

CORNERSTONE RESEARCH

ECONOMIC AND FINANCIAL CONSULTING AND EXPERT TESTIMONY

Characteristics of U.S. Natural Gas Transactions

Insights from FERC Form 552 Submissions

As of May 16, 2014



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INTRODUCTION

The Federal Energy Regulatory Commission (FERC) receives and compiles the most comprehensive information on trading activity and pricing methods in the 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 end users to producers.

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

- The year 2013 saw a decline in the amount of natural gas traded in the United States measured both by the Form 552 volume (which fell 3 percent) and by the volume on exchanges. The number of natural gas contracts traded on the major exchanges also declined from 2012 to 2013. IntercontinentalExchange Inc. (ICE) experienced a decline of 18 percent, while CME Group Inc.'s natural gas products volume decreased approximately 13 percent from 2012. These decreases occurred during a time of increased natural gas production in the United States. (pages 2–5)
- In 2013, there was also a continuation of the shrinking of the base of transactions used to set the price indices relative to the transactions that used the indices. The volume of transactions dependent on the indices was almost six times larger in 2013 than the volume of transactions that formed the indices. Overall, this disparity has grown in the past several years. (page 10)
- The trading activity reported in the Form 552 submissions totaled 120,618 tBtu transacted by 660 companies. (page 3)
- The portion of reportable volume reported to price-index publishers decreased for the second consecutive year. From 2012 to 2013, volume reported decreased by over five percentage points. (page 11)
- Reporting to price-index publishers was inconsistent across industry segments in 2013. Integrated-upstream companies reported more than 90 percent of eligible volume to the price-index publishers, while industrial or commercial consumers and chemical consumers reported less than 10 percent of their eligible volume. (page 13)
- Of the 660 Form 552 respondents in 2013, 128 (19 percent) reported transaction information to the price-index publishers for at least one affiliate. While the majority of the Form 552 respondents did not report, the reporting companies tended to be larger than average. Approximately half of the reporting-eligible volume was transacted by companies that report to the price-index publishers. (page 11)
- The U.S. natural gas industry remains unconcentrated, with a large number of diverse participants. In 2013, the top 20 transacting companies by volume accounted for almost 44 percent of the transaction volume in the Form 552 submissions. (page 8) Traders or wholesale marketers continued to report the largest transaction volumes, accounting for approximately 41 percent of transactions. (page 6)
- As transactions between physical participants took place, an average molecule of natural gas passed through approximately 2.5 transactions from production to consumption, down from 2.6 in 2012.¹

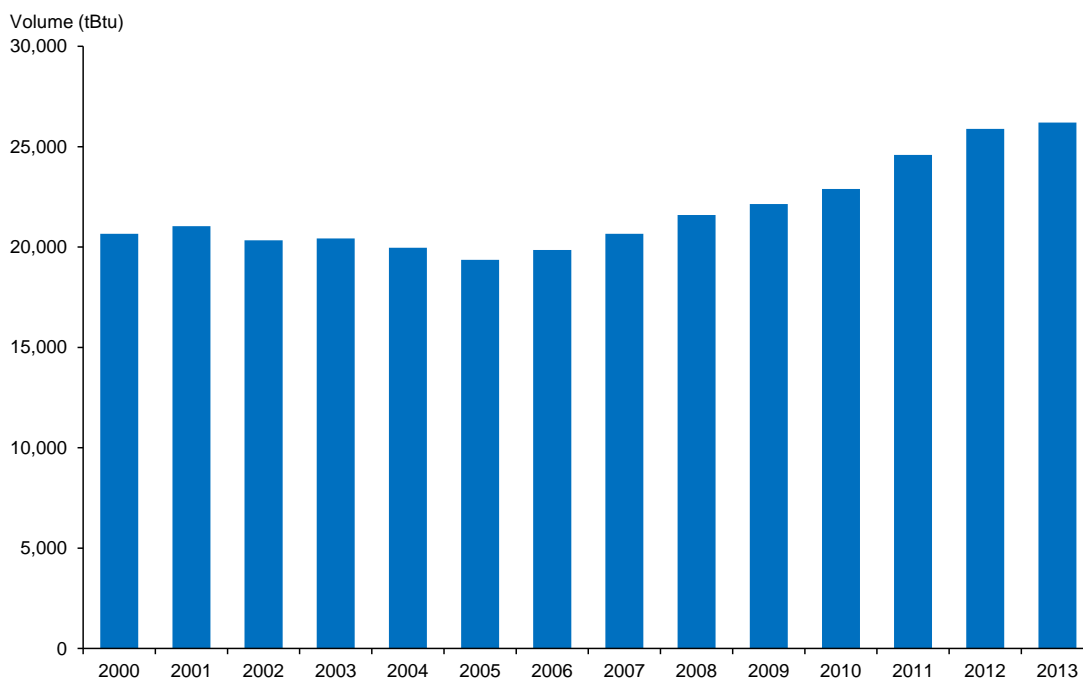
MARKET VOLUME

According to the U.S. Energy Information Administration (EIA),² the increase in natural gas production was primarily attributable to the development of shale gas, which it predicts will increase from 40 percent of U.S. natural gas production in 2012 to approximately 53 percent by 2040.³ The growth in domestic natural gas production has resulted in an overall trend of decreasing prices and a broadening of the uses for natural gas.

- Annual marketed production has expanded steadily since the mid-2000s, and has increased 18 percent since 2009.
- Natural gas prices decreased by 57 percent between 2005 and 2013. However, the trend of lower prices reversed in 2013, when prices rose from \$2.75 to \$3.73 per mmBtu from 2012 to 2013.⁴
- From 2005 to 2013, the use of natural gas to fuel vehicles increased by 44 percent—and by 9 percent between 2012 and 2013—as natural gas users sought alternatives to higher-priced gasoline and diesel.⁵
- By 2040, the EIA projects natural gas to constitute 35 percent of freight rail energy consumption and 28 percent of bus consumption in the United States.⁶
- Natural gas is also increasingly used as an alternative to coal-powered electricity generation and is projected to surpass coal as the largest source of U.S. electricity generation by 2035.⁷

The relatively small increase in natural gas production from 2012 to 2013 may indicate that recent growth is slowing.

FIGURE 1: U.S. NATURAL GAS MARKETED PRODUCTION
2000–2013



Source: EIA

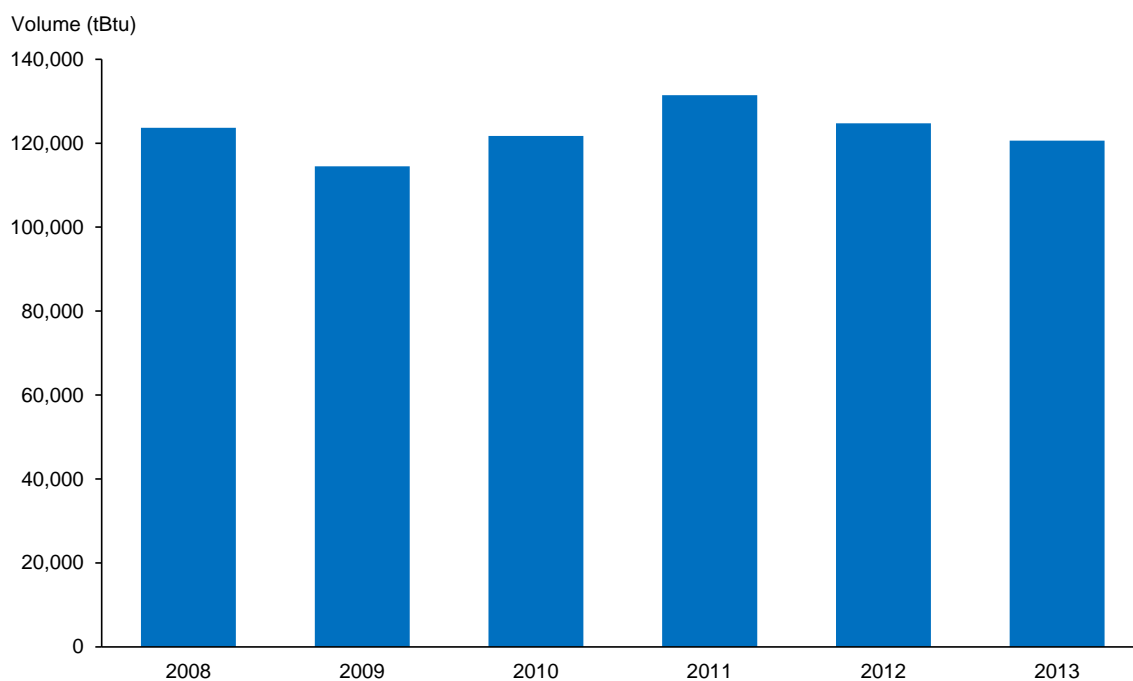
Note: One tBtu equals 1 million mmBtu.

MARKET VOLUME *continued*

- Form 552 volumes in 2013 represent a minimum of 60,309 tBtu of trading volume.⁸
- Total Form 552 volume continued to decrease, declining 3 percent from 2012 and 8 percent from its peak in 2011.
- The trading activity reported in the Form 552 submissions totaled 120,618 tBtu transacted by 660 companies.⁹

Both the number of Form 552 submissions and the total Form 552 volume decreased from 2012.

FIGURE 2: FORM 552 TOTAL VOLUME
2008–2013



Source: FERC Form 552 submissions as of May 16, 2014

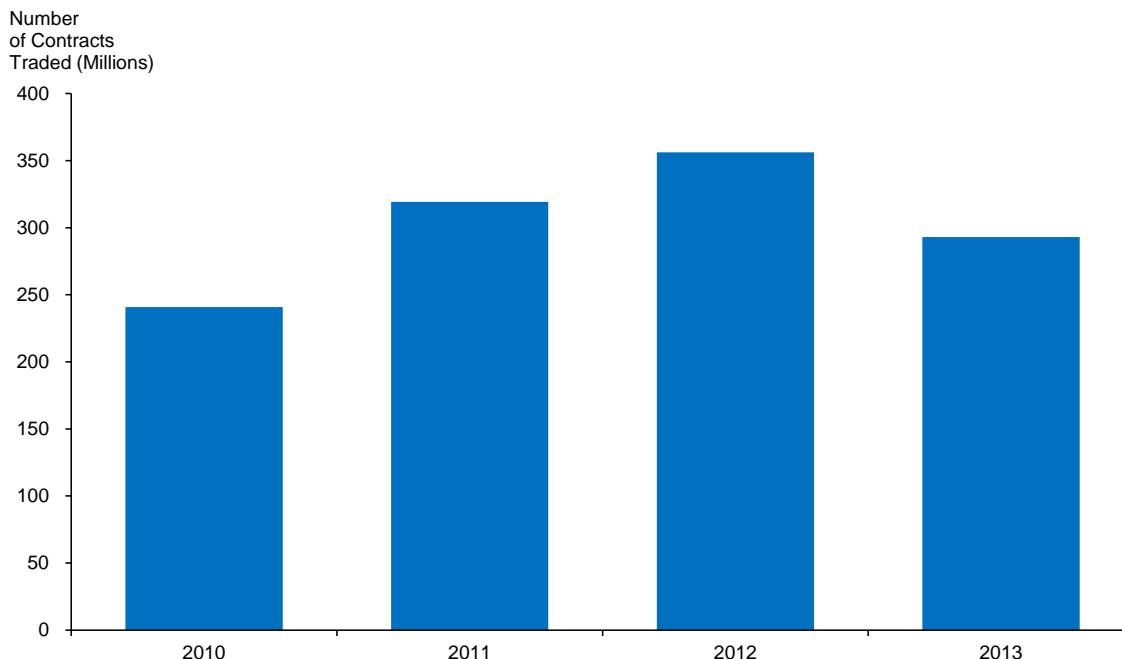
Note: One tBtu equals 1 million mmbtu.

MARKET VOLUME *continued*

- During 2013, approximately 293 million North American natural gas contracts were traded on ICE, 18 percent less than in 2012 and 8 percent less than in 2011.¹⁰
- Between 2012 and 2013, the decrease in the aggregate number of North American futures, options, and cleared over-the-counter (OTC) natural gas contracts on ICE was even greater than the decline in FERC submissions.
- ICE commented on the decrease in its annual filings, attributing the decline to “low volatility and low price levels for natural gas, which produced muted trading activity.” ICE further noted that the “higher level of price volatility in 2012 was due in part to changes in expectations for natural gas inventories as the winter heating season progressed and changes in expectations for supply based on shale gas discoveries.”¹¹

The number of natural gas contracts on ICE declined in 2013, reversing the increase in volume between 2011 and 2012.

FIGURE 3: ICE NORTH AMERICAN NATURAL GAS FUTURES, OPTIONS, AND CLEARED OTC CONTRACTS 2010–2013



Source: ICE 2013 Form 10-K

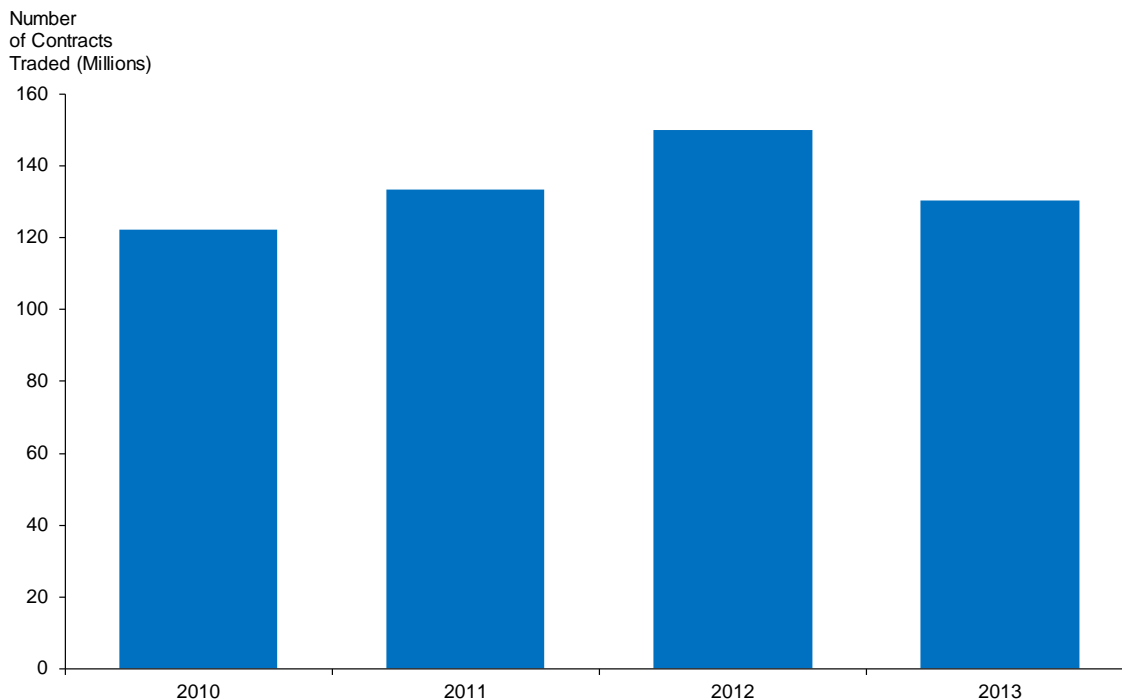
Note: Due to ICE’s conversion of swaps to futures in October 2012, the ICE 10-K reports an aggregated total of natural gas futures, options, and cleared OTC contracts. In its 2012 10-K, ICE provides comparable totals for 2011 and 2010 to reflect the 2012 reclassification.

MARKET VOLUME *continued*

- During 2013, an average of 552 million North American natural gas contracts traded daily on the CME Group, 13 percent less than in 2012.¹²
- Similar to ICE, the CME Group cited low volatility and lower prices as causes of decreased volume. CME Group’s annual filing specifically noted that these factors were related to domestic natural gas supply exceeding forecasted levels and a decrease in the number of weather-related events, respectively.
- In contrast to natural gas products, CME Group’s crude oil contract volume increased from 2012 to 2013. CME Group’s overall energy contract volume decreased 1 percent from 2012 to 2013.

The volume of natural gas products traded on the CME Group exchanges declined from 2012 to 2013.

**FIGURE 4: CME GROUP NATURAL GAS PRODUCTS
2010–2013**



Source: CME Group 10-Ks

Note: The figures reported by CME Group represent the average daily volume of its natural gas products, and they have been multiplied by 250 to convert them to annual values.

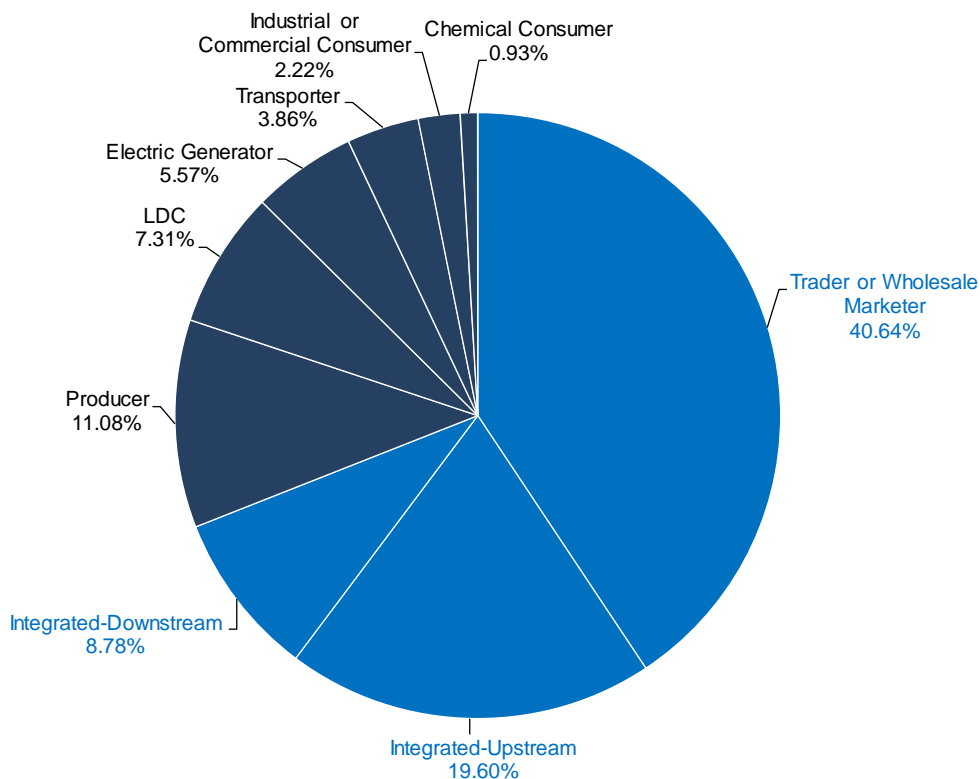
NATURAL GAS MARKET PARTICIPANTS

This report supplements FERC Form 552 data with proprietary research that classifies the respondent companies by industry segments. The companies have been classified by their primary natural gas business activity, yielding an overview of the natural gas market.

- The large integrated-upstream and integrated-downstream companies and the traders or wholesale marketers accounted for approximately 69 percent of Form 552 physical natural gas volume.
- In contrast, industrial or commercial consumers and chemical consumers accounted for only about 3 percent of the Form 552 volume.
- These percentages have remained relatively consistent over the past five years. For example, in 2009 the large integrated companies and the traders or wholesale marketers accounted for 73 percent of the volume.

The activity of the various business sectors within the natural gas market has remained stable over the past half-decade.

FIGURE 5: FORM 552 TRANSACTION VOLUME BY COMPANY CATEGORY
2013



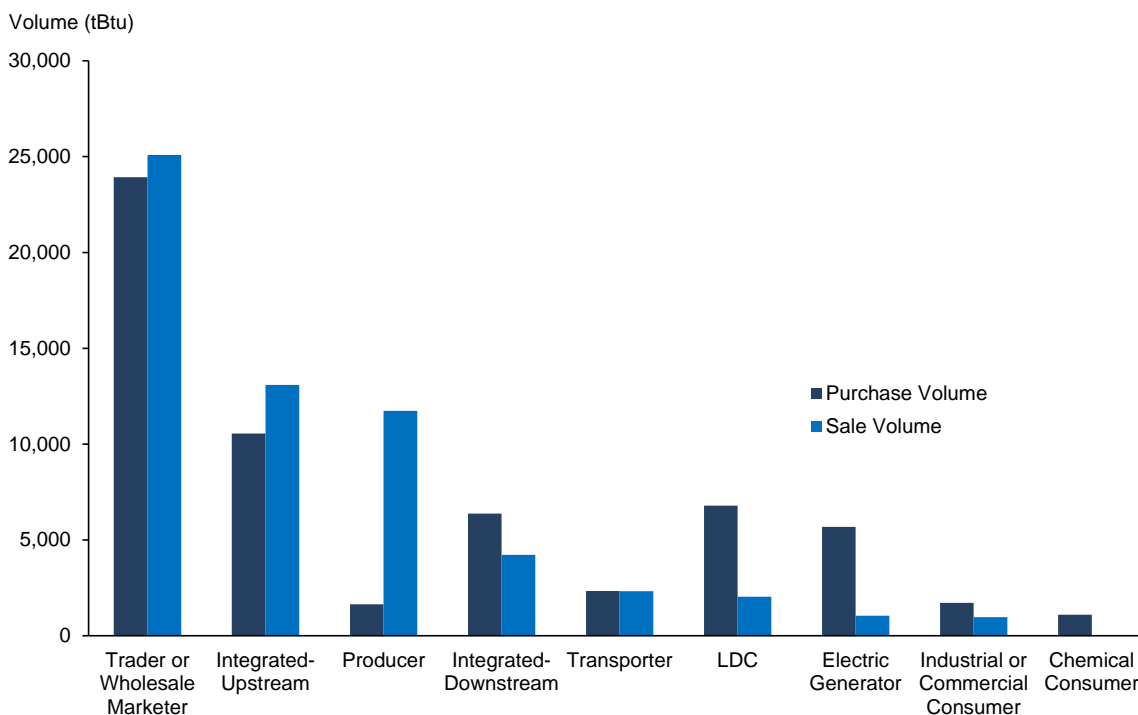
Source: FERC Form 552 submissions as of May 16, 2014
 Note: Percentages may not add up to 100 due to rounding.

NATURAL GAS MARKET PARTICIPANTS *continued*

As would be expected, companies primarily engaging in “upstream” or “downstream” activities are strong net purchasers or sellers of natural gas, while “midstream” companies buy and sell in more equal amounts.

- The breakdown of Form 552 purchases and sales by company category showed that integrated-upstream companies and producers sold more natural gas than they purchased.
- Local distribution companies (LDCs), electric generators, industrial or commercial consumers, and chemical consumers purchased significantly more than they sold.
- Consistent with their business models, traders or wholesale marketers and transporters purchased and sold approximately equal amounts.

FIGURE 6: FORM 552 PURCHASE AND SALE VOLUME BY COMPANY CATEGORY 2013



Source: FERC Form 552 submissions as of May 16, 2014

Note: One tBtu equals 1 million mmBtu.

NATURAL GAS MARKET PARTICIPANTS *continued*

The 20 companies with the largest total transaction volume show that the U.S. natural gas market remains an unconcentrated industry, with a large number of diverse participants. The largest companies tend to be consistent from year to year—18 of the top 20 companies in 2012 were also among the 20 leading companies in 2013.

Only two companies were new to the top 20 list in 2013.

- The top 20 companies accounted for 52,862 tBtu out of 120,618 tBtu, or almost 44 percent of volume reported on Form 552 submissions. This represents a two percentage point decrease from 2012.
- Since 2009, the top 20 companies have accounted for between 44 and 50 percent of the physical natural gas volumes reported on Form 552 submissions, suggesting that the decrease in volume did not significantly affect market concentration.
- BP Energy Company had the largest physical volumes for the sixth consecutive year at 7,772 tBtu (down approximately 3 percent from 2012).
- Energy Transfer Partners LP fell in rank from 20 in 2012 to 27 in 2013, while Citigroup Energy Inc. had a larger decline from 14 to 30. Both new entrants to the top 20 saw especially large gains, with Twin Eagle Resource Management LLC rising from 35 in 2012 to 18 in 2013 and Iberdrola Energy Services LLC rising from 44 to 19.

FIGURE 7: TOP 20 COMPANIES BY TOTAL FORM 552 VOLUME 2013
(Sorted by Total 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 ²
BP Energy Company	Y	3,672	4,101	-429	7,772	2,083
Shell Energy North America (US) LP	Y	2,165	2,510	-345	4,675	983
ConocoPhillips Company	Y	2,033	2,453	-420	4,486	1,027
Macquarie Energy LLC	Y	1,961	2,037	-76	3,997	1,412
EDF Trading North America LLC	N	1,821	1,822	0	3,643	980
Chevron USA Inc.	Y	1,479	1,674	-195	3,153	651
Tenaska Marketing Ventures	Y	1,564	1,476	88	3,039	951
AGL Resources Inc.	N	1,541	1,299	242	2,841	1,548
BG Energy Merchants Canada Limited	Y	1,152	1,270	-118	2,422	688
J.P. Morgan Ventures Energy Corporation	N	1,216	1,002	214	2,219	449
Total Gas & Power North America Inc.	Y	835	937	-102	1,772	572
CenterPoint Energy Resources Corp.	N	977	660	318	1,637	197
Natural Gas Exchange Inc.	N	807	807	0	1,613	826
Enterprise Products Partners LP	N	857	692	165	1,548	143
Anadarko Petroleum Corporation	Y	226	1,225	-998	1,451	152
Occidental Energy Marketing Inc.	N	639	744	-106	1,383	430
Chesapeake Energy Corporation	N	93	1,289	-1,197	1,382	105
Twin Eagle Resource Management LLC	N	664	651	13	1,314	469
Iberdrola Energy Services LLC	N	623	665	-42	1,288	314
Pacific Summit Energy LLC	N	578	648	-70	1,226	295
Total for All Companies		60,086	60,533	-447	120,618	30,685
Top 20 Companies by Total Volume		24,902	27,960	-3,058	52,862	14,277
All Other Companies		35,184	32,572	2,611	67,756	16,408

Source: FERC Form 552 submissions as of May 16, 2014

Note:

1. Numbers may not add up to totals due to rounding. One tBtu equals 1 million mmBtu.

2. 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.

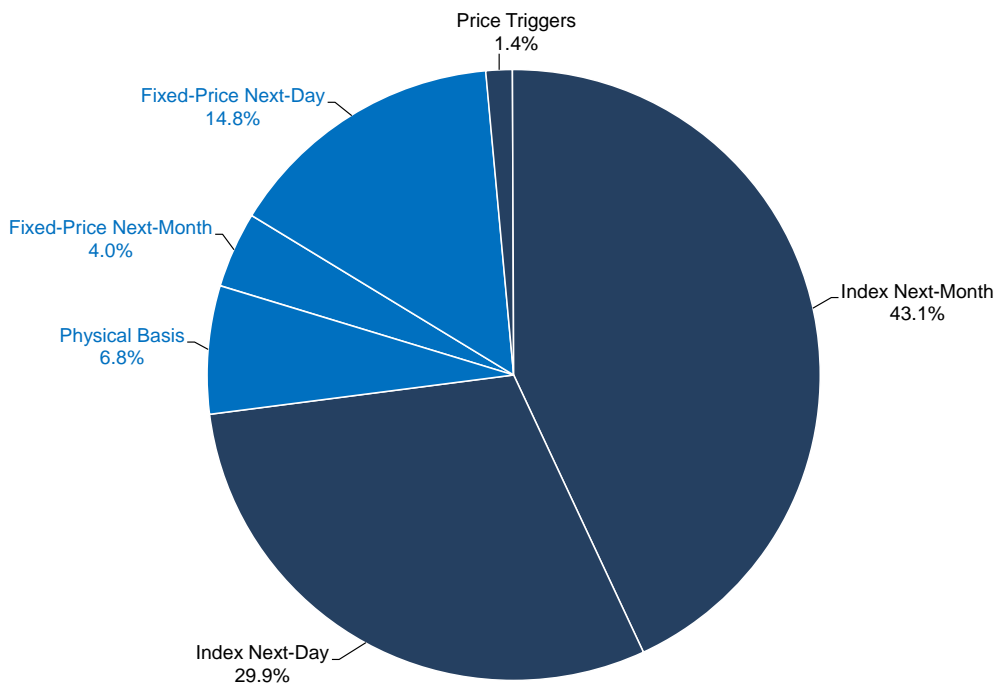
TRANSACTION TYPES

It is important to remember that the Form 552 data do not cover all of the transactions in the OTC market, since Form 552 excludes certain types of non-index-price transactions. (See Appendix 2.) Index-price transactions in actuality make up approximately three-quarters of the entire market.

Index-price transactions accounted for a majority of Form 552 OTC transactions.

- The vast majority of transactions covered by Form 552 (74 percent¹³) were index-price transactions.¹⁴ Direct fixed-price transactions comprised only 19 percent of the 552 transaction volume.
- Among the index-price transactions, transactions based on the monthly index outnumbered the transactions based on the daily indices three to two. In fact, the monthly index was the most widely used basis for price setting and was used in 43 percent of all Form 552 transactions.
- Among the fixed-price and index-price transactions covered by Form 552, transactions were split relatively equally between next-month gas transactions (47 percent) and next-day gas transactions (45 percent).
- Fixed-price, next-month transactions and physical-basis transactions each accounted for only about 4 to 7 percent of the transactions.

FIGURE 8: FORM 552 TRANSACTION VOLUME BY TRANSACTION TYPE 2013



Source: FERC Form 552 submissions as of May 16, 2014
 Note: Percentages may not add up to 100 due to rounding.

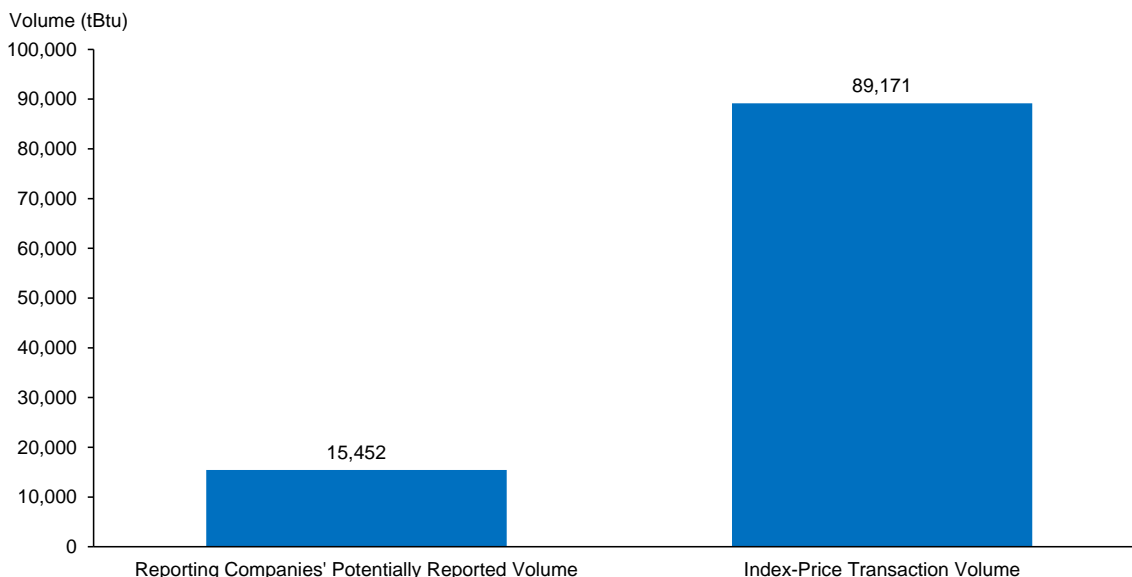
VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS

In Order 704, FERC commented that understanding the relative sizes of the volume of index-price transactions and reporting-eligible, fixed-price transactions was a core purpose of the Form 552 submissions.¹⁵

- The volume of transactions that form the indices has decreased relative to the volume of transactions dependent on indices.
- Overall, this disparity has grown in the past several years, from about three and a half times larger in 2008, to almost six times larger in 2013. While the index-price transaction volume remained fairly constant in 2013, reporting companies’ potentially reported volume fell by 19 percent from 2012.
- Volumes were influenced not only by the volume of index-price transactions reported in Form 552 submissions but also by the number of companies that reported transaction information to the price-index publishers.

The volume of transactions dependent on the indices was almost six times larger than the volume of transactions that formed the indices.¹⁶

FIGURE 9: FORM 552 VOLUMES POTENTIALLY REPORTED TO INDICES VERSUS VOLUMES PRICED BASED ON INDICES 2013



Source: FERC Form 552 submissions as of May 16, 2014

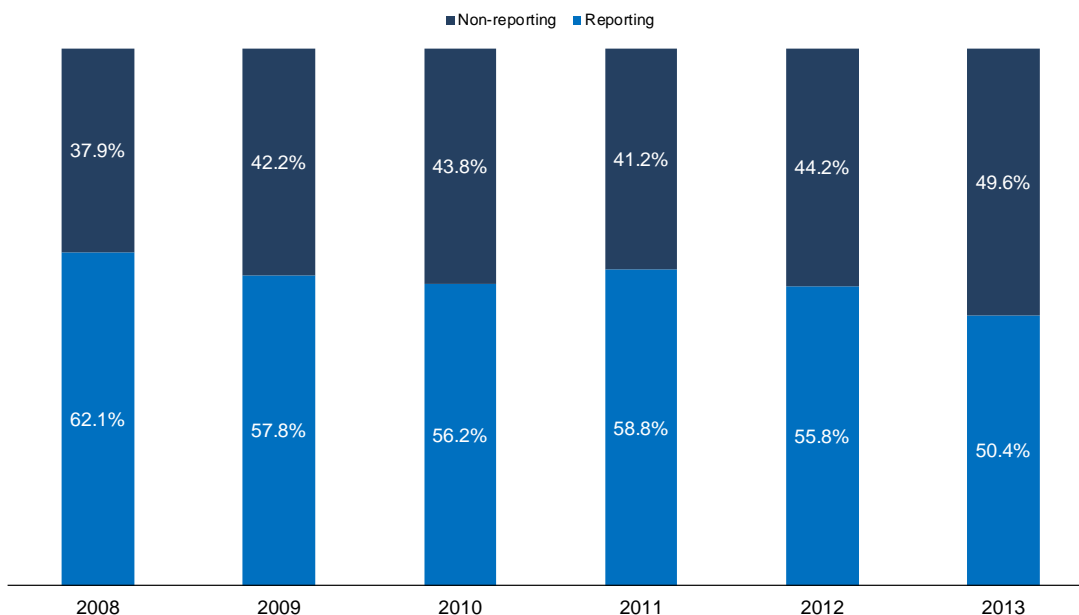
Note: Reportable volume is the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552. Companies that did not enter information regarding their price reporting were assumed to not report. One tBtu equals 1 million mmBtu.

VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

- The majority of the companies that submitted a Form 552 did not report to the price-index publishers at all.
- Of the 660 Form 552 respondents, only 128 indicated that they had at least one affiliate that reported transaction information to the price-index publishers.
- The 128 reporting companies accounted for approximately half of the reporting-eligible, fixed-price volume in 2013.
- In contrast to 2013, the percentage of reportable volume transacted by a reporting company had remained stable from 2009 to 2012, ranging between 56 and 59 percent.

Following a period of stability, the percentage of reportable Form 552 volume dropped over five percentage points in 2013.

FIGURE 10: REPORTABLE FORM 552 VOLUME BY REPORTING VERSUS NON-REPORTING COMPANIES 2008–2013



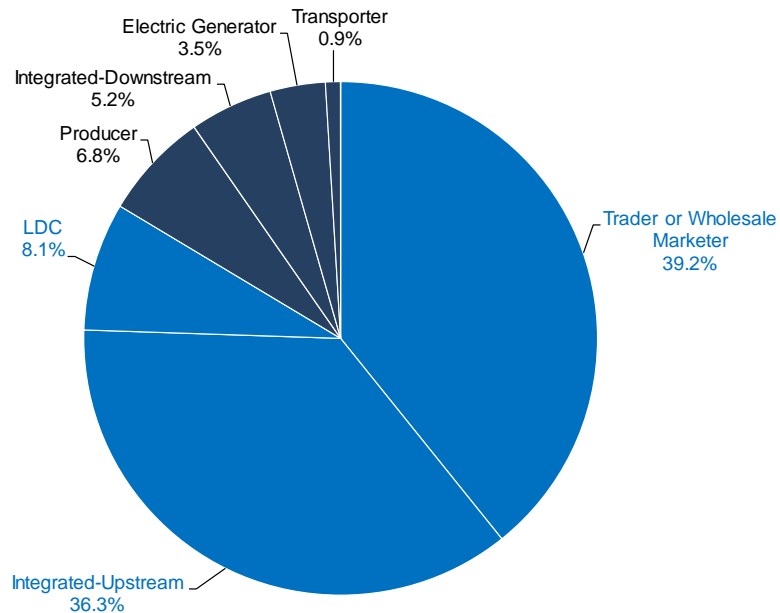
Source: FERC Form 552 submissions as of May 16, 2014

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. Companies that did not enter information regarding their price reporting were assumed to not report.

VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

- Among the companies that reported to the price-index publishers, integrated-upstream companies, LDCs, and traders or wholesale marketers accounted for approximately 84 percent¹⁷ of the reportable volume.
- Of the top 20 reporting companies, nine reported to index publishers, which accounted for 55 percent¹⁸ of the reporting-eligible volume at reporting companies.

FIGURE 11: REPORTING-ELIGIBLE TRANSACTION FORM 552 VOLUME BY COMPANY TYPE EXCLUDING NON-REPORTING COMPANIES 2013



Source: FERC Form 552 submissions as of May 16, 2014

Note: Industrial or commercial consumer and chemical consumer companies reported less than 0.05 percent of reportable volume and are not included. Percentages may not add up to 100 due to rounding.

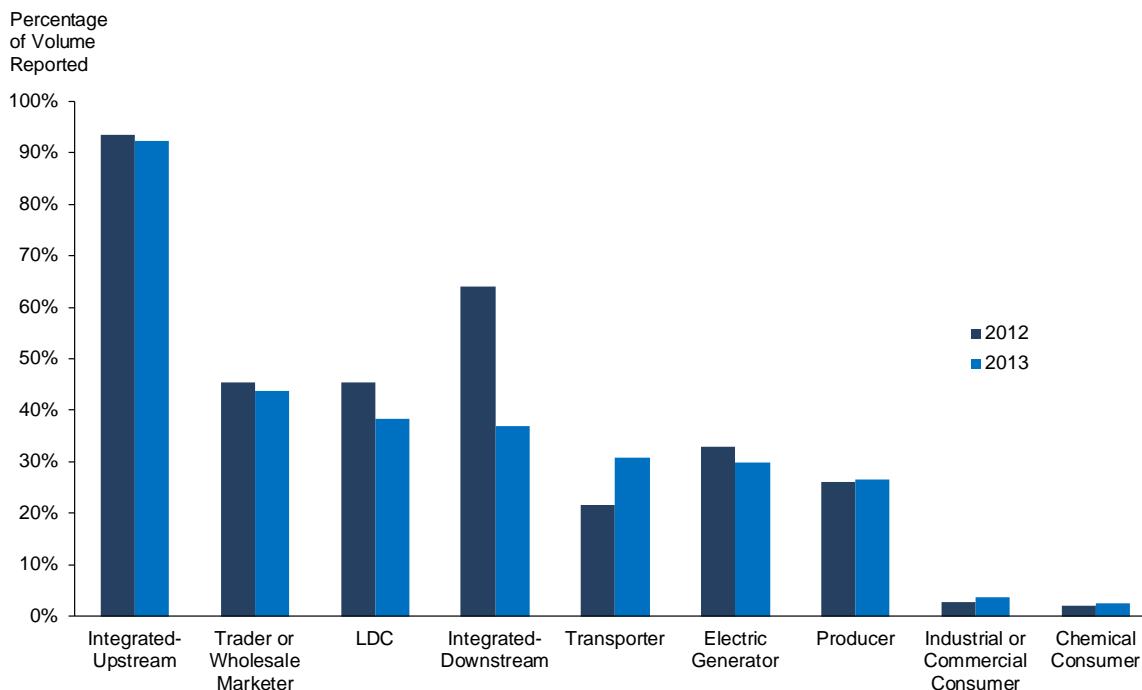
VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

There was significant disparity in the proportion of transaction volume reported by the various industry segments.

- While integrated-upstream companies continued to report over 90 percent of transaction volume, integrated-downstream companies reported only 37 percent of transaction volume, dropping by approximately 27 percentage points from 2012 to 2013. The decrease in the integrated-downstream segment was driven by one company no longer reporting.¹⁹
- Only five chemical consumers indicated that they reported to the price-index publishers, whereas 27 industrial or commercial consumers reported to the price-index publishers.

The percentage of volume reported decreased for many industry segments.

FIGURE 12: PERCENTAGE OF FORM 552 VOLUME POTENTIALLY REPORTED BY COMPANY CATEGORY 2013



Source: FERC Form 552 submissions as of May 16, 2014

Note: Of the 660 respondents in 2013, 128 indicated they reported transaction information to price-index publishers for themselves or at least one affiliate.

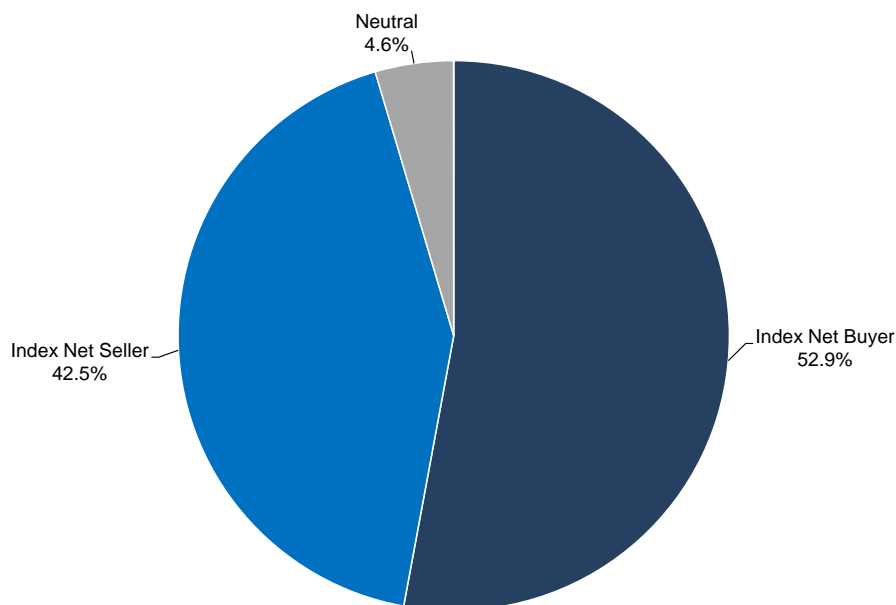
VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

The disparity between industry segments reporting transaction information to the price-index publishers may cause concern that the basis for the price indices might arise predominantly from segments that have either long or short exposure to the published indices.

- In 2013, net buyers reported approximately 53 percent of transactions and net sellers reported almost 43 percent. This gap represents a two percentage point decline.
- From 2008 to 2010, the proportion of reported volume by net buyers and net sellers was approximately equal.
- In 2011, the difference between the proportion of net buyers and net sellers that report to the price-index publishers exceeded 20 percent for the first time. This gap declined by nine percentage points in 2012 and has declined further in 2013.

Net buyers continued to report a larger proportion of volume to index publishers than net sellers.

FIGURE 13: REPORTABLE FORM 552 VOLUME BY INDEX NET BUYERS AND INDEX NET SELLERS 2013



Source: FERC Form 552 submissions as of May 16, 2014

Note: Reportable volume to price-index publishers 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. Index-price transactions include index-price next-month purchases and sales, index-price next-day purchases and sales, and trigger agreements. Index net buyers are identified as companies that purchase more index-price transactions than they sell. Percentages may not add up to 100 due to rounding.

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.: A “diverse derivatives marketplace. . . . The company provides a marketplace for buyers and sellers, bringing together individuals, companies and institutions that need to manage risk or that want to profit by accepting risk.” <http://www.cmegroup.com/company/history/>

Downstream: “A term used in the petroleum industry referring to the refining, transportation and marketing side of the business.” <http://www.energy.ca.gov/glossary/glossary-d.html>

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/docs-filing/forms/form-552/form-552.pdf>

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/docs-filing/forms/form-552/form-552.pdf>

Fixed-price, next-day transaction: “[D]elivery of natural gas pursuant to a transaction executed prior to NAESB [North American Energy Standards Board] nomination deadline (11:30 am Central Prevailing Time) on one day for uniform physical delivery over the next pipeline day.” <https://www.ferc.gov/docs-filing/forms/form-552/form-552.pdf>

Fixed-price, next-month transaction: “[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/docs-filing/forms/form-552/form-552.pdf>

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

ICE: IntercontinentalExchange Inc. A “network of regulated exchanges and clearinghouses for financial and commodity markets.” <https://www.theice.com/about.jhtml>

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.” <http://www.uniongas.com/storage-and-transportation/resources/additional-info/glossary>

GLOSSARY *continued*

LDC: Local distribution company. “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>

Midstream: Activity involving “pipelines, processing plants, and storage facilities.” <http://www.ferc.gov/market-oversight/guide/energy-primer.pdf>

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/docs-filing/forms/form-552/form-552.pdf>

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/docs-filing/forms/form-552/form-552.pdf>

Upstream: “A term used in the petroleum industry referring to the exploration and production side of the business.” <http://www.energy.ca.gov/glossary/glossary-u.html>

APPENDICES

APPENDIX 1: BACKGROUND ON THE ENERGY POLICY ACT OF 2005, FORM 552 SUBMISSIONS, AND CORNERSTONE RESEARCH'S PROPRIETARY ANALYSIS

In 2005, Congress passed the Energy Policy Act of 2005 (EPAAct 2005), which authorized FERC to “facilitate price transparency in markets for the sale or transportation of physical natural gas in interstate commerce” (§ 316). The EPAAct 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 1,121 respondents. On June 17, 2010, FERC issued Order 704-C, which provides for slightly revised reporting rules that ease some reporting requirements.²⁰ For 2013 natural gas transactions, Form 552 submissions covered 660 firms.

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-price 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 has supplemented the FERC 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.²¹ The latter two categories capture companies that span multiple industry segments.²²

APPENDICES *continued*

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.”²³ Order 704-A (p. 9) further clarifies that the latter category includes “bilateral, arms-length, fixed-price physical natural gas transactions between nonaffiliated 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 an index-price publisher. The criteria for reporting to an index-price 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 requirement.

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, index price referencing next-month indices, transactions with price triggers,²⁴ and physical-basis transactions.²⁵ In addition to volumes of physical transactions, market participants are required to state whether or not they report transaction information to the price-index publishers.

ENDNOTES

- 1 Calculated as minimum trading volume of 60,533 tBtu from Figure 7 divided by 24,431 tBtu EIA natural gas delivered to consumers. EIA, “U.S. Natural Gas Consumption by End Use,” http://www.eia.gov/dnav/ng/NG_CONS_SUM_DCU_NUS_A.htm. Converted to million Btu (mmBtu) from million cubic feet (MMcf). 1 cubic foot = 1,023 Btu.
- 2 EIA, “U.S. Natural Gas Marketed Production (tBtu),” <http://www.eia.gov>.
- 3 EIA, “Annual Energy Outlook 2014,” p. MT-23, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2014\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf).
- 4 Prices are based on the Henry Hub spot price. EIA, “Natural Gas Spot and Futures Prices (NYMEX),” http://www.eia.gov/dnav/ng/ng_pri_fut_s1_a.htm.
- 5 EIA, “U.S. Natural Gas Consumption by End Use (Million Cubic Feet [MMcf]),” <http://www.eia.gov/dnav/ng/hist/n3025us2a.htm>.
- 6 EIA, “Annual Energy Outlook 2014,” p. MT-15, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2014\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf).
- 7 EIA, “Annual Energy Outlook 2014, Market Trends: Electricity Demand,” May 7, 2014, http://www.eia.gov/forecasts/aeo/MT_electric.cfm.
- 8 To the extent that both parties to a transaction submit a Form 552, the total submitted volume 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 volume.
Relatedly, the minimum volume represented by Form 552 is the maximum of the buy and sale totals shown in Figure 7. The addition of the buy and sale volume can double count transactions if both the buyer and seller file a Form 552. Conversely, 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.
- 9 There were 655 companies that submitted a Form 552 with non-zero volumes and five companies that submitted a Form 552 with zero volume, for a total of 660 companies.
- 10 These aggregate figures from ICE represent both financial and physical natural gas contracts. ICE reports the total number of contracts, and the volume represented by each contract can vary in size (ICE SEC Form 10-Ks).
- 11 ICE 2013 SEC Form 10-K, p. 53.
- 12 The figures reported by CME Group represent the average daily volume of its natural gas products, and they 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 (CME Group SEC Form 10-Ks).
- 13 Calculated based on Figure 8: Index Next-Day 29.9% + Index Next-Month 43.1% + Price Triggers 1.4% = 74.4%.
- 14 For the purposes of this report, price-trigger agreements are considered to be dependent on an index because they are, at inception, often priced based on an index. Since they often convert to fixed prices, however, the buyer can ultimately end up paying a price that is no longer dependent on an index price. Further, the set of other index-price transactions likely includes purchases by industrial consumers with embedded price caps or associated hedges, so that the buyer ultimately does not end up paying a price determined by an index. Thus, the percentage of transactions with prices at settlement determined by an index price may be lower than these statistics suggest.
- 15 Order 704 (p. 4) 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.”
- 16 Calculated based on Figure 9, volume potentially reported to index publishers divided by the volume of index-price transactions: $15,452 \div 89,171 = 17.3\%$ or $1/0.173 = 5.78$.
- 17 Calculated as LDC plus integrated-upstream plus traders or wholesale marketers: $8.1\% + 36.3\% + 39.2\% = 83.6\%$.
- 18 Calculated based on Figures 7 and 9, top 20 companies with volume reportable to indices and an affiliate that reports to index publishers divided by total volume potentially reported to index publishers: $8,520 \div 15,452 = 55\%$.
- 19 The company AGL Resources and its affiliates no longer reported to price-index publishers in 2013, a change from 2012. AGL Resources is the eighth largest company by volume.
- 20 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.
- 21 The categorization process is necessarily judgmental and was based on company websites and financial filings. Companies were categorized as closely as possible to their most significant natural gas market activity.

ENDNOTES *continued*

- ²² 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.
- ²³ FERC Form 552 (2009 version). Note that Form 552 covers only physical natural gas transactions. Financial transactions, such as swaps and options, are excluded, as are futures contracts, whether or not they are taken to physical delivery.
- ²⁴ 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.
- ²⁵ 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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