

## US NATURAL GAS INVENTORY: EAST AND WEST REGION BUILD SEASON

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“Oh, East is East and West is West, and never the twain shall meet,  
Till Earth and Sky stand presently at God’s great Judgment Seat”. Rudyard Kipling, “The Ballad  
of East and West”

### CONCLUSION

Assume normal weather and moderate United States economic growth. Then natural gas inventories in the US Eastern Consuming Region at the end of the 2014 build season probably will range between 1825bcf and 1930bcf. Around 2050bcf is about “normal” (average) for current United States supply and demand patterns. This current bullish inventory picture for the Eastern Consuming Region for the balance of build season parallels the bullish stock outlook of the US Producing Region.

Within the American natural gas scene, Producing Region and Eastern Consuming Region inventories have bigger marketplace shares than that of the Western Consuming Region. Is the Western Consuming Region’s inventory situation for build season 2014 bullish or bearish? The Energy Information forecasts that Western inventories will exceed 560bcf, a bearish perspective relative to that region’s 511bcf end build season average. However, the EIA probably overstates the likely amount of Western inventory building. Not only did Western stocks finish winter 2013-14 draw season at very low levels. Based on historical analysis of builds following comparable low starting totals, Western end build season inventories probably will be around 450bcf to 500bcf. This outcome is slightly bullish.

Despite the sharp price slump in NYMEX natural gas nearest futures continuation after its 2/24/14 peak at 6.493, the overall US inventory situation for the balance of 2014 build season remains bullish. The NYMEX natural gas complex during the course of build season probably will remain in a sideways trend. The NYMEX nearest futures contract probably will stay in a range from 3.80 /4.00 to 5.00/5.20. See “US Natural Gas Inventory Building: the Producing Region Picture” (5/18/14) for price forecast and Producing Region inventory details.

### FACING EAST: THE HISTORICAL BUILD UP

For Eastern Consuming Region (“ECR”) build season, the following table details the early spring inventory low and the autumn stockpile summit for a given calendar year (1994-2013). Valleys and peaks for each column are in bold. Averages for the 20 season span appear at the base of each column. Even though in recent years the East has increasingly become an important producing arena, it still generally gets labeled as a consuming region.

### US NATURAL GAS INVENTORY: EASTERN CONSUMING REGION (1994-Present)

<u>Year</u>	<u>Inventory Low (bcf; date)</u>	<u>Inventory Peak (bcf; date)</u>	<u>Inventory Change (arithmetic, bcf)</u>	<u>Inventory Change (percent)</u>
1994	461 (3/25/94)	1896 (11/11)	1435	311.3
1995	613 (4/14)	1813 (11/3)	1200	195.8
1996	285 (4/12)	1841 (11/1)	1556	546.0

<u>Year</u>	<u>Inventory Low</u> <u>(bcf; date)</u>	<u>Inventory Peak</u> <u>(bcf; date)</u>	<u>Inventory Change</u> <u>(arithmetic, bcf)</u>	<u>Inventory Change</u> <u>(percent)</u>
1997	493 (4/18)	1824 (11/7)	1331	270.0
1998	635 (3/27)	1917 (10/30)	1282	201.9
1999	657 (3/26)	1877 (11/12)	1220	185.7
2000	535 (4/14)	<b>1762 (11/10)</b>	1227	229.3
2001	364 (4/6)	1928 (11/30)	1564	429.7
2002	721 (4/12)	1867 (10/25)	1146	158.9
2003	<b>277</b> (4/11)	1891 (11/7)	<b>1614</b>	<b>582.7</b>
2004	473 (4/9)	1939 (11/5)	1466	309.9
2005	546 (4/1)	1946 (11/7)	1400	256.4
2006	846 (3/31)	1990 (10/20)	1144	135.2
2007	663 (4/13)	2017 (11/2)	1354	204.2
2008	563 (4/4)	2041 (11/7)	1478	262.5
2009	641 (3/27)	<b>2101</b> (11/13)	1460	227.9
2010	750 (4/2)	2087 (10/29)	1337	178.3
2011	616 (4/1)	2091 (11/11)	1475	239.4
2012	<b>1049</b> (3/16)	2096 (11/2)	<b>1047</b>	<b>99.8</b>
2013	646 (4/5)	1984 (11/8)	1338	207.1

**1994-2013**

**Average (20 periods):**

**592bcf                      1945bcf                      1353bcf                      228.5pc**

The average date for the Eastern Consuming Region inventory bottom is around April 6. The typical end date for the inventory top is November 5. The table presents percentage inventory change for the entire period as the average inventory shift relative to the average low (1353/592bcf). Alternatively, the average of actual percentages (sum of the inventory changes divided by 20) is 261.5pc.

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The 2014 ECR inventory bottom is 4/4/14's 305bcf, the lowest since 2003's 277bcf. ECR stocks on 5/23/14 stand at 586bcf, down 35.0 percent from 5/23/13's 902bcf.

**2014 EASTERN BUILD SEASON**

How sizable will be Eastern Consuming Region inventory at end build season 2014?

Given increased United States natural gas demand (and supply) since 2006, viewpoints regarding and estimates derived from "average" (normal, typical, desired), "high" and "low" gas inventories in the US as a whole and for its various regions should emphasize the 2006-13 time period. However, the long run perspective beginning with 1994 remains relevant.

Over the eight years from 2006-2013, the average ECR inventory at the commencement of build season is 722bcf. For 2006-13, average inventory elevation at the close of build period is 2051bcf. Thus the average increase is about 1329bcf (2051 less 722bcf), or about 184 percent (1329/722bcf).

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Natural gas price levels and trends in various regions of course intertwine with gas supply, demand, and inventory totals and patterns, as well as with numerous other factors. In the current US natural gas marketplace, the natural gas versus coal switching issue, especially within the electric power sector, is a critical variable.

In any event, the most recent EIA Short-Term Energy Outlook (“STEO”, Table 5a; 5/8/14; next release 6/10/14) predicts end October 2014 ECR inventory of 1822bcf, with end November at 1787bcf. Since the ECR inventory high tends to arrive around 11/5, an inventory peak estimate derived from the EIA figures probably should be slightly above 1822bcf. The EIA estimates end 1Q15 inventories of 530bcf.

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Let’s further assess potential Eastern Consuming Region inventory levels for end build season 2014 via another approach.

Suppose one takes the 305bcf low for 2014 (4/4/14) and adds the 1329bcf average (2006-13) to it. Thus inventory climbs to 1634bcf by the end of 2013 build season. Is this 1329bcf estimated increase too conservative? Probably. Why?

All else equal, average natural gas inventory levels at the dawn of ECR build season tend to be followed by average stock increases for the overall build season. Significantly, low inventory encourages higher builds. For example, note the extremes of 1996, 2001, and 2003 build seasons; for the 2006-13 era, see 2008 and perhaps 2011 as well. High inventory at the start of the build period tends to produce (be associated with) small stock increases. Note the 2012 and 2006 build seasons, as well as 1999 and 2002. These gas inventory build patterns have been true of the US Producing Region as well. See “US Natural Gas Inventory Building: the Producing Region Picture” (5/18/14).

The 305bcf starting point for 2013 ECR inventory lurks far beneath (417bcf; 57.8pc) the 722bcf average of the 2006-13 time frame. Consequently, meager early April 2014 ECR inventory total probably will help lead to a greater than average (relative to the 2006-13 vista) bcf jump.

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The EIA’s 1822bcf estimate for the end October 2014 ECR stockpile implies a massive build from the long run (1994-2013) historical perspective. ECR inventories may be a few bcf higher than this as build season peak closes around the end of the first week of November. Anyway, suppose they loom around 1825bcf. So 1825bcf less 305bcf is a 1520bcf leap. This falls short of 2003’s record 1614bcf and 1996 and rivals the 1996 and 2001 ones. A 498.4 percent inventory boost (1520/305bcf), though not a record, would recall the soaring totals of 1996 and 2003 shown in the preceding table.

In arithmetic terms, this 1520bcf ascent surpasses all increases over the eight year 2006-13 era. For the 2006-13 horizon, no boost comes close to this nearly 500 percent climb in percentage terms. Therefore observers should monitor actual inventory builds particularly closely this year. A five percent shortfall relative to 1825bcf would leave stocks at 1734bcf.

Keep in mind that 1825bcf ECR stocks still falls about eleven percent beneath 2006-13’s 2051bcf end build season average. All else equal, this is a bullish price scenario.

Will US natural gas production in calendar 2014 exceed the EIA’s current production estimates? See the analysis in “US Natural Gas Inventory Building: the Producing Region Picture”

(5/18/14). Suppose that for America's 2014 seven month (April through October) build season, a one bcf/day output increase relative to the current EIA forecast for the entire US occurs. All else equal, this would push total US stocks about 210bcf higher. However, not all of that hypothetical incremental build would occur in the ECR. Suppose as much as half the additional 210bcf total ends up in the ECR. Relative to the EIA's forecast, that would make ECR end build season stocks around 1930bcf (1825bcf plus 105bcf), about six percent less than the 2006-13 average.

For ECR inventories to match the 2006-13 average, they will have to balloon substantially. Take the 2051bcf average and subtract build season 2014's 305bcf start. That generates a 1746bcf build, or roughly 572.4pc. This would be a new record arithmetical jump for the entire 1994-2013 period, bounding over 2003's 1614bcf. The percentage move nearly would match 2003's 582.7pc. At present, this scenario looks unlikely.

Assuming normal weather and modest US economic growth, ECR inventory at end build season 2014 probably will be around 1825 bcf to 1930bcf.

### **STORAGE CAPACITY: EAST**

As of November 2013, demonstrated peak working gas capacity for the ECR was 2201bcf (Energy Information Administration, 2/28/14; November 2013 represents the most recent data). So even if ECR inventories skyrocket in 2014 to reach their 2051bcf 2006-13 average, the ECR generally should not suffer any significant containment problems during 2014 build season.

November 2013's storage capacity was unchanged year-on-year, an interesting phenomenon given growing ECR production (as well as national consumption increases) in recent years. The EIA also states: "Most of currently planned storage projects are in the Producing Salt and West regions" (perhaps 63bcf in 2014). It thus implicitly anticipated little new storage building in the ECR for the near term.

ECR capacity building prior to the November 2012-2013 span was slight. It averaged between 16 and 17bcf each 12 months. From April 2011 to April 2012 capacity grew merely 14bcf. The year-on-year rise from 2008 to 2009 was 25bcf. For 2009 to 2010, it was 18bcf, with that for 2010 to 2011 only nine bcf.

### **TRAVELING WEST: THE HISTORICAL VIEW**

"If you ever plan to motor west,  
Travel my way, take the highway that is best.  
Get your kicks on Route 66." "Route 66", a song by Bobby Troup  
\*\*\*\*

America's natural gas Western Consuming Region, assuming normal weather and moderate real GDP growth, probably will end its 2014 build season with inventory around 450bcf to 480bcf.

Survey Western Consuming Region ("WCR") build season inventory from 1994-2013 (EIA, weekly statistics). For each year, the table portrays the late winter/early spring inventory trough and the autumn stockpile pinnacle. Lows and highs for a given column are in bold. Averages for the two decade period appear at the base of the columns.

**US NATURAL GAS INVENTORY: WESTERN CONSUMING REGION (1994-2013)**

<b><u>Year</u></b>	<b><u>Inventory Low (bcf; date)</u></b>	<b><u>Inventory Peak (bcf; date)</u></b>	<b><u>Inventory Change (arithmetic, bcf)</u></b>	<b><u>Inventory Change (percent)</u></b>
1994	201 (3/11/94)	407 (10/28/94)	206	102.5
1995	244 (4/21)	420 (11/17)	176	72.1
1996	220 (4/5)	340 (10/18)	<b>120</b>	<b>54.5</b>
1997	166 (3/14)	367 (11/7)	201	121.1
1998	137 (4/17)	390 (11/6)	253	184.7
1999	195 (4/16)	373 (11/19)	178	91.3
2000	192 (3/17)	<b>314</b> (10/27)	122	63.5
2001	<b>114</b> (3/9)	416 (11/23)	<b>302</b>	<b>264.9</b>
2002	211 (3/22)	416 (10/25)	205	97.2
2003	167 (3/21)	399 (10/31)	232	138.9
2004	148 (3/5)	425 (11/12)	277	187.2
2005	205 (3/25)	443 (11/11)	238	116.1
2006	229 (3/24)	473 (11/10)	244	106.6
2007	224 (3/9)	478 (11/16)	254	113.4
2008	173 (4/4)	473 (11/14)	300	173.4
2009	276 (3/13)	526 (11/27)	250	90.6
2010	283 (3/12)	520 (11/5)	237	83.7
2011	216 (3/25)	517 (12/2)	301	139.4
2012	<b>344</b> (3/23)	551 (11/9)	207	60.2
2013	330 (3/29)	<b>555</b> (11/1)	225	68.2

**1994-2013**

**Average (20 periods):**

**214bcf                      440bcf                      226bcf                      105.6pc**

The average date for the Western Consuming Region inventory bottom occurs around March 24. The average end date for its inventory pinnacle is November 9.

The table presents percentage inventory change for the entire period as the average inventory change relative to the average low (226/214bcf). Alternatively, the sum of the actual percentage inventory changes divided by 20 is 116.5pc.

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For the eight years 2006-13, the WCR's start of build season inventory averages 259bcf, with its average end season peak about 511bcf. The average stock gain is about 252bcf, or 97.4pc (252/259bcf). The sum of the actual percentage inventory changes divided by eight is 104.4pc.

\*\*\*\*

All else equal, average WCR inventory level at the commencement of its build season tends to produce average builds. In the WCR as elsewhere in the United States, an elevated natural gas inventory total favors less than average inventory building (in the table above, see 2012 as well as 1995 and 1996 and arguably 2010 and 2013). A relatively depressed WCR stock amount at the onset of build season encourages greater than normal inventory growth (look at the percentages for 1998, 2001, 2004, and 2008). Yet this guideline is not absolute, as 2000's paltry inventory expansion occurred relative to a modest build season start (the 3/17/00 192bcf starting point was almost even with the 194bcf average of the preceding six years 1994-1999).

## WESTERN CONSUMING REGION: 2014 END BUILD SEASON STOCKS

The 2014 inventory low was 160bcf on 3/28/14. The 5/23/14 inventory of 250bcf slipped about 33.9 percent year-on-year.

How high will WCR end build season 2014 working gas inventory be? Focus on the 1994-2013 table above and particularly on the 2006-13 statistics within it.

\*\*\*\*

The EIA's May 2014 Short-Term Energy Outlook gives end October 2014 WCR inventories at 563bcf, with end November at 566bcf. Relative to the eight year average end season total of about 511bcf, this outcome represents a bearish inventory outcome. As the average peak date for WCR inventory is November 9, the ultimate inventory top may be a few bcf above the government's forecasts for end month October/November 2014. The EIA anticipates end 1Q15 WCR stocks of 352bcf.

Suppose WCR inventories peak at 570bcf. Not only would this total attain a new high relative to 2013's 555bcf ending stocks. The 2014 stocks, soaring 410bcf versus the late March 2014 bottom, would be a record-shattering advance in bcf terms. The 256.3pc increase would rival 2001's. This mammoth WCR build may occur, but historical review suggests it probably will not.

Even if overall US natural gas production increases more (perhaps by about one bcf/day) in calendar 2014 than the EIA currently forecasts, how likely is it that the great majority of incremental supplies will find their way into the WCR?

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Suppose visionaries boost the 160bcf inventory bottom reached on 3/28/14 with the 252bcf average build of 2006-2013. This leaves 2014 end build season supplies at 412bcf. This total falls significantly under 2006-13's 511bcf end build season average. This perspective consequently produces a bullish inventory picture. Although the bcf build was average, the 157.5 percent increase (252/160bcf) is well above normal for both the past eight years as well as the long run horizon of 1994-2013. This fits the viewpoint of a greater than average inventory increase following very low supplies.

However, relative to the eight years 2006-13, this year's 160bcf starting total looks extremely low, and the 157.5pc boost still leaves WCR inventories significantly below average. An average arithmetic build in the 2014 context arguably is too cautious. Maybe the natural gas industry will make a herculean effort to push WCR stocks closer to normal levels.

The 157.5pc jump is considerably less than 2001's 264.9pc, as well as a fair amount under the 181.8pc average of 1998, 2004, and 2008. Suppose inventories march 181.8pc upward this season. Then WCR ending stocks will peak at around 451bcf ( $X/160bcf=181.8pc$ , so X equals 291 bcf; 291 plus 160 gives 451bcf), A 200pc increase versus the 3/28/14 inventory depth is 320bcf, breaking 2001's 302bcf climb. At 480bcf; stocks will be about six percent under the 511bcf benchmark. A 450bcf/480bcf (or 500bcf) range would be slightly bullish.

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For the EIA's WCR estimate around 570bcf to be reached, perhaps pipeline imports from Canada would have to sustain increases at a greater rate than many foresee. The EIA's recently issued (5/28/14) "US Natural Gas Imports & Exports 2013" comments that pipeline imports from Canada have decreased almost every year since 2007. In 2013, the decline of imports into the

Eastern US was sharp. The EIA notes that imports from Canada into the Western US stayed relatively stable compared with levels of previous years. However, this comment for 2013 does not speak of a notable increase of natural gas into the Western US.

The EIA's "Monthly Energy Review" (Table 4.2, 5/28/14) data for the first two months of calendar 2014 (the most recent data) relative to the comparable 2013 months and full calendar year 2013 nevertheless displays an increase of gross natural gas imports into the US from Canada. The first two months of calendar 2014 US imports from Canada rise 8.1pc (about 20bcf) versus January/February 2013 and grow about 14.0pc (over 32bcf) relative to full year 2013.

Was this import boost in early 2014 due to an especially cold US winter, and how likely is that increase to be sustained? Is this MER import data influencing the EIA's lofty prediction for Western Consuming Region build season inventories? Even if overall imports of natural gas from Canada do not maintain their early 2014 gains relative to recent history, perhaps an increased quantity of Canadian gas will move into the Western US, having been displaced from Eastern US destinations due to booming US Eastern region natural gas production.

### **WESTERN STORAGE**

Demonstrated peak working gas capacity as of November 2013 for the Western territory is 645bcf, up 4.7pc from November 2012's 616bcf (EIA, 2/28/14) The EIA indicates WCR storage will expand about 28bcf during calendar 2014. Even if the WCR natural gas hoard reaches 570bcf, the WCR region probably will not face a notable containment problem around the end of 2014 build season.

WCR annual capacity builds have fluctuated substantially. Capacity jumped 46bcf higher from April 2011 to April 2012. Yet the 2010 to 2011 increase was a meager two bcf. However, from 2009 to 2010, the year-on-year growth was 47bcf. It climbed a modest 19bcf from 2008 to 2009.

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