U.S. Natural Gas Distribution: Insights from FERC Form 552 Submissions

by Greg Leonard

The Federal Energy Regulatory Commission (FERC) recently received the second round of annual submissions of U.S. natural gas transactions as part of its efforts to increase the availability of information on trading activity and price formation in the U.S. natural gas market. To date these submissions constitute the most comprehensive data on the over-the-counter natural gas market. Cornerstone Research has collected and analyzed these submissions to produce an in-depth picture of transaction activity and price formation in the U.S. natural gas market.

The results of this study show that in 2009:

• The U.S. natural gas market experienced little overall change from 2008 at the aggregate level. Aggregate trading volumes declined only slightly from 2008 levels. All but one of the 2008 top twenty companies by transaction volume remained in the top twenty for 2009. The breakdown of transactions by type and by industry segment shows little change from 2008.

• On average a molecule of natural gas passes through at least two and one-half transactions as it winds its way from production to consumption.

• The U.S. natural gas market is not concentrated; the top twenty companies by volume account for slightly less than half of the transaction volume covered by the submissions.

• Transactions with prices dependent in some manner on published price indices constitute about two-thirds of the transaction types covered by submissions. Since FERC submissions include all types of physical index-priced transactions, but exclude some types of physical transactions that have prices not dependent on price indices, index-priced transactions actually make up less than two-thirds of the entire physical natural gas market.

• Reporting to price index publishers appears to be robust, with more than 133 respondents reporting transaction information for at least one affiliate; approximately 58 percent of the reporting-eligible volume is transacted by companies that report to the price index publishers.

• Price reporting to the price index publishers is not consistent across industry segments. The majority of the reporting-eligible volume transacted by the integrated firms and the traders and marketers is conducted by companies that report to the price index publishers. In contrast to these large participants, other industry segments appear largely to avoid reporting to price index publishers.

Background

In 2005 Congress passed the Energy Policy Act of 2005 (EPAct 2005), which authorized FERC to

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1 Greg Leonard is a Vice President at Cornerstone Research in Washington DC. The views expressed in this article are solely the views of the author.
“facilitate price transparency in markets for the sale or transportation of physical natural gas in interstate commerce.”

Further, 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.”

After an extensive rulemaking process, FERC issued Order 704A, which governs reporting requirements. In the summer of 2009, FERC received the first round of Form 552 submissions (552 submissions) covering the 2008 natural gas transactions by more than eleven respondents. On June 17, 2010, FERC issued Order 704C which provides for slightly revised reporting requirements. Form 552 submissions covering 2009 natural gas transactions were due by September 30, 2010. Through October 2010, 693 firms responded with 552 submissions.

Data Submitted to FERC

Order 704C requires natural gas market participants with purchases or sales of physical “reportable” natural gas of at least 2,200,000 mmBtu in the prior calendar year to report their natural gas market activities for that prior calendar year 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.” Order 704A further clarifies that the latter category includes “bilateral, arms-length, fixed-price physical natural gas transactions between nonaffiliated companies at all trading locations.”

Significantly, Order 704C excludes a number of transaction types from the submission requirements. Order 704C does not cover 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 bid week, 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 704C excludes affiliate transactions 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-priced referencing next-day indices, fixed-price for next-month delivery, index-priced referencing next-month indices, transactions with price triggers, and physical basis transactions. In addition to volumes of physical transactions, market participants are

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4 Transparency Provisions of Section 23 of the Natural Gas Act, Order No. 704-C, 75 Fed. Reg. 35632 (June 17, 2010) (to be codified at 18 C.F.R. pt. 260). Among other minor revisions, Order 704C 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 Form 552. For 2008, more than 300 companies filed a Form 552 and did not report any transaction volume. For 2009, only sixteen companies filed a Form 552 without reporting transaction volumes.
5 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.
7 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
required to state whether or not they report transaction information to price index publishers.

**Results**

*Market Size and Types of Participants*

The data contained on the 552 submissions provide a unique view into the size and nature of a large portion of the physical natural gas market. First, these forms quantify the number and volumes of market participants that report to price index publishers. Second, the data give 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 markets, especially at the trading and wholesale levels.

Further, to allow investigation of the activities of different types of market participants, Cornerstone Research has combined the 552 submissions with its own proprietary research that classifies the respondent companies by industry segments. These industry segments are Producer, Pipeline or Storage Operator, Electric Generator, Industrial or Commercial Consumer, Chemical Consumer, Trader or Wholesale Marketer, Local Distribution Company (LDC),

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**Figure 1**

*Breakdown of Form 552 Transaction Volume by Company Category 2009*

![Pie chart showing transaction volume by company category.]

Note: Municipality Category is not shown. It accounts for 0.4% of transaction volume.

Source: FERC Form 552 Submissions as of November 10, 2010.

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8 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.
Integrated-Downstream, and Integrated-Upstream. The latter two categories capture companies that span multiple industry segments.

The 552 submissions show physical trading volumes far in excess of annual U.S. natural gas consumption. The types of transactions captured by the 552 submissions total 114,502 million mmBtus transacted by 693 companies. To the extent that both parties to a transaction submit a Form 552, the 552 submissions will include double the volume of that transaction. For example, a trade for 10,000 mmBtus between two companies each submitting a Form 552 will add 20,000 mmBtus to the total volume. Thus, these 552 volumes represent a minimum of 57,990 million mmBtus of trading volume.

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Figure 2

Purchase and Sale Volume by Category
2009

Source: FERC Form 552 Submissions as of 11/10/10

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9 The categorization process is necessarily judgmental and was based on company web sites and financial filings. Companies were categorized as closely as possible to their most significant natural gas market activity.

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

11 There were 675 companies that submitted a Form 552 with non-zero volumes.

12 Since some transactions involve market participants that do not submit a Form 552, the actual volume of transactions is higher than represented by the Form 552 data.
In comparison, the Energy Information Administration reports that 21,531 million mmBtus of gas were delivered to consumers in 2009. This suggests that each molecule of natural gas passes through almost three transactions from production to consumption.

Not surprisingly, as shown in Figure 1, the large integrated companies and the Trader or Wholesale Marketers account for a significant portion of the physical natural gas volume. These companies account for 73 percent of the Form 552 volume. In contrast, Industrial or Commercial Consumers and Chemical Consumers account for only 2.5 percent of the Form 552 volume.

Figure 2 shows the breakdown of Form 552 transaction-type purchases and sales by company category. Not surprisingly, the Integrated-Upstream companies and the Producers sell more than they purchase. At the other end of the industry, LDCs, Electric Generators, Industrial or Commercial Consumers, and Chemical Consumers consume significantly more than they sell. Consistent with their business model, Trader or Wholesale Marketers purchase and sell approximately equal amounts.

As shown in Table 1, the top twenty companies ranked by total volume account for transactions totaling 54,450 million mmBtus out of 114,502 million mmBtus contained on all 552 submissions. Thus, the top twenty companies account for 48 percent of the physical natural gas volumes of the 552 submissions. As in 2008, BP

Table 1

Top 20 Companies by Total Volume
(Sorted by Total Volume; Volume in Tbtu)

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Category</th>
<th>Any Affiliates Report to Index Publishers</th>
<th>Total Buy Volume</th>
<th>Total Sale Volume</th>
<th>Net Volume</th>
<th>Total Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP Energy Company</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>4,353</td>
<td>4,930</td>
<td>-577</td>
<td>9,282</td>
</tr>
<tr>
<td>ConocoPhillips Company</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>2,486</td>
<td>3,140</td>
<td>-654</td>
<td>5,626</td>
</tr>
<tr>
<td>Shell Energy North America (US), L.P.</td>
<td>Trader/Marketer</td>
<td>Y</td>
<td>2,660</td>
<td>2,800</td>
<td>-140</td>
<td>5,460</td>
</tr>
<tr>
<td>Macquarie Energy LLC</td>
<td>Trader/Marketer</td>
<td>Y</td>
<td>1,877</td>
<td>1,821</td>
<td>56</td>
<td>3,698</td>
</tr>
<tr>
<td>Chevron U.S.A. Inc.</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>1,560</td>
<td>1,747</td>
<td>-187</td>
<td>3,307</td>
</tr>
<tr>
<td>Total Gas &amp; Power North America, Inc.</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>1,600</td>
<td>1,477</td>
<td>123</td>
<td>3,077</td>
</tr>
<tr>
<td>Louis Dreyfus Energy Services L.P.</td>
<td>Integrated Upstream</td>
<td>N</td>
<td>1,376</td>
<td>1,343</td>
<td>33</td>
<td>2,719</td>
</tr>
<tr>
<td>Tenaska Marketing Ventures</td>
<td>Trader/Marketer</td>
<td>Y</td>
<td>1,376</td>
<td>1,301</td>
<td>75</td>
<td>2,677</td>
</tr>
<tr>
<td>Occidental Energy Marketing, Inc.</td>
<td>Trader/Marketer</td>
<td>N</td>
<td>1,002</td>
<td>1,080</td>
<td>-78</td>
<td>2,082</td>
</tr>
<tr>
<td>EDF Trading North America, LLC</td>
<td>Trader/Marketer</td>
<td>N</td>
<td>1,041</td>
<td>983</td>
<td>58</td>
<td>2,024</td>
</tr>
<tr>
<td>BG Energy Merchants, LLC</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>863</td>
<td>1,046</td>
<td>-183</td>
<td>1,909</td>
</tr>
<tr>
<td>ONEOK Energy Services Company, L.P.</td>
<td>Trader/Marketer</td>
<td>N</td>
<td>970</td>
<td>912</td>
<td>58</td>
<td>1,882</td>
</tr>
<tr>
<td>AGL Resources Inc.</td>
<td>Integrated Downstream</td>
<td>N</td>
<td>780</td>
<td>683</td>
<td>97</td>
<td>1,463</td>
</tr>
<tr>
<td>J.P. Morgan Ventures Energy Corporation</td>
<td>Trader/Marketer</td>
<td>N</td>
<td>768</td>
<td>671</td>
<td>97</td>
<td>1,438</td>
</tr>
<tr>
<td>Sempra Energy Trading LLC</td>
<td>Trader/Marketer</td>
<td>Y</td>
<td>789</td>
<td>652</td>
<td>117</td>
<td>1,421</td>
</tr>
<tr>
<td>CenterPoint Energy, Inc.</td>
<td>Integrated Downstream</td>
<td>N</td>
<td>810</td>
<td>537</td>
<td>273</td>
<td>1,347</td>
</tr>
<tr>
<td>Enterprise Products Partners L.P.</td>
<td>Transporter</td>
<td>N</td>
<td>716</td>
<td>622</td>
<td>96</td>
<td>1,340</td>
</tr>
<tr>
<td>Hess Corporation</td>
<td>Integrated Upstream</td>
<td>Y</td>
<td>1,029</td>
<td>307</td>
<td>722</td>
<td>1,336</td>
</tr>
<tr>
<td>Anadarko Petroleum Corporation</td>
<td>Producer</td>
<td>Y</td>
<td>182</td>
<td>1,057</td>
<td>-875</td>
<td>1,239</td>
</tr>
<tr>
<td>Iberdrola Renewables, Inc.</td>
<td>Trader/Marketer</td>
<td>Y</td>
<td>536</td>
<td>588</td>
<td>-52</td>
<td>1,124</td>
</tr>
</tbody>
</table>

Top 20 Companies by Total Volume 26,756 27,694 -938 54,450
All Other Companies 31,233 28,818 2,415 60,052
Total for All Companies 57,990 56,512 1,478 114,502

13 Energy Information Administration, U.S. Dep’t of Energy, Natural Gas Annual 2009 (December 2010). Converted to mmBtus from million cubic feet.
Energy Company (9,282 million mmBtus) had the largest physical volumes by a significant margin over the second largest company, ConocoPhillips Company (5,626 million mmBtus). Thus, the Form 552 data show that the U.S. natural gas market is an unconcentrated industry, with a large number of diverse participants.

Transaction Types

The Form 552 data show that the volume of next-month gas (54 percent) is significantly larger than the volume of next-day gas (38 percent) among the types of transactions covered by Form 552.

Index-priced transactions constitute the majority of transactions covered by Form 552. As shown in Figure 3, 71 percent of the Form 552 transaction prices depend on an index. The monthly index plays a role in determining the price in almost half (48 percent) of the Form 552 transactions. Fixed-price, next-month transactions and physical basis transactions each account for only around 6 to 7 percent of the transactions.

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**Figure 3**

**Breakdown of Form 552 Transaction Volume by Transaction Type**

**2009**

<table>
<thead>
<tr>
<th>Transaction Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Agreements</td>
<td>1%</td>
</tr>
<tr>
<td>Fixed Priced Next Day</td>
<td>16%</td>
</tr>
<tr>
<td>Fixed Price Next Month</td>
<td>6%</td>
</tr>
<tr>
<td>Index Next Day</td>
<td>22%</td>
</tr>
<tr>
<td>Physical Basis</td>
<td>7%</td>
</tr>
<tr>
<td>Index Next Month</td>
<td>48%</td>
</tr>
</tbody>
</table>

Source: FERC Form 552 Submissions as of November 10, 2010.

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14 For the purposes of this discussion, trigger transaction are considered to be dependent on an index since 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-priced 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 price. Thus, the percentage of transactions with prices at settlement determined by an index price may be significantly lower than these statistics suggest.
covered by Form 552. Since they are primarily targeted at Industrial or Commercial Consumers, transactions with price triggers account for around 1 percent of the Form 552 transaction volume.

While on the surface these results suggest that the index-priced transactions account for the majority of natural gas transactions, it is important to reiterate 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-priced transactions, the proportion of the entire market made up of index-priced transactions is lower than 71 percent. Without additional data, however, it is impossible to quantify how much lower.

Volume and Depth of Reporting to Price Index Publishers

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

…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.¹⁵

Figure 4
Reportable Transaction Volume vs. Index-Priced Transaction Volume

2009

Source: FERC Form 552 Submissions as of November 10, 2010.

This “volumetric relationship” is now clear. The volume of reporting-eligible, fixed-priced transactions at companies that report transaction information to the price index publishers is approximately one-quarter of the transactions in the Form 552 data that depend on index prices. These volumes, shown in Figure 4, are influenced not only by the volume of index-price transactions but also by the number of companies that report transaction information to the index publishers.

The majority of the companies that submitted a Form 552 did not report to the index publishers at all. Of the 693 Form 552 respondents who submitted transactions volumes, only 133 indicated that they have at least one affiliate that reports transaction information to the price index publishers. Figure 5 shows that these reporting companies, however, account for the majority (58 percent) of the reporting-eligible, fixed-price volume. The remaining 42 percent of the fixed-price transaction volume is conducted by companies that do not report to the price index publishers.

Large integrated companies and Trader or Wholesale Marketers comprise the vast majority of companies reporting to price index publishers. As shown in Figure 6, among the companies that report transaction information to the price index publishers, approximately 88 percent of the reportable volume occurs at the large integrated companies or at the Trader or Wholesale Marketers. Further, the top twenty reporting companies make up 64 percent of the reporting-eligible volume at reporting companies.

![Figure 5](image_url)

**Figure 5**

**Reportable Transaction Volume for Reporting vs. Nonreporting Companies 2009**

Note: Reporting companies are those that indicate at least one of its affiliates report to price index publishers. Reportable transaction volume is the sum of fixed-price, next-month purchases and sales, fixed-price, next-day purchases and sales, and physical basis transaction purchases and sales reported on Form 552. Companies that did not enter information regarding their price reporting are assumed to not report.

Source: FERC Form 552 Submissions as of November 10, 2010.
Figure 6  Breakdown of Reportable Transaction Volume by Company Type for Reporting Companies 2009

Note: Reporting companies are those that indicate at least one of its affiliates report to price index publishers. Reportable transaction volume is the sum of fixed-price, next-month purchases and sales, fixed-price, next-day purchases and sales, and physical basis transaction purchases and sales reported on Form 552. Companies that did not enter information regarding their price reporting are assumed to not report. Industrial or Commercial Consumer, Municipality, and Chemical Consumer companies report less than 0.02 percent of reportable volume and are not included.

Source: FERC Form 552 Submissions as of November 10, 2010.

Figure 7  Percentage of Total Transaction Volume Transacted by Reporting Companies by Company Category 2009

Note: Reporting companies are those that indicate at least one of its affiliates report to price index publishers. Chemical Consumers reported 0.27% of total volume for reporting companies. No Municipalities indicated that they report to price index publishers.

Source: FERC Form 552 Submissions as of November 10, 2010.
Only fourteen Industrial or Commercial Consumers, two Pipeline or Storage Operators, and one Chemical Consumer indicated that they report to the price index publishers. As shown in Figure 7, there is significant disparity in the proportion of transaction volume reported by the various industry segments.

The disparity across industry segments of reporting transaction information to the price index publishers might 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. These data, however, suggest that, at least on an aggregate level, this is not the case. Rather, as shown in Figure 8, the volume of reportable transactions from companies that report to the price index publishers comes in roughly equal amounts from net sellers and net buyers of index-priced natural gas.

Looking ahead

Since the Form 552 submissions covering transactions in 2010 are due May 1, 2011, we will shortly have a view into the continued evolution of the U.S. natural gas trading markets. As a preview, the volume of North American natural gas traded on the IntercontinentalExchange increased 26% from 2009 to 2010. The 2010 552 submissions should provide an interesting baseline for evaluating the impacts of the Dodd-Frank financial reform bill.

Figure 8

Breakdown of Reportable Volume by Index Net Buyers and Index Net Sellers

2009

Index Net Seller 55%

Index Net Buyers 45%

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. Index-priced transactions include index-priced, next-month purchases and sales, index-priced, next-day purchases and sales, and trigger agreements. Index net buyers are identified as companies that purchase more index-price transactions than they sell. Index neutral buyers / sellers account for 0.1% of reportable volume and are excluded.

Source: FERC Form 552 Submissions as of November 10, 2010.

16 IntercontinentalExchange, Annual Report (Form 10-K), at 74 (Feb. 9, 2011).