

“So much trouble in the world...  
The way earthly thin’s are goin’  
Anything can happen”. Bob Marley and the Wailers, “So Much Trouble in the World”

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### **CONCLUSION AND OVERVIEW**

In economics, politics, and other cultural fields, players create a variety of competing perspectives. They select between and arrange a variety of diverse variables to produce their arguments and conclusions. In commodity, currency, interest rate, and stock marketplaces, bulls and bears therefore tell a variety of contending stories. In natural gas as in other marketplace battlegrounds, an array of speakers creates assorted viewpoints fighting to attract attention and persuade eager audiences.

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“Dangerous Times in US Natural Gas” (11/2/15) concluded: “The probable range for the United States natural gas marketplace (NYMEX nearest futures continuation basis) for the next several months is a relatively broad avenue between major support at 1.65/1.90 and significant resistance at 3.10/3.45.” The NYMEX natural gas major bear trend that followed 2/24/14’s major peak at 6.493 smashed through 4/27/15’s 2.443 minor low, 10/27/15’s 1.948 interim low, and the last prior major bottom (1.902 on 4/19/12), crashing to 1.684 on 12/18/15. Assuming normal weather for the balance of winter 2015-16 and spring/summer 2016, this range probably will persist for the next several months as well.

The high since December 2015’s low is 1/8/16’s 2.495. What would enable US natural gas prices (nearest futures) to sustain travels over 3.00? It probably will require significantly colder temperatures for the balance of winter, a blazing spring and summer, or (and especially) noteworthy cuts in natural gas production. Stronger than expected US (and global) economic growth would help rally natural gas prices. A major bull move in commodities “in general” (and especially in the petroleum complex) and a significant reversal of the major bull move in the broad real trade-weighted US dollar to some extent would assist a bull move in natural gas.

However, a somewhat significant containment risk (supplies too high relative to available storage capacity), nevertheless exists for US natural gas around the end of calendar 2016 build season. If containment fears grow stronger, and especially if actual problems develop, the 1.65 floor could be broken. In addition, US economic weakness (especially if accompanied by similar slumps around the globe), renewed feebleness in commodities (particularly in the petroleum world), and a continued strong trade-weighted US dollar would help to keep US natural gas prices under pressure.

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Historical analysis indicates the major bear trend in US natural gas from February 2014 to December 2015 voyaged sufficiently far in price and duration terms to conclude that a trend shift from bearish to sideways occurred with December 2015’s low. However, the dramatic February 2014 to October 2015 price tumble is not the greatest or longest on record. So a further descent in NYMEX natural gas would not be unprecedented.

Anticipated end March 2016 gas inventories probably will be high in both arithmetic (bcf) and days coverage terms, a bearish consideration. However, based upon US Energy Information Administration (EIA) anticipated end October 2016's 52.1 days coverage level slides 3.4 days beneath the 2006-15 end October average of 55.5 days and 1.5 days under 1990-2015's 53.6 days.

Nevertheless, modest days coverage levels for October 2016 does not eliminate a containment danger; one should focus closely on arithmetic levels. The days coverage perspective of course does not provide a complete viewpoint on the natural gas inventory situation and related price risks. After all, arithmetic quantities (bcf) of gas must be put in arithmetic storage places. Especially if little new natural gas storage capacity has been (and is being) created, containment problems could emerge around the end of the 2016 inventory build season (roughly around end October 2016). And currently, the containment risks for the end of build season 2016 are not insubstantial; this bearish potentiality weighs on prices.

Yet sustained low natural gas prices could reduce production more than some soothsayers forecast. This would help reduce containment risks. Note the big drop in US natural gas rig counts. A sustained slump back under 2.00 might boost electric power switching from coal to gas.

Everyone knows that much can happen between now and 2017, whether in natural gas or elsewhere. Yet based upon the EIA's bcf prediction, natural gas days coverage at end October 2017 probably will be less than average, a bullish factor. And the EIA's bcf arithmetic inventory forecast for end October 2017 implies there probably will not be a containment problem around the end of build season 2017.

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Natural gas prices often travel substantially independently of both petroleum (and commodities "in general") and so-called "international" or "financial" marketplaces and variables. Trend changes in NYMEX natural gas need not roughly coincide with one in the petroleum complex or commodities in general, or currency, stock, or interest rate playgrounds.

However, especially since mid-to-late June 2014 (NYMEX natural gas nearest futures interim high 6/16/14 at 4.886) and into calendar 2015 (gas interim top 5/19/15 at 3.105), bearish natural gas price movements intertwined with those in the petroleum complex (and commodities in general) and the bull move in the broad real trade-weighted US dollar. Such natural gas retreats to some extent paralleled slumps in emerging marketplace stocks. Note also the timing coincidence between May 2015's natural gas top and the S+P 500's 5/20/15 peak at 2135. In regard to the timing of the S+P 500's May 2015 high, note that the nominal broad trade-weighted dollar (Federal Reserve, H.10, which has daily data) made an interim low at 112.8 on 5/15/15 before appreciating further.

See "The Curtain Rises: 2016 Marketplace Theaters" (1/4/16), "Japanese Yen: Currency Adventures (2007-09 Revisited)" (1/14/16), "Commodities: Captivating Audiences" (10/12/15), and various related essays.

Natural gas prices indeed can trade "on their own". But suppose a sustained bull move finally appeared in commodities "in general" (especially petroleum). Worldwide OECD industry and United States petroleum stocks are very elevated. OPEC next meets 6/2/16. It remains determined to capture market share and induce output cutbacks by high-cost oil producers around the world (including some American and Canadian ones). But is crude oil under 30 dollars a barrel "irrational"? The chairman of Saudi Arabia's state oil company, Aramco said: "The market has

overshot on the low side and it is inevitable that it will start turning up”, predicting higher prices by the end of the year.” (Financial Times, 1/22/16, p20). Will OPEC reach agreement with non-OPEC nations such as Russia to boost prices? Might OPEC hold an emergency meeting?

Key global central banks battle to ensure economic growth, create sufficient inflation (avoid deflation), and reduce unemployment. The European Central Bank recently suggested it might ease its already highly accommodative policies further (ECB Statement and Press Conference, 1/21/16). The Bank of Japan recently (1/29/16) eased its lax monetary policy even further, adopting negative interest rates. Will the Federal Reserve delay additional interest rate increases?

The Fed and its allies probably do not want the S+P 500 and related stock marketplaces to crash under their January 2016 lows. They also probably do not want the dollar’s bull move to extend much (if at all) beyond its January 2016 high. The US dollar’s major bull trend has been long and powerful. From its July 2011 major low around 80.5 to the recent January 2016 high at 101.2, the broad real trade-weighted dollar has climbed 25.8 percent (Federal Reserve, H.10; monthly average). What will happen to natural gas prices if the S+P 500 (and emerging marketplace stocks “in general”) rallied substantially? What if the US broad real trade-weighted dollar weakens notably (even if it remains relatively strong)?

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The recent low in NYMEX natural gas nearest futures, 12/18/15’s 1.684, occurred fairly close in time (about one month) before an assortment of notable lows in other important marketplaces. Maybe natural gas will keep declining from its early January 2016 high. Perhaps one or many of the January 2016 lows in these key marketplaces outside the natural gas landscape will not hold. In any case, players should underline and keep an eye on them. Note their proximity in time to the Saudi Arabian oil comments, ECB talk, Bank of Japan easing, and conjectures the Fed may not raise the Fed Funds rate again soon.

NYMEX crude oil (nearest futures continuation): \$26.19 on 1/20/16

ICE Brent crude oil (nearest futures): \$27.10 on 1/20/16

OPEC crude oil basket: \$22.48 on 1/20/16

Broad Goldman Sachs Commodity Index (GSCI): 268 on 1/20/16. Note January 2016’s GSCI low occurred midway between the calendar month times of the GSCI’s 2008-09 bottom (12/24/08 at 308 and 2/19/09 at 306).

MXEF (MSCI emerging stock markets index, from Morgan Stanley): 687 on 1/21/16

S+P 500: 1812 on 1/20/16

Japanese Nikkei- 16,017 (1/21/16)

Interim low of the US dollar in its cross against the Japanese Yen was around Y116.0 on 1/20/16.

### **US NATURAL GAS INVENTORIES**

“I am stranded, caught in the crossfire”, sings Stevie Ray Vaughan in “Crossfire”

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For the week ending 1/22/16, United States working gas in underground storage (Lower 48 states; EIA) was 3086bcf, up 530bcf and 20.7 percent relative to the prior year week. This year-on-year comparison, however, does not tell the entire story regarding inventory levels and their implications.

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Detailed historical analysis of working natural gas inventories enables audiences to ascertain the degree of tightness in America’s overall supply/demand situation. Although arithmetical (bcf) levels are important, review from the days coverage perspective generally offers greater insight. However, fundamental considerations related to days coverage should be interpreted alongside the potential for inventory containment problems (supply relative to arithmetic storage capacity availability). In the current natural gas marketplace situation, containment risks exist for end build season 2016 and thus are relevant to price levels and trends.

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Nowadays, for calendar October and calendar March (and for all other calendar months), the medium run span from 2006 to the present arguably better displays the normal (average) level of days coverage than the long run 1990-present vista. Why? The average level of natural gas industry stock holding probably shifted upwards beginning around 2006. One likely variable influencing this boost has been alternative investment in commodities, which reduces natural gas free supply. This reduction in free supply probably can have particularly significant consequences in low inventory situations around the finish of the winter draw season. Essays such as “US Natural Gas- a Winter’s Tale” (1/12/14), “US Natural Gas Inventory: the Producing Region Drawing Board” (12/16/13), and “US Natural Gas: Drawing Pictures” (11/25/13) address this topic.

However, the alternative investment situation is not the only relevant development regarding days coverage. The explosive natural gas production boost in recent years, particularly when interpreted in the context of notable gas pipeline expansion/building (over that time span and looking forward), perhaps has pushed the natural gas industry’s desired level of days coverage downward to some extent. Greater output now (or eventually) will have (more) avenues of escape, so why should players keep as much inventory around?

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In the ensuing analysis for US working gas inventories, bcf levels are from the Energy Information Administration (“EIA”). Recent bcf history and estimates come from its Short-Term Energy Outlook, (“STEO”, Table 5a, 1/12/16, next release 2/9/16).

**END WINTER 2015-16 DRAW SEASON: MARCH 2016 NATURAL GAS STOCKS**

In the following discussion regarding and tables for US end calendar March working gas inventories, the indicated “year” for a given March derives from the calendar year of the preceding October. Thus the 2473bcf (in actual calendar March 2012) noted for the 2011 “year” is from the end October 2011 to March 2012 winter draw season. This table extends through winter 2015-16 (includes EIA’s projected March 2016 inventory total).

	<b>Long Run (1990-2015)</b>	<b>Long Run (1990-2015)</b>
	<b>End Calendar Month</b>	<b>End Calendar Month</b>
	<b>Arithmetic (Bcf)</b>	<b>Days Coverage</b>
	<b><u>Average</u></b>	<b><u>Average</u></b>
<b><u>March</u></b>	<b>1370</b>	<b>22.0</b>

	<u>Season Highs (Year)</u>		<u>Season Lows (Year)</u>	
	<u>(Bcf)</u>	<u>Days Cover</u>	<u>(Bcf)</u>	<u>Days Cover</u>
<b><u>March</u></b>	2473 (2011)	37.1 (2011)	730 (2002)	11.6 (2002)
	1692 (2005)	28.1 (2005)	742 (2000)	11.6 (2000)
			857 (2013)	12.0 (2013)
			758 (1995)	12.5 (1995)

Some statisticians would label the 1723bcf end March inventory for the 2012 year as very high. Yet this represented only 24.7 days coverage- a modest 2.7 days above 1990-2015's long run average, whereas 2005's leaped 6.1 days above that average. Compare calendar year 2012's 69.8bcf/day consumption with 2005's 60.3bcf/d.

**March**            **Medium Run (2006-2015)**  
**End Calendar Month**  
**Days Cover Average**  
**24.4 days** (2.4 days greater than 1990-2015's time span)

At end March 2016, the EIA predicts working gas inventory of 2043bcf. Therefore around the finish of winter 2015-16 draw season, days coverage will be about 27.1 days relative to full calendar year 2015 demand of 75.5bcf/day. This stands 2.7 days above the 2006-15 average and 5.1 days above that for the 1990-2015 span. From the historic end March days coverage vantage point, this is moderately bearish. Inventories in days coverage terms at the end of winter 2015-16, though way beneath the 2011 season's mammoth 37.1 days, finish in third place for the past 25 years, fairly close to 2005's 28.1 day total. Compare winter 2014-15's end March 1483bcf stocks and 20.3 days coverage.

**BUILDING UP: THE 2016 SEASON**

The EIA forecasts working natural gas inventories will be 3986bcf at end October 2016 (STEO, Table 5a). Relative to calendar year 2016 demand of about 76.6bcf/day (up 1.5 percent year-on-year), days coverage at the close of the 2016 build season will be about 52.1 days (3986bcf divided by 76.6bcf/day). That neighbors October 2015's 52.4 days coverage total (3952bcf).

Let's survey the 3986bcf stocks and 52.1 days coverage level for end October 2016 in historical context. Focus for now especially on the days coverage variable.

	<u>Long Run (1990-2015)</u>		<u>Long Run (1990-2015)</u>	
	<u>End Calendar Month</u>	<u>End Calendar Month</u>	<u>End Calendar Month</u>	<u>End Calendar Month</u>
	<u>Arithmetic (Bcf)</u>	<u>Days Coverage</u>	<u>Arithmetic (Bcf)</u>	<u>Days Coverage</u>
	<u>Average</u>	<u>Average</u>		
<b><u>October</u></b>	<b>3340</b>	<b>53.6</b>		
	<u>Season Highs (Year)</u>		<u>Season Lows (Year)</u>	
	<u>(Bcf)</u>	<u>Days Cover</u>	<u>(Bcf)</u>	<u>Days Cover</u>
<b><u>October</u></b>	3952 (2015)		2732 (2000)	42.9 (2000)

3929 (2012) 66.0 (1990) 2810 (1996) 45.5 (1996)  
3851 (2010) 60.7 (2009)

**October**

**Medium Run (2006-2015)**

**End Calendar Month**

**Days Cover Average**

**55.5 days** (1.9 days more than the 1990-2015 time span)

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End October 2016's 52.1 days coverage level slides 3.4 days beneath the 2006-15 end October average of 55.5 days and 1.5 days under 1990-2015's 53.6 days. This end October 2016 days coverage total (taken "alone" and "all else equal") seems neutral (or even slightly bullish), particularly with the NYMEX nearest futures natural gas price under 2.50. Even if end October 2016 inventories are 4100bcf, 53.5 days coverage at end build season remains around average.

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However, days coverage does not entirely describe the inventory picture. After all, gas supplies must be stored somewhere. Whatever days coverage happens to be, there can be natural gas oversupply in the actual physical practice (real world) context. Days coverage totals do not necessarily eliminate containment problems.

Although end October 2016's 52.1 days coverage of 51.9 days is a bit below average, it will establish a new record arithmetical level for end October, besting the 2015 and 2012 summits. The lofty arithmetic level for end October 2016 prompts containment fears for the close of 2016 build season.

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End November average inventories from 1990-2015 3235bcf and 51.9 days coverage.

Sometimes US natural gas inventories build a bit more into calendar November. Over the calendar 2000 to 2015 period, end November stocks even have exceeded those of end October three times. Underline 2001 (end October's 3144bcf to end November's 3254bcf, up 110bcf), 2009 (3810bcf to 3837bcf, up 27bcf), and 2011 (3804bcf to 3843bcf, a 39bcf rise). 2005 managed only a 5bcf monthly draw, from 3194bcf to 3189bcf.

**CONTAINMENT HAZARDS**

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"

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Although the US as a whole does not face significant containment problems for the balance of winter and the next few months, it may at the end of build season 2016.

Demonstrated underground maximum working gas capacity in the lower 48 states as of November 2014 was 4336bcf (EIA, "Underground Natural Gas Working Storage Capacity"; 2/25/15, next release February 2016). How much natural gas storage capacity has been added since the EIA's last survey?

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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. The EIA declared this rose merely three bcf from November 2013 to November 2014's 4336bcf (2/25/15). November 2014's total working gas design capacity of 4665bcf likewise was about unchanged year-on-year (inactive fields are not included in the design capacity statistic).

The EIA's next release date for its underground natural gas working storage capacity survey, February 2016, will provide very important data as of November 2015. Yet unless the EIA volunteers additional information, capacity estimates for the post November 2015 period will remain conjectural.

Sustained production increases, all else equal, tend to encourage storage growth (via expansion of existing facilities or from new building). Many past periods have manifested storage expansion. However, the basically flat storage build for November 2014 versus 2013 occurred despite rising US natural gas production. This warns that storage may have grown little since November 2014, and that capacity increases may be modest through the end of build season 2016.

Although the EIA releases its key comprehensive storage capacity survey only annually, it also publishes monthly estimates for lower 48 states working natural gas total underground storage capacity. These figures do not precisely duplicate those released in the EIA's annual survey. However, review them for changes. They do not indicate storage capacity volume increases. The estimate of about 4722bcf for November 2015 is about even with November 2014's 4717bcf (1/29/16 release). The EIA also offers monthly estimates for lower 48 states total natural gas underground storage capacity; these likewise shifted little from November 2014 to November 2015.

The EIA also compiles information on "Planned Storage Projects" ("Upcoming U.S. Natural Gas Storage Facilities"; 10/16/15 and 1Q16). This data is not collected via an EIA survey, but from trade press, FERC, and other industry sources. The EIA underlines this is not a forecast; capacity additions may differ significantly from the indicated data. In any case, the October 2015 statistics did not indicate substantial capacity expansion for 2015, the 1Q16 ones do not do so for 2016 and 2017.

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Focus on demonstrated maximum working gas volume statistics. A one percent rise versus the November 2014 estimate will expand volume 43bcf to 4379bcf ( $4336bcf * 1.01$ ). Two pc adds 87bcf, making the maximum volume 4423bcf. Five percent (a 217bcf leap, which would be rather surprising) makes the maximum volume 4553bcf.

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Even if actual inventories happened to fall beneath a given maximum working gas storage capacity estimate, apparently "empty space" does not necessarily equate to the practical free (readily available) storage capacity, whether for the lower 48 states as a whole or for a given region. And not everyone seeking storage space may be able to acquire it; it may be "tied up (controlled) by others". Thus coming close to a demonstrated working gas capacity level in practice can produce a containment problem. This arithmetic perspective in the containment context tends to put downward pressure on prices along the entire natural gas price curve.

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Suppose little new storage is built. Will there be containment problems if end build season 2016 supplies attain the EIA's end October 3986bcf estimate? After all, the maximum theoretical storage space may not necessarily be achievable in practice. Also, storage space may not be available to all marketplace players desirous of it. Nevertheless, inventories of 3986bcf fill about 91.9pc of November 2014's 4336bcf demonstrated maximum working gas volume storage level, so there appears to be a little breathing room. There probably will not be nationwide containment problems, though some may appear in particular regions.

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Bearish concerns regarding end October 2016 inventory levels remain conjectural. Perhaps sustained relatively low prices will slash production more than current estimates. Perhaps the balance of winter 2015-16 will be much colder than normal. Or, spring/summer 2016 may be unusually hot.

The EIA predicts a 1943bcf stock build from end March 2016 to end October 2016 (2043bcf to 3986bcf). However, suppose end October 2016 stocks are notably larger than the EIA's current STEO prediction. The balance of winter 2015-16 may be milder than usual, or spring/summer 2016 may be relatively cool. Is there any build season history that justifies worrying about larger than anticipated stock increases?

The 2014 build season saw a gigantic 2730bcf climb from end March's 857bcf to end October's 3587bcf. Stocks expanded a hefty 2469bcf from end March 2015's 1483bcf to reach end October 2015's 3952bcf.

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Assume end March 2016 stocks are what the EIA predicts, 2043bcf. Assume limited expansion of maximum working gas volumes relative to November 2014's 4336bcf demonstrated maximum working gas volume total for the lower 48 states.

A 2730bcf inventory build (as in the 2014 season) from an end March 2016 level of 2043bcf leaves end October 2016 stocks at 4773bcf, soaring above November 2014's 4336bcf demonstrated maximum working gas capacity. That build would even exceed November 2014's total working gas design capacity of 4665bcf. Thus there very probably would be a notable containment problem in many locations. In the absence of substantial storage capacity increase (via facility expansion or new construction), even if the 4336bcf demonstrated maximum working gas threshold in practice could stretch slightly, the containment problem remains. It persists if maximum storage volume builds two percent by end October 2016 to 4423bcf, or even if it spikes five percent to 4553bcf.

Suppose 2016 US natural gas stocks increase the same quantity as in 2015's build period, 2469bcf. That still would present a containment problem in many regions, for end October inventories would be 4512bcf (2043 plus 2469bcf).

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The average days coverage build from end March to end October over the 2006-15 span is about 31.0 days. Assuming end March 2016 days coverage of 27.1 days, average days coverage expansion will leave end October 2016 working gas inventories at about 58.1 days coverage, an above average amount.

Assume calendar 2016 consumption is as the EIA predicts, about 76.6bcf/day. Then if days coverage grows by 31.0 days, then end October inventories will be about 4417bcf. Take 31.0



days times roughly 76.6bcf/day to create a 2374bcf build (which is less than the 2015 season's); add 2374bcf to the EIA's 2043bcf end March 2016 level. This hypothetical 4417bcf inventory represents at 101.9 percent of November 2014's 4336bcf maximum working gas storage capacity. Absent notable net storage expansion between November 2014 and end October 2016, this total probably would generate storage problems in several regions.

To avoid severe containment problems, will some natural gas producers be forced to shut-in or flare production?

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However, high inventory levels at end March 2016 probably would inspire smaller builds than suggested by these perspectives.

The EIA's anticipated 1943bcf build from end March 2016 to end October 2016 is 25.4 days (1943bcf/76.6bcf per day). The 2013 build season net injection was much less than those of 2014 and 2015, at just under 2100bcf (end October 3817bcf versus end March's 1720bcf). A 2100bcf increase from the EIA's 2043bcf end March 2016 leaves end October 2016 inventories at 4143bcf, around 95.5 percent of November 2014's 4336bcf storage capacity.

Also, 2014's huge build in part reflected an effort to respond to high natural gas prices and very low inventories (12.0 days cover at end of the 2013-14 winter season). The 2016 build background situation is very different in those respects, so a massive build akin to the 2014 one in 2014 is unlikely.

However, 2015's ultimate arithmetic build was still rather large in the context of only slightly below normal days coverage at end winter season 2014-15. Although 20.3 days coverage as of end March 2015 of was a bit below average, NYMEX natural gas prices (nearest futures) were not very high. And prices during 2015 build season stood far under February 2014's 6.493 pinnacle. For most of the 2015 build season, prices stayed in the range of 2.443 (the 4/27/15 low) and 3.105 (5/19/15's high), though they plunged to 1.948 on 10/27/15.

In regard to 2015's fairly high production levels, do debt burdens in the context of rather low natural gas prices force some US natural gas producers to maximize production to pay off creditors and stay in business, during calendar year end 2016?

Given the variety of variables influencing natural gas inventory levels, it is conceivable, though unlikely, that 2016 build season arithmetic stock gains could resemble 2015's.

Nevertheless, increases along the lines of the 2013 build year or the EIA's 1943bcf estimate probably are the more likely outcome for the 2016 season given the dramatic slump in US natural gas drilling rig counts (and note the drop in the oil patch too) and (assuming these persist during build season 2016) relatively natural gas low prices, and a continuing modest gain in US real GDP. The 1943bcf build estimate during build season 2016 relative to November 2014's 4336bcf demonstrated maximum working gas volume storage level, probably will not produce nationwide containment problems (though some may appear in particular regions). However, in the absence of storage capacity builds since November 2014, a 2100bcf 2016 build season boost probably would create more notable containment challenges.

## **NATURAL GAS STOCKS IN MARCH AND OCTOBER 2017**

The 2017 future of course is murky. Obviously much can happen between now and then. But based upon the EIA's January 2016 STEO predictions, there probably will not be containment problems in October 2017.

Suppose end March 2017 working gas inventory is 1883bcf. Relative to full calendar year 2016 demand of about 76.6bcf/day, that gives 24.6 days coverage. The EIA states end October 2017 inventories will be 3857bcf, 129bcf less than its estimate for October 2016. Natural gas days coverage at end October 2017 will be about 50.0 days coverage (2017 calendar year consumption is about 77.2bcf/day), less than average.

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The EIA states calendar 2015 total US marketed production was 79.1bcf/day, up a towering 5.7 percent year-on-year (dry gas production jumped 5.8pc to about 74.6bcf/d). The recent production high quarter was 3Q15's 80.0bcf/d. Though 4Q15 dipped to 79.2bcf/d, output resumes its upward climb, reaching 80.3bcf/d in 4Q16. Calendar 2016 total marketed production rises slightly, about .8pc to reach almost 79.7bcf/d. The EIA predicts calendar 2017 total production increases 1.9pc to 81.2bcf/d (4Q17's is 81.8bcf/d).

Recall the production acceleration from March 2014's 72.5bcf/day occurred around February 2014's NYMEX natural gas price peak. The March 2013 output was 68.9bcf/d. The recent high was September 2015's 80.3bcf/d.

EIA statistics for total marketed natural gas production for the lower 48 states (excluding the Gulf of Mexico) manifest a similar pattern to that for America as a whole. Lower 48 calendar 2014 production was 70.5bcf/day, jumping 5.8pc to 74.6bcf/d in calendar 2015. The EIA forecasts that the recent quarterly high, 3Q15's 75.2bcf/d, probably will be surpassed in 2Q16 and thereafter. Calendar 2016 supplies increase 1.3pc to 75.5bcf/d, with 2017's hopping up 2.2pc to 77.2bcf/d.

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Production estimates and actual output for calendar 2016 and thereafter obviously in part depend on price. Sustained low natural gas prices may reduce production estimates from the EIA and other marketplace wizards. In any case, the January 2016 STEO (Table 2) projects the Henry Hub spot natural gas price will average \$2.65/mmbtu in calendar 2016, (\$2.63 calendar year 2015, with 4Q15's only \$2.12; compare calendar 2014's \$4.39). Calendar 2017 averages \$3.22.

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As for the United States, Canada's natural gas output has been abundant. Canadian marketable natural gas production for the first half of calendar 2015 (most recent statistics; National Energy Board, January 2016; no data yet for 4Q15) displays year-on-year production gains in each month. However, average output for 3Q15 output fell .5pc year-on-year.

## **UNCERTAINTY, CONTINUED: INVESTMENT, RIG COUNTS, COAL, AND LNG**

Marketplace headlines, though most focus on the petroleum complex, indicate that energy groups around the globe generally appear to be slashing investment projects.

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Baker Hughes data reveals the collapse of petroleum rotary rig counts in the context of the oil price crash. The Baker Hughes United States oil rotary rig count on 1/29/16 was 498, a new depth for the rig trend. It falls 69.1 percent from the 1609 peak on 10/10/14.

What about US natural gas? Gas drilling (via fracking, especially) has become more productive, so fewer rigs are producing more supplies. Rotary gas rigs at end year 2011 were 810, end 2012 about 430, and end 2013 almost 375. However, note the slump in natural gas rigs since 11/7/14's 356 rigs; recall the interim price top in NYMEX natural gas nearest futures at 4.544 on 11/10/14. The 3/7/14 total, close to 2/24/14's major price pinnacle at 6.493, was 345. As of 10/9/15, there were only 189 gas rigs (contrast the 320 on 10/10/14). There were 185 on 12/11/15, but the total collapsed further to a mere 121 rigs on 1/29/16, a 66.0 pc plunge relative to 11/7/14.

In the key Marcellus natural gas producing region, on 10/30/15 there were only 43 rigs. Compare 10/31/14's interim high of 84 rigs (4/25/14 counted 86).

In the context of current relatively low natural gas prices (NYMEX nearest futures under 2.50), what do falling investment and the slumping gas (and oil) rig count suggest? The EIA's current estimate for only a fairly small US natural gas production increase in calendar 2016 and a related modest stock build during the 2016 build season probably are more likely than predictions of large production boosts and very substantial stock increases promoted by marketplace bears.

In the output context, monitor natural gas production levels and decline rates for natural gas from legacy (older) wells. See the EIA's "Drilling Productivity Report". And might US natural gas output even tumble if prices stay low?

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At current or even lower natural gas prices, maybe there will be further switching to gas from coal. This may reduce natural gas oversupply.

The EIA's STEOs (see October 2015 alongside January 2016) point out the sharply declining gap between coal and natural gas fired electricity generation marketplace shares from 2014 to 2015. Coal's annual share of US generation was 38.7 percent in calendar 2014; the average fuel share of natural gas was 27.4pc in 2014. The coal share fell to 34.0pc in 2015, with the natural gas share ascending to 33.0pc in 2015. In several 2015 months (April, July, and August), the natural gas share of electricity generation exceeded that of coal. See the EIA's "Today in Energy" (7/31/15 and 10/7/15) and "Electricity Market Update" (10/27/15). In August 2015, natural gas captured a 35.3pc share, coal 34.6pc. In July 2015, natural gas had 35.0pc, coal 34.9pc.

Coal retirements continue, which should fortify natural gas demand. Yet renewable energy sources creep higher in importance in many regions.

However, although coal's portion of electricity generation dips to 33.0pc in calendar 2017, the natural gas level slides to 31.0pc that year, beneath coal's level. The share from renewables climbs over that two year span (January STEO, pp1-2).

American electricity consumption in calendar 2015 was 10.61 billion kilowatt hours/day. The January 2016 STEO predicts flat American electricity demand from 2015 to 2016 and 2017 (Table 7a). See 2016's 10.66 bbkwh/d and 2017's 10.78 bbkwh/d.

What will be the outcome of heated legal battles related to the Clean Air Act and coal power plants? Will environmental concerns related to fracking grow stronger?

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What about US liquefied natural gas exports? LNG exports eventually are a significant bullish variable for America's natural gas arena. Yet this is a relatively longer run factor. Near-term prospects are relatively modest. The EIA believes LNG gross exports will be only .2bcf/day in 1Q16, rising to .5bcf/d in 2Q16 (and averaging .7bcf for calendar year 2016; 2017 averages 1.4bcf/d).

### **MARKETPLACE TRENDS: LOOKING FOR COMMITMENTS**

At times the CFTC's Commitments of Traders is a helpful indicator for predicting significant trend changes and travels in natural gas marketplaces. Review the benchmark NYMEX and ICE natural gas contracts (futures and options combined) plus the NYMEX European look-alike options contract. In the natural gas complex, sometimes (but not always) key highs and lows in price occur alongside notable levels in the net noncommercial position.

On 2/18/14, the net noncommercial long ("NCL") position peaked at about 328,000 contracts, or 7.7 percent of total open interest. The net NCL percentage of total open interest attained its 8.4pc high the following week (8.4pc is the record net NCL since the ICE began to report data in January 2010). February 2014's net NCL summit roughly coincided with the NYMEX natural gas (nearest futures continuation) 2/24/14 pinnacle at 6.493. The substantial liquidation of this large net noncommercial long position in natural gas helped to propel prices sharply lower in succeeding months.

What about recent times? On 10/27/15, the day of an interim low (at 1.948) for NYMEX nearest futures natural gas, the net noncommercial short position ("NCS") reached about 264,000 contracts. This was the highest net NCS total since January 2010. The net NCS as a percentage of total open interest was 9.4 percent, a record percentage for the net NCS position (and even higher than the 8.4pc net NCL plateau).

On 12/22/15, close in time to the key 1.684 bottom on 12/18/15, the net NCS position was still very substantial, at 234m contracts and 7.5pc of total open interest. Short covering by noncommercial probably helped accelerate the violent 48.2 percent rally from the December 2015's trough to 1/8/16's 2.495 high.

The 1/26/16 net NCS position stands at about 90m contracts, 3.4pc of total open interest. With NYMEX nearest futures prices still relatively feeble (under 2.50), this net NCS position, though modest, warns that renewed rallies relative to the December 2015 bottom could occur.

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Of course the net noncommercial short position could get larger if prices (watch individual contract months, not just nearest futures continuation) fall further. And recall that after the net NCS peaked in November 2011, prices kept diving lower while the net NCS position diminished. On 4/24/12, the net NCS position was merely 15m contracts. Thus one should approach the Commitments of Traders data with care.

As calendar 2016 unfolds, if natural gas prices do not manage to rally further from their December 2015 trough, some gas "investors" (and buy side "speculators") may choose to liquidate their positions.

## “TECHNICAL” FACTORS: PRICE, DISTANCE, AND TIME

“Here I am stuck in the middle with you”.  
Bob Dylan’s song, “Stuck in the Middle with You”

\*\*\*\*

Interpretation of natural gas price history can venture beyond the NYMEX nearest futures continuation contract. Wall Street trend seekers may elect to review individual actual contract months (such as the NYMEX April 2016 natural gas futures contract). Within a particular NYMEX natural gas winter draw season, the price of a given nearby actual NYMEX winter contract may be lower than a subsequent winter month (price curve structure in contango). Marketplace navigators may analyze several trading months of a gas season (as in the NYMEX summer 2016 strip), calendar years (like the calendar 2020 strip of contracts), spreads (such as NYMEX October 2016/January 2017 or March 2017/April 2017), prices in other regions than the NYMEX realm, and basis relationships. Marketplace players can derive insight into and tell tales regarding natural gas domains and their past, present, and potential bull and bear patterns by analyzing electricity, coal, oil, and other financial battlefields, as well as assorted additional economic and political phenomena. In natural gas as in other territories, supply/demand investigation can intertwine with so-called technical analysis.

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Here follows one perspective on major natural gas bear moves based upon the NYMEX natural gas nearest futures continuation contract.

<b><u>High; Date</u></b>	<b><u>Low; Date</u></b>	<b><u>Decline (Percent)</u></b>	<b><u>Duration (Months)</u></b>
1. 4.60; 12/20/96	1.68; 2/24/97	63.5pc	Two
2. 3.85; 10/28/97	1.61; 8/27/98	58.2	Ten
3. 10.10; 12/27/00	1.76; 9/26/01	82.6	Nine
4. 11.90; 2/25/03	4.39; 9/22/03	63.1	Seven
5. 15.78; 12/13/05	4.05; 9/27/06	74.3	Nine and two weeks
6. 13.694; 7/2/08	2.409; 9/4/09	82.4	Fourteen
7. 6.108; 1/7/10	1.902; 4/19/12	68.9	Twenty-seven and one wk

The average distance traveled over these seven bear moves is 70.4 percent. The average duration is about eleven and one-quarter months.

Looking back prior to the December 1996 high does not significantly alter the table’s price and time portrait. The 53.4 percent decline from the 3.72 plateau on 12/21/95 to the 1.735 valley on 9/5/96 lasted about nine and a half months (though a final low, as part of a double bottom, arguably occurred 2/24/97 at 1.68). The 60.0pc drop from 11/26/90 at 2.65 to 6/25/91 at 1.06 spent seven months. The 52.3pc fall from 11/5/91 at 2.14 to 1/24/92 at 1.02 lasted two and a half months.

So for the ten bear moves combined, the average fall is about 65.9 percent (66pc erosion from February 2014’s 6.493’s summit is 2.162), with the average duration about nine and three quarter months.

\*\*\*\*

What does the current marketplace situation indicate? The collapse from the 6.493 major high on 2/24/14 to 12/18/15’s 1.684 low is 74.1 percent and almost 22 months.

Thus from the historical distance (price move) perspective of ten bear moves (65.9pc) or the seven since 1996 (70.4pc), the bear slump has been above average.

Note that the 1.684 level stands around other important support. Recall not only 4/19/12's major low, but also the double bottom of 1.85 (1/28/02)/1.76 (9/26/01) as well as a trough at 1.735 on 9/5/96 alongside a low at 2/24/97 at 1.68.

From the historical bear move duration vantage point, the almost 22 month decline since February 2014 has been more than twice as long as the nearly nine and three-quarter month average for 10 big bear moves, surpassed only by the January 2010 to April 2012 crash.

Thus from the time parameter (nearest futures continuation basis), and though history is not destiny, a change from the bear trend that commenced in February 2014 probably occurred with the December 2015 trough. Watch various NYMEX individual contract months, strips, and spreads (and other marketplaces) to indicate (confirm) such a trend change.

The December 2015 low occurred not too far from contract expiration. Many important NYMEX natural gas trend changes have occurred around contract expiration.

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Keep end build season 2016 containment risks in view. Remember that some major bear moves exceeded 70 percent. A 75pc drop from the February top gives 1.623 (2/26/99 bottom was 1.625, 8/27/98 trough 1.61), an 80pc one 1.298 (82.6pc 1.130; 1/13/95's bottom was 1.25, the all-time low 1/24/92 at 1.02). Ten percent of the all-time high, 12/13/15's 15.78, is about 1.58; a five percent break under the 12/18/15 low at 1.684 gives about 1.60.

\*\*\*\*

On the significant price resistance front, keep in mind the key price gap around 3.35/3.45 (12/19/14 low at 3.449, 12/22/14 high 3.351, 1/15/15 minor high 3.352). Moreover, twice the key 12/18/15 depth is 3.368. Note 5/19/15's important interim high at 3.105 (compare 2/23/15's 3.039 and 6/17/15's 2.995).

A 50 percent rally from 12/18/15's low is 2.526 (compare the 1/8/16 top at 2.495), a 66pc climb gives about 2.806.

\*\*\*\*

One should not be dogmatic about calendar month timing regarding major trend shifts, though such history can offer guidance. Chronicles of calendar month timing of key marketplace trend changes attract some soothsayers. What does history reveal regarding prior appearances of very important (major) highs and lows in the NYMEX natural gas nearest futures continuation contract for calendar December and the next several calendar months?

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\*\*December- no noteworthy lows; 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). Though establishing a major low in calendar December (or calendar October, for that matter) would be unusual (contrary to the historic pattern), the large extent (distance) and long duration of the major bear trend since February 2014 would not make it extraordinary. Besides, the NYMEX natural gas 25 year trading history is relatively short; compare wheat or the Dow Jones Industrial Average.

December 2015's natural gas low was a 10 year diagonal calendar move relative to the all-time high of December 2015. Admittedly, prior to December 2015, major lows in nearest futures continuation have not occurred in calendar December. In any case, even if it is "unusual" for a major natural gas bottom to occur in calendar December, suppose one occurred in December 2015. Then the likely eventual rally from that point probably will be substantial.

Alternatively, suppose notable oversupply and containment issues weigh on prices during 2016. Then a double bottom linked to an initial low in December 2015 may emerge. The second bottom perhaps will appear as far out in time as late calendar August/September 2016.

\*\*January- significantly, there have been four key bottoms in calendar January. The two highs that also occurred in January underscore the potential for trend change during that month. If natural gas prices move beneath the October 2015 low, January is an important calendar month to watch for the bear trend to end. Major and record low 1/24/92 (1.02), 1/13/95 (1.25), 1/15/00 (2.13; see November), 1/28/02 (1.85; preceded by the 9/26/01 low at 1.76); tops 1/9/04 (7.63) and 1/7/10 (6.11). Keep in mind the interim lows in early January 2013 (1/2/13's 3.05 and 1/9/13's 3.09).

\*\*February- troughs at 2/24/97 (1.68), 2/26/99 (1.63); summits 2/2/94 (2.69), 2/25/03 (11.90), and 2/24/14 (6.493). A major low in February 2016 would be a two year diagonal time move from 2/24/14's pinnacle.

\*\*March- no noteworthy lows or highs.

\*\*April- major bottom 4/19/12 at 1.902. Interim low, but not a major one, on 4/27/15 at 2.443. April 2015's level stands close to 9/4/09's major low at 2.409. In ancient times, recall the 4/23/93 top at 2.80.

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