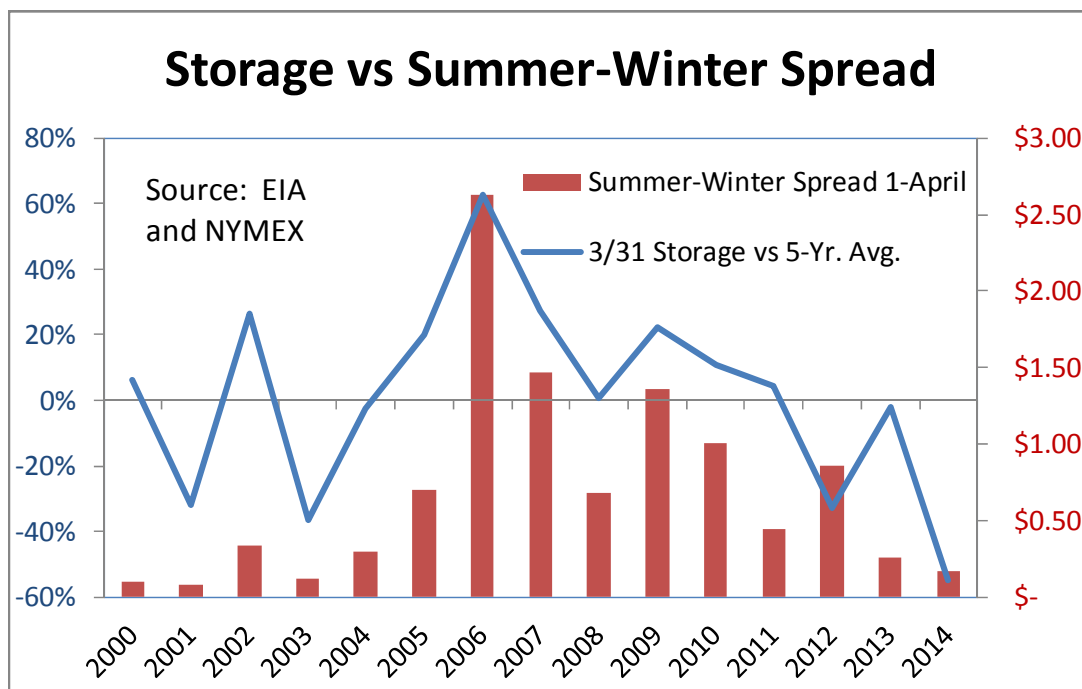


2014 Natural Gas Storage

In Four Slides

Compared to average end-of-winter levels, gas storage is at its lowest level in recent history. So why is the summer-winter price spread the lowest in a decade?

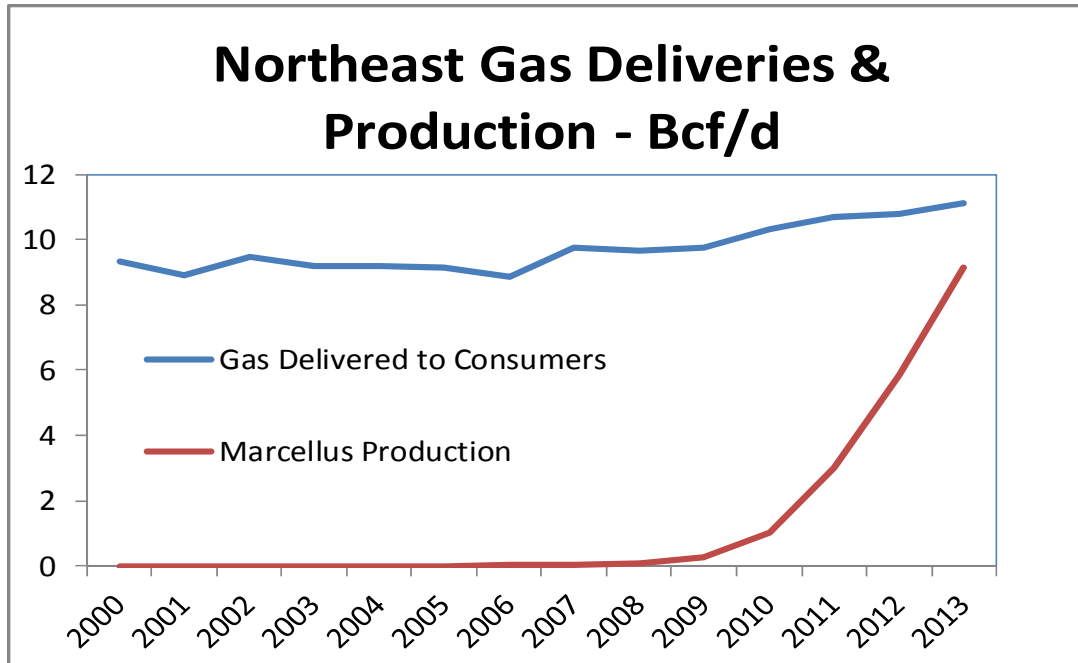


SHORT TERM EFFECTS/ISSUES:

- End of winter storage is only 45% of the 5-year average, the lowest percentage on record.
- To get 1-Nov storage up to the start-of-winter average requires injections to average 33 Bcf more than the 5-year average.
- To accomplish this requires a combination of summer supply growth or demand cuts that average 4.7 BCFD.
- How high must gas prices be to displace 1.0 BCFD or more of gas-fired electric generation this summer?
- With discretionary storage 20% to 25% of the total, what is the financial incentive required for refill?
- Does the large growth of salt-dome storage, with multiple turnover capability affect the storage equation?
- Will a higher NYMEX price curve result in any political fallout?

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Northeast gas production should surpass consumption in 2014. Will this negate or exacerbate the need for new infrastructure?



Source: EIA

LONG TERM EFFECTS/ISSUES:

▪ Were the price spikes, price volatility and curtailments this winter a one-off condition or will it be repeated? Will additional coal generation retirements exacerbate these events? [Note: April 1 FERC Technical Conf.]

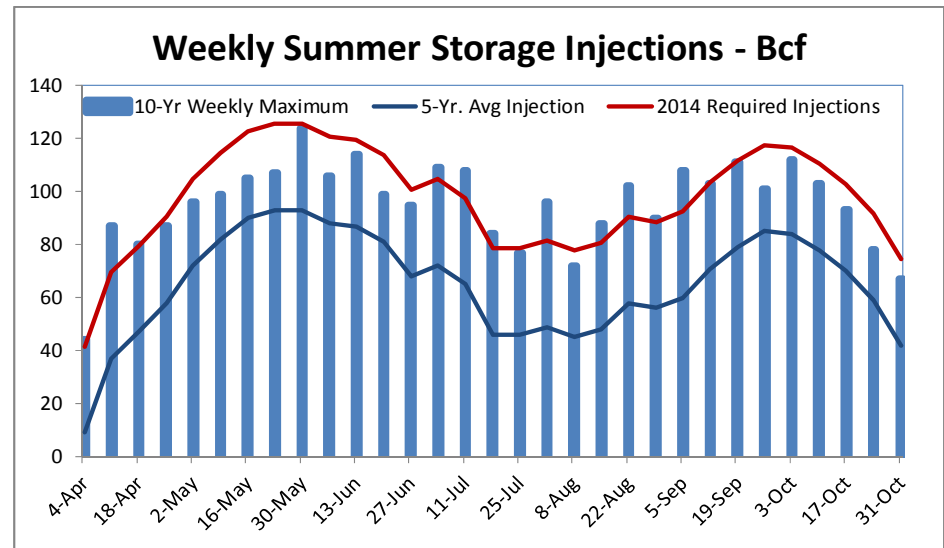
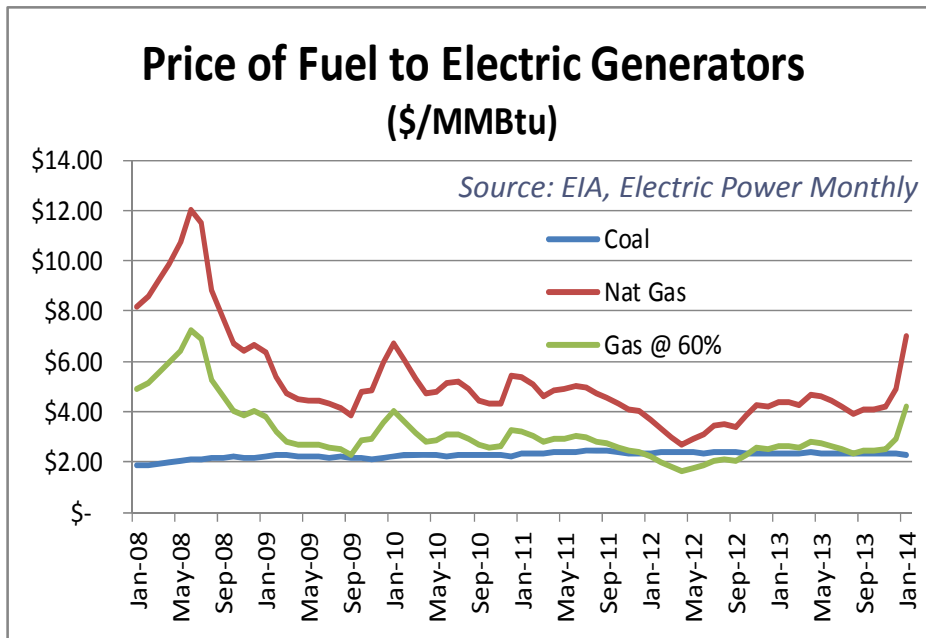
LONG TERM EFFECTS/ISSUES (CONT.):

- Are there any studies underway to isolate drivers? Was it simply the extreme cold? Is storage sufficient or must more be added?
- Will this winter's price spikes discourage new LNG export licenses?
- If new export terminals are curtailed, will this depress gas prices and cut U.S. production?
- Will new pipelines and related infrastructure in the Northeast alleviate the price volatility? Who will pay for it and with what mechanism for cost recovery?
- Will Marcellus/Utica production growth be sufficient to meet regional demand growth as well as incremental growth in other locations, such as the Gulf Coast? What are the constraints and bottlenecks? What are the timing issues?
- Have there been structural changes to demand? What will happen when EPA enforces *CSPR and other rules?

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Summer 2014 Gas Pricing Issues

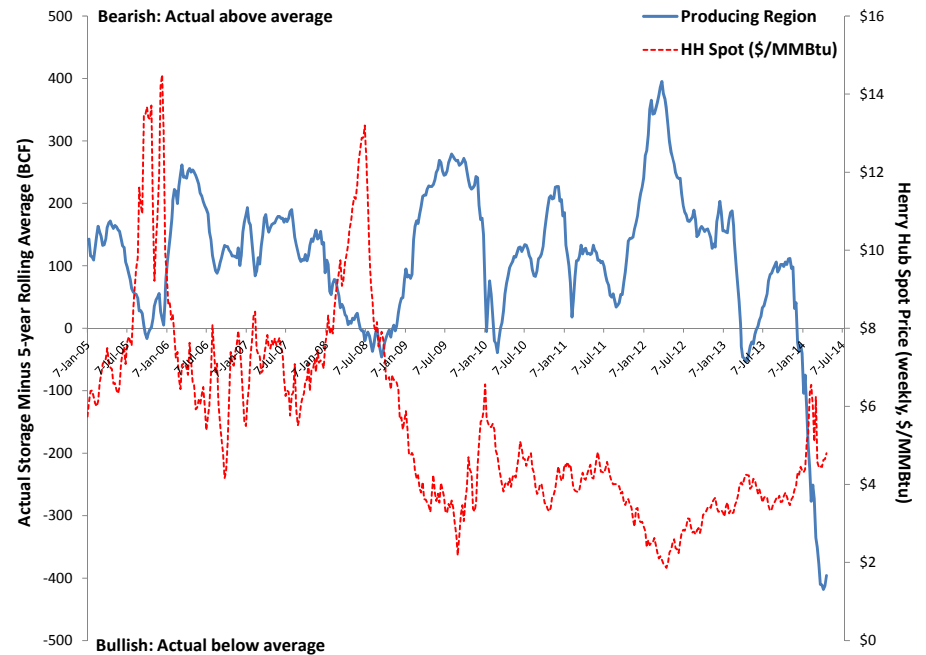
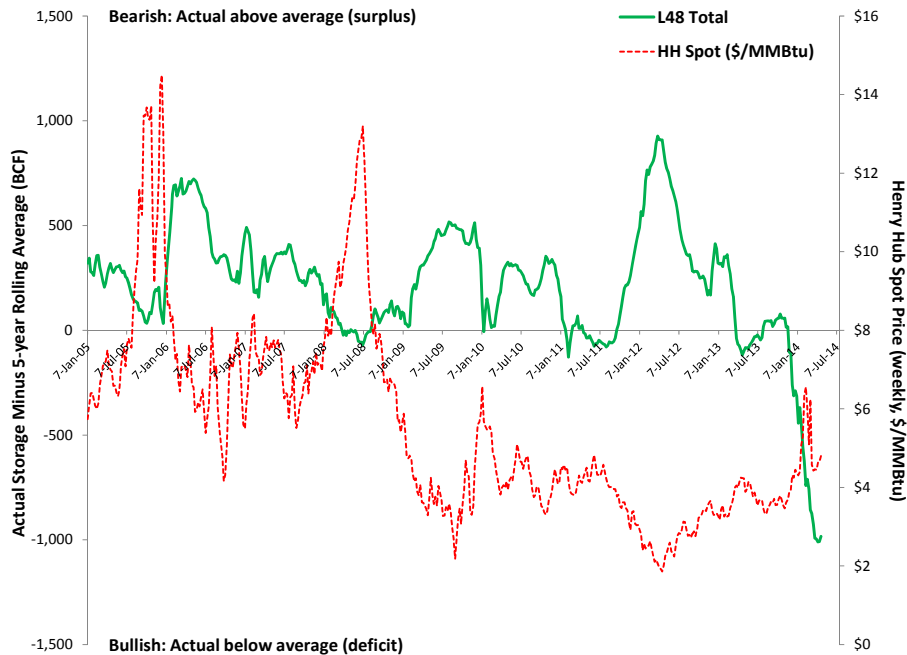
Summer 2014 Requires Record Gas Injections



Natural gas captured significant electric generation load in 2011-12 because it was **priced competitively against coal** in many regions. Gas prices in 2014 need to be **high enough to discourage** coal-to-gas switching, allowing for record high storage injections. [Note that the Gas @ 60% line is the approximate efficiency difference between CC-gas and coal-fired generating units.]

To reach the average start of winter (1-Nov) storage level of 3.85 TCF requires that weekly injections between April and October total nearly 33 BCF more than normal (4.6 BCFD), **a volume that is more than the maximum weekly summer injection in all but 7 out of 31 weeks over past last 10 years.**

All Regions are Being Affected



- *Storage is actual minus five-year rolling average. Based on EIA, NYMEX.*
- *Gas prices are inversely correlated with storage volumes.*
- *Spot gas prices in the East this summer will be affected by injection capacity and infrastructure constraints.*
- *Spot gas prices in the West will be affected by the closure of the SONGS nuclear plant.*