

Alvin Toffler's "Future Shock" (Chapter I) notes: "Future shock...the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time."

CONCLUSION

The ferocious bear trend in NYMEX natural gas (nearest futures continuation) that commenced after 11/14/18's 4.929 peak probably ended with 8/5/19's 2.029 low. If not, it likely will finish fairly soon. Assuming normal weather, major support around 1.90/2.00 probably will hold. For the near term, noteworthy resistance stands around 2.50/2.55, with 3.05/3.10 an important target. If United States winter weather is significantly colder than normal, an advance toward 4.00 looms.

Marketplace history of course is not marketplace destiny. Based on historical major bear trends for NYMEX natural gas (nearest futures), the current bear trend has lasted sufficiently long in price (distance) and time terms for that trend to end and for a bull move to emerge. A critical variable supporting this viewpoint is the overall United States natural gas inventory situation. From the days coverage perspective, America's natural gas inventory outlook is bullish.

NYMEX NATURAL GAS BEAR TRENDS: PRICE, DISTANCE, AND TIME

Here follows a long run historical overview of major natural gas bear moves (fifty percent or more from peak to bottom) based upon the NYMEX natural gas nearest futures continuation contract.

<u>High; Date</u>	<u>Low; Date</u>	<u>Decline (Percent)</u>	<u>Duration (Months)</u>
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
8. 6.493; 2/24/14	1.611; 3/4/16	75.2	Twenty-four and one wk

The average distance traveled over these eight bear moves is 71.0 percent. The average duration is about twelve and three-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 eleven bear moves combined, the average fall is about 66.7 percent, with the average duration about eleven months.

The natural gas (nearest futures continuation) price collapse from 4.929 on 11/14/18 to 2.029 on 8/5/19 stretched 58.8 percent and lasted about eight and three-quarters months. Since that percentage retreat from November 2018's summit is less than the historical average, as is the nearly nine month duration (to 8/5/19's trough), does the bear pattern have a bit more price and time to run? Probably not. Even though this bear move is shorter than average in distance and time terms, it still represents a massive price drop over a fairly long time, and thus its travels are sufficient to support a change in trend to the bull side.

First, note the substantial price support around 1.900 to 2.000. Recall the 1.902 major low on 4/19/12, and especially see the low in the price gap from 1.985 on 5/26/16 to 2.101 on 5/27/18 (a decline from 4.929 to 1.900 is 61.5 percent). Twice the all-time low for NYMEX natural gas is 2.04. And very significantly, underline in this context the likely relatively tight days US natural gas inventory position in days coverage terms for October 2020 and October 2021 (see below).

In any case, assuming normal weather for winter 2019/20, it is very unlikely that NYMEX natural gas (nearest futures) will achieve the average percentage price decline (66.7 percent) for the bear trend which started in mid-November 2018. A 66 percent decline from 4.929 is 1.641, very close to 3/4/16's major bottom at 1.611.

What about the particular calendar month in which a trend change for nearest futures continuation occurs? Does history reveal that August or September are times when notable trend changes have happened? Although marketplace history need not repeat itself, either entirely or even partly, the past offers guidance. Yet audiences should not be dogmatic about calendar month timing regarding major trend shifts in NYMEX natural gas nearest futures continuation. For example, prior to November 2018, key bull tops generally did not occur in calendar November. Also, trading warriors should monitor trend changes in actual contract months and strips, not only in the nearest futures continuation contract.

Marketplace timing history indicates the potential for a significant uptrend to start (or resume) in late calendar August or September for the nearest futures contract. Several major lows in NYMEX natural gas have appeared in late August and (especially) calendar September. Recall 8/27/98 at 1.610, 9/26/01 at 1.760, 9/22/03 at 4.390, 9/16/04 (final bottom) at 4.520, 9/27/06 at 4.050, and 9/4/09's 2.409. See also the 1.735 valley on 9/5/96. A minor low in the bull charge up to the November 2018 pinnacle was 9/10/18's 2.752.

With the exception of a top over 20 years ago (9/23/92 at 2.790), highly significant summits have not occurred in the August/September calendar period window.

Early calendar August usually does not display major bottoms for natural gas. This argues that 8/5/19's low 2.029 was not the final bottom in the bear move. Also, often major lows and highs in natural gas occur at or around the trading expiration date of the nearest futures contract, and 8/5/19 was not right next to one.

However, the 8/5/19 trough probably was the major low. Not only did nearest futures establish a low on 8/5/19, so did the actual NYMEX October 2019 contract (at 2.045) and the widely-watched NYMEX winter 2019/20 calendar strip (2.360). Also, an important trough occurred over

25 years ago at 1.396 on 8/1/90. In addition, there have been a few notable interim lows for the nearest futures contract in the past several years. In the bull move which culminated in the February 2014 top, 8/8/13's low at 3.129 stands out (it matched 2/15/13's 3.125 level). Keep in mind 8/12/16's interim trough at 2.523. Besides, given the current contango in the NYMEX natural gas marketplace structure (near month price less than distant) for the next few trading contract months (see the October 2019 to January 2020 spread), it will be challenging for nearest futures to decline much under the 8/5/19 valley anytime soon.

Various later calendar strips achieved lows in their bear trends on 8/19/19, an August date closer to the late August/calendar September timing signpost for trend changes based on long run history. This further supports the view that the 8/5/19 valley was a critical valley, from which prices probably will continue to climb. For the summer 2020 strip, see 8/19/19's 2.263; winter 2020/21 at 2.528; summer 2021 at 2.296; 2.342 for calendar year 2020, with 2.399 for calendar 2021. The anticipated relatively low inventory level thus is relevant not only from the price perspective, but also from the calendar timing one; an "earlier than usual" low (in calendar August) is "reasonable".

MEASURING UP: US NATURAL GAS INVENTORIES

"To every thing there is a season, and a time to every purpose under the heaven." Ecclesiastes, Chapter 3, verse 1 (King James Version)

What is a "low", "high", or "normal" (average, reasonable) price or inventory level is a matter of opinion. In any case, over the past two or three years, the United States natural gas industry probably has shifted toward a lower level of desired (appropriate, reasonable, normal, prudent, sufficient) stock holding relative to long run historical averages. Structural changes in the US natural gas marketplace have inspired more widespread (and more aggressive) adoption of a "just-in-time" (lower inventories in days coverage terms) inventory management method instead of a "just-in-case" (relatively higher stockpiles) approach.

Why? One likely factor has been faith that gas production would remain far greater than that of calendar 2017. Many players therefore probably believe there "always (or almost always) will be enough gas around" to satisfy demand, even during peak consumption periods. Another variable likely encouraging lower inventory in days coverage terms is America's significant expansion of its pipeline infrastructure. Thus it has (will) become easier to move sufficient gas to many locations where it is needed. In addition, the growing share of renewables in total US electricity generation arguably to some extent reduces the amount of necessary natural gas inventories.

Assume an entrenched change in natural gas inventory management practices to the just-in-time orientation. Assume also that from the days coverage perspective (stocks relative to consumption), the "reasonable" level of industry holdings has tumbled by several days relative to historical days coverage benchmarks. Nevertheless, anticipated October 2019 (and October 2020) United States natural gas inventories from the days coverage perspective are substantially lower than the historical average. The natural gas inventory situation therefore is somewhat bullish, particularly from the perspective regarding the close of build seasons at end October 2019 and end October 2020.

In the following analysis of US working natural gas inventories, bcf levels are from the Energy Information Administration. Recent bcf history and estimates come from its Short-Term Energy Outlook, (“STEO”, Table 5a, 8/6/19, next release 9/10/19).

Historical analysis of working natural gas inventories permits audiences to ascertain the degree of tightness in America’s overall supply/demand situation. Arithmetical (bcf) levels are important, but review from the days coverage perspective generally provides greater insight. After all, supply and demand levels in commodity playgrounds can evolve over time, sometimes substantially. For US natural gas, compare calendar year 2018’s 82.1bcf/day and 2019’s 84.7bcf/d consumption with 2005’s 60.3bcf/d, or even 2017’s 74.3bcf/d. The EIA predicts calendar 2020 consumption will dip about .8pc year-on-year to 84.0bcf/d.

One can define labels such as supply, demand, and consumption in various ways. Keep in mind that the EIA’s summary of actual “total consumption” deals only with that within the United States. The LNG and pipeline import and export data appear in the “supply” section of the STEO report. Thus growing net exports, if added to the actual American consumption, can show a greater “overall” demand number for American-sourced natural gas. Growing net exports also decreases the absolute total of natural gas output available for US inventories.

The days coverage perspective of course does not provide a complete viewpoint on the natural gas inventory situation and related price risks, both in general and at specific delivery hub locations around the country. So fundamental considerations related to days coverage should be interpreted alongside arithmetic quantities (bcf). After all, commercial participants place arithmetic quantities (bcf) of gas in storage locations with arithmetic capacity; inventory shortage problems or containment difficulties (oversupply relative to arithmetic storage capacity availability) reflect arithmetic levels.

It is a matter of opinion whether a given natural gas inventory, supply, or demand level is high, low, or normal (average; sufficient). Viewpoints as to whether a given natural gas price is high (or too high), low (too low), or average (normal; reasonable, rational) likewise reflect subjective perspectives.

THE 2019 NATURAL GAS BUILD SEASON

	Long Run (1990-2018)	Long Run (1990-2018)		
	End Calendar Month	End Calendar Month		
	Arithmetic (Bcf)	Days Coverage		
	<u>Average</u>	<u>Average</u>		
<u>October</u>	3376	53.0		
	<u>Season Highs (Year)</u>		<u>Season Lows (Year)</u>	
	<u>(Bcf)</u>	<u>Days Cover</u>	<u>(Bcf)</u>	<u>Days Cover</u>
<u>October</u>	4013 (2016)	66.0 (1990)	3237 (2018)	39.4 (2018)
	3942 (2015)	60.7 (2009)	2732 (2000)	42.9 (2000)
	3929 (2012)	58.4 (2010)	2810 (1996)	45.5 (1996)
	3851 (2010)		2886 (1997)	46.3 (1997)

End October 2018's 3237bcf inventory soared above the deepest prior year arithmetical valleys for end October. However, focusing primarily on the arithmetic bcf level only tells part of the story regarding so-called oversupply (or undersupply). The end October 2018 inventory total attained a new record low for days coverage for that calendar month; 3237bcf divided by 82.1bcf/day consumption for full calendar year 2018 equals 39.4 days. Remember the price spike through mid-November 2018 (and prices remained fairly lofty for about a month thereafter) as fears quickly intensified regarding supply sufficiency for the upcoming winter.

October **Medium Run (2006-2018)**
End Calendar Month
Days Cover Average
53.8 days (.8 days more than the 1990-2018 time span)

The EIA forecasts working natural gas inventories will climb to 3746bcf at end October 2019 (STEO, Table 5a). Relative to calendar year 2019 demand of almost 84.7 bcf/day, days coverage at the finish of the 2019 build season will be about 44.3 days (3746bcf divided by 84.7bcf/d).

End October 2019 thus plummets 8.7 days beneath 1990-2018's end October 53.0 days coverage average and craters 9.5 days beneath 2006-18's 53.8 days. Even allowing that the desired (reasonable, typical, normal) level of industry coverage for end October has fallen significantly, it is unlikely that the acceptable average height has collapsed by such a large amount (and so rapidly). A 8/7/9.5 day cut relative to prior long run averages is very substantial in number of days as well as percentage terms (8.7 days divided by 53.0 days is 16.4 percent).

Though greater than October 2018's 39.4 days coverage, October 2019's anticipated 44.3 day total still is bullish since it floats within the range of the three other lows for end October days coverage achieved prior to end October 2018 (42.9 to 46.3 days). The average of all four end October days coverage lows is 43.5 days.

Suppose that the current just-in-case natural gas regime has reduced the normal (average; reasonable) level by five days relative to the 1990-2018 and 2006-2018 averages. Thus the "new normal" hovers around 48.0 to 48.8 days. Prospective end October 2019 days coverage of 44.3 days falls decisively beneath this.

History suggests that high (low) inventory levels at end-winter probably inspire smaller (larger) builds. The 2014 build season saw a gigantic 2730bcf climb from end March's 857bcf to end October's 3587bcf.

The EIA predicts a 2561bcf stock build from end March 2019 to end October 2019 (1185bcf to 3746bcf).

Days coverage from end March to end April generally grows by about 2.3 days (2.2 days from the 1990-2008 era and 2.3 days for the 2006-18 period).

Over the 1990 to 2018 time horizon, what were lofty and low builds in days coverage for the end April to end October period?

High Days Cover Builds

36.7 (2003)
35.3 (2001)
34.6 (2014)
33.5 (2004)

Low Days Cover Builds

18.2 (2016)
18.9 (2012)
20.5 (2017)
22.1 (2018)
23.1 (2002)

End April 2019's working gas inventory was 1560bcf, or about 18.4 days cover relative to full calendar year 2019 demand of 84.7bcf/d. The build from April 2019's 1560bcf to end October 2019's STEO forecast of 3746bcf is 2186bcf. Therefore from April to October 2019, days coverage will increase about 25.9 days (44.3 less 18.4).

The 1990-2018 average inventory build from end April to end October is 1789bcf, and 28.2 days in days coverage terms. For the past thirteen years 2006-18, the average stock increase from end April to end October is 1825bcf, or 26.5 days coverage. The 2186bcf build for the 2019 season, is above the historical average from the arithmetical standpoint, but that is much less important than the days coverage factor. The prospective 25.9 days coverage increase from April through October 2019 is slightly below normal.

End November inventories from 1990-2018 average 3270bcf and 51.3 days coverage. They average a draw of about 106bcf relative to end October.

Sometimes US natural gas inventories accumulate a bit more into calendar November. Over the calendar 2000 to 2018 period, end November stocks have exceeded those of end October three times. Recall 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).

Despite the popularity of just-in-time inventory perspectives and practices, and even if producer or inventory short hedging potential exists, if natural gas inventories head to "low" or "very low" levels in days coverage terms, natural gas price fireworks can erupt. From its 9/10/18 interim low at 2.752 (10/29/18 low 3.100), prices leaped 79.1 percent higher to 11/14/18's 4.929 summit (the ascent from 2/15/18's 2.530 trough to the peak was 94.8 pc). Recall also the entrancing rapid price blast-off for nearest futures of 42.6 percent from 2.568 (12/21/17) to 3.661 (1/29/18).

For the week ending 8/23/19, United States working gas in underground storage (Lower 48 states; EIA) was 2857bcf, up 14.6 percent versus 2494bcf in the prior year week. But relative to the five year average of 2959bcf for this date, 8/23/19's total decreases 3.4 percent.

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 2018 was 4263bcf ("Underground Natural Gas Working Storage Capacity"; 3/29/19, next release March 2020). Based upon the EIA's anticipated inventory of 3746bcf for end build season 2019, the US probably will not face containment problems this year.

Keep an eye on natural gas inventories in various key regions. Since inventories probably will be relatively low in several of them (given the situation in the US as a whole), price spikes may occur where supplies are tight.

WINTER 2019/20 DRAW SEASON: MARCH 2020 NATURAL GAS STOCKS

The future for United States natural gas supply, demand, and inventories for calendar 2020 is cloudy. Obviously much can happen between now and then.

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 2018-19; it includes the 1185bcf of March 2019’s inventory.

	Long Run (1990-2018)	Long Run (1990-2018)		
	End Calendar Month	End Calendar Month		
	Arithmetic (Bcf)	Days Coverage		
	<u>Average</u>	<u>Average</u>		
<u>March</u>	1403	22.0		
	<u>Season Highs (Year)</u>		<u>Season Lows (Year)</u>	
	<u>(Bcf)</u>	<u>Days Cover</u>	<u>(Bcf)</u>	<u>Days Cover</u>
<u>March</u>	2486 (2015)	33.2 (2015)	730 (2002)	11.6 (2002)
	2473 (2011)	36.9 (2011)	742 (2000)	11.6 (2000)
	2063 (2016)	36.4 (1990)	857 (2013)	12.0 (2013)
			758 (1995)	12.5 (1995)

For any given arithmetical bcf level, demand matters in the days coverage context. For example, March 2016’s bcf total represented about 27.5 days coverage, modestly above average but not by a massive amount. The 36.4 days coverage for 1990 derived from inventory of 1912bcf.

<u>March</u>	Medium Run (2006-2018)
	End Calendar Month
	<u>Days Cover Average</u>
	23.9 days (1.9 days greater than 1990-2018’s time span)

The March 2018 “year” (stocks of 1185bcf at actual end March 2019) days coverage of 14.4 days (1185bcf/82.1bcf/day for full calendar year 2018 consumption) thus was 7.6 days beneath and thus very low relative to the long run average. And end March 2019’s US natural gas inventories of 1185bcf were 9.5 days below average in days coverage terms relative to the 2006-2018 vantage point (23.9 less 14.4).

Suppose end March 2020 working gas inventory matches the EIA’s 1622bcf prophecy (STEO, Table 5a). Relative to full calendar year 2019 demand of about 84.7bcf/day, that represents 19.2 days coverage. Though 19.2 days represents a fairly large increase relative to the 14.4 days of the

preceding year, it falls 4.7 days under 2006-18's 23.9 day end March average, and is 2.8 days below 1990-2018's long run vista of 22.0 days.

Has the just-in-time inventory method for the US natural gas industry reduced the desired level of days coverage relative to prior long run averages by the same number of days across the entire 12 month calendar? Would storage operators and other commercial firms cut both end October and end March days coverage by five days?

Or, might they instead reduce desired (normal, average) inventory holdings by more days for the build season than the winter draw period? This seems more likely. After all, running out of natural gas inventory obviously is a far greater economic (and political) risk during winter. Thus if the (admittedly conjectural) reduction in desirable end October days coverage due to just-in-time inventory management relative to historical averages is around five days, the related cut for end March (and other winter months) arguably is only two or three days.

Since the US natural gas industry likely has cut desired days coverage levels relative to historical averages, end March 2020 days coverage of 19.2 days probably is about normal.

CALENDAR 2020 BUILD SEASON: DAYS COVERAGE STILL LOW

The EIA believes end October 2020 inventories will be 3821bcf. Natural gas days coverage at end October 2020 will be about 45.5 days (3821bcf divided by 84.0bcf/day). Hypothetical end October 2020 days coverage days falls a very substantial 8.3 days under the 2006-2018 end October average of 53.8 days and 7.5 days beneath 1990-2018's 53.0 day average.

Let's assume that the natural gas perspective on what constitutes normal (reasonable) inventories in days coverage terms for end October has fallen to around 48.0 to 48.8 days (a five day reduction relative to the 1990-2018 and 2006-18 averages). Thus even though the natural gas industry has slashed its desired levels of days coverage for end October, end October 2020 days coverage of 45.5 days is mildly bullish relative to a just-in-time standard of about 48.0 to 48.8 days.

Natural gas production estimates and actual output for the balance of calendar 2019 and thereafter obviously in part depend on price. Prices of course also shape consumption forecasts and actual demand. The August 2019 STEO (Table 2) projects the Henry Hub spot natural gas price will average \$2.55/mmbtu in calendar 2019 (calendar 2018 was \$3.15), The EIA's estimate for calendar 2020 is \$2.75.

FINISHING LINES

“When large sums of money are concerned there is seldom much of personal indignation between man and man. The loss of fifty pounds or of a few hundreds may create personal wrath;- but fifty thousand require equanimity.” Anthony Trollope, “The Way We Live Now” (1875)

In natural gas as in other territories, supply/demand investigation can intertwine with so-called technical analysis.

What are significant support and resistance levels for NYMEX natural gas (nearest futures continuation contract)?

Major support for nearest futures is at 1.90 to 2.05. The most recent bear move only partly filled the price gap lurking around 2.00 (5/26/16 high 1.985, 5/27/16 low 2.101). Twice the all-time low is 2.040. The 4/19/12 major trough was 1.902. Above-average temperatures during winter increase the risk of an attack on the 1.90 floor. If that support is broken, it probably will not be by much or for very long, unless winter temperatures stay far above normal.

Beneath that is about 1.60 to 1.75. Underscore 3/4/16's major bottom at 1.611. The average percentage fall for 11 major bear marketplace trends is about 66.7 percent; a two-thirds fall from 4.929 is 1.641. Other bottoms from ancient times: 1.735 (9/5/96)/1.680 (2/24/97); 1.610 (8/27/98)/1.625(2/16/99); 1.760 (9/26/01). It probably would take a much warmer than normal winter alongside significant US economic weakness to attain this range.

Key resistance sits at 2.40 to 2.55. See the six notable lows in the past three years around 2.50: 8/12/16's 2.523, 11/9/16's 2.546, 2/22/17's 2.522, 12/21/17's 2.568, 2/15/18's 2.530, and 2/15/19's 2.543. A fifty percent crash from 4.929 (11/14/18) is 2.465. Recall 1/8/16's interim top at 2.495 and the recent minor top at 2.489 on 7/10/19. A twenty percent bounce from 8/5/19's 2.029 valley gives 2.435, a 25pc one 2.536. A fifty percent rally from 3/4/16's major low at 1.611 is 2.417. The major bottom on 9/4/09 was 2.409.

See the barrier around 2.90 to 3.10. Especially note the unfilled gap from 3.047 (1/25/19) to 2.983 (1/28/19). Three times the all-time low is 3.060. A 50 percent leap from 2.029 equals 3.044. Also note 2015's critical interim top at 3.105 on 5/19/15, part of the major bear descent from 2/24/14's 6.493. See the interim tops in early 2019 around 2.900 (2/26/19 at 2.908; 3/19/19 at 2.897).

Picture a significantly colder than usual winter (or widespread belief this will occur). A colder than normal winter 2019/20 (or winter 2020/21), assuming low end October days coverage, boosts the risks of very low inventories at the end of winter and thus substantial (even if brief in duration) bull ascents.

Important resistance for NYMEX natural gas sits at 3.25 to 3.43. Double the 3/4/16 major bottom of 1.611 gives 3.222. A fifty percent fall from 2/24/14's pinnacle at 6.493 equals 3.247. Recall 5/12/17's interim crest at 3.431 and 10/13/16's interim high at 3.366. A notable price gap within the 3.20/3.45 range emerged in January 2018: 1/29/18's low 3.297, 1/30/18's high 3.259.

A substantial barrier looms around 3.70. Recall the price gap after 12/28/16's 3.994 peak. The 12/30/16 low was 3.690, the 1/3/17 high 3.568. The 1/29/18 high at 3.661, which ended the sharp rally from 12/21/17's 2.568 low, did not completely plug that gap (though autumn 2018's bull charge did so). See 1/15/19's interim top at 3.722.

The 4.00 to 4.10 range represents major resistance for NYMEX natural gas. First, 12/28/16's 3.994 summit initiated a significant price drop (36.9 percent) to 2/22/17's 2.522 trough. The price gap from the 4.075 low on 11/28/14 to the 4.041 high on 12/1/14 remained unfilled for almost four years; the breakthrough over that gap in autumn 2018 stayed above that gap for only about a month. Four times the all-time low for natural gas equals 4.080. A 150 percent rally from 1.611 (3/4/16) gives 4.028. A fifty percent retracement from 6.493 (2/24/14) to 1.611 (3/4/16) is 4.052.

Substantial resistance resides around 4.90 to 5.10. The 11/14/18 peak was 4.929. Recall the critical price collapse point following February 2014's summit, 6/16/14's 4.886. Five times the all-time low is 5.100.

Chronicles and interpretation of natural gas price history can voyage beyond the NYMEX nearest futures continuation contract. Trend seekers and fortune hunters may elect to review individual actual contract months (such as the NYMEX December 2019 natural gas futures contract). Stargazers may analyze several trading months of a gas season (such as the NYMEX winter 2019/20 and summer 2020 calendar strips) or entire calendar years (like the calendar 2021 strip of contracts).

They may study intramarket spreads (such as NYMEX October 2019/January 2020 or March 2020/April 2020), prices in other regions than the NYMEX realm and basis (intermarket) relationships. Note the recent narrowing of the October 2019/January 2020 NYMEX spread alongside 8/5/19's 2.029 low in NYMEX nearest futures continuation. As natural gas has become an increasingly global marketplace, monitoring ICE's NBP natural gas contract and paying attention to liquefied natural gas benchmarks can assist investigators.

Marketplace wizards can derive insight into and tell stories regarding natural gas domains and their past, present, and potential bull and bear patterns by analyzing electricity, coal, petroleum, and other financial battlefields, as well as assorted additional economic and political phenomena.

Will US crude oil output continue its remarkable rising trend? The boom in domestic US crude oil output, especially since December 2016, probably has encouraged the natural gas industry to reduce its desired level of days coverage. According to the "Annual Energy Outlook 2019" (1/24/19, p18), "The percentage of dry natural gas production from oil formations increased from 8% in 2013 to 17% in 2018 and remains near this percentage through 2050 in the Reference case."

The CFTC's Commitments of Traders is sometimes a useful variable for predicting (or confirming) significant trend changes and adventures in the NYMEX natural gas marketplace.

Marketplace convergence and divergence (lead/lag) relationships are complex and can change or transform, sometimes dramatically. Natural gas prices often travel substantially independently of both petroleum (and commodities "in general") and so-called "international" or "financial" marketplaces and variables. After all, natural gas has its own supply/demand picture. Trend changes in NYMEX natural gas need not roughly coincide with one in the petroleum complex or commodities in general, or in currency, stock, or interest rate arenas. For example, natural gas can embark on a bull trend whereas NYMEX crude oil can venture on or remain in a bear pattern.

Nevertheless, bullish and bearish natural gas price movements (nearest futures continuation) sometimes have intertwined with those in the petroleum complex and occasionally with the S+P 500. The S+P 500 made a major bottom in first quarter 2016 (1/20/16 at 1812; 2/11/16 at 1810). So did nearest futures continuation NYMEX crude oil (1/20/16 at \$26.19; 2/11/16 at \$26.05). NYMEX natural gas established its major low not long thereafter with 3/4/16's 1.611.

After the S+P 500 attained its all-time high on 9/21/18 (2941)/10/3/18 (2940), it rapidly dropped about twenty percent to 12/26/18's 2347. NYMEX crude oil's major high was 10/3/18's \$76.90. It precipitously fell 44.9 percent to \$42.36 on 12/24/18. The high in NYMEX natural gas nearest

futures, 11/14/18, occurred several weeks after (but still fairly close in time to) those peaks in the S+P 500 and NYMEX crude oil. It made a brief interim low at 2.878 on 1/3/19, flying quickly to 1/15/19's 3.722.

NYMEX crude oil rallied up to a crucial plateau at \$66.60 on 4/23/19 (recall 1/25/18's important high at \$66.66), but thereafter resumed its descent. NYMEX natural gas had a minor top at 2.700 on 5/20/19. The low in NYMEX crude oil to date in its bloody bear retreat since 4/23/19 is 8/7/19's \$50.52, adjacent to the 8/5/19 natural gas low at 2.029.

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