023 range is based on the weekly working gas inventory values and is converted to tBtu using the 2023 Marketed Heat Content.

Natural Gas Production and Consumption

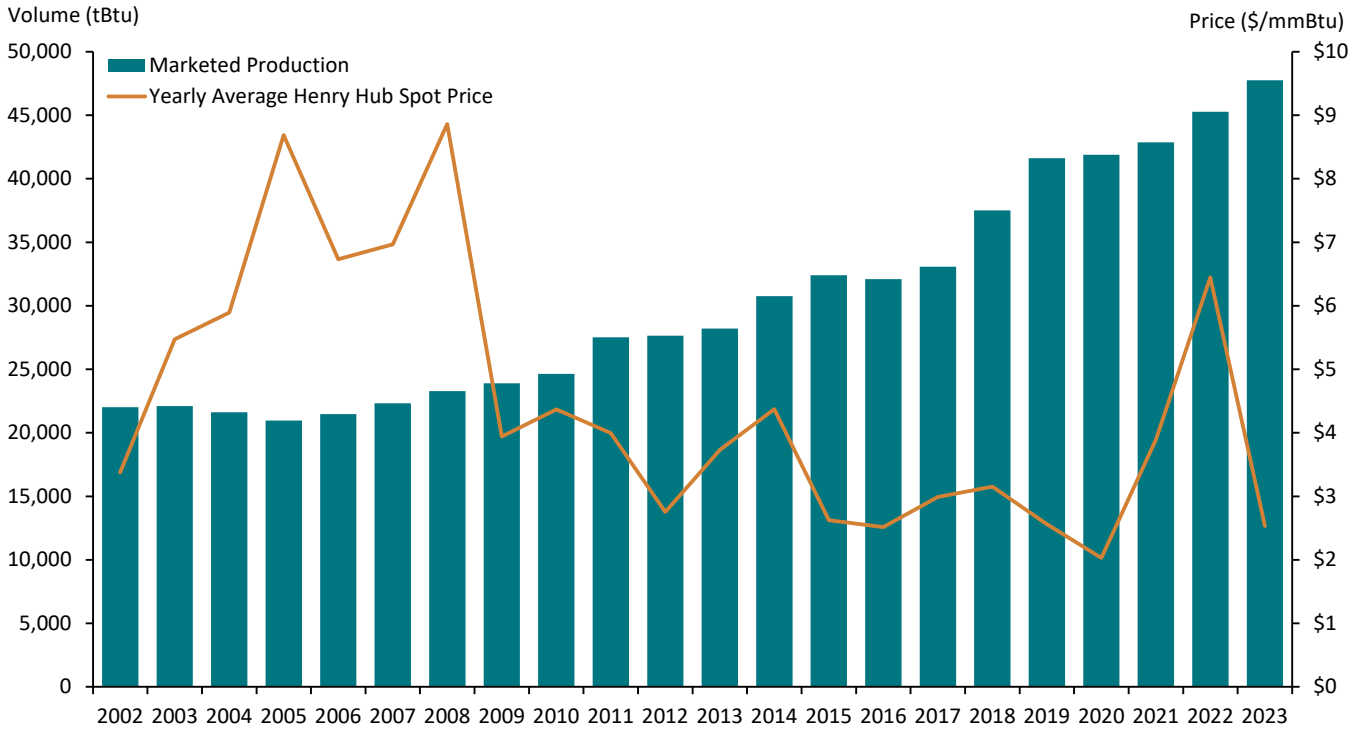
- Annual marketed production of natural gas increased by 5% in 2023 to 47,750 tBtu, setting a new record high for the seventh consecutive year. Gross withdrawals of gas grew by 4% in 2023, driven by production increases in the Permian, Haynesville, and Appalachia regions that all registered increases of more than one billion cubic feet per day.[14] Production growth in Appalachia was again hindered by recurring pipeline capacity constraints.[15] In 2023, 74% of gross withdrawals came from shale gas wells, 14% from natural gas wells, and 12% from crude oil and coalbed wells.[16]
- U.S. natural gas consumption reached a record 89.1 billion cubic feet per day in 2023, with nine out of 12 months setting new monthly records. This growth materialized despite summer temperatures being below average and winter temperatures being above average.[17]

"In 2023, U.S. natural gas prices decreased below their 10-year average despite sustained demand for U.S. LNG."

Sylvain Delalay, Cornerstone Research

- Natural gas consumption by the electric power sector increased by 7% in 2023 while consumption in the residential sector decreased by 10%.[18] The sectors consuming the most natural gas were electric power (40%), industrial (32%), and residential (14%).[19]
- After reaching more than $6.00 per mmBtu in 2022 amid geopolitical unrest, the annual average Henry Hub price decreased to approximately $2.50 per mmBtu in 2023, below the 10-year historical average.[20]

Figure 3: U.S. Natural Gas Marketed Production and Average Henry Hub Natural Gas Spot Price 2002–2023



Source: U.S. Energy Information Administration (EIA)
Note: One tBtu equals one million mmBtu.

Liquefied Natural Gas

- Global natural gas demand grew by 0.5% in 2023, while the IEA estimated that global LNG trade grew by 2%. LNG imports decreased by 1.5% in Europe after increasing by 63% in 2022 to substitute for Russian gas.[21]
- The U.S. exported more than 4,343 billion cubic feet of LNG in 2023, up 12% from 2022, becoming the world's largest LNG exporter.[22] U.S. export growth was bolstered by the restart of the Freeport LNG terminal after a prolonged outage.[23]
- As in the recent past, U.S. LNG exports were driven by attractive price differentials between the U.S. and international markets.
- The U.S. now has seven facilities and 44 liquefaction units (referred to as "trains") in service.[24] Liquefaction capacity investments in the U.S. are continuing with five projects currently under construction and 10 projects awaiting a final investment decision.[25]
- About 62% of U.S. LNG exports went to Europe in 2023, the majority of which were shipped to terminals located in the Netherlands, France, and the UK.[26] Europe remained the largest destination for U.S. LNG exports after overtaking Asia in 2022.
- For the first time, the U.S. exported LNG to terminals located in El Salvador and the Philippines in 2023.[27]

"The U.S. is expected to solidify its position as the world's top LNG exporter with the addition of substantial liquefaction capacity."

Laurent Samuel, Cornerstone Research

Figure 4: U.S. Liquefied Natural Gas Exports and LNG Prices by Country
2023

Source: U.S. Energy Information Administration (EIA)

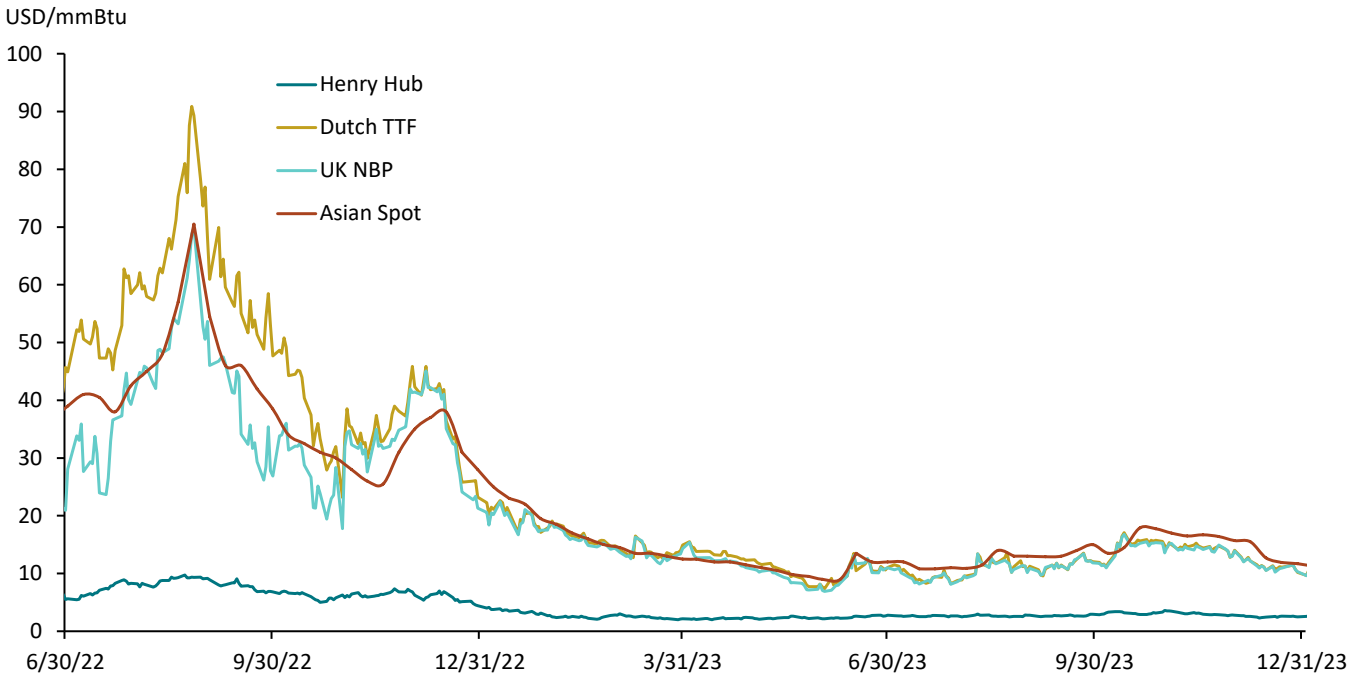
Note: tBtu conversion uses 2023 Btu per cubic foot for Natural Gas Exports Heat Content. Volumes are converted from millions of cubic feet to tBtu using the Natural Gas Export Heat content reported by the EIA. LNG prices are export-location specific. "Other" includes Truck Exports to Canada, Truck and Vessel Exports to Mexico, and Vessel Exports to Antigua and Barbuda, the Bahamas, Bangladesh, Barbados, Brazil, Chile, Colombia, El Salvador, Finland, Greece, Haiti, Indonesia, Jamaica, Jordan, Kuwait, Malta, Pakistan, Panama, the Philippines, and Singapore.

- U.S. LNG exports to Asia increased by 28% in 2023. Exports to China increased by 79% to 173 billion cubic feet, but did not recover to 2021 levels (453 billion cubic feet). Overall, the share of U.S. LNG exports to Asia increased slightly from 23% to 26% between 2022 and 2023.[28]
- U.S. LNG exports to the Caribbean and to Central and South America increased by approximately 17% in 2023. U.S. combined exports of natural gas to Mexico by vessel, truck, and pipeline increased by 8% in 2023.[29]
- The average export price of U.S. LNG decreased by 38% between 2022 and 2023, ending a five-year trend of yearly increases.[30]

Intercontinental arbitrage opportunities bolstered demand for U.S. LNG despite the narrowing of the spread between overseas and U.S. price benchmarks.

- Driven by increased demand from LNG exporters, Henry Hub spot prices averaged $6.45 per mmBtu in 2022, which represented a 66% increase from 2021 and the highest yearly average since 2008.[31]
- In January 2023, the monthly average price dropped by 41% to $3.27 per mmBtu driven by mild temperatures across the U.S. and increased production. The Henry Hub average monthly price remained below $3.00 per mmBtu for the rest of 2023.
- U.S. natural gas prices also saw a decrease in volatility during 2023—wholesale natural gas price volatility was 47% in December 2023 compared to 99% in January 2023.[32]
- The EIA expects U.S. natural gas prices to rise in 2025 amid an increase in LNG exports of almost two billion cubic feet per day.[33]
- European price levels decreased in the first quarter of 2023 following a milder-than-expected winter and an increase in LNG imports to substitute Russian gas imports. Asian and European price benchmarks remained above their historical average in 2023.[34]

Figure 5: Evolution of Spot Gas Prices
June 2022–December 2023



Source: Refinitiv

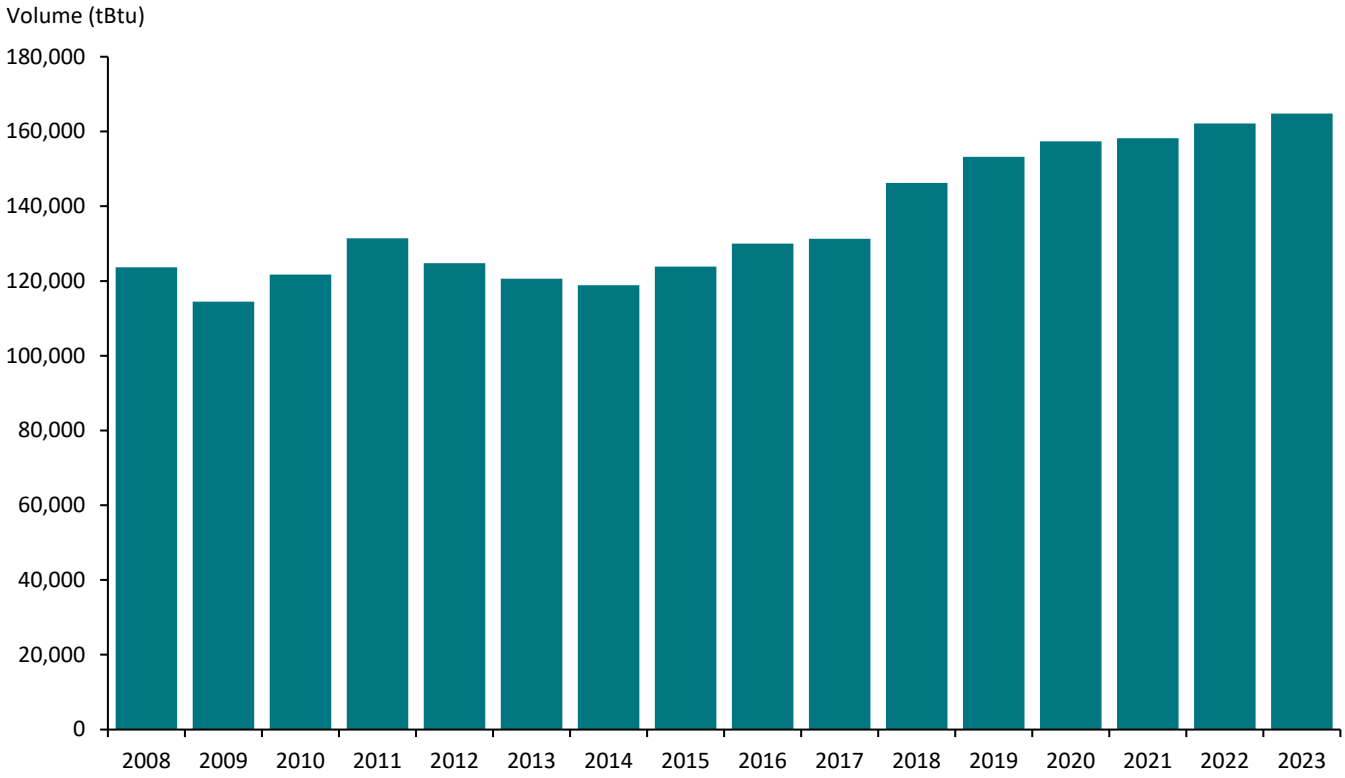
Note: The TTF front month price is converted from USD/MWh to USD/mmBtu using a conversion rate of 3.412 mmBtu per MWh. See https://www.aqua-calc.com/convert/energy/megawatt-hour-to-british-thermal-unit.

Market Volume

- Form 552 volumes increased for the ninth consecutive year in 2023, albeit at a slower rate than in 2022. Total reported volume grew about 1.7% between 2022 and 2023, compared to 2.5% between 2021 and 2022 and 0.5% between 2020 and 2021.
- Trading activity reported in Form 552 submissions for 2023 totaled 164,817 tBtu, transacted by 676 respondents. There were 671 respondents for volume transacted in 2022.
- Form 552 volumes in 2023 represented a minimum of 83,375 tBtu of trading volume, which is 1,612 tBtu more than the 2022 minimum trading volume of 81,763.[35]

Total volumes reported to FERC increased by 1.7% in 2023, reaching an all-time high of almost 165,000 tBtu. Total volumes have increased by 39% since 2014.

Figure 6: Total Reported Volume
2008–2023



Source: FERC Form 552 submissions as of July 17, 2024
Note: One tBtu equals one million mmBtu.

Exchange Trading

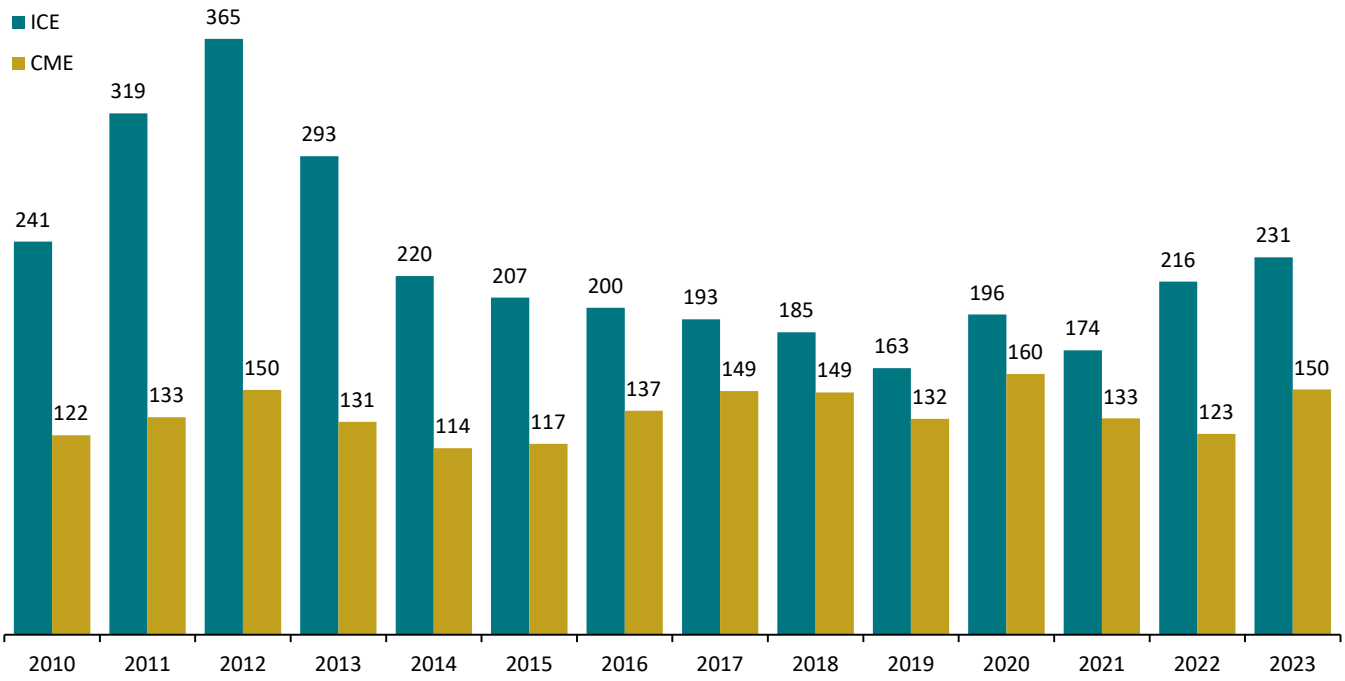
- Aggregate exchange trading of North American natural gas futures and options contracts continued to rise in 2023 after an increase in 2022, with both CME and ICE trading activity increasing.
- ICE North American natural gas contract volume increased by 7% in 2023 to reach 231 million after increasing by 24% in 2022.
- In 2023, trading of North American natural gas products on CME increased by 22%. This partially reversed a downward trend that started in 2020—a 23% decrease occurred from 2020 to 2022.[36]

Trading activity in natural gas products increased on both ICE and CME in 2023.

- In their 10-K filings for 2023, both exchanges mentioned the effect of the ongoing war in Ukraine on natural gas markets. CME mentioned that the war caused "uncertainty in the global energy markets,"[37] while ICE stated that the war was "a catalyst for an energy crisis in Europe."[38]
- ICE and CME expanded their line of natural gas trading products in 2023. For example, CME launched Micro Henry Hub futures and options for trading with smaller margin requirements.[39]
- Global natural gas contracts are also traded on other platforms. For instance, UK NBP Natural Gas Futures and Dutch TTF Natural Gas Futures are listed on ICE's European platform.[40]

Figure 7: ICE and CME Natural Gas Contracts Traded 2010–2023

(Millions)



Source: ICE Form 10-Ks; ICE Market Data Report Center; CME Form 10-Ks

Note: Due to ICE's conversion of swaps to futures in October 2012, the ICE 10-K reports an aggregated total of natural gas futures, options, and cleared over-the-counter (OTC) contracts. In its 2012 10-K, ICE provides comparable totals for 2011 and 2010 to reflect the 2012 reclassification. The figures reflect only North America contract volume for all years except 2012, which reflects worldwide contract volume. In 2012, the Non–North America contract volume accounts for less than 3% of total contracts traded. Values from 2013 onward are sourced from the Historical Monthly Volumes Section of the Market Data available from ICE. The figures reported by CME represent the average daily volume of its natural gas products, and they have been multiplied by 250 to convert them to annual values.

Transaction Volume

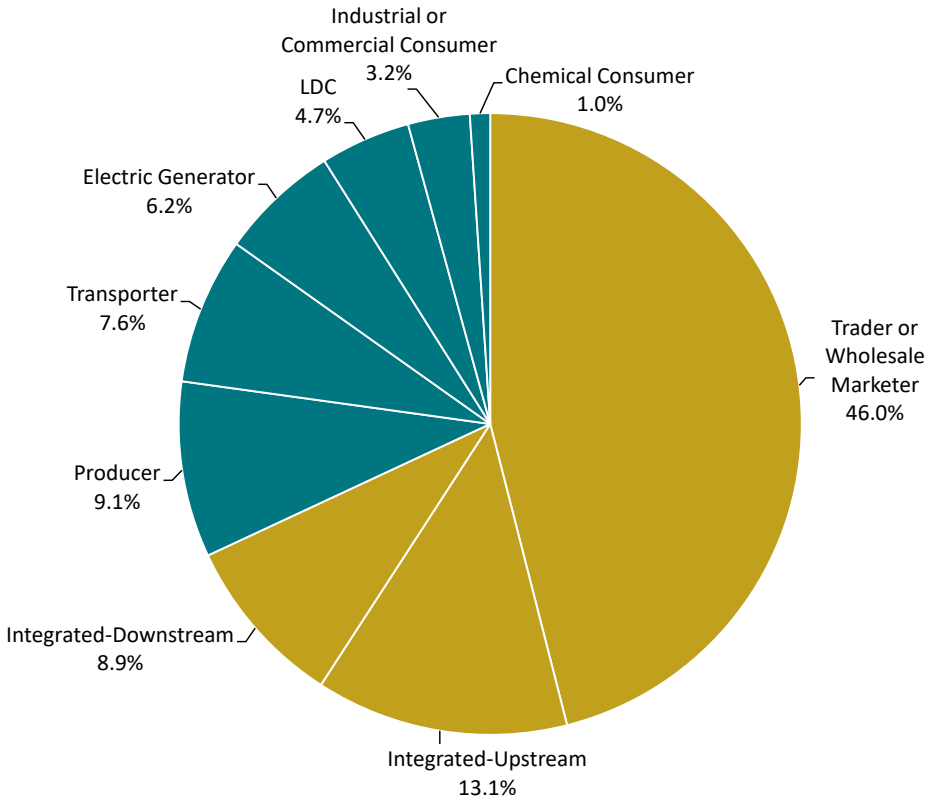
Cornerstone Research supplements FERC Form 552 data with proprietary research that classifies the respondent companies by industry segments. Companies are classified by their primary natural gas business activity, yielding unique insights into the natural gas market.

- Generally, the shares of trading volume attributed to each industry segment of market participant have remained relatively stable over recent years.
- The share of Form 552 natural gas volume attributed to integrated-upstream and integrated-downstream companies and traders or wholesale marketers (shown in gold in the figure below) remained stable in 2023 compared to 2022 at around 68% of all transaction volume.

The shares of trading volume attributed to each industry segment of market participants have remained relatively stable over recent years.

- Industrial or commercial consumers and chemical consumers accounted for about 4% of total 2023 Form 552 trading volume.

Figure 8: Transaction Volume by Industry Segment
2023



Source: FERC Form 552 submissions as of July 17, 2024
Note: Percentages may not add up to 100% due to rounding.

Purchase and Sale Volume

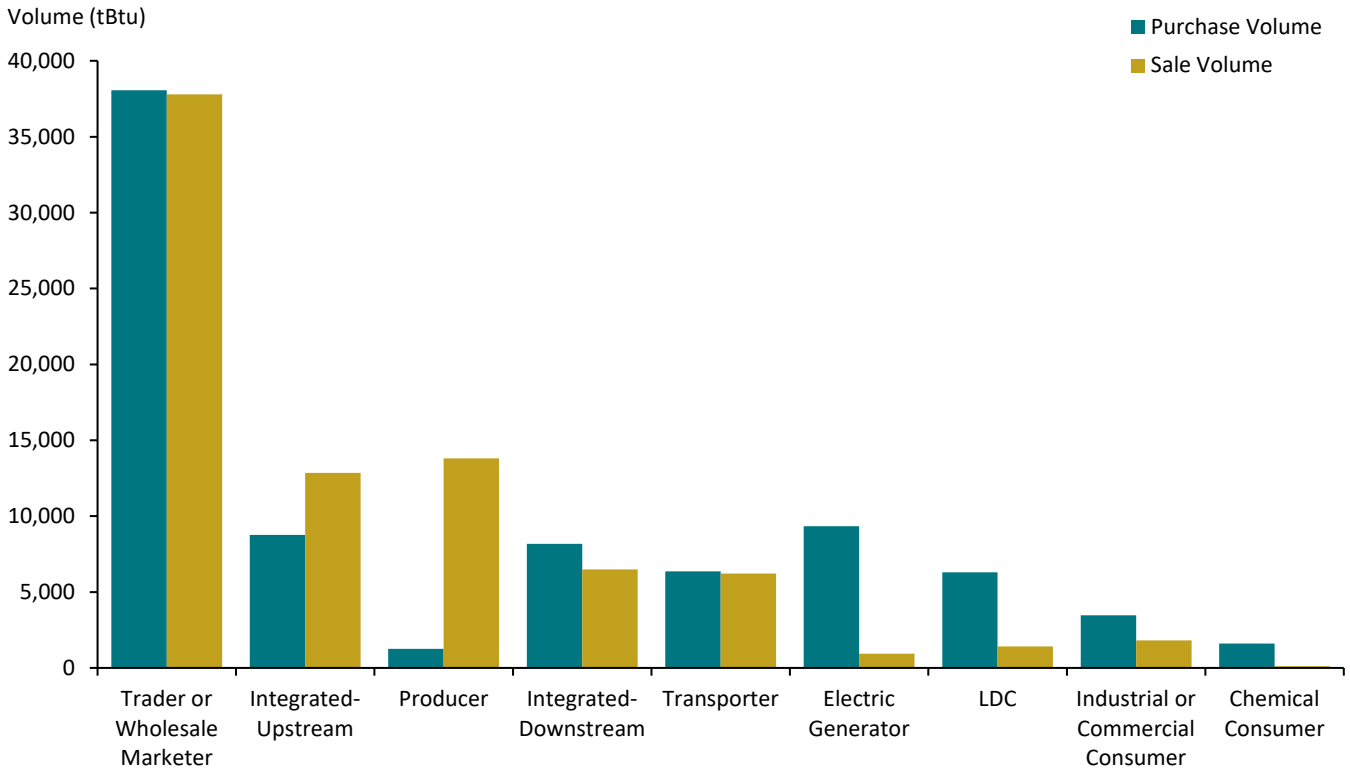
As would be expected, companies primarily engaging in "upstream" or "downstream" activities are net sellers or buyers of natural gas, respectively, while "midstream" companies buy and sell in approximately equal amounts.[41]

- The breakdown of Form 552 purchases and sales by industry segment shows that producers and integrated-upstream companies sold more natural gas than they purchased in 2023.

Electric generators and local distribution companies remained the largest net purchasers of natural gas in 2023.

- In addition to the increase in the total volume transacted, the number of times a molecule of natural gas was traded from production to consumption was slightly higher in 2023 compared to 2022 (2.74 vs. 2.70).[42]
- As in the past, integrated-downstream companies, local distribution companies (LDCs), electric generators, industrial or commercial consumers, and chemical consumers purchased significantly more than they sold in 2023.
- Consistent with their business model, traders or wholesale marketers and transporters purchased and sold approximately equal amounts in 2023.
- The total purchased volume by producers decreased by 5% between 2022 and 2023 after a 22% decrease from 2021 to 2022.

Figure 9: Purchase and Sale Volume by Industry Segment 2023



Source: FERC Form 552 submissions as of July 17, 2024
Note: One tBtu equals one million mmBtu.

Top 20 Companies

The list of 20 companies with the largest total transaction volumes indicates that the U.S. natural gas market continues to have a number of diverse participants. Eighteen of the top 20 companies in 2023 were among the leading 20 companies in 2022.

- The top 20 companies accounted for 65,287 tBtu of 164,817 tBtu, or approximately 40% of volume reported on Form 552 submissions in 2023. This share of volume is consistent with that of recent years.
- Tenaska had the highest physical volumes at 5,676 tBtu, an increase of approximately 9% from 2022. Tenaska's volume was 5% higher than the second-largest trader, BP, whose 15-year streak as leader of the top 20 companies ended in 2023.

The top 20 companies accounted for 40% of total volume reported to FERC.

- Two companies fell from the top 20 in 2023: Mercuria and Energy Transfer. In both 2022 and 2023, Energy Transfer had affiliates that reported to price index publishers.
- CIMA Energy and Castleton Commodities Merchant Trading entered the top 20 in 2023.
- Six of the top 20 companies reported to price index publishers in 2023, compared to seven in 2021 and 2022. Fourteen of the top 20 companies reported to price index publishers in 2008 according to Form 552 submissions. However, the number of top 20 companies with transactions in the index assessments is likely higher than six, since price index publisher S&P Global Platts began incorporating anonymized transactions from ICE's trading platform in its daily assessments in 2017.[43]

Figure 10: Top 20 Companies by Total Reported Volume 2023 (Sorted by Total Transaction Volume, in tBtu)

	Company Name	Any Affiliates Report to Index Publishers	Total Buy Volume	Total Sale Volume	Net Volume	Total Transaction Volume	Volume Reportable to Indices
1	Tenaska Marketing Ventures	Y	2,969	2,707	263	5,676	1,341
2	BP Energy Company	Y	2,668	2,726	-58	5,394	796
3	Macquarie Energy LLC	Y	2,178	2,019	159	4,197	734
4	Shell Energy North America (US) LP	Y	2,126	1,965	161	4,090	449
5	Koch Energy Services LLC	N	2,216	1,765	450	3,981	630
6	Sequent Energy Management LLC	N	1,979	1,975	5	3,954	478
7	ConocoPhillips Company	Y	1,784	1,918	-135	3,702	429
8	Citadel Energy Marketing LLC	N	1,681	1,581	101	3,262	820
9	EQT Energy LLC	N	656	2,544	-1,889	3,200	260
10	Vitol Inc.	N	1,499	1,622	-123	3,121	519
11	NextEra Energy Marketing LLC	Y	1,249	1,564	-315	2,813	163
12	DTE Energy Trading Inc.	N	1,416	1,370	47	2,786	123
13	ICE NGX Canada Inc.	N	1,334	1,334	0	2,668	671
14	EDF Trading North America LLC	N	1,385	1,217	168	2,602	442
15	Twin Eagle Resource Management LLC	N	1,408	1,100	308	2,508	438
16	Morgan Stanley Capital Group Inc.	N	1,250	1,125	125	2,375	125
17	Chevron U.S.A. Inc.	N	1,076	1,274	-198	2,351	214
18	CIMA Energy LP	N	1,245	1,060	185	2,305	188
19	Direct Energy Marketing Inc.	N	1,487	669	818	2,155	166
20	Castleton Commodities Merchant Trading LP	N	1,079	1,068	12	2,147	257
	Top 20 Companies by Total Volume		32,685	32,602	83	65,287	9,243
	All Other Companies		50,690	48,841	1,849	99,531	12,904
	Total for All Companies		83,375	81,443	1,932	164,817	22,147

Source: FERC Form 552 submissions as of July 17, 2024

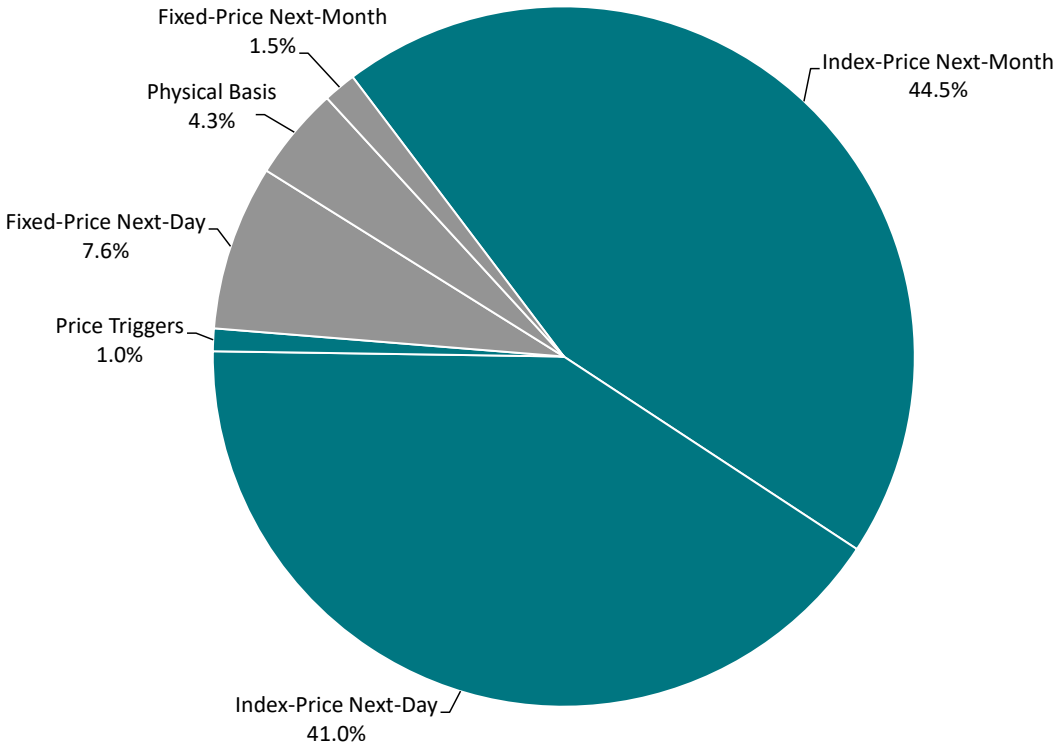
Note: Numbers may not add up to totals due to rounding. One tBtu equals one million mmBtu. "Volume Reportable to Indices" includes the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552.

Transaction Types

- Between 2022 and 2023, index-priced next-day transactions remained constant at 41%, and index-priced next-month transactions increased slightly from 44% to 45%.[44]
- Over the same period, index-priced next-day transaction volume remained stable at 84% of total next-day volume.
- Index-priced next-month transaction volume comprised 97% of total next-month transaction volume in 2023.
- Since 2008, transactions that reference the monthly index have been the most prevalent among index-priced transactions.
- The share of index-priced transactions increased from 67% to 86% between 2008 and 2023.
- Between 2022 and 2023, the share of next-day transactions remained stable at 49%. The share of next-month transactions increased slightly, from 45% in 2022 to 46% in 2023.
- In 2023, price triggers transactions replaced fixed-price next-month as the least prevalent transaction type, comprising approximately 1% of Form 552–reported transactions.

Since 2008, index-priced transactions have comprised an increasing share of Form 552–reported transactions, while the percentage of fixed-price transactions has steadily declined.

Figure 11: Transaction Volume by Transaction Type
2023

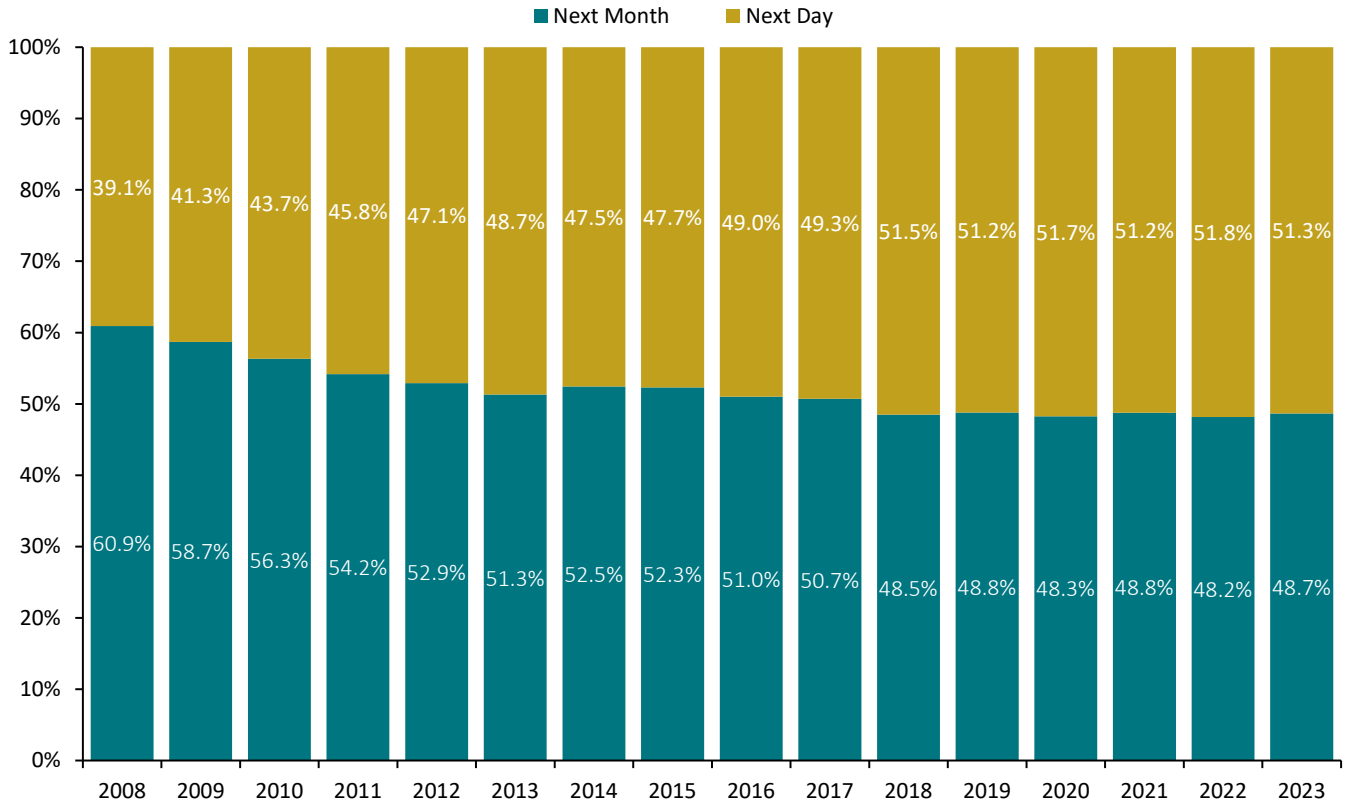


Source: FERC Form 552 submissions as of July 17, 2024
Note: Percentages may not add up to 100% due to rounding.

- Next-day transactions have increased relative to next-month transactions since 2008. Additionally, the volume of fixed-price transactions as a percentage of total transaction volume declined.[45]
- The percentage of volume based on next-month transactions compared to next-day transactions decreased by 12 percentage points between 2008 and 2023 (from 61% to 49%). This percentage has remained stable and just below 50% since 2018.

The split between next-day and next-month index transactions is relatively even.

Figure 12: Next-Month and Next-Day Transaction Volume Across Both Fixed-Price and Index-Priced Transactions 2008–2023



Source: FERC Form 552 submissions as of July 17, 2024
Note: Percentages may not add up to 100% due to rounding.

Reporting to Price Index Publishers

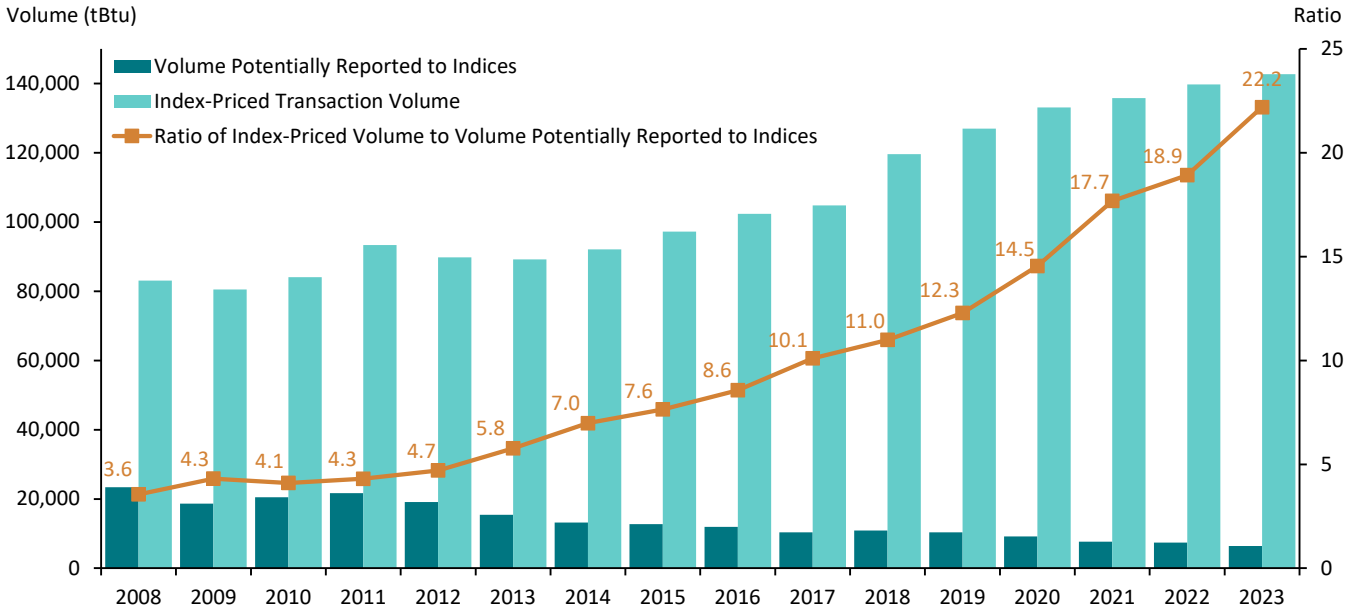
In Order 704, FERC commented that understanding the relative sizes of the volume of index-priced transactions and reporting-eligible, fixed-price transactions was a core objective of mandating Form 552 submissions.[46]

- Starting in calendar year 2023, Form 552 requires companies to disclose whether they report daily and monthly transactions to price index publishers separately.[47]
- Continuing a nine-year trend, 2023 saw the largest volume of transactions based on indices since the inception of Form 552 reporting in 2008.
- For the 13th year in a row, the Form 552 data show an increase in the ratio of index-priced volume dependent on indices to volume potentially reported to indices by the transaction counterparties.
- The increase in this ratio between 2022 and 2023 resulted from a 2% increase in the volume of index-priced transactions relative to a 13% decrease in the fixed-price volume potentially reported to indices.
- Since 2017, price index publisher S&P Global Platts has been incorporating anonymized natural gas transactions from the ICE platform in its daily natural gas assessments. A company does not necessarily need to report to index publishers in order to have its trades incorporated into an index. It is important to note that while these additional transactions enter into the index-formation process, these data are not necessarily included in the Form 552 reporting requirements.

"The continued shift to index-priced natural gas relative to fixed-price is a vote of confidence by entities with money at stake."

Greg Leonard, Cornerstone Research

Figure 13: Total Volumes Potentially Reported to Indices Versus Transaction Volumes Priced Based on Indices 2008–2023



Source: FERC Form 552 submissions as of July 17, 2024

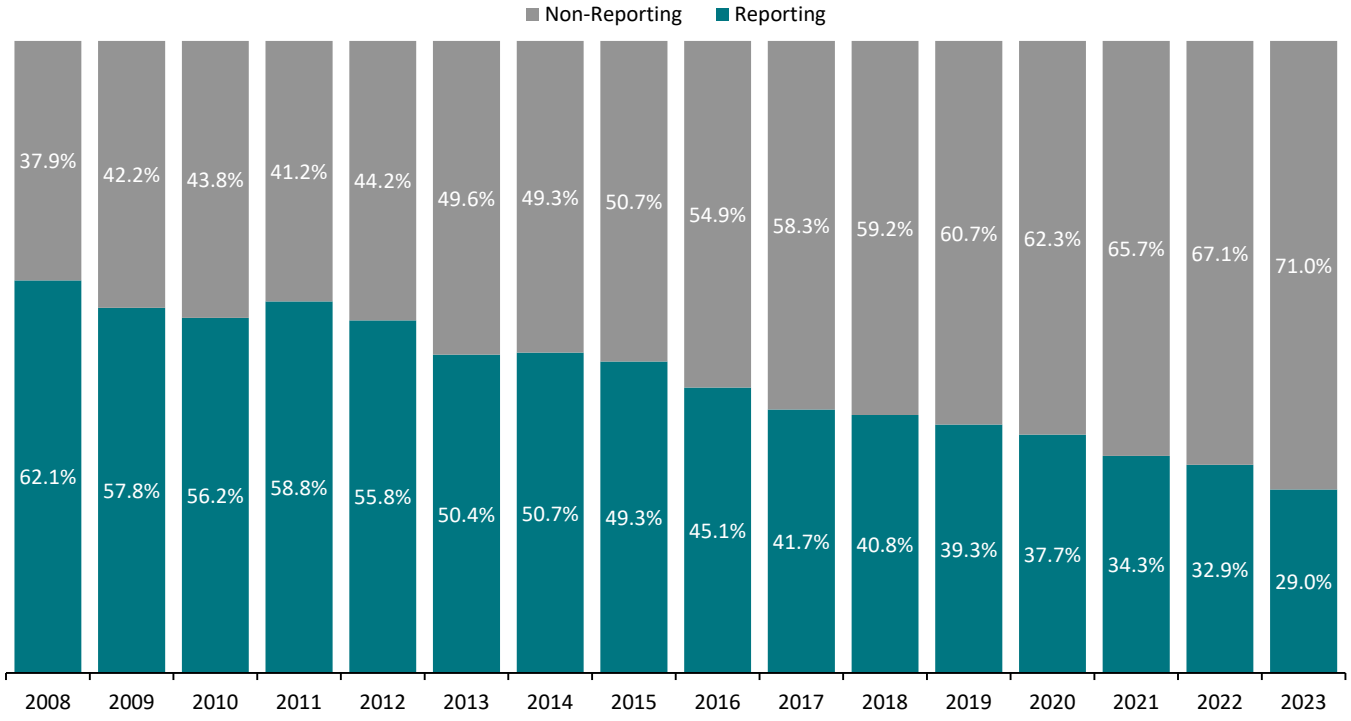
Note: Reportable volume is the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552. For years before 2023, volume potentially reported to indices is the sum of reportable volume for companies that disclosed reporting their transactions to price index publishers on Form 552. For year 2023, volume potentially reported to indices is the sum of (1) fixed-price next-month and physical basis transaction volume for companies that disclosed reporting monthly transactions to price index publishers, and (2) fixed-price next-day transaction volume for companies that disclosed reporting daily transactions to price index publishers. Companies that did not enter information regarding their price reporting are assumed to not report. One tBtu equals one million mmBtu.

Form 552 submissions also provide information on which companies had volume eligible to be reported (i.e., fixed-price transactions) and whether they reported that volume to the indices.[48]

- The percentage of fixed-price volume transacted by non-reporting companies increased from 67% to 71% between 2022 and 2023.
- Of the 676 respondents for volume transacted in 2023, 87 (about 13%) reported transaction information to the price index publishers for themselves or at least one affiliate. Of these 87 respondents, 62 reported information about both daily and monthly transactions, 14 reported information about daily transactions only, and 11 reported information about monthly transactions only.
- The reporting companies accounted for 29% of the reporting-eligible, fixed-price volume in 2023, compared to more than 62% in 2008.
- The companies directly reporting daily transactions to price index publishers accounted for 30% of the reporting-eligible daily fixed-price volume in 2023. This figure was 28% for monthly transactions.
- Analysts have offered multiple hypotheses explaining why companies did not report to indices, including (1) the FERC safe harbor provision was not safe enough to protect against inadvertent errors, and (2) costs associated with internal systems and regulatory risk were too high.[49]

For the ninth consecutive year, companies that chose not to directly report fixed-price volume to the indices comprised a larger share of fixed-price volume than reporting companies.

Figure 14: Fixed-Price Volume by Reporting Versus Non-Reporting Companies
2008–2023



Source: FERC Form 552 submissions as of July 17, 2024

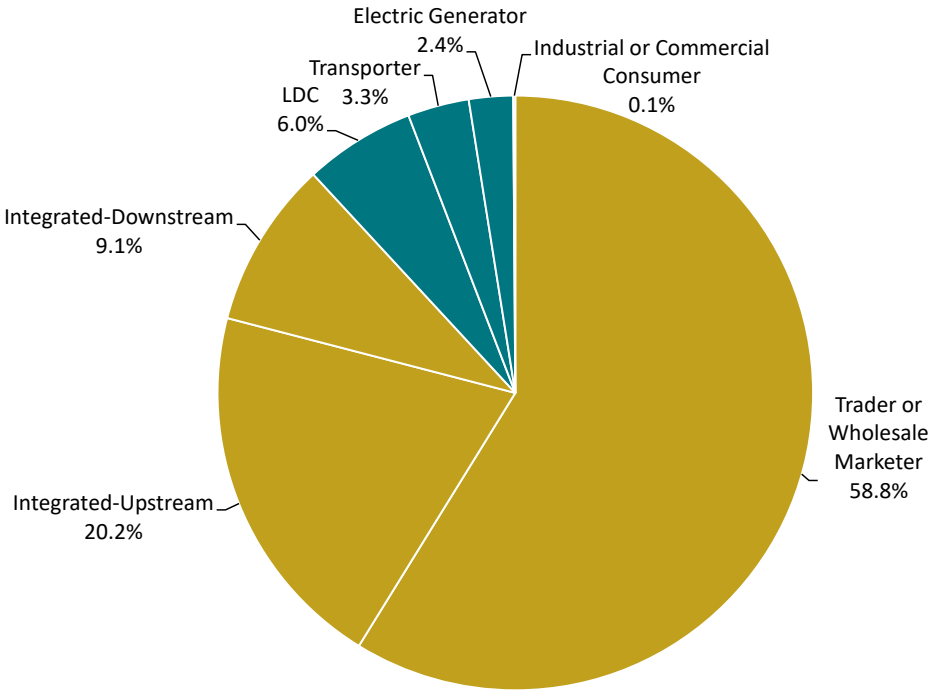
Note: Reportable volume is the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552. For years before 2023, fixed-price volume by reporting companies is the sum of reportable volume for companies that disclosed reporting their transactions to price index publishers on Form 552. For year 2023, fixed-price volume by reporting companies is the sum of (1) fixed-price next-month and physical basis transaction volume for companies that disclosed reporting monthly transactions to price index publishers, and (2) fixed-price next-day transaction volume for companies that disclosed reporting daily transactions to price index publishers. Companies that did not enter information regarding their price reporting are assumed to not report. One tBtu equals one million mmBtu. Percentages may not add up to 100% due to rounding.

Fixed-Price Volume by Industry Segments

- In 2023, integrated-upstream companies, integrated-downstream companies, traders, and wholesale marketers (shown in gold in the figure below) accounted for approximately 88% of the fixed-price volume potentially reported to the price index publishers aside from the transactions captured by S&P Global Platts through its data-sharing agreement with ICE.
- Six of the top 20 companies by total transaction volume reported to index publishers in 2023. These six companies accounted for 61% of the fixed-price volume potentially reported to price index publishers.

Traders and wholesale marketers traded the majority of the potentially reported fixed-price volume.

Figure 15: Fixed-Price Volume for Entities Reporting to Price Index Publishers by Company Type
2023



Source: FERC Form 552 submissions as of July 17, 2024

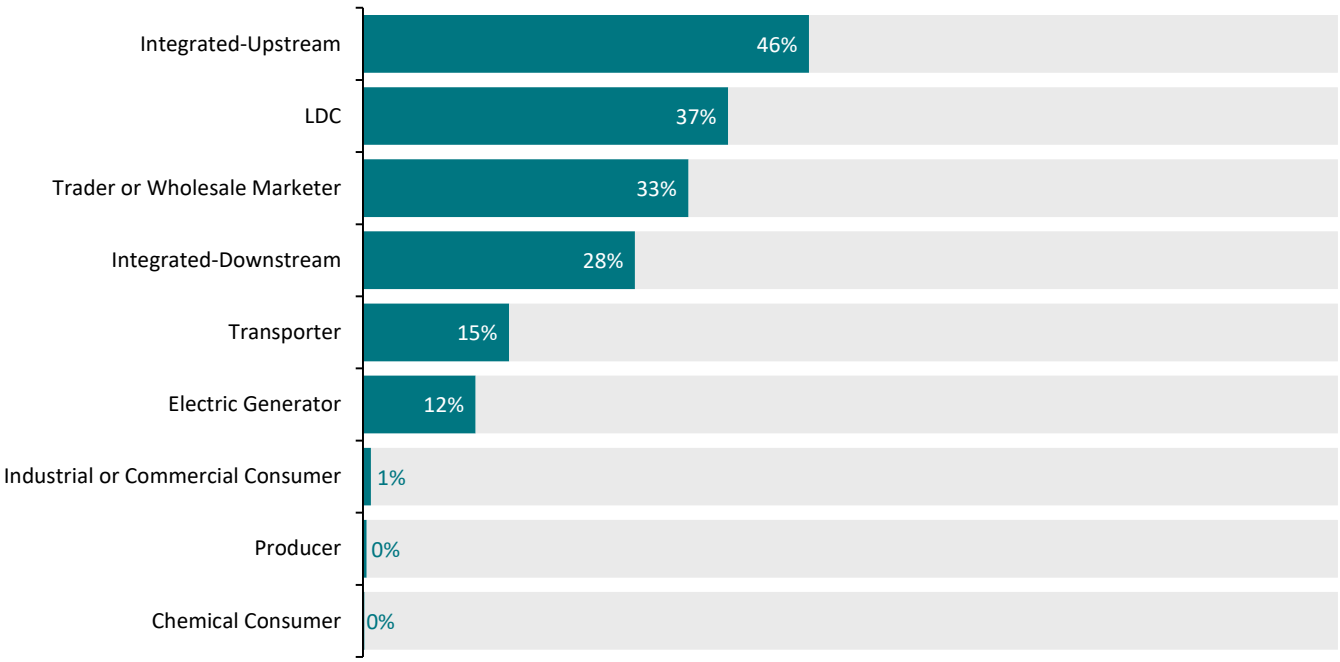
Note: Producers and chemical consumer companies reported less than 0.1% of volume potentially reported and are not included. Percentages may not add up to 100% due to rounding.

In 2023, the share of fixed-price volume potentially reported by producers decreased from 22% to less than 1% compared to 2022.[50] Integrated-downstream companies potentially reported approximately 28% of fixed-price transaction volume to indices in 2023, a decrease of about 8 percentage points compared to 2022.

- Less than half of the volume (46%) executed by integrated-upstream companies took place at companies that directly report their transactions to price index publishers. In 2022, these companies' potentially reported share of fixed-price volume was 53%.
- The share of fixed-price volume potentially reported to index publishers by LDCs and traders or wholesale marketers fell in 2023, to 37% and 33%, compared to 45% and 35% in 2022, respectively.
- Companies with a primary business outside the natural gas markets—such as industrial or commercial consumers and chemical consumers—potentially reported less than 1% of their combined fixed-price transaction volume to indices.

Fixed-price transactions potentially reported by integrated-upstream companies decreased by 7 percentage points from 2022 to 2023.

Figure 16: Percentage of Fixed-Price Volume Reported to Price Index Publishers by Industry Segment
2023



Source: FERC Form 552 submissions as of July 17, 2024
Note: Of the 676 respondents in 2023, 87 indicated they reported transaction information to price index publishers for themselves or at least one affiliate.

Glossary

Btu: A British thermal unit (Btu) is the amount of heat energy needed to raise the temperature of one pound of water by one degree Fahrenheit. Millions of this unit are written as mmBtu, and trillions as tBtu.

CME Group Inc. (CME): A "leading derivatives marketplace" that offers "global benchmark products across all major asset classes" so that businesses can "manage risk and achieve growth."
https://www.cmegroup.com/company/history/

Downstream: "A term used in the petroleum industry referring to the refining, transportation, and marketing side of the business."
https://www.energy.ca.gov/resources/energy-glossary

Dutch Title Transfer Facility (TTF): A principal natural gas trading hub in Europe. It is the virtual trading hub for the natural gas market in the Netherlands.
https://www.cmegroup.com/rulebook/NYMEX/11/1159.pdf

EIA: U.S. Energy Information Administration. "EIA provides a wide range of information and data products covering energy production, stocks, demand, imports, exports, and prices and prepares analyses and special reports on topics of current interest."
http://www.eia.gov/about/

FERC Form 552: Annual Report of Natural Gas Transactions. "FERC Form No. 552 collects transactional information from natural gas market participants. The filing of this information is necessary to provide information regarding physical natural gas transactions that use an index and transactions that contribute to, or may contribute to gas price indices. This form is considered to be a non-confidential public use form."
https://www.ferc.gov/media/form-552-cy-2022

Fixed price: "A 'Physical Natural Gas Transaction' price determined by agreement between buyer and seller and not benchmarked to any other source of information."
https://www.ferc.gov/media/form-552-cy-2022

Fixed-price, next-day delivery: "[D]elivery of natural gas pursuant to a transaction executed prior to NAESB [North American Energy Standards Board] nomination deadline (1:00 pm Central Prevailing Time) on one day for uniform physical delivery over the next pipeline day."
https://www.ferc.gov/media/form-552-cy-2022

Fixed-price, next-month delivery: "[D]elivery of natural gas pursuant to a transaction executed during the last five (5) business days of one month (bidweek) for uniform physical delivery over the next month."
https://www.ferc.gov/media/form-552-cy-2022

Gross withdrawals: "Full well stream volume from both oil and gas wells, including all natural gas plant liquids and nonhydrocarbon gases after oil, lease condensate, and water have been removed. Also includes production delivered as royalty payments and production used as fuel on the lease."
https://www.eia.gov/tools/glossary/?id=gross_withdrawals

Henry Hub: A "principal natural gas trading hub in North America," with connections to "nine interstate and four intrastate pipelines." Henry Hub serves as the delivery point for the U.S. natural gas futures contract traded on the New York Mercantile Exchange (NYMEX).
https://www.theice.com/publicdocs/ICE_NatGas_Brochure.pdf; http://www.cmegroup.com/trading/energy/natural-gas/natural-gas_contract_specifications.html

Intercontinental Exchange Inc. (ICE): An electronic marketplace that connects participants in major markets and offers the ability to manage risk and make informed decisions.
https://www.intercontinentalexchange.com/about

International Energy Agency (IEA): An autonomous intergovernmental organization that "recommends policies that enhance the reliability, affordability and sustainability of energy."
https://www.iea.org/about/

Index price: A price obtained from an industry publication, which is intended to represent an average price of gas delivered to a specific point on the pipeline at or during a specified period of time.

Liquefied natural gas (LNG): "Natural gas (primarily methane) that has been liquefied by reducing its temperature to [negative] 260 degrees Fahrenheit at atmospheric pressure."
http://www.eia.gov/tools/glossary/index.cfm?id=L

Local distribution company (LDC): "A legal entity engaged primarily in the retail sale and/or delivery of natural gas through a distribution system that includes main lines (that is, pipelines designed to carry large volumes of gas, usually located under roads or other major right-of-ways) and laterals (that is, pipelines of smaller diameter that connect the end user to the mainline). Since [the] structuring of the gas industry, the sale of gas and/or delivery arrangements may be handled by other agents, such as producers, brokers, and marketers that are referred to as 'non-LDC.'"
http://www.eia.gov/tools/glossary/index.cfm?id=L

Marketed production: "Gross withdrawals less gas used for repressuring, quantities vented and flared, and nonhydrocarbon gases removed in treating or processing operations. Includes all quantities of gas used in field and processing plant operations."
https://www.eia.gov/tools/glossary/index.php?id=M

Midstream: Activity involving "transportation on intrastate and interstate pipeline systems that move natural gas through large-diameter pipelines to storage facilities and a variety of consumers."
https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020_Final.pdf

Natural gas plant liquids (NGPL): "Those hydrocarbons in natural gas that are separated as liquids at natural gas processing, fractionating, and cycling plants. Products obtained include ethane, liquefied petroleum gases (propane, normal butane, and isobutane), and natural gasoline."
https://www.eia.gov/tools/glossary/index.php?id=N

Physical basis transactions: "[T]ransactions in which the basis value is negotiated on one of the first three days of bidweek and the price is set by the final closing value of the near-month NYMEX Natural Gas Futures contract plus or minus the negotiated basis. These transactions are for uniform physical delivery over the next month."
https://www.ferc.gov/media/form-552-cy-2022

Price trigger: According to FERC Form 552, a trigger agreement is "a NYMEX trigger transaction that is contingent upon a futures contract that trades on an exchange, resulting in an automatic physical trade at an agreed upon price."
https://www.ferc.gov/media/form-552-cy-2022

Shale gas: "Natural gas produced from wells that are open to shale formations. Shale is a fine-grained, sedimentary rock composed of mud from flakes of clay minerals and tiny fragments (silt-sized particles) of other materials. The shale acts as both the source and the reservoir for the natural gas."
https://www.eia.gov/tools/glossary/index.php?id=S

Upstream: "A term used in the petroleum industry referring to the exploration and production side of the business."
https://www.energy.ca.gov/resources/energy-glossary

Appendices

Appendix 1: Energy Policy Act of 2005, Form 552 Submissions, and Cornerstone Research's Proprietary Analysis

In 2005, Congress passed the Energy Policy Act of 2005 (EPAct 2005), which authorized FERC to "facilitate price transparency in markets for the sale or transportation of physical natural gas in interstate commerce" (§ 316). The EPAct 2005 allowed FERC to issue rules to "provide for the dissemination, on a timely basis, of information about the availability and prices of natural gas sold at wholesale and in interstate commerce to the Commission, State commissions, buyers and sellers of wholesale natural gas, and the public" (§ 316). After an extensive rule-making process, FERC issued Order 704-A, which established reporting requirements.

In the summer of 2009, FERC received the first round of Form 552 submissions covering 2008 natural gas transactions from more than 1,100 respondents. On June 17, 2010, FERC issued Order 704-C, which provided for slightly revised reporting rules that eased some reporting requirements.[51] For 2023 natural gas transactions, Form 552 submissions covered 676 respondents.

The data contained on the Form 552 submissions, described more fully in Appendix 2, provide a unique view into the size and nature of the physical natural gas market. First, these forms quantify the number of trade participants and trade volumes of firms that report to the price index publishers. Second, the data provide insight into the relative proportion of fixed-price and index-priced transactions. Third, while FERC did not request information on all natural gas transactions, the data yield an outline of the size of the physical natural gas market, especially at the trading and wholesale levels.

Cornerstone Research supplements the FERC Form 552 data with proprietary research that classifies the respondent companies by industry segments. These industry segments are producer, transporter, electric generator, industrial or commercial consumer, chemical consumer, trader or wholesale marketer, LDC, integrated-downstream, and integrated-upstream.[52] The latter two categories capture companies that span multiple industry segments.[53]

Appendix 2: Data Submitted to FERC

Order 704-C requires natural gas market participants with purchases or sales of physical "reportable" natural gas of at least 2.2 tBtu in the prior calendar year to report these activities on Form 552. Specifically, these market participants must submit volumes of physical natural gas transactions that "are only those transactions that refer to an index, or that contribute to, or could contribute to the formation of a gas index during the calendar year."[54] Order 704-A (p. 9) further defines the transactions that could be reported to an index publisher as any "bilateral, arms-length, fixed[-]price physical natural gas transactions between non-affiliated companies at all trading locations."

Order 704-C excludes any transaction that does not depend on a published price index or that could not be reported to a price index publisher. The criteria for reporting to a price index publisher specifically exclude transactions for balance-of-month supply, intraday trades consummated after the pipeline nomination deadline, monthly fixed-price transactions conducted prior to bidweek, fixed-price transactions for terms longer than one month, and fixed-price transactions including other services or features (such as volume flexibility) that would render them ineligible for price reporting. Further, Order 704-C excludes transactions by affiliates from the submission requirements.

While respondents aggregate their reported transaction volumes across locations and for the entire calendar year, they must submit purchase and sale volumes separately for each of the following types of transactions: fixed-price for next-day delivery; index-price referencing next-day indices; fixed-price for next-month delivery; and index-price referencing next-month indices, transactions with price triggers,[55] and physical-basis transactions.[56] In addition to volumes of physical transactions, market participants are required to state whether they report transaction information to price index publishers.

Endnotes

[1] Data as of July 17, 2024, were used for all respondents.

[2] A respondent is defined as a unique reporting company–respondent combination as reported on FERC Form 552.

[3] "Natural Gas Gross Withdrawals and Production," EIA, https://www.eia.gov/dnav/ng/ng_prod_sum_a_epg0_vgm_mmcf_a.htm; "U.S. Energy Production Exceeded Consumption by Record Amount in 2023," EIA, June 26, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62407.

[4] "Natural Gas Consumption by End Use," EIA, https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm; "U.S. Energy Production Exceeded Consumption by Record Amount in 2023," EIA, June 26, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62407; "U.S. Natural Gas Consumption Set Annual and Monthly Records During 2023," EIA, April 23, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61923.

[5] "Short-Term Energy Outlook (STEO)," EIA, November 13, 2024, https://www.eia.gov/outlooks/steo/archives/nov24.pdf ("November 2024 EIA STEO Report"), Table 5a.

[6] "Gas Market Report, Q1-2024," IEA, https://iea.blob.core.windows.net/assets/601bff14-5d9b-4fef-8ecc-d7b2e8e7449a/GasMarketReportQ12024.pdf ("IEA Gas Market Report Q1 2024"), p. 4.

[7] IEA Gas Market Report Q1 2024, p. 4.

[8] "Gas Market Report, Q3-2024," IEA, p. 5, https://iea.blob.core.windows.net/assets/14a61f2b-04fa-4a9d-a78b-6c22fc23d5c8/GasMarketReport%2CQ3-2024.pdf.

[9] "U.S. Natural Gas Exports and Re-Exports by Country," EIA, https://www.eia.gov/dnav/ng/NG_MOVE_EXPC_S1_A.htm ("EIA U.S. Natural Gas Exports Data").

[10] EIA U.S. Natural Gas Exports Data.

[11] EIA U.S. Natural Gas Exports Data.

[12] IEA Gas Market Report Q1 2024, p. 4.

[13] November 2024 EIA STEO Report, Table 5a.

[14] "U.S. Natural Gas Production Grew by 4% in 2023, Similar to 2022," EIA, March 27, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61646.

[15] "U.S. Natural Gas Production Grew by 4% in 2023, Similar to 2022," EIA, March 27, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61646.

[16] "U.S. Natural Gas Flows, 2023," EIA, https://www.eia.gov/totalenergy/data/flow-graphs/natural-gas.php ("EIA U.S. Natural Gas Flows").

[17] "U.S. Natural Gas Consumption Set Annual and Monthly Records During 2023," EIA, April 23, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61923; "A Warm February Wrapped Up a Warm Winter for U.S.," NOAA, March 8, 2023, https://www.noaa.gov/news/warm-february-wrapped-up-warm-winter-for-us.

[18] "U.S. Natural Gas Consumption Set Annual and Monthly Records During 2023," EIA, April 23, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61923.

[19] EIA U.S. Natural Gas Flows.

[20] "Henry Hub Natural Gas Spot Price," EIA, https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm.

[21] IEA Gas Market Report Q1 2024, pp. 40–42.

[22] EIA U.S. Natural Gas Exports Data; IEA Gas Market Report Q1 2024, p. 40.

[23] "Natural Gas Deliveries to U.S. LNG Export Facilities Set a Record in First-Half 2023," EIA, July 31, 2023, https://www.eia.gov/todayinenergy/detail.php?id=57261.

[24] "U.S. Liquefaction Capacity," EIA, September 30, 2024, https://www.eia.gov/naturalgas/importsexports/liquefactioncapacity/U.S.liquefactioncapacity_2024_3Q.xlsx.

[25] "U.S. Liquefaction Capacity," EIA, September 30, 2024, https://www.eia.gov/naturalgas/importsexports/liquefactioncapacity/U.S.liquefactioncapacity_2024_3Q.xlsx.

[26] EIA U.S. Natural Gas Exports Data.

[27] EIA U.S. Natural Gas Exports Data.

[28] Figures for Asia exclude Middle Eastern countries. See EIA U.S. Natural Gas Exports Data.

[29] EIA U.S. Natural Gas Exports Data.

[30] EIA U.S. Natural Gas Exports Data.

[31] "Henry Hub Natural Gas Spot Price," EIA, https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm.

[32] "U.S. Natural Gas Prices Calmed After a Volatile 2022," EIA, June 4, 2024, https://www.eia.gov/todayinenergy/detail.php?id=62203.

[33] November 2024 EIA STEO Report, p. 11.

[34] IEA Gas Market Report Q1 2024, p. 4.

[35] If both parties to a transaction submit a Form 552, the total volume submitted to FERC will be double the volume of that transaction. For example, a trade for 10,000 mmBtu between two companies, each submitting a Form 552, will add 20,000 mmBtu to the total submitted volume. The minimum volume that could be represented by Form 552 is the maximum of the buy and sale totals shown in Figure 10. Adding the buy and sale volume can double-count transactions if both the buyer and seller file a Form 552. A potential limitation of this is that estimating volume with only sales or only purchases may underrepresent the volume of transactions represented by Form 552, since some transactions involve market participants that do not submit a Form 552.

[36] The figures reported by CME represent the average daily volume of its natural gas products, and have been multiplied by 250 to convert them to annual values. CME reports the total number of contracts, and the volume represented by each contract may vary in size. See CME Form 10-Ks.

[37] CME 2023 10-K, p. 40, https://investor.cmegroup.com/static-files/34a8a1b1-d396-4fcb-9b7d-00feca989f7a.

[38] ICE 2023 10-K, p. 22, https://d18rn0p25nwr6d.cloudfront.net/CIK-0001571949/2285dc6a-0c12-4856-beda-e863d8c5f761.pdf.

[39] "CME Group to Launch Micro Henry Hub Futures and Options on November 6," CME, September 27, 2023, https://www.cmegroup.com/media-room/press-releases/2023/9/27/cme_group_to_launchmicrohenryhubfuturesandoptionsonnovember6.html.

[40] "Products – Futures & Options," ICE, https://www.ice.com/products/Futures-Options.

[41] Midstream refers to integrated-upstream, integrated-downstream, and transporters. Traders and wholesale marketers also have nearly equal levels of buying and selling through their role in market-making.

[42] The number of times one molecule of natural gas is traded through from production to consumption in 2023 is calculated as the minimum trading volume of 83,375 tBtu from Figure 10 divided by 30,468 tBtu of natural gas delivered to consumers reported by the EIA. See "U.S. Natural Gas Consumption by End Use," EIA, http://www.eia.gov/dnav/ng/NG_CONS_SUM_DCU_NUS_A.htm. Converted to trillion Btu (tBtu) from million cubic feet (mmcf). In 2023, one cubic foot = 1,036 Btu, the annual Total Consumption conversion factor in the EIA time series "Heat Content of Natural Gas Consumed (Btu per Cubic Foot)," EIA, https://www.eia.gov/dnav/ng/ng_cons_heat_dcu_nus_a.htm.

[43] "S&P Global Platts Announces North America Natural Gas Assessment Methodology Details Following Its Agreement with Intercontinental Exchange to Improve Price Transparency and Bolster Benchmarks," S&P Global Platts, February 9, 2017, https://www.prnewswire.com/news-releases/sp-global-platts-announces-north-america-natural-gas-assessment-methodology-details-following-its-agreement-with-intercontinental-exchange-to-improve-price-transparency-and-bolster-benchmarks-300405153.html; "Platts Market Data – Natural Gas," S&P Global Platts, https://www.spglobal.com/commodityinsights/en/products-services/natural-gas/market-data-natural-gas; "Natural Gas Trade Activity Numbers Leap After ICE Agreement," S&P Global Platts, June 7, 2018, https://www.spglobal.com/commodityinsights/en/market-insights/blogs/natural-gas/060718-natural-gas-trade-activity-numbers-leap-after-ice-agreement.

[44] Data do not cover all transactions in the OTC market, since Form 552 excludes certain types of non-index-priced transactions. See Appendix 2.

[45] Physical basis and price trigger trades are not included in this analysis.

[46] Order 704 states that Form 552 submissions should be used "to determine important volumetric relationships between (a) the fixed price, day-ahead or month-ahead transactions that form price indices; and (b) transactions that use price indices. Without the most basic information about these volumetric relationships, the Commission has been hampered in its oversight and its ability to assess the adequacy of price-forming transactions." Order 704, p. 4. See also Appendix 1.

[47] Prior to calendar year 2023, companies only had to disclose whether they report transactions to price index publishers, without distinction between daily and monthly transactions.

[48] For the purposes of this analysis, physical-basis transactions are also included in the category of fixed-priced volume.

[49] FERC Technical Conference, Developments in Natural Gas Index Liquidity and Transparency, June 29, 2017, Docket No. AD17-12-000, 25:19–25, 151:9–23.

[50] In 2023, ExxonMobil's FERC Form 552 stated that its subsidiary XTO Energy did not report volume to price index publishers. In 2022, XTO Energy filed its own FERC Form 552 in which it disclosed reporting to price index publishers.

[51] Among other minor revisions, Order 704-C exempts transactions involving unprocessed natural gas as well as cash-out and imbalance transactions. Further, for 2009, companies that hold blanket marketing certificates but do not meet the minimum transaction volume

threshold are no longer required to file a Form 552. For 2008, more than 300 companies filed a Form 552 and did not report any transaction volume. For 2009, only 16 companies filed a Form 552 without reporting transaction volumes.

[52] The categorization process was necessarily judgmental and based on company websites and financial filings. Companies were categorized as closely as possible to their most significant natural gas market activity.

[53] Since these integrated companies typically have a focus at either the industry segment that is upstream (such as production, gathering, or processing) or downstream (such as electric generation, marketing to wholesale users, or industrial consumption), two categories were created to allow for investigation of any differences between these types of companies.

[54] FERC Form 552 (2019 version). Note that Form 552 covers only physical natural gas transactions. Financial transactions, such as swaps and options, are excluded, as are futures contracts, regardless of whether they are taken to physical delivery.

[55] FERC includes NYMEX plus contracts among trigger contracts. In these contracts, the price is typically set at a specified index value as a default. The buyer, however, has the option to fix (or trigger) the price at any given point in time based on the prevailing market prices.

Typically, the buyer can fix the price at the prevailing NYMEX price for the delivery month plus a predetermined premium. When they are triggered, these contracts become fixed-price trades. Thus, while trigger contracts are initially dependent on an index price, they often shed this dependence and give the buyer the price certainty of a fixed-price transaction.

[56] Physical-basis transactions are physical transactions that have prices set as a predetermined amount plus the NYMEX settlement price. The price index publishers state that they incorporate physical-basis transactions into their price assessments.

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Greg Leonard, a senior vice president in Cornerstone Research's London office and cohead of the firm's finance practice, has more than 20 years of experience consulting to clients in complex commercial litigation and regulatory proceedings involving energy, commodities, finance, antitrust, and intellectual property. In the energy and commodity markets, Dr. Leonard has extensive experience in analyzing market manipulation claims, analyzing trading patterns and strategies, valuing trading businesses and portfolios, valuing alleged breaches of contract, evaluating risk management practices, and analyzing the price impacts of alleged wrongful conduct. Dr. Leonard has led consulting projects involving the trading of natural gas, natural gas liquids, liquefied natural gas, crude oil, refined products, agricultural products, electric power, and electric generation capacity on futures exchanges as well as in the OTC market. On behalf of clients, he has appeared before the enforcement staffs of the U.S. Commodity Futures Trading Commission, the Federal Energy Regulatory Commission, the Federal Bureau of Investigation, and the U.S. Department of Justice.

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