

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, 2015

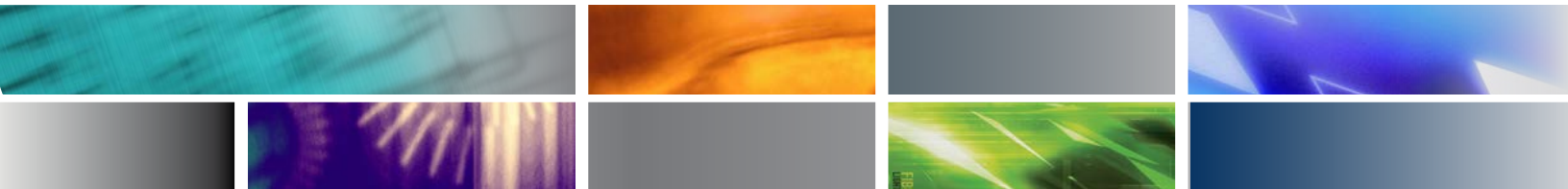


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INTRODUCTION

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 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

The year 2014 saw a slight decline in the amount of natural gas traded in the United States as measured by Form 552 submissions. Overall trading volume fell by 1.4 percent. From 2013 to 2014, the major exchanges experienced double-digit declines in the number of natural gas contracts traded. These decreases extended a multiyear trend of falling trading volumes during a time of increased natural gas production in the United States.

- The trading activity reported in the Form 552 submissions totaled 118,901 tBtu transacted by 656 companies. [\(page 3\)](#)
- Intercontinental Exchange Inc. (ICE) experienced a decline in volume of 22 percent. [\(page 4\)](#)
- CME Group Inc.'s (CME's) natural gas products volume decreased approximately 12 percent from 2013. [\(page 4\)](#)
- The U.S. natural gas industry remains unconcentrated, with a large number of diverse participants. [\(pages 5–7\)](#)
- In 2014, the base of transactions used to set the price indices relative to the transactions that relied on the indices continued to shrink. [\(page 9\)](#)
- The volume reported to price-index publishers decreased for the third consecutive year. [\(page 9\)](#)
- Of the 656 Form 552 respondents in 2014, 112 (17 percent) reported transaction information to the price-index publishers for at least one affiliate. While the majority of Form 552 respondents did not report, the reporting companies tended to be larger than average. [\(page 10\)](#)
- Reporting to price-index publishers was inconsistent across industry segments in 2014. [\(page 12\)](#)
- The volume of these reported transactions indicates that, on average, a molecule of natural gas was traded through approximately 2.4 transactions from production to consumption.¹

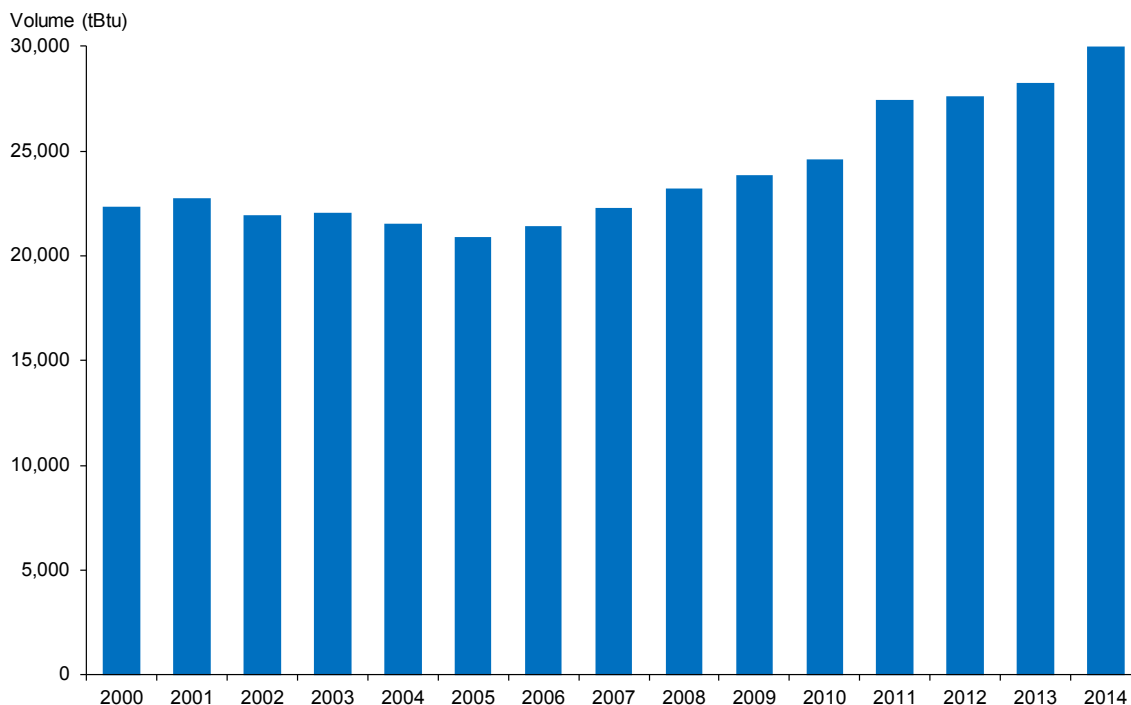
TRENDS IN NATURAL GAS PRODUCTION AND CONSUMPTION

In sharp contrast to recent U.S. dependence on imported energy sources, by 2017 the United States is predicted to be a net exporter of natural gas.² According to the U.S. Energy Information Administration (EIA), the development of shale gas resources is playing the largest role in the rise of natural gas production.³ The EIA projects a 73 percent increase in shale gas production from 2013 to 2040.⁴ The growth in domestic natural gas production has resulted in an overall broadening of the uses for natural gas.

The increase in production in 2014 was the largest since 2011.

- Annual marketed production has expanded steadily since the mid-2000s, and has increased nearly 26 percent since 2009.⁵
- The 6.2 percent increase in production in 2014 was 3.7 percentage points greater than the increase in 2013.
- After decreasing by 68 percent from 2005 to 2012, the decline of natural gas prices reversed in 2013, increasing from \$2.75 to \$3.73. In 2014, natural gas prices rose to \$4.37, a 17 percent increase.⁶
- While the EIA projects that natural gas-fired generation of electricity will remain below 2012 levels until after 2025, it projects that natural gas will fuel more than 60 percent of the new generation needed from 2025 to 2040.⁷
- More than half of the total increase in shale gas production through 2040 is projected to come from the Haynesville and Marcellus shale formations.⁸

FIGURE 1: U.S. NATURAL GAS MARKETED PRODUCTION 2000–2014



Source: EIA

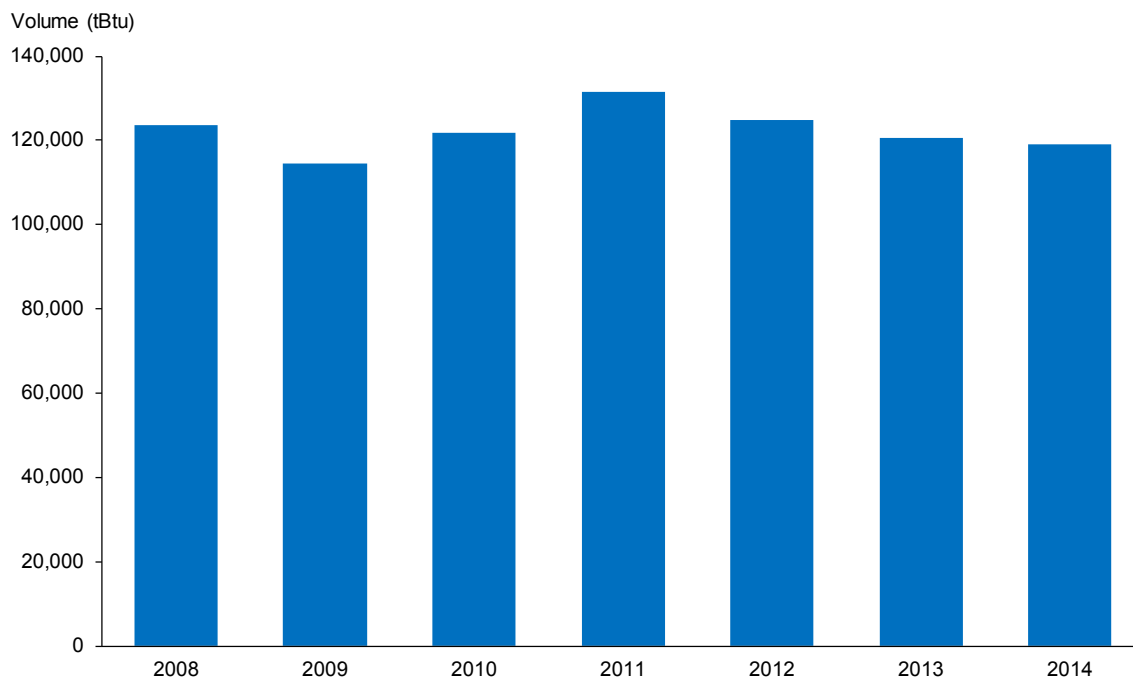
Note: One tBtu equals 1 million mmBtu.

MARKET VOLUME

- Total Form 552 volume continued to decrease, declining 1.4 percent from 2013 and 9.5 percent from its peak in 2011.
- The trading activity reported in the Form 552 submissions totaled 118,901 tBtu transacted by 656 companies.⁹
- Form 552 volumes in 2014 represent a minimum of 59,649 tBtu of trading volume.¹⁰

Both the number and total volume of Form 552 submissions decreased from 2013 to 2014.

FIGURE 2: FORM 552 TOTAL VOLUME
2008–2014



Source: FERC Form 552 submissions as of May 16, 2015

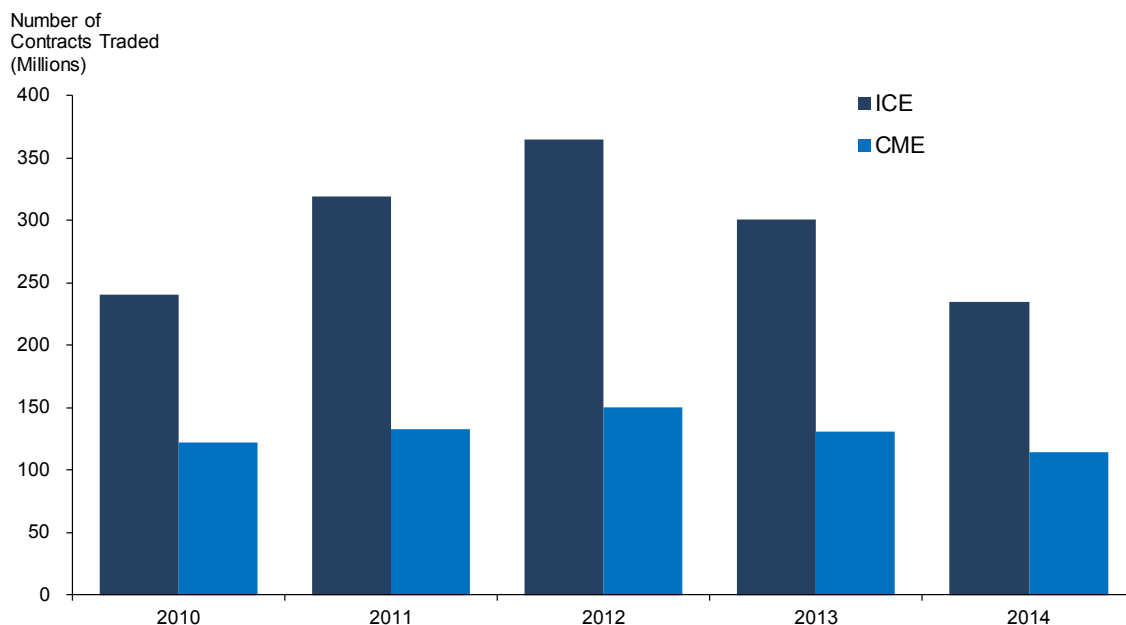
Note: One tBtu equals 1 million mmBtu.

INCREASE IN PRODUCTION, DECREASE IN TRADING: WHAT THE EXCHANGES SAY

- From 2013 to 2014, trading of natural gas contracts decreased 22 percent for ICE and 12 percent for CME.¹¹
- This annual decrease in natural gas contracts traded on ICE and CME was even greater than the decline in Form 552 submissions.
- ICE attributed the decline to “continued low volatility and low price levels, which produced muted trading activity in comparison to the record volume levels established during the year ended December 31, 2012. In addition, moderate commodity demand due to muted economic growth, regulatory uncertainty and strong natural gas supply reduced the demand for trading and hedging during 2014 and 2013.”¹²
- CME ascribed the decline in natural gas contract volume to “low overall price levels resulting from increasing U.S. energy production.”¹³
- In 2014, approximately 235 million and 114 million natural gas contracts were traded on ICE and CME, respectively.¹⁴ These levels are similar to the levels of trading seen on the exchanges in 2010.

Despite increased natural gas production, the number of contracts traded on ICE and CME declined for the second straight year.

FIGURE 3: ICE AND CME NATURAL GAS TRADING
2010–2014



Source: ICE Form 10-Ks; CME 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 OTC contracts. In its 2012 10-K, ICE provides comparable totals for 2011 and 2010 to reflect the 2012 reclassification. From 2012 forward, the figures reflect worldwide contract volume; prior to 2012, the totals reflect only North America contract volume. In 2012 and 2013, the only years where both estimates are available from ICE, the Non-North America contract volume accounts for less than 3 percent of total contracts traded. 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.

PRIOPRIETARY CLASSIFICATION OF MARKET PARTICIPANTS

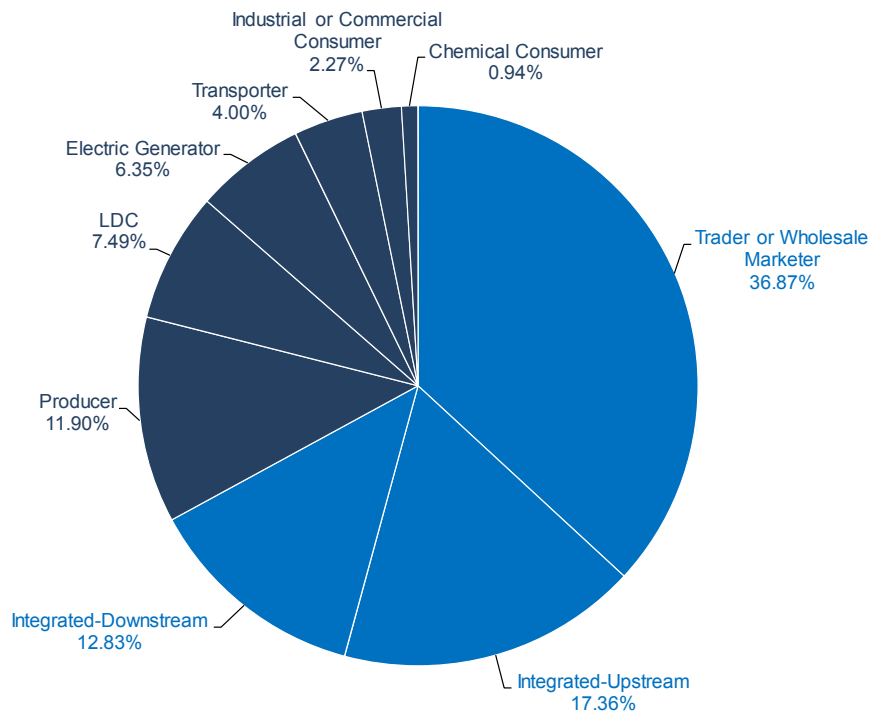
Cornerstone Research has supplemented the FERC Form 552 data with proprietary research that classifies the respondent companies by industry segments. The companies have been classified by their primary natural gas business activity, yielding an overview of the natural gas market.

NATURAL GAS MARKET PARTICIPANTS

- Large integrated-upstream and integrated-downstream companies and traders or wholesale marketers accounted for approximately 67 percent of Form 552 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 4: FORM 552 TRANSACTION VOLUME BY COMPANY CATEGORY 2014



Source: FERC Form 552 submissions as of May 16, 2015
 Note: Percentages may not add up to 100 due to rounding.

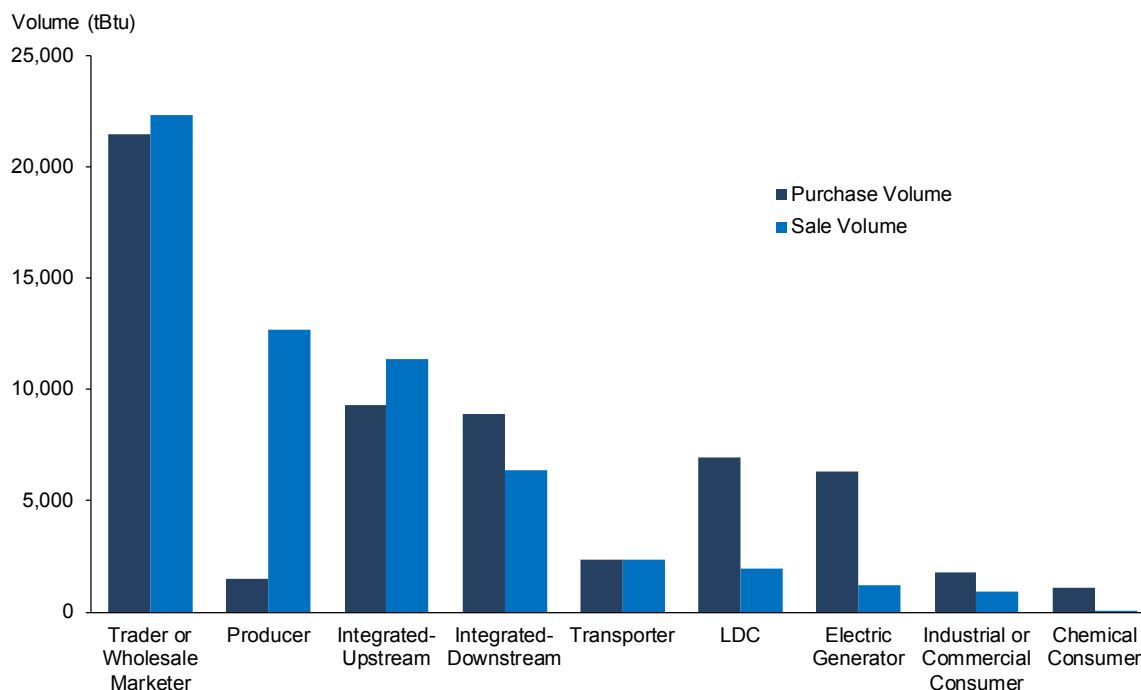
NATURAL GAS MARKET PARTICIPANTS *continued*

As would be expected, companies primarily engaging in “upstream” or “downstream” activities are strong net purchasers or sellers of natural gas, respectively, 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 substantially more than they sold. Integrated-downstream companies also purchased more than they sold.
- Consistent with their business models, traders or wholesale marketers and transporters purchased and sold approximately equal amounts.

The largest net buyers of natural gas were LDCs and electric generators.

FIGURE 5: FORM 552 PURCHASE AND SALE VOLUME BY COMPANY CATEGORY 2014



Source: FERC Form 552 submissions as of May 16, 2015

Note: One tBtu equals 1 million mmBtu.

NATURAL GAS MARKET PARTICIPANTS *continued*

A large number of diverse participants comprise the U.S. natural gas industry. Of those, the 20 companies with the largest total transaction volume tend to be consistent from year to year—18 of the top 20 companies in 2013 were also among the 20 leading companies in 2014.

- The top 20 companies accounted for 52,266 tBtu out of 118,901 tBtu, or slightly below 44 percent of volume reported on Form 552 submissions. This percentage remained unchanged from 2013, although it is slightly below the average of 47 percent from 2010 to 2012. The results suggest that the overall decrease in trading volumes did not affect market concentration.
- BP Energy Company had the largest physical volumes for the seventh consecutive year at 8,498 tBtu, an increase of approximately 9 percent from 2013 and almost double the second-largest trader.
- Two companies fell from the top 20 companies by volume. Total Gas & Power North America Inc. fell from 11 to 32. Iberdrola Energy Services LLC fell from 19 to 22. J. Aron & Company and DCP Midstream LLC were new entrants relative to 2013.¹⁵

The U.S. natural gas market remains an unconcentrated industry.

FIGURE 6: TOP 20 COMPANIES BY TOTAL FORM 552 VOLUME 2014
(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	4,074	4,424	-350	8,498	2,107
Shell Energy North America (US) L.P.	Y	2,095	2,382	-287	4,477	907
AGL Resources Inc.	N	2,427	1,958	469	4,384	884
Macquarie Energy LLC	Y	2,068	2,118	-50	4,186	1,286
ConocoPhillips Company	Y	1,603	1,638	-36	3,241	709
EDF Trading North America LLC	N	1,616	1,562	54	3,178	681
Tenaska Marketing Ventures	Y	1,721	1,423	298	3,144	835
Chevron U.S.A. Inc.	Y	1,078	1,234	-156	2,313	334
BG Energy Merchants LLC	Y	1,020	1,000	20	2,019	826
J. Aron & Company	Y	999	989	10	1,989	766
Natural Gas Exchange Inc.	N	828	828	0	1,655	787
J.P. Morgan Ventures Energy Corporation	N	863	773	90	1,636	289
Enterprise Products Partners L.P.	N	848	730	119	1,578	159
Pacific Summit Energy LLC	N	777	766	11	1,543	264
Chesapeake Energy Corporation	N	80	1,429	-1,348	1,509	169
CenterPoint Energy Inc.	N	894	609	285	1,503	95
Twin Eagle Resource Management LLC	N	710	668	42	1,377	162
Occidental Energy Marketing Inc.	N	666	706	-40	1,373	343
Anadarko Petroleum Corporation	Y	146	1,221	-1,075	1,367	177
DCP Midstream LLC	Y	195	1,099	-904	1,294	466
Top 20 Companies by Total Volume		24,709	27,557	-2,848	52,266	12,243
All Other Companies		34,940	31,696	3,244	66,636	13,769
Total for All Companies		59,649	59,252	397	118,901	26,013

Source: FERC Form 552 submissions as of May 16, 2015

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.

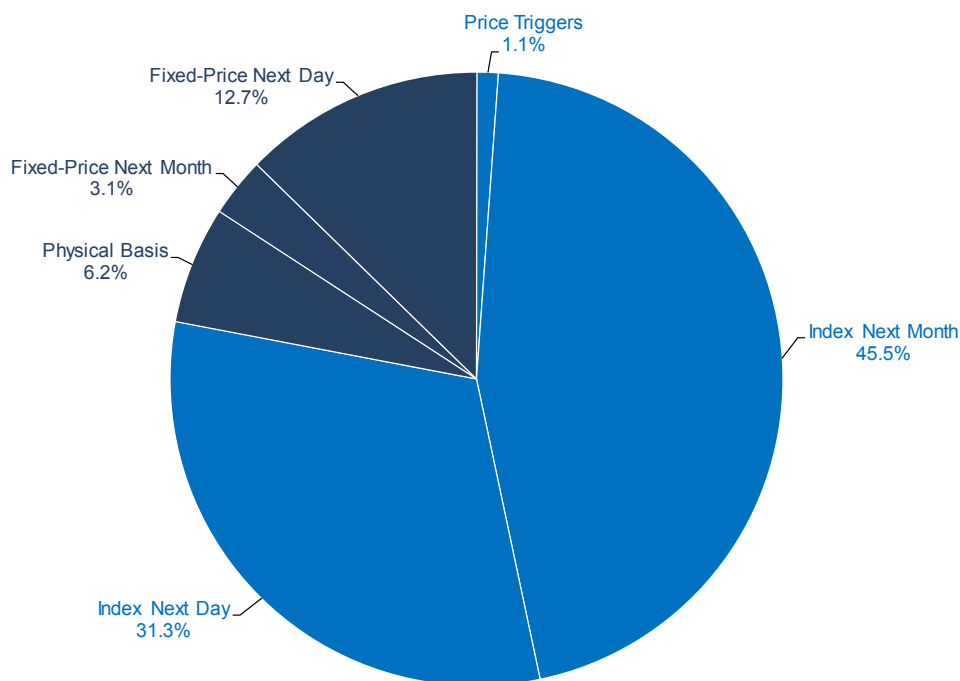
TRANSACTION TYPES

In 2014, the vast majority of transactions covered by Form 552 (78 percent¹⁶) were index-price transactions (compared to 74 percent in 2013).¹⁷ Direct fixed-price transactions comprised only 16 percent of the Form 552 transaction volume (compared to 19 percent in 2013). Thus, in 2014 the ratio of transactions relying on the indices to transactions potentially forming the indices rose again.

The monthly index was the most widely used index for price setting.

- 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 used in 46 percent of all Form 552 transactions.
- Among the combined fixed-price and index-price transactions covered by Form 552, transactions were split relatively equally between next-month gas transactions (49 percent) and next-day gas transactions (44 percent).¹⁸
- Fixed-price, next-month transactions and physical-basis transactions accounted for only about 3 percent and 6 percent of the transactions, respectively.
- 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).

FIGURE 7: FORM 552 TRANSACTION VOLUME BY TRANSACTION TYPE 2014



Source: FERC Form 552 submissions as of May 16, 2015
 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 mandating the Form 552 submissions.¹⁹

- The volume of transactions dependent on indices increased relative to the volume of transactions that form the indices. While the index-price transaction volume increased by 3 percent in 2014, the reporting companies' potentially reported volume decreased by 15 percent.
- This imbalance has doubled in the past several years, as the index-price transaction volume grew from about three-and-a-half times larger than the reporting companies' potentially reported volume in 2008 to almost seven times larger in 2014. Reporting volumes were also influenced by the number of companies that reported transaction information to the price-index publishers. For example, the number of companies that reported transaction information to price-index publishers decreased from 133 to 112 between 2009 and 2014.

The volume of transactions dependent on the indices was almost seven times larger than the volume of transactions that formed the indices.²⁰

FIGURE 8: FORM 552 VOLUMES POTENTIALLY REPORTED TO INDICES VERSUS TRANSACTION VOLUMES PRICED BASED ON INDICES 2008–2014



Source: FERC Form 552 submissions as of May 16, 2015

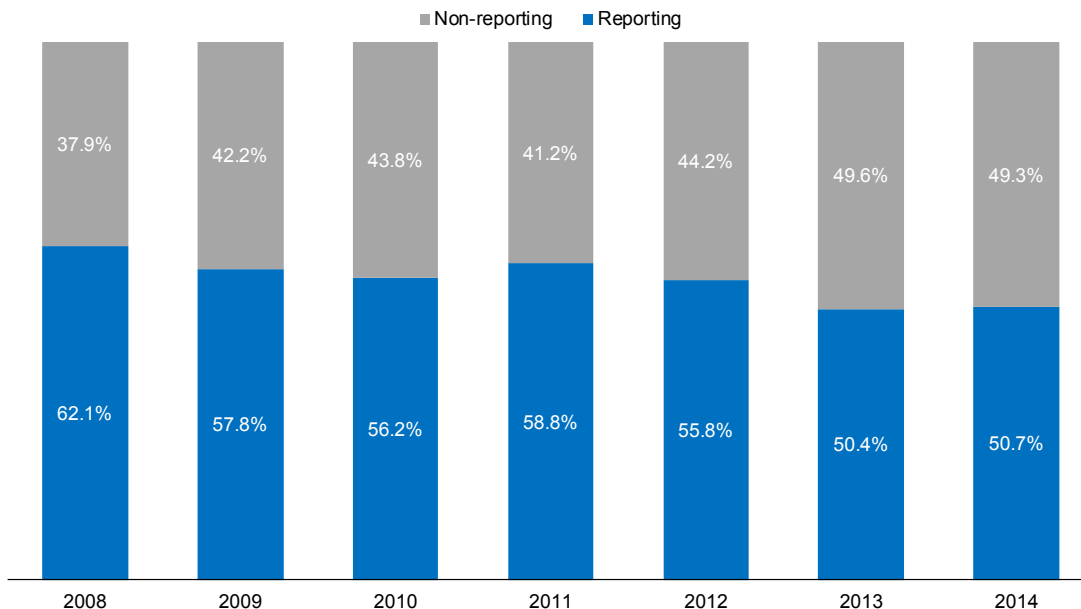
Note: Reportable volume is the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552. Companies that did not enter information regarding their price reporting were assumed to not report. One tBtu equals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

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

- Slightly less than half of the reportable volume for companies that submitted a Form 552 was not reported to the price-index publishers.
- Of the 656 respondents in 2014, only 112 (17 percent) reported transaction information to the price-index publishers for at least one affiliate. The percentage of reportable volume transacted by a reporting company increased slightly from 2013, by 0.3 percentage points. The 112 reporting companies accounted for approximately half of the reporting-eligible, fixed-price volume in 2014, down from over 60 percent in 2008.

After a decline in 2013, the percentage of reportable Form 552 volume remained flat in 2014.

FIGURE 9: REPORTABLE FORM 552 VOLUME BY REPORTING VERSUS NON-REPORTING COMPANIES 2008–2014



Source: FERC Form 552 submissions as of May 16, 2015

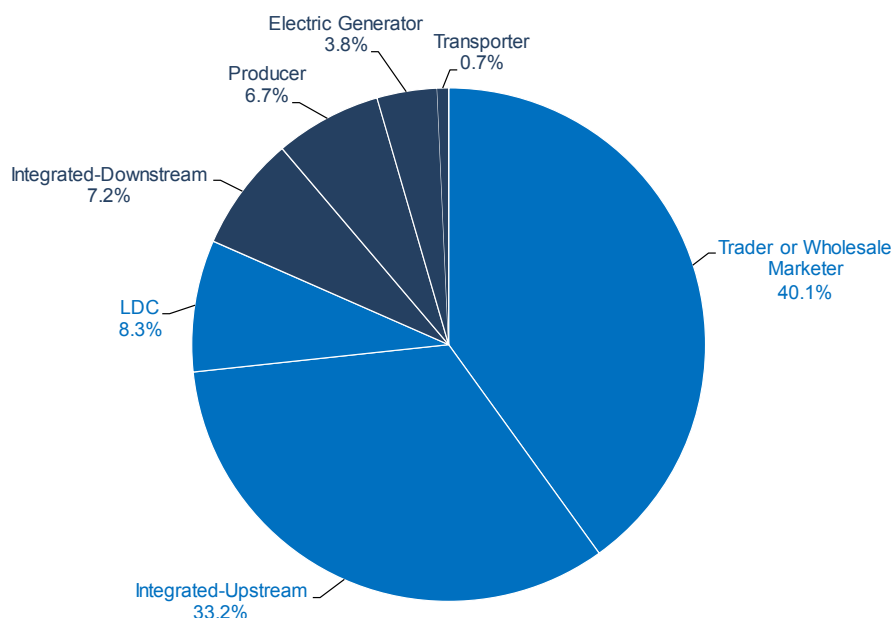
Note: Reportable volume is the sum of fixed-price next-month purchases and sales, fixed-price next-day purchases and sales, and physical-basis-transaction volume reported on Form 552. Companies that did not enter information regarding their price reporting were assumed to not report.

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

- The vast majority of volume reported to the price-index publishers was transacted by integrated-upstream companies, LDCs, and traders or wholesale marketers. These categories accounted for approximately 82 percent²¹ of the reportable volume.
- Out of the top 20 FERC-reporting companies, 10 reported to index publishers. These 10 accounted for 64 percent²² of the reporting-eligible volume at reporting companies.

Of the top 20 FERC-reporting companies, half reported to index publishers.

FIGURE 10: REPORTING-ELIGIBLE TRANSACTION FORM 552 VOLUME BY COMPANY TYPE EXCLUDING NON-REPORTING COMPANIES 2014



Source: FERC Form 552 submissions as of May 16, 2015

Note: Industrial or commercial consumer and chemical consumer companies reported less than 0.15 percent of reportable volume and are not included.

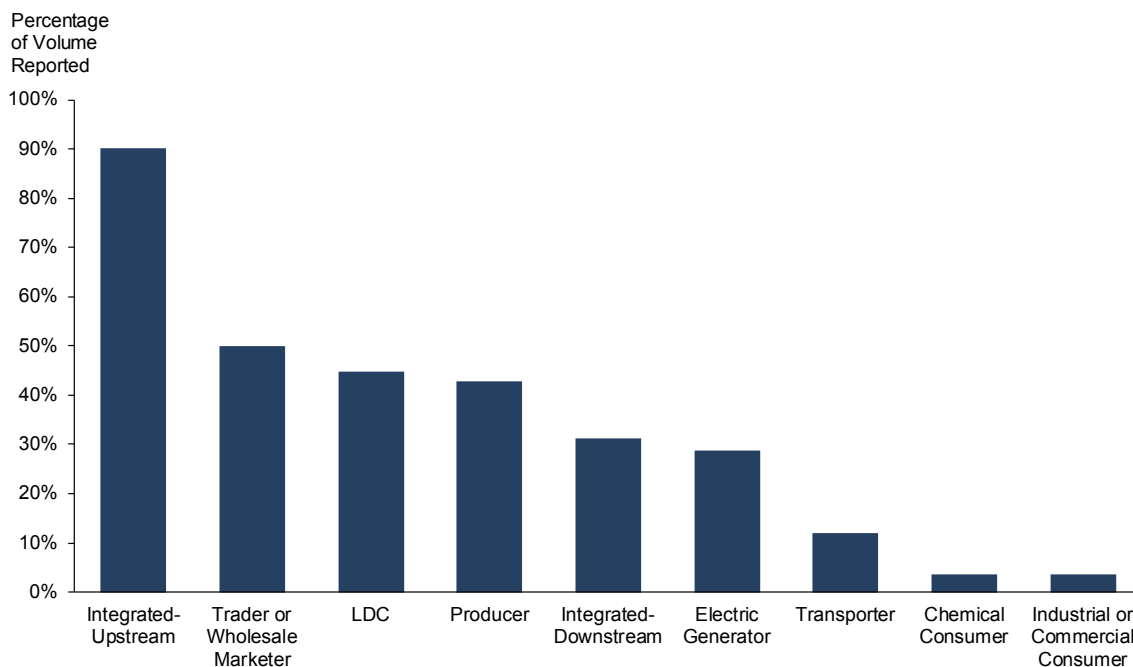
VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

While many companies conduct fixed-price transactions, only a fraction of this volume is reported to index publishers. Among the various industry segments, there was a large difference in the proportion of transaction volume reported relative to that industry’s total fixed-price transactions.

- While integrated-upstream companies reported over 90 percent of transaction volume, integrated-downstream companies reported only 31 percent of transaction volume.
- Only 4 percent of volume from both chemical consumers and industrial or commercial consumers was potentially reported to the price-index publishers.

Integrated-upstream firms report index-price transactions more than any other industry segment.

FIGURE 11: PERCENTAGE OF REPORTING-ELIGIBLE FORM 552 VOLUME POTENTIALLY REPORTED BY COMPANY CATEGORY 2014



Source: FERC Form 552 submissions as of May 16, 2015

Note: Of the 656 respondents in 2014, 112 indicated they reported transaction information to price-index publishers for themselves or at least one affiliate.

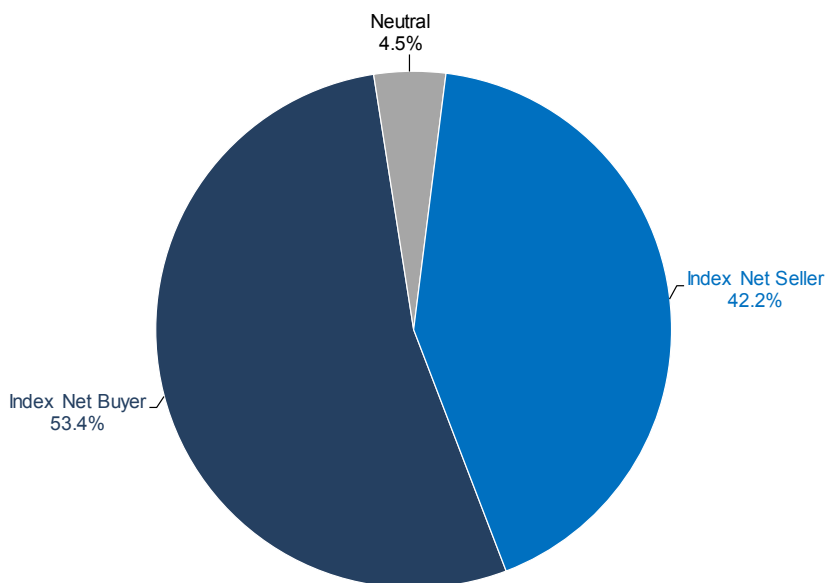
VOLUME AND DEPTH OF REPORTING TO PRICE-INDEX PUBLISHERS *continued*

The difference 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 2014, net buyers reported approximately 53 percent of transactions and net sellers reported approximately 42 percent. The 11.2 percent gap represents an increase from the 10.4 percent value in 2013.
- 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 reported to the price-index publishers exceeded 20 percent for the first time. This gap declined by 9 percentage points in 2012, and has since remained relatively stable.

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

FIGURE 12: REPORTABLE FORM 552 VOLUME BY INDEX NET BUYERS AND INDEX NET SELLERS 2014



Source: FERC Form 552 submissions as of May 16, 2015

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>.

Dry natural gas: “Dry Natural Gas is almost completely methane. The higher the methane concentration within the gas, the drier it is. According to the U.S. Energy Information Administration (EIA), dry natural gas is what remains after all of the liquefied hydrocarbons (hexane, octane, etc.) and non-hydrocarbon (helium, nitrogen, etc.) impurities are removed from the natural gas stream.” http://www.usenergydevcorp.com/media_downloads/Natural%20Gas%20Dry%20Vs%20Wet_050913.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/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: Intercontinental Exchange Inc. A “network of regulated exchanges and clearinghouses for financial and commodity markets.” <https://www.intercontinentalexchange.com/about/overview>.

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/index.cfm?id=L>.

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>.

Wet natural gas: “Wet Natural Gas contains less than 85% methane and has a higher percentage of liquid natural gasses (LNG’s) such as ethane and butane. The combination of LNG’s and liquefied hydrocarbons give it the ‘wetness.’ LNG’s are separated from the methane and sold as individual compounds.”
http://www.usenergydevcorp.com/media_downloads/Natural%20Gas%20Dry%20Vs%20Wet_050913.pdf.

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.²³ For 2014 natural gas transactions, Form 552 submissions covered 656 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.²⁴ The latter two categories capture companies that span multiple industry segments.²⁵

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.”²⁶ Order 704-A (p. 9) further clarifies that the transactions that could be reported to an index publisher means any “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,²⁷ and physical-basis transactions.²⁸ 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 59,649 tBtu from Figure 6 divided by 25,124 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 trillion Btu (tBtu) from million cubic feet (MMcf). 1 cubic foot = 1,031 Btu, the annual Total Consumption conversion factor in the EIA time series “Approximate Heat Content of Natural Gas (Btu per Cubic Foot),” http://www.eia.gov/totalenergy/data/monthly/pdf/sec13_4.pdf.
- 2 EIA, “Annual Energy Outlook 2015,” April 2015, p. 21, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2015\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2015).pdf).
- 3 Ibid., p. 20.
- 4 Ibid.
- 5 Marketed production converted to million Btu (mmBtu) from million cubic feet (MMcf) using the annual Marketed Production values in the EIA time series “Approximate Heat Content of Natural Gas (Btu per Cubic Foot),” http://www.eia.gov/totalenergy/data/monthly/pdf/sec13_4.pdf.
- 6 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.
- 7 EIA, “Annual Energy Outlook 2015,” April 2015, p. 24, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2015\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2015).pdf).
- 8 Ibid., p. 20.
- 9 There were 648 companies that submitted a Form 552 with nonzero volumes and eight companies that submitted a Form 552 with zero volume, for a total of 656 companies.
- 10 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 6. Adding 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.
- 11 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. CME reports the total number of contracts, and the volume represented by each contract may vary in size (CME Form 10-Ks).
- 12 ICE 2014 10-K, p. 48.
- 13 CME 2014 10-K, p. 40.
- 14 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 Form 10-Ks).
- 15 In 2013, J. Aron & Company and DCP Midstream LLC were ranked 25 and 26, respectively.
- 16 Calculated based on Figure 7, index next day plus index next month plus price triggers: $31.3\% + 45.5\% + 1.1\% = 77.9\%$.
- 17 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.
- 18 Calculated based on Figure 7, index next month plus fixed-price next month: $45.5\% + 3.1\% = 48.6\%$; index next day plus fixed-price next day: $31.3\% + 12.7\% = 44.0\%$.
- 19 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.”
- 20 Calculated based on Figure 8, volume potentially reported to index publishers divided by the volume of index-price transactions: $92,067 \div 13,184 = 6.98$.
- 21 Calculated based on Figure 10, LDC plus integrated-upstream plus traders or wholesale marketers: $8.3\% + 33.2\% + 40.1\% = 81.6\%$.
- 22 Calculated based on Figures 6 and 8, 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: $8,412 \div 13,184 = 63.8\%$. From Figure 6, 10 of the top 20 companies have any affiliates that report to index publishers, which totals 8,412. From Figure 8, the 2014 volume potentially reported to indices represented by the smaller blue bar totals 13,184.
- 23 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.
- 24 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*

- ²⁵ 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.
- ²⁶ 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.
- ²⁷ 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.
- ²⁸ 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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