

US NATURAL GAS: A VIEW OF THE PAST, A VISION OF A FUTURE

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Bob Dylan's song "All Along the Watchtower" states:

"There must be some way out of here," said the joker to the thief

"There's too much confusion, I can't get no relief"

CONCLUSION AND OVERVIEW

Is the major bull trend for NYMEX natural gas (nearest futures continuation) that began in early March 2016 finished? Probably not, though it is a difficult call. In any event, assuming normal weather and moderate United States economic growth, it nevertheless will be very hard for the NYMEX front month price to exceed 12/28/16's high bordering 4.00 by much (if at all) anytime soon.

The probable longer run bullish US natural gas inventory situation suggests the likelihood of eventual further moderate rises in NYMEX natural gas prices (nearest futures continuation). The days coverage perspective underlines this, particularly in light of anticipated stockpiles at end October 2017 and thereafter. A comparison of the recent bull move that started in March 2016 to the prior major bull move inaugurated on 4/19/12 at 1.902 offers insight into past and potential trends.

Marketplace history does not necessarily repeat itself, whether entirely, partly, or at all. But all else equal, since 2016's natural gas rally was less than average in time and (percentage) distance terms, this also indicates the move that commenced in March 2016 probably has more time and price to run. NYMEX natural gas (nearest futures continuation) rallied about 148 percent in about ten months from its 3/4/16 bottom at 1.611 to its 12/28/16 high at 3.994. The distance and duration for eleven major bull moves in NYMEX natural gas (nearest futures continuation) since trading began in 1990 is about 246 percent and twelve months and three weeks.

Some bull voyages took a very long time to complete. For example, the April 2012 to February 2014 advance lasted about twenty-two months and a week. September 2003-December 2005's flight took 26 months and three weeks; the August 1998 to December 2000 adventure was 28 months.

However, the move above December 2016's height may not be substantial and could take at least a few months to occur. Why?

First, US natural gas inventories in days coverage terms at end March 2017, though they likely will slip slightly below those at end March 2013, nevertheless will hover around end March long run averages.

A few major (over 120 percent) bull charges were shorter in extent or briefer in time than 2016's leap, so an assertion that the 2016 rally ended in December 2016 is not "unreasonable". Besides, the NYMEX natural gas 26 year trading history is relatively short; compare wheat or the Dow Jones Industrial Average. In any case, one big bull move voyaged up around 123.5 percent, another 129.2pc. For the time horizon parameter, three major bull moves from 1990 to the present

were completed quickly. One finished in about two months, another in about three and a half months, and a third in four months. In this context, and although marketplace history is not marketplace destiny, several major peaks in NYMEX natural gas occurred in calendar December, with another one in early January. NYMEX natural gas often attains its major peaks and valleys around the day of the actual nearest futures contract expiration.

The CFTC's Commitments of Traders reveals a massive net noncommercial long position in the natural gas complex. An elevated net noncommercial position in natural gas has often (but not always) been associated with key marketplace trend changes. The current net noncommercial long position in the petroleum complex likewise is extremely large from the historical standpoint. Both natural gas and petroleum currently are vulnerable to liquidation by the net noncommercial long fraternity, which would tend to pressure prices.

Apparent convergence/divergence (lead/lag) relationships between marketplaces can change, sometimes dramatically. Yet although natural gas of course has its own supply/demand picture, its price trends are not always divorced from those of the petroleum complex, or even from those of commodities "in general", the broad real-trade weighted dollar, benchmark American interest rates (such as Federal Funds or the 10 year US government note), or American (and emerging marketplace) stocks. Witness the patterns since around first quarter 2016.

See "Gold and Goldilocks: 2017 Marketplaces" (1/10/17), "Back to the Future: the Marketplace Time Machine" (12/13/16), and other essays. In the current economic (and political) environment, reviewing NYMEX natural gas trends in the context of various other financial marketplaces warns of a natural gas price top. The Federal Reserve suggests it will continue to raise policy rates; the US Treasury 10 year note yield established a major bottom in July 2016 at 1.32 percent. After an extensive bull move from July 2011's 80.3 major bottom, the broad real trade-weighted dollar probably will fall (high to date in the bull climb is December 2016's 102.8, a 28.0 pc appreciation). Many key US dollar peaks have occurred in calendar first quarter. The recent rally in gold from its \$1124 low on 12/15/16 is relevant for trends in the dollar and related arenas.

For predicting NYMEX natural gas price trends, monitor those in the petroleum complex. NYMEX crude oil's 2/11/16 trough at \$26.05 (nearest futures continuation) occurred shortly before the NYMEX natural gas bottom on 3/4/16 (and alongside the S+P 500's 2/11/16 trough at 1810). NYMEX crude oil made important interim lows in its rally, \$39.19 on 8/3/16 and \$42.20 on 11/14/16; critical interim lows in NYMEX natural gas occurred near in time to these. Remember 8/12/16's 2.523 and 11/9/16's 2.546. NYMEX crude oil's recent high occurred 1/3/17 at \$55.24, adjacent in time to 12/28/16's 3.994 natural gas elevation.

For US natural gas "in general", analysis of and comparisons between past and current natural gas price marketplaces can venture beyond the NYMEX nearest futures continuation contract. Wizards can study actual NYMEX contract months (October 2017 or March 2018) and intramarket spreads (such as March 2017 versus April 2017). Coaches can analyze price trends at other key gas delivery locations, as well as intermarket (basis) spreads involving such pricing points. Generals can compare natural gas price movements with those of other commodities (such as coal, electricity, and crude oil) and financial territories.

"High" natural gas prices probably boost production and slice demand a bit (fuel switching from gas to coal).

**UNITED STATES NATURAL GAS INVENTORIES:
BUILD SEASONS 2012 and 2016 AND THEIR AFTERMATH**

In the ensuing analysis for US working natural gas inventories, historic bcf levels are from the Energy Information Administration's ("EIA") Short-Term Energy Outlook, ("STEO", Table 5a, 1/10/17, next release 2/7/17). For January through March 2017 and subsequent months, bcf predictions also come from the January 2017 STEO. Calendar year US natural gas consumption statistics are from the EIA.

Detailed historical analysis of working natural gas inventories enables eager audiences to ascertain the degree of tightness in America's overall supply/demand situation. Arithmetical (bcf) levels are important, but study and illustration from the days coverage perspective (inventories divided by consumption) generally offers greater insight and foresight. After all, supply and demand levels in commodity playgrounds can evolve over time, sometimes significantly.

Also, what given marketplace players view as "average" (sufficient, normal, typical, or reasonable) in days coverage terms can shift. So can opinions regarding what is "high" or "low" (abnormal, unusual, unreasonable).

The following discussion calculates days coverage for a given end calendar month by dividing that month's arithmetic bcf total by a full year calendar daily consumption average. Thus October 2016's end month bcf amount is divided by the average consumption over all twelve months of calendar 2016. However, for end January, February, and March calendar months, the consumption denominator is the average daily demand for the entire preceding calendar year (twelve months, January through December). For example, to ascertain days coverage represented by the anticipated (EIA forecast) end March 2017 bcf level, divide the end March inventory total by average demand over the actual January through December 2016 calendar year. An actual January (or February or March) calendar month such as January 2013 belongs to the winter draw season that began at the end of the prior October (winter 2012-13).

The EIA's natural gas supply/demand predictions obviously partly derive from its price forecast. The January 2017 STEO (Table 2) forecasts calendar year 2017 spot Henry Hub prices will average 3.55 per mmbtu, with 2018's at 3.73/mmbtu (calendar 2016 was 2.51).

The winters of 2011-12 and 2015-16 not only ended with massive supplies. They also completed long-running major bear trends. In commodity realms, all else equal, and absent revolutionary developments on the supply or demand side, there is some tendency for monumental oversupply (massive inventories) accompanied by sustained depressed prices eventually to be reversed by falling production, increasing demand, or both.

A crucial similarity between the calendar 2012 and calendar 2016 build seasons was the substantially diminishing US natural gas oversupply over the course of build season. Seasonal builds were much less than normal. This encouraged and sustained noteworthy bull moves.

Both the March 2012 and March 2016 inventories dwarfed average levels. The long run (1990-2016) end month days coverage for end March is 22.3 days. The medium run (2006-16) end March days cover average is 24.9 days, 2.6 days greater than 1990-2016's.

The long run (1990-2016) average days coverage inventory for end October is 53.6 days. The medium run (2006-16) days coverage for end October is 55.3 days, 1.7 days above 1990-2016's span. The peak days coverage was 1990's huge 66.0 days, with 2009's 60.7 days the runner-up.

The average winter natural gas draw from 1990 to 2016 is about 31.3 days (1965bcf), that for 2006-16 is 30.5 days (2060bcf).

From 1990-2016, the average days coverage increase from end March to end October is about 30.9 days. For about the past decade of build seasons (2006-16), the average days coverage increase from end March to end October is about 30.0 days. The average of the two spans is 30.5 days.

Natural gas consumption climbed from about 59.4bcf/day for full calendar year 2006 to 69.8bcf/d in 2012 to 75.1bcf/d in 2016. The EIA predicts calendar 2017 demand at nearly 75.4bcf/d, with a two percent rise to 2018's 76.9bcf/d.

Calendar March 2016's 2496bcf inventory at the end of winter 2015-16 slightly surpassed 2012's 2473bcf, thus establishing a new bcf record for the 1990-2016 era. However, end March 2016's 33.4 days coverage resides in second place relative to calendar March 2012's 36.9 days. In days coverage terms, end March 2016's 33.4 days soared over the 1990-present average for end March by almost eleven days, and that of 2006-present by 8.5 days.

Let's review the inventory patterns for the evolution of the 2012 bull marketplace trend alongside those of the 2016 advance, including hypothetical inventory for calendar 2017 and 2018 based on the EIA's bcf predictions.

	Calendar 2012 Build Season		Calendar 2016 Build Season	
	<u>Inventory (BCF)</u>	<u>Days Coverage</u>	<u>Inventory (BCF)</u>	<u>Days Coverage</u>
March	2473	36.9	2496	33.4
October	3929	56.3	4025	53.6

Concentrating on the days coverage dimension, calendar 2012 build season dramatically slashed its oversupply. Calendar 2012 build season days coverage rose only 19.4 days (1456bcf), far less than the roughly 30.5 days average seasonal expansion. End October 2012's 56.3 days coverage surpassed the long run end October (1990-2016) 53.6 day average by only 2.7 days, the medium run (2006-16) 55.3 day average by only a day.

The calendar 2016 build season likewise "fixed" the severe oversupply problem from the days coverage dimension. Days coverage ascended only 20.2 days (1529bcf) from end March to end October 2016, around ten days less than average. End October 2016's 53.6 days of coverage (4025bcf divided by full calendar year 2016 average daily consumption of about 75.1bcf/day) matched the long run average and was 1.7 days beneath 2006-16's average. From the days coverage vantage point, end October 2016 days coverage total (taken "alone" and "all else equal") was neutral to slightly bullish. In any case, build season 2016 ended on a more bullish note than did calendar 2012's.

Numerous intertwining variables will influence the ability of the calendar 2016 bull trend to sustain itself, including the timing and extent of any price climb over the December 2016 high.

Yet looking forward, the US days coverage level and trend matters a great deal. The 2012-2014 pattern underscores this.

Winter 2012-13 Draw Season			Winter 2016-17 Draw Season	
	<u>Inventory (BCF)</u>	<u>Days Coverage</u>	<u>Inventory (BCF)</u>	<u>Days Coverage</u>
November	3799	54.4	3983	53.1
December	3413	48.9	3326	44.3
January	2699	38.7	2527	33.7
February	2099	30.1	1942	25.9
March	1720	24.6	1745	23.2

The 2012-13 draw was 2209bcf (3929bcf less 1720bcf), or approximately 31.7 days (56.3 less 24.6 days). The 2016-17 draw based on EIA estimates will be 2279bcf, or 30.4 days (53.6 less 23.2 days). Both of these winter season draws are around “normal” levels; recall the average days coverage draws for 1990-2016 of 31.3 days and 2006-16 of 30.5 days.

End March 2017 in days coverage terms (based upon the January 2017 STEO’s arithmetic bcf and consumption estimates) will be slightly more bullish than end March 2013 because it is 1.4 days less. However, in days coverage terms, the 23.2 day end March 2017 level (1745bcf divided by full calendar year 2016 consumption of 75.1bcf/d) is about average in relation to the 1990-2016 span’s 22.3 days and 2006-16’s 24.9 days. Thus all else equal, the end March 2017 inventory level is neutral from the price perspective.

The climb from 4/19/12’s major bottom at 1.902 to 5/1/13’s interim top at 4.444 was 133.6 percent and about 12 and a half months. The 147.9 percent move from the 3/4/16 2016 trough to the 12/28/16’s 3.994 height exceeds that of the April 2012-May 2013 advance. However, the time spent in the rally since the March 2016 low, nine months and three weeks, is less than that of the April 2012 to May 2013 stage of the bull move that ended in February 2014. As end March 2017 inventories likely will be around average, this comparison argues that it will be difficult for at least the near term for the March 2016 major bull move to advance above its December 2016 high.

Charles Dickens remarked in “A Christmas Carol”: “it is always the person not in the predicament who knows what ought to have been done in it, and would unquestionably have done it too.”

End Build Season Calendar 2013			End Build Season Calendar 2017	
	<u>Inventory (BCF)</u>	<u>Days Coverage</u>	<u>Inventory (BCF)</u>	<u>Days Coverage</u>
October	3817	53.3	3667	48.7

Relative to calendar year 2017 consumption of about 75.4bcf/day, days coverage at the close of the 2017 build season will be roughly 48.7 days (3667bcf divided by 75.4bcf/day). This is bullish. It is almost five days beneath the 53.6 day end October 1990-2016 average, and 6.6 days under 2006-16’s 55.3 day average.

Everyone knows that much can happen related to the natural gas playground to significantly alter this end October 2017 inventory picture between now and the end of the 2017 build season. Weather for the balance of winter 2016-17 and thereafter of course is one critical factor.

However, the October 2017 natural gas days coverage picture of 48.7 days not only appears more bullish than October 2016's 53.6 days. It also is more bullish than end October 2013's 53.3 days.

Recall that natural gas (nearest futures continuation) established an interim high on 11/23/12 at 3.933. Yet after dropping to 3.050 on 1/2/13 (3.125 on 2/15/13), it resumed its advance, attaining an important interim top on 5/1/13 at 4.444.

Fundamental considerations related to days coverage and price risk should be interpreted alongside the potential for inventory containment problems (supply relative to arithmetic storage capacity availability).

The EIA estimates the demonstrated maximum working gas storage volume for the lower 48 states. It defines this as the sum of the highest storage inventory levels of working gas observed in each storage reservoir over the previous five year period. Demonstrated underground maximum working gas capacity in the lower 48 states as of November 2015 was 4343bcf ("Underground Natural Gas Working Storage Capacity"; 3/16/16, next release February 2017). This crawled up a meager seven bcf from November 2014's 4336bcf.

Will containment problems develop if end build season 2017 supplies at end October are around the 3667bcf estimate? Unlikely. At 3667/4343bcf, this equals 84.4 percent of capacity, a high but not dangerous total.

	Winter 2013-14 Draw Season		Winter 2017-18 Draw Season	
	<u>Inventory (BCF)</u>	<u>Days Coverage</u>	<u>Inventory (BCF)</u>	<u>Days Coverage</u>
March	857	12.0	1559	20.7

The hypothetical end March 2018 working gas inventory of 1559bcf will equal 20.7 days coverage, down from end March 2017's 1745bcf and 23.2 days coverage. As this end March 2018 days coverage will stand notably but not dramatically below average levels for the 1990-2016 (22.3 days) and 2006-16 (24.9 days) periods, it is moderately bullish for natural gas prices.

However, trends in petroleum and other financial marketplaces (base and precious metals, the US dollar, interest rates, the S+P 500 and emerging marketplace stocks) and political developments will be relevant for levels and trends in US natural gas prices.

In 2013, prices climbed from 8/8/13's 3.129 up to 12/23/13's 4.532. However, it required an enormous drawdown in natural gas inventories to produce the explosive price spike up to 2/24/14's 6.493 (from 1/10/14's 3.953 low). Winter 2013-14 displayed a record days coverage draw of 41.3 days. Compare not only the average winter season draws, but also contrast the all-time low draws of 19.4 days (1455bcf) in winter 2015-16 and 2011-12's 19.8 (1331bcf).

Days coverage of 20.7 days at end March 2018 hovers far above March 2014's 12.0 days, so the conjectured end March 2018 level probably would not generate a price flight similar to that of winter 2013-14. The record end March inventory troughs are 11.6 days cover (742bcf in winter 2000-01; 730bcf in winter 2002-03). Breaking above 4.45/4.55 resistance would be difficult. Nevertheless, as these end March 2018 inventories are below normal, they (their possible occurrence) will help (all else equal) to maintain the long run bullish trend that began in March 2016. The potential end October 2018 inventories bolster this long run bullish scenario.

End Build Season Calendar 2014			End Build Season Calendar 2018	
	<u>Inventory (BCF)</u>	<u>Days Coverage</u>	<u>Inventory (BCF)</u>	<u>Days Coverage</u>
October	3587	49.2	3518	45.8

End October 2018's 45.8 days coverage (3518bcf divided by 2018 demand of just under 76.9bcf/day) is very bullish for natural gas prices. It stands 7.8 days beneath 1990-2016's 53.6 day October average, and 9.5 days under the medium term (2006-16) 55.3 day average.

Moreover, the (admittedly conjectural) 45.8 days coverage estimate neighbors October 2000's 42.9 days, the all-time end October days coverage low. In 2000, NYMEX natural gas peaked on 12/27/00 at 10.10. Recall also October 1996's 45.5 days coverage depth. Nearest futures continuation peaked on 12/20/96 at 4.60.

In addition, the October 2018 days coverage thus continues a bullish days coverage trend tracing back to build season 2016. Recall end October 2016's 53.6 days supply. October 2018 coverage drops clearly beneath October 2017's (potential) 48.7 days (as well as October 2014's 49.2 days).

In calendar 2014, NYMEX natural gas, after its 2/24/14 summit, collapsed from subsequent interim highs on 6/16/14 at 4.886 and 11/10/14 at 4.544. Recall NYMEX crude oil's crucial drop-off point high on 6/20/14 at \$107.73, close in time to the June 2014 natural gas one.

COMMITMENTS OF TRADERS

The CFTC's Commitments of Traders sometimes is a helpful indicator for predicting significant trend changes and travels in natural gas and other marketplaces. One should interpret Commitments of Traders data with care. Review the benchmark NYMEX and the ICE Henry Hub natural gas contracts (futures and options combined; ICE data converted to NYMEX contract terms) plus the NYMEX European look-alike options contract (all options in futures-equivalent terms). In the natural gas complex, sometimes (but not always) key price tops and bottoms occur alongside notable highs and lows in the net noncommercial position.

February 2014's net noncommercial long position ("NCL") summit for natural gas roughly coincided with 2/24/14's NYMEX natural gas pinnacle at 6.493. The net NCL plateau was 2/18/14's approximately 328,000 contracts, 7.7 percent of total open interest of around 4.3 million contracts. The 8.4pc of the following week was the net NCL percentage record up to that time for the period starting January 2010, when ICE Commitments of Traders data first appeared.

Current net noncommercial length in natural gas likewise is very high. Open interest on 1/17/17 is just over 3.24 million contracts. The net noncommercial position is about 267,000 or about 8.2 percent of total open interest. The current net NCL remains close to the high reached since the March 2016 bull move began, 12/20/16's 283,000 contracts. The 283m net NCL, though very large, is not a record. However, 4/30/13's net NCL peak of 367m contracts (7.6pc of total open interest) occurred with a total open interest of about 4.8 million contracts, an open interest much larger than current levels. The February 2014 total open interest likewise was higher than recent totals. The high percentage of total open interest for the recent natural gas bull move is 1/3/17's 9.0 percent, and this percentage also is a record for the period back to January 2010.

Note the timing of 12/20/16's elevated net NCL position and 1/3/17's high in the net percentage of total open interest in conjunction with 12/28/16's 3.994 high. The recent high net NCL and net

percentage of total open interest warn of (tend to confirm a price top in) NYMEX natural gas prices (nearest futures continuation).

The petroleum complex also manifests a massive noncommercial long position. In this context, keep 1/3/17's \$55.24 NYMEX crude oil plateau in sight. For the NYMEX petroleum complex (benchmark crude oil, heating oil/diesel, and gasoline/RBOB contracts combined; futures and options combined), the 1/17/17 week achieved all-time highs (going back to March 1995) in the gross noncommercial long position (about 884,000 contracts) and the net noncommercial long position (nearly 648,000 contracts). The 1/17/17 net noncommercial long position is almost 17.4 percent of total open interest. This very lofty percentage stands close to the 2/25/14's towering and record 18.8pc elevation.

NYMEX NATURAL GAS: KEEPING AN EYE ON SEASONAL HIGHS

One should not be dogmatic about calendar month timing regarding major trend shifts, though history can offer guidance. Chronicles of calendar month timing of key marketplace trend changes attract some visionaries. The high in the NYMEX natural gas bull move that began 3/4/16 at 1.611 is 12/28/16's 3.994. What does history reveal regarding prior appearances of major highs in the NYMEX natural gas nearest futures continuation contract during calendar December and the next few calendar months?

Price peaks have occurred several times from mid-December to early January. February also shows a couple of pinnacles.

**December- major tops 12/21/95 (at 3.72), 12/20/96 (4.60), 12/27/00 (10.10), 12/13/05 (15.78; all-time high). Calendar December has had no major bottoms.

**January- Major high 1/7/10 (6.108). An important interim top at 7.63 occurred 1/9/04.

**February- crucial summits occurred 2/25/03 (11.90), and 2/24/14 (6.493).

**March- No noteworthy highs. However, a top around March 2017 would represent a one year diagonal bull move from 3/4/16's major bottom. Also, recall that an average major bull move in NYMEX natural gas lasts about twelve months and three weeks.

SOME PRICE RESISTANCE AND SUPPORT POINTERS

The following NYMEX natural gas resistance and support levels are for the nearest futures continuation contract.

Price gaps (especially unfilled ones) often represent significant resistance and support levels to marketplace clairvoyants. A large resistance gap hovers between 12/30/16's 3.690 low and 1/3/17's 3.568 high. A ten percent tumble from 12/28/16's 3.994 equals 3.595.

December 2016's high fell just short of a major unfilled gap from over two years ago. Keep an eye on the space between 11/28/14's 4.075 low and 12/1/14's 4.041 high. A 150 percent rally from the March 2016 low gives 4.028. An important interim high in the 2012 bull ascent, 3.933

on 11/23/12, occurred fairly close in price and time of year to the December 2016 high. The spike up to 6.493 on 2/24/14 occurred from a height close to 4.00, 1/10/14's 3.953.

Above those levels, monitor around 4.45 (interim high 5/1/13) to 4.55 (4.532 minor top on 12/23/13; a notable drop off point 4.544 on 11/10/14 during the bear move commencing with the February 2014 peak).

Around 3.05 to 3.20 is an important support range. Keep in mind the potential parallels between the 2012 and 2016 bull marches. The price dips in 2013 carried down only to 3.050 (1/2/13), 3.125 (2/15/13), and 3.129 (8/8/13). A twenty percent retreat from 12/28/16's 3.994 is 3.195. From the interim high at 3.933 in the 2012 move on 11/23/12, the price slumped about 22.5pc to 3.050. A 22.5pc fall from 3.994 gives 3.095, about equal to the subsequent low price achieved on 1/9/17. Recall the 3.105 interim high on 5/19/15 and 10/31/16's 3.163 price drop-off elevation. A one hundred percent rally from March 2016's bottom is 3.222.

An important price gap lurks from 2.852 (11/18/16 high) to 2.891(11/21/16 low). In regard to this price range, draw a long uptrend line on the daily continuation chart up from the 3/4/16 bottom through late May troughs and the 11/9/16 minor low at 2.546.

The 2.50 to 2.60 level offers support. In addition to 11/9/16's low, see 8/12/16's interim trough at 2.523 and the interim top (prior to the March 2016 major bottom) at 2.495 on 1/8/16.

For additional natural gas analysis, see "Parallels in US Natural Gas: 2012 and 2016 Build Seasons" (7/4/16), "NYMEX Natural Gas: a History of Bull Trends" (9/5/16), "US Natural Gas: Traveling Forward" (6/13/16), "US Natural Gas Bear Trends and the Commitments of Traders" (4/11/16), and "US Natural Gas: Caught in the Middle" (2/1/16).

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