

December 27, 2002

Is there Sufficient Natural Gas in  
Storage to Meet this Winter's Needs?

EIA's most recent Weekly Storage Reports have been startling.

For several weeks in a row, the weekly storage withdrawal figures reported by EIA have been *far* above the levels that might normally be expected for this time of the year – even after adjusting for weather:

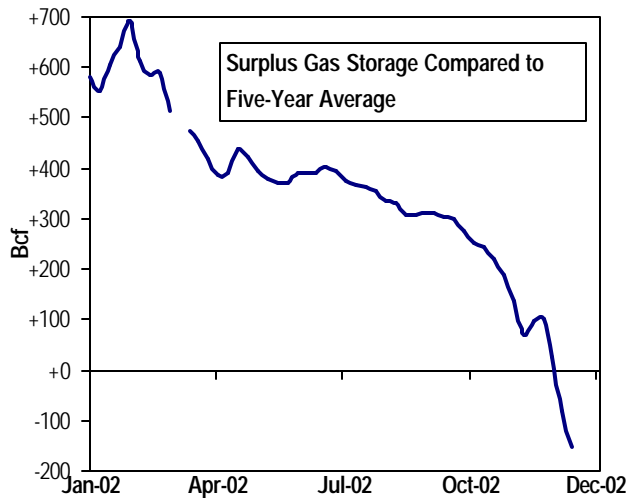
<u>Week Ending</u>	<u>Normal Withdrawal</u>	<u>Adj. For Weather</u>	<u>Weather Adj. Target</u>	<u>Actual</u>	<u>Variance</u>
11/29/02	45 BCf *	+ 15 BCf *	60 BCf	91 BCf	+ 31 BCf
12/06/02	88 BCf	+ 30 BCf	118 BCf	162 BCf	+ 42 BCf
12/13/02	105 BCf	- 12 BCf	93 BCf	159 BCf	+ 66 BCf
12/20/02 **	132 BCf	- 59 BCf **	73 BCf	95 BCf	+ 22 BCf
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TOTAL	370 BCf	- 26 BCf	344 BCf	507 BCf	+163 BCf

\* Reflects shortened workweek due to Thanksgiving Holiday.

\*\* Heating Degree Days (HDD's) for the week ended 12/20/02 were approximately 154 HDD's (49 HDD's less than the norm for the week).

These withdrawals continue a pattern that has persisted for much of the year.

Since early February, when working gas in underground storage peaked at almost 700 BCf **above** the 5-year average for the comparable week, storage has **declined** on a relative basis *every* month for *10 consecutive* months. As of EIA's most recent Weekly Storage Report (for the week ending December 20<sup>th</sup>), relative to the 5-year average, storage has dropped by almost 825 BCf since the February peak and now stands at a level more than 125 BCf **below** the 5-year norm – one of the steepest 10 month drops in U.S. history:



This rapid deterioration in the amount of natural gas in storage, starting just as winter is officially beginning, raises obvious questions as to what to expect over the remainder of the winter heating season. Will storage continue to decline relative to the 5-year average? If so, how rapidly? Is the amount of natural gas in storage sufficient for the U.S. to make it through the winter heating season without running out of natural gas? If so, are prices likely to continue to rise or (as many prominent analysts suggest) will prices soon revert to the \$ 3.50 – 4.00/MMBTU level? If another price run-up occurs, when is it likely to take place? How high will prices climb?

These issues will be addressed briefly below and discussed in more detail in the Energy Business Watch study on *The Coming Natural Gas Crisis* to be released later this month.

The bottom-line: as is true during any winter heating season, storage levels and prices will be strongly affected by weather. This year in particular, prices also are likely to be influenced by geo-political events, both in Venezuela and in the Middle East.

Especially over the critical next 6-8 weeks, therefore -- when winter weather typically is at its peak – much will depend upon whether and, if so, how far temperatures plummet and upon events elsewhere in the world.

Even if January and February are much colder than the norm, however, we do not believe that under any scenario the U.S. will “run out” of natural gas; instead, even if the amount of natural gas in underground storage continues to dwindle rapidly in January, we have no doubt that the LDC’s will bid prices to whatever level is necessary in order to ensure that they can maintain adequate amounts of natural gas in storage to meet customer needs throughout the remainder of the winter heating season, *with* an adequate “safety margin” to ensure that no shortages will occur even under a “worst case” scenario.

The issue, therefore, is only whether – and if so, how high – prices ultimately may need to rise in order to balance supply and demand.

Overall, we believe the price risks facing the U.S. market are clearly asymmetrical – i.e., the likelihood of significant further price increases is *considerably* higher than the potential for any sustained softening.

In the wake of very mild temperatures during the week ended December 20<sup>th</sup> (the Weekly Storage Report for which was issued earlier today), and the above-normal temperatures expected over the next 5-7 days, there is a substantial possibility that during the next week prices will temporarily decline.

Given the current severe undersupply condition in the market, however, we will be surprised if natural gas prices fail to crack the \$ 6.00/MMBTU threshold during

January, even if temperatures are close to historical norms; if temperatures average colder than normal (as proprietary forecasts suggest may occur), the potential for *significantly* higher prices in the very near term can not be ruled out – and instead should be taken *very* seriously.

Further, even if temperatures moderate significantly, absent a particularly strong *El Nino* effect during the second half of the winter (which we've been advised appears increasingly unlikely), prices are unlikely to fall more than 10% from this week's levels.

Moreover, as 2003 unfolds and the magnitude of the emerging near to mid-term mismatch between supply and demand in the North American market becomes clearer, we believe that higher natural gas prices are inevitable over the course of the year.

These increases in turn could last for much of the rest of the decade (i.e., the lead-time required for the major new initiatives needed to significantly expand supplies available to the North American market, such as construction of the MacKenzie Delta Pipeline to bring natural gas into the U.S. from the Arctic Circle in Canada and/or permitting and construction of the massive new infrastructure necessary for any large-scale expansion of imports of LNG).

#### Remaining Cushion

In assessing the prospects for the remainder of this year's winter heating season, it is important to emphasize that, as a result of the huge build-up in storage that occurred last year, we still have at least some cushion left.

Specifically, as of EIA's most recent Weekly Storage Report, for the week ending December 20th, working gas in storage totaled 2,540 BCf – still only modestly below the 5-year average:

<u>Region</u>	<u>12/20/02 Levels</u>	<u>5-Year Average</u>	<u>Variance</u>	<u>Percentage</u>
East	1,468 BCf	1,629 BCf	- 161 BCf	- 9.9 %
West	379 BCf	323 BCf	+ 56 BCf	+17.3 %
Producing	693 BCf	716 BCf	- 23 BCf	- 3.2 %
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TOTAL	2,540 BCf	2,668 BCf	-148 BCf	- 4.8 %

This remaining cushion in turn is more than 500 BCf *higher* than storage levels for the comparable week in December of 2000, when the spot market price for natural gas was on a sharp upward spiral (averaging well above \$ 8/ MMBTU for the month) and the comparable figure for storage stood at 1,973 BCf.

In addition, the Weekly Storage Report issued by EIA this week is likely to temporarily calm the market.

Consistent with the usual lag-time in EIA's reporting of storage levels, the Weekly Storage Report issued this morning (one day later than usual because of the Christmas holiday) covers the week ended December 20, 2002. The weather during the week of the 20<sup>th</sup> was unusually mild – i.e., more like a typical day in November than the December norm, with temperatures (as measured in Heating Degree Days (HDD's) almost 25% below historical norms.

As result, the withdrawals reported by EIA this morning, while significantly above the levels that should have been expected in view of the relevant weather, are not nearly as startling in absolute terms as EIA's postings for the two prior weeks.

Implications for Price and Supply  
Of Natural Gas this Winter

We would caution against taking too much comfort, however, in the size of the remaining cushion.

In particular, as explained in detail in the EBW Study to be issued next week:

1. **While storage is currently only modestly below historical norms, the rapidly dwindling cushion that remains available today is due almost entirely to a unique combination of circumstances that began in the last 8 months of 2001, which resulted in a huge temporary build up in storage that is not likely to reoccur, not to any sustainable equilibrium between supply and demand in the U.S. market.**

This unique combination of events included: (i) beginning in the spring of 2001, the worst manufacturing recession in 22 years; (ii) the September 11<sup>th</sup> terrorist attacks; and (iii) the mildest winter weather in many years.

As a result of the combined impact of these factors, during the last two months of 2001 and the first two months of 2002, natural gas consumption was at its lowest comparable-month level at any time in the past 10 years every month for four successive months, with a year-over-year decline in consumption of over 1.3 Tcf in a single four month period:

Winter Heating Season Natural Gas Consumption

<u>Month</u>	<u>'00/'01 Season</u>	<u>'01/'02 Season</u>	<u>Net Decrease</u>	<u>% Decline</u>
November	1,909 BCf	1,615 BCf	- 294 BCf	- 15.4 %
December	2,581 BCf	1,909 BCf	- 560 BCf	- 21.7 %
January	2,636 BCf	2,322 BCf	- 304 BCf	- 11.5 %
February	2,278 BCf	2,094 BCf	- 184 BCf	- 8.7 %
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TOTAL	9.404 Tcf	8.062 Tcf	- 1.342 Tcf	- 14.3 %

Almost 70% of this decline, however, was due to record warm temperatures in the winter of '01/'02 (both in absolute terms and relative to the slightly-colder than normal '00/'01 winter heating season) – *not* to any underlying change in demand that can be expected to reoccur in subsequent years.

- 2. Considered in conjunction with longer-term trends, the withdrawals from storage that have occurred in recent weeks strongly confirm that the U.S. natural gas market already is in a significant “undersupply” condition, in which the amount of natural gas available to the U.S. market is at least 3 - 4 BCf/day below the daily supply rate necessary to satisfy projected demand for next year (i.e., for the year as a whole, a potential shortfall of more than 1.0 TCf).**

In looking at the Weekly Storage Report, we believe it is always a mistake to treat the storage withdrawal numbers for any one week as a definitive indicator of long-term trends. The reported numbers are subject to too much error, and there are too many extraneous factors that can cause week-to-week fluctuations in EIA's weekly postings.

Further, given the startling numbers posted by EIA over the past few weeks, it is certainly possible that at some point EIA will make adjustments to its figures that could put the reported values for the past few weeks in a somewhat different light – at least to a degree.

The overall pattern of the past few weeks, however, is too striking to dismiss lightly – especially when viewed in conjunction with data from earlier months.

The weather over the past four weeks, on balance, was slightly *milder* than normal (though only modestly so), with 16 *fewer* Heating Degree Days than the historical norm for comparable weeks.

*Despite* this milder than-normal weather, the total withdrawal for the four-week period was 137 BCf (i.e., 27%) *greater* than the expected withdrawal *prior to* adjusting to weather and 163 BCf (or 44%) greater on a weather-adjusted basis.

Further, the withdrawals for two of the four weeks (i.e., the weeks ending the 6<sup>th</sup> and the 13<sup>th</sup>) were at or near *all-time highs* for comparable weeks even though the temperatures during these weeks were well within the typical range for these weeks.

In the aggregate, the total withdrawal over the past four weeks (i.e., 507 BCf) is more in line with the withdrawals that might be expected during the peak weeks of the winter heating season in January or February than the withdrawals that typically occur during late November and early December, when temperatures still are comparatively mild. (This is a *huge* difference, since in most years the

withdrawal rate in November and early December is only about 1/4<sup>th</sup> to one half of the expected withdrawal rate in January or February.)

When viewed in the context of a longer-term pattern of declining storage that has persisted for many months, therefore, the conclusion couldn't be clearer – i.e., the U.S. almost certainly is now in a period in which the overall supplies available to the U.S. market are running *significantly* below the levels required to meet expected '03 demand.

Until recently, the existence of this growing imbalance between supply and demand has been masked by the *huge* build up in storage that occurred in the second half of 2001 and the first few weeks of this year.

With current production levels in the U.S. market now at its lowest level in more than a decade, however, and production in Canada also declining (albeit at a more modest rate), it is only a matter of time until the ongoing supply deficit in the U.S. market becomes unmistakable to every participant in the market.

3. **While the record withdrawals over the past few weeks in all likelihood are due in part to temporary phenomenon, only a small portion of this shortfall can be attributed to temporary circumstances.**

In assessing the implications of recent withdrawals for the current balance between supply and demand, it is certainly possible – perhaps even likely --that the size of these withdrawals reflects to a degree temporary phenomenon that will not necessarily reoccur over the remainder of the winter season.

For example, during the first few weeks of the transition to peak winter weather, for operating reasons, line pack often is increased, in order to enable pipelines to respond quickly to increased demand on days when temperatures plummet. Pipelines may take this action either at their own initiative or in response to specific requests by LDC's.

To the extent this increase occurs, it can result in increases in the amount of natural gas withdrawn from storage that are not necessarily immediately reflected in deliveries to LDC's or end-user customers, since the gas is not necessarily immediately drawn down from the lines. This in turn can create a larger than-normal drop in storage levels for a temporary period.

While we have not found data that would allow us quantify this effect precisely, given the amount of natural gas being transported through the pipeline system at any one point in time, it would not be surprising if this factor contributed 25 BCf or more to the net decline in storage over the past few weeks, when the pipelines and LDC's needed to prepare for the onset of much colder weather.

This factor does not even begin to explain, however, the 163 BCf weather-adjusted deviation from expected storage that has occurred during the past 4 weeks.

It is also possible, as suggested in a report issued on Thursday of last week by the institutional research group at Friedman, Billings & Ramsey, that withdrawals from storage over the past few weeks may have been “artificially inflated” at least to a small degree due to “cash-strapped energy traders/marketers blowing down storage earlier than normal.”

While FBR acknowledges that this phenomenon, if it is occurring, would be difficult to prove, to support its contention, FBR notes that, over the prior week, the spread between NYMEX futures and cash rose more than four-fold to \$ 0.28/MMBTU. This in turn suggests that, during the course of the week, larger-than-normal quantities of natural gas may have been sold into the spot market.

In our judgment, given the current liquidity needs of many energy traders, it is plausible that certain companies may be liquidating amounts in natural gas earlier than they might have done in prior years (as they have every right to do if they believe it is in their economic self-interest to do so).

As the FBR report suggests, this in turn may have temporarily moderated, at least to a degree, the increase in cash prices that might otherwise have been expected to occur as supplies tightened over the past few weeks. Lower spot market prices resulting from the liquidation of amounts in storage, in turn, might be artificially increasing consumption (or at least delaying a likely decline) during the period in which the storage inventories held by these companies still are being drained.

To the extent amounts in storage controlled by traders are being sold into the market, however, it is likely that much of it is simply being resold to LDC's or other traders who want to increase their own storage levels – in which case it is not necessarily having any impact on the total amount of natural gas currently in storage. Further, in those circumstances in which natural gas is being released into the market and consumed by end users, the net effect is to *reduce* the total amounts in storage that remain available for use later in the winter – and therefore potentially to exacerbate supply pressures in future months.

Even if FBR's suggestion is correct, therefore (as we suspect, to a degree, may well be true), the net impact on storage levels is likely to be both temporary and small.

The lion's share of the record 507 BCf draw down from storage that has occurred over the past four weeks, therefore, can not be readily dismissed, and instead is a clear indication of the growing mismatch between supply and demand that is occurring in the U.S. market.

4. **As the amounts in storage continue to deteriorate, the impact on natural gas prices could be both rapid and severe.**

The primary cause, therefore, of the huge draw down in storage that has occurred over the past 10 months appears to be unmistakable: during the course of this year, a serious undersupply condition has developed in the U.S. market, in which over the course of the current injection/withdrawal cycle, withdrawals are likely to *far* exceed injections.

Further, over the past 30-45 days, this mismatch between supply and demand appears to be accelerating.

During this year's injection cycle, storage was *not* replenished at anywhere near the normal rate. Instead, net injections fell at least 300 BCf below normal levels (a shortfall of nearly 20%).

Of even greater concern, now that the U.S. has entered into the winter withdrawal season, natural gas is being pulled out of storage at a rate that *far* exceeds historical norms.

As a result, even though we still at an early stage in the winter heating season, since storage peaked in late October at 3,172 BCf, a whopping 632 BCf has been withdrawn from storage in a period of just eight weeks. This massive withdrawal in a high compressed time period, occurring *before* winter even officially begins at a time when temperatures are still far milder than on a typical cold winter day in January or February, is more than **twice** the normal withdrawal from underground storage during comparable weeks (i.e., a withdrawal of 632 BCf vs. a 5-year average withdrawal for the same period of 311 BCf – a difference of 321 BCf, or an average of 5.73 BCf/day during the eight week period).

Nor is there any reason to believe that this mismatch will be short-lived.

Instead, to the contrary, there is every indication that the imbalance between supply and demand has been growing all year long -- and could *continue* widening through much of next year.

On the supply side, production from U.S. wells has been declining consistently throughout the course of the year, to the point that it is now 5-7% below last year's levels, with no immediate turnaround of any significance in sight.

Further, while imports of LNG are increasing, this increase is being more than offset by declines in imports from Canada and by a rapid increase in exports to Mexico. On an all-in basis, therefore, net imports have been declining – and almost certainly will continue to decline next year.

At the same time, demand for natural gas has begun to increase – with the potential for this increase to *accelerate* rapidly.

While industrial demand remains at depressed levels, over the past several months, the decline in industrial demand increasingly has been offset by surging demand for electricity, particularly in the regions of the U.S. that depend most heavily on natural gas as a fuel to generate electricity.

As a result in part of this increased demand by the power industry, EIA most recent forecast predicts that aggregate U.S. demand for natural gas in 2003 will be more than 1.0 TCf *higher* than this year's levels.

This upward pressure on demand could be further exacerbated by the 12-state NOx trading program that goes into effect in the Northeast on May 1<sup>st</sup> of this coming year, which may require ratcheting back use of certain coal-fired generating units in New York and the Mid-Atlantic states and substituting what otherwise would be out-of-merit-order dispatch of natural gas-fired generating units in order to comply with region-wide restrictions on allowable emissions of NOx during the 5-month summer ozone season.

There is every reason to expect, therefore, that the imbalance between supply and demand on natural gas in the U.S. market will continue to accelerate in the first nine months of next year – especially given the rock bottom Q1 '02 comps against which consumption during the first several months of next year will be judged.

An imbalance of this nature cannot persist for long.

At least in theory, given the current undersupply condition in the market, if non-weather driven consumption were to remain at current levels and winter temperatures for the remainder of the heating season turn out to be in the normal to colder-than-normal range, by the end of March working gas in storage could decline to as low as 400 – 600 BCf (i.e., to record low levels).

We do ***not*** believe, however, that storage ever will be permitted to decline to this level – or that there is any risk that the U.S. will “run out” of natural gas at any time this winter.

Instead, if storage continues to be decline rapidly in January, we believe that the LDC's will take whatever steps are necessary to prevent working gas in underground storage from falling any lower than approximately the same storage levels that were maintained in the East Region and the Producing Region during the first three months of 2001 (when storage reached its lowest point in many years):

<u>Milestone</u>	<u>East Region</u>	<u>Producing Region</u>
1/31/01	Approx. 775 BCf	Approx. 325 BCf
2/28/01	Approx. 575 BCf	Approx. 275 BCf
3/31/01	Approx. 375 BCf	Approx. 225 BCf

This in turn should provide an adequate safety margin to, in the words of one LDC spokesperson, “make sure that no one’s grandmother freezes to death if we have a sudden cold spell in late March or early April” (a planning standard that, with appropriate refinements, LDC’s do – *and should* -- take seriously, since they are legally obligated to ensure that supplies are adequate to meet customer needs and the public is dependent upon LDC’s acting cautiously and conservatively in order to avoid potential harm to the public [including but not limited to potential harm to grandparents]).

Absent a rapid return to the record mild winter temperatures of recent winters, however, maintaining storage at these levels may require further steep price increases above current levels. This is because, to free-up additional natural gas to inject into storage, it may be necessary to raises prices high enough to drive out the market a significant fraction of the remaining non-weather related industrial demand.

#### Key Indicators to Watch

The single most important metric to monitor, in our judgment, will be underground storage in the Eastern Region.

Over the past few weeks, storage in the East has begun to fall significantly relative to the 5-year average (i.e., as of this week’s report, 9.9% below the historical average). As a result, it is now perilously close to the levels experienced in November and December of 2000, when prices last skyrocketed.

Even though December of 2000 was by far the coldest portion of the ‘00/’01 winter heating season, the current “cushion” in the East is only 195 BCf greater than storage levels for the comparable week in December of 2000 (when prices by the end of the month rose to almost twice current levels):

#### Remaining East Region Underground Storage

<u>Week Ending</u>	<u>’02/’03 Storage Level</u>	<u>’00/’01 Storage Level</u>	<u>Difference</u>
11/29/02	1751 BCf	1569 BCf	+ 182 BCf
12/06/02	1640 BCf	1469 BCf	+ 171 BCf
12/13/02	1537 BCf	1378 BCf	+ 159 BCf
12/20/02	1468 BCf	1273 BCf	+ 195 BCf
12/27/02	?	1131 BCf	?

01/03/03	?	1035 BCf	?
01/10/03	?	975 BCf	?
01/17/03	?	922 BCf	?
01/24/03	?	825 BCf	?
01/31/03	?	762 BCf	?

For the first time in several weeks, this week's Weekly Storage Report showed a modest improvement in storage in the East Region vs. '00/'01 storage for the comparable week. The 36 BCf net gain for the week, however (from +159 BCf to +195 BCf) occurred solely because of differences in weather between the two years.

Specifically, weather during the week ended 12/20/02 (i.e., the week covered by today's report), measured in HDD's, temperatures was almost 25% warmer than historical norms; by contrast, weather during the last two weeks of December of '01 was far colder-than-normal, resulting in two of the largest withdrawals of that year. If the weather for the week of 12/20/02 had been more typical, storage in the East almost certainly would have continued to deteriorate relative to '00/'01 levels.

This coming January and February, however, the '00/'01 comps for the East Region will not be as easy to meet, since temperatures in January and February or 2001 were very near historical norms and the undersupply condition in the U.S. market was not nearly as severe as it is now.

If a reasonably strong *El Nino* affect kicks in very soon (i.e., within the next 2-3 weeks) and persists for most of the remainder of the winter (bringing sustained warmer-than-normal temperatures to the Midwest and the Northeast), it is still possible that we will not test the winter '00/'01 comps in the East Region at any time during the remainder of this year's winter heating season.

As a result, prices may remain at or near current levels for much of the remainder of the winter heating season (in part because the "market" does not appear to yet fully recognize the magnitude of the undersupply condition that already exists in the market).

If temperatures during the remainder of the winter heating season are closer to historical norms, however, given the current undersupply condition in the U.S. market, we would expect the current 195 BCf buffer relative to the '00/'01 comps to begin to diminish rapidly by no later than the Weekly Storage Reports scheduled to be issued in mid to late January.

If this occurs, the pressure on natural gas prices as January progresses could become quite intense – especially given that EIA estimates that industrial demand for natural gas *already* is more than 19% *below* the level of industrial demand two years ago (i.e., viz., 5.51 TCf/year currently vs. 6.87 TCf/year in

'00). As a result, far less industrial load remains available to decrement this winter than was available to decrement just two years ago.

Even if we are able to make it through this winter without any further intense upward pressure on prices, however, we believe that it is only a matter of a few more months until the mismatch between supply and demand in the North American will become apparent to all concerned.

By next fall, therefore, we expect that the forward delivery price curve to be far higher than current levels even if the remainder of this winter is unusually mild.

There are of course many other factors that will affect both the precise balance between supply and demand over the next year and the timing and magnitude of the impending further run-up in the price for natural gas.

These factors, and our specific forecasts for storage levels and prices over the next year, will be discussed in detail in the EBW report on *The Coming Natural Gas Crisis* to be issued next week.

In the interim, if you have questions, please don't hesitate to contact me at [aweissman@energyvg.com](mailto:aweissman@energyvg.com) or 202/944-4141.

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