



## SHALE GAS - TOO MUCH OF A GOOD THING

Natural Gas Prices – It's all About Drilling

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Exploitation of Canada's massive natural gas resource is coming to a near halt and likely to remain that way until natural gas prices improve. The natural gas well completions in Canada have fallen to a level not seen in recent history and although some activity is focused on unconventional plays, the economics are underpinned by liquids production, not natural gas. Canada's production has dropped from a high of 17 bcf/d to barely treading water at 13 bcf/d, and likely to continue its descent.

Meanwhile, south of the boarder, activity continues to be brisk, exploiting unconventional plays, particularly shales. While the debate rages on whether shale plays make money, gas prices hover at \$4.00/mcf and in its shadow "America's Champion of Natural Gas" Chesapeake Energy's share price has fallen 25% this year and its Canadian look-alike, Encana's share price has fallen 20% in value. If you had held the shale gas leader, Chesapeake, since the beginning of the shale phenomena in 2005, you would be no better than even today which is an improvement over the fate of many other gas weighted companies.

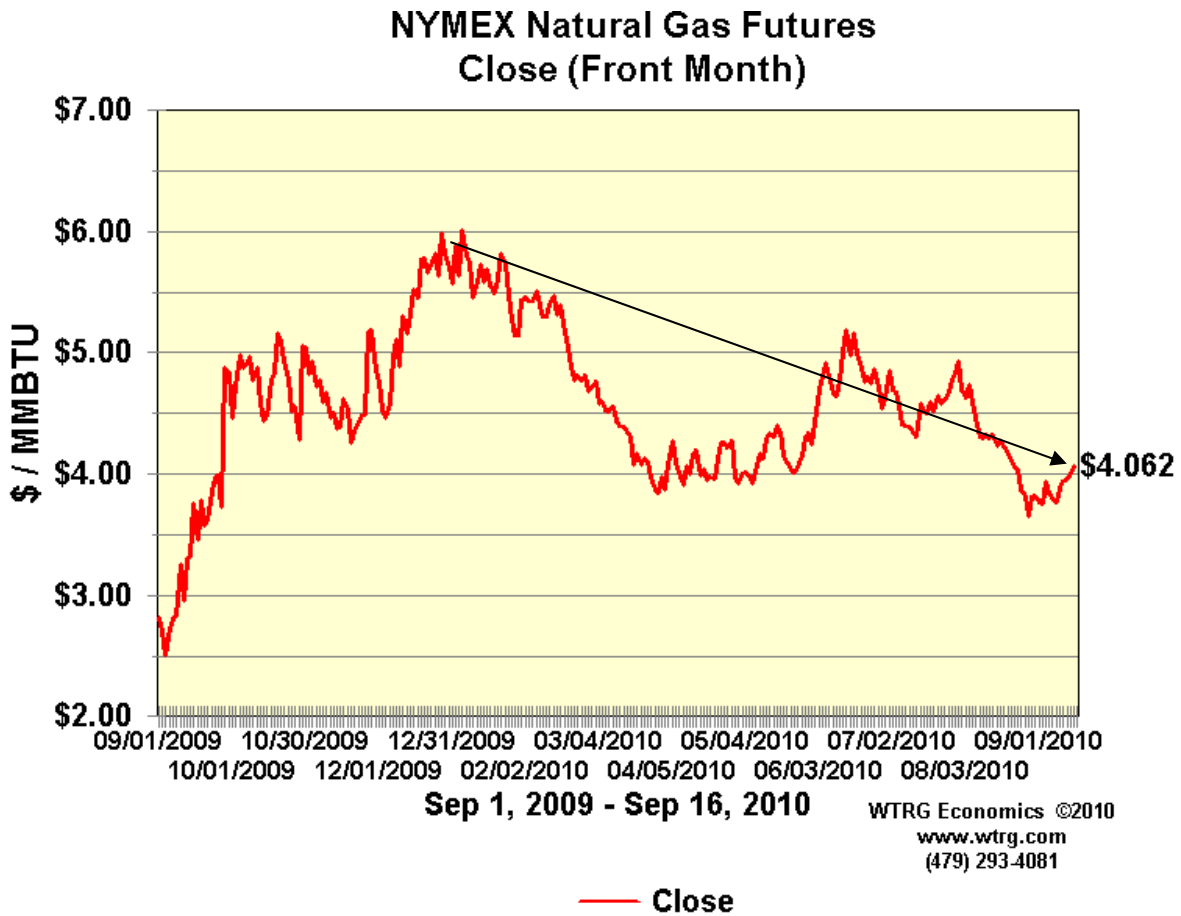
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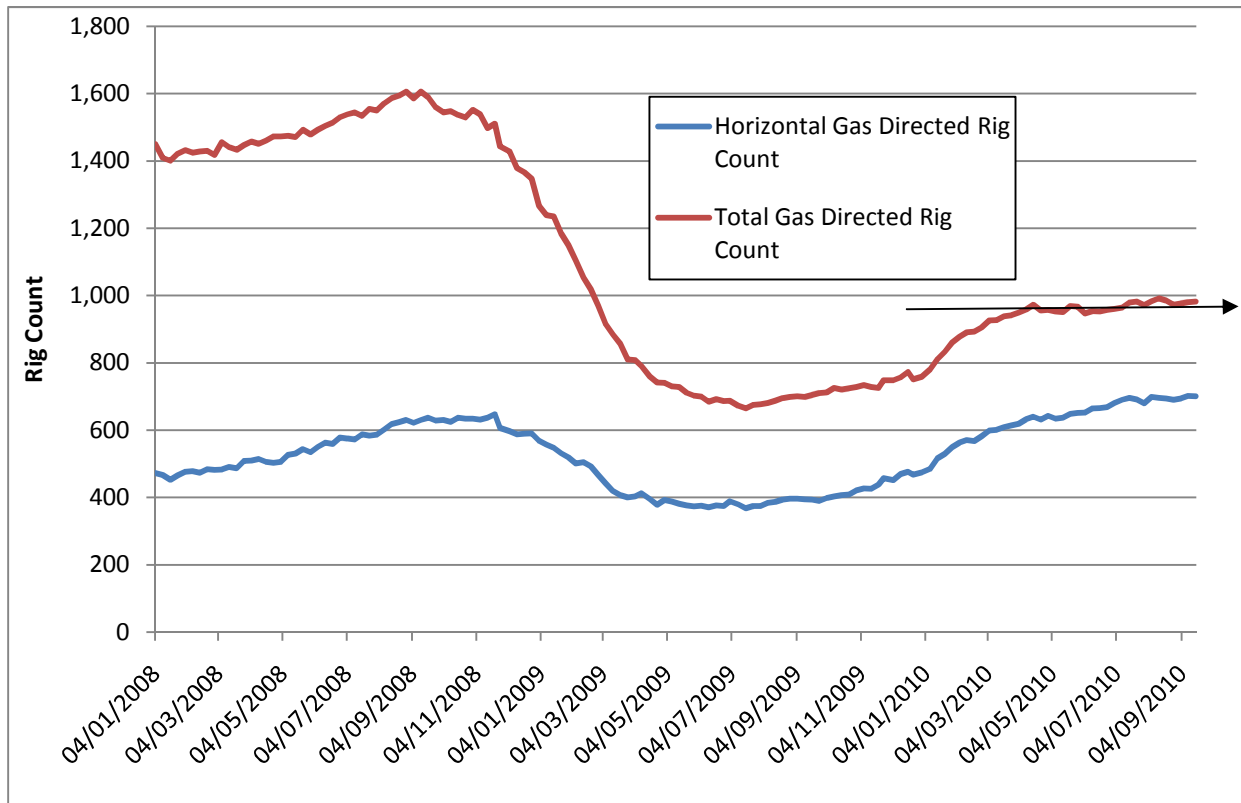
Chart 1



#### Drilling = Supply

There are currently 980 gas directed natural gas rigs operating in the United States and of those 71% are being drilled horizontally into shales or tight sand plays. It is interesting that this activity level has remained flat for the past 22 weeks. Recently there is a greater amount of commentary about drilling rig constraints as utilization for rigs are running 82% (RIG DATA Sept,9, 2010), as a consequence it is not likely that we will see an increase in activity anytime soon, hopefully putting a cap on new supply.

Chart 2



#### Baker Hughes/Rig Data

According to The Land Rig Newsletter's 2Q 2010 Day Rate Report operators' strong demand for 1,000 hp rigs has lifted day rates 38%, over the same period hydraulic fracturing service costs have increased 25%, with 15,000 hp equipment rising the most.

Low gas prices, and increasing service costs are an unlikely recipe for making money so why the seemingly irrational brisk levels of activity? Are the economics of shale plays that robust, or are other factors at play?

One explanation is lease retention – protecting sunk costs. A significant amount of land was acquired by operators throughout 2008 with a shortened three year term and 25% royalties in hopes of capturing the value of then \$8.00/mcf natural gas. In some cases cost per acre was upwards of \$15,000 per acre in the Haynesville area resulting in a cost per spacing unit (640 acres) of approximately \$9 million. As the third year of the lease terms approaches, the question becomes - do you walk away from a \$9 million investment or drill a well to protect the investment? The amount of drilling driven by lease retention is difficult to quantify but the following are a few comments from industry:

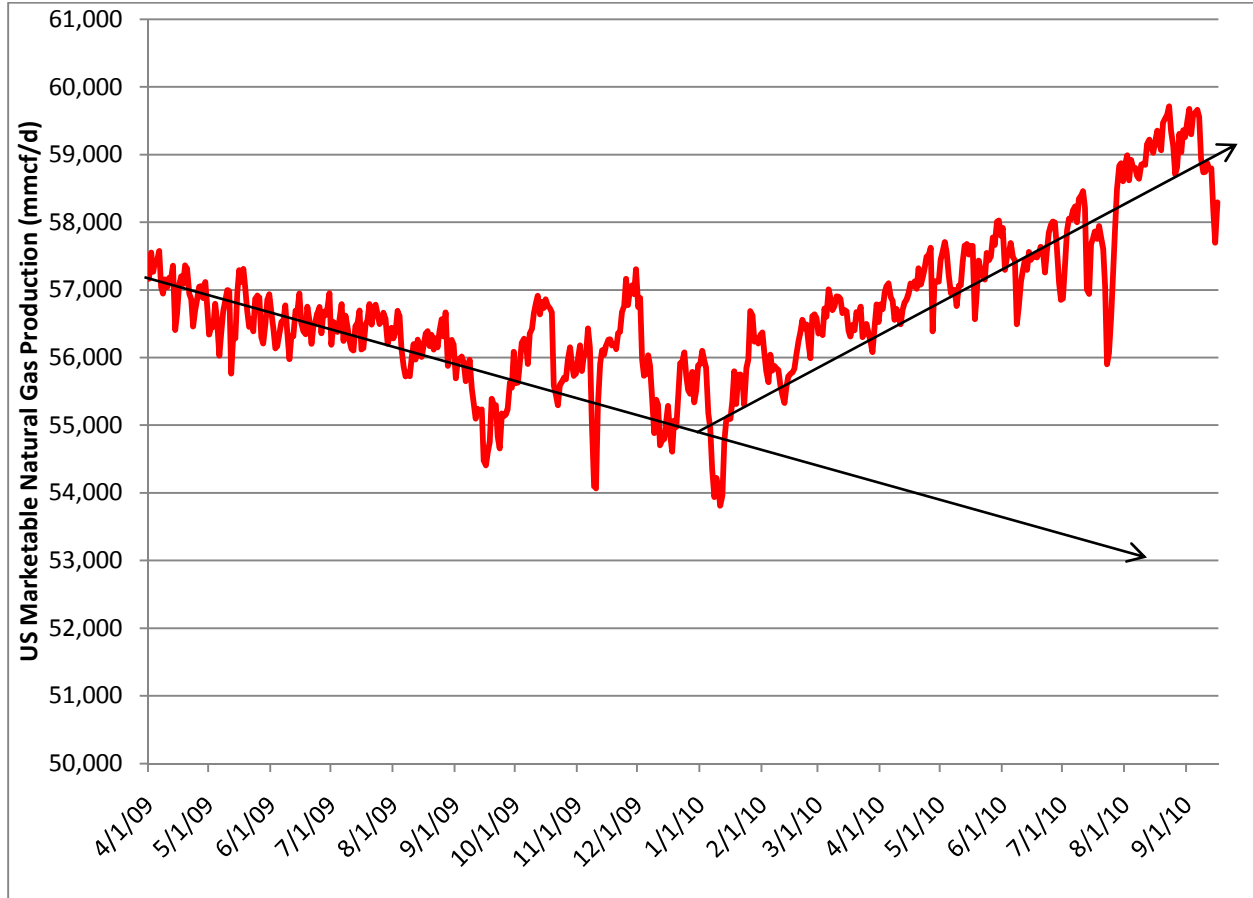
*"The portion of EOG's capital expenditures that has been designated for natural gas drilling in the Haynesville, Marcellus and Horn River is primarily to retain our leasehold acreage positions."*

*“Up to 50% of all industry drilling for natural gas is tied to the need to retain leases”, says Chesapeake Energy CEO Aubrey McClendon.*

After the first half of 2011, it is likely we will observe a change in operators’ behaviour where lease retention will become less of a factor in drilling activity and economics derived from the forward prices will prevail.

### US Natural Gas Production

Chart 3



Bentek Energy

### What will turn the tide? – Chesapeake!!!

Chesapeake currently operates 120 rigs, 111 of those rigs are dedicated to unconventional gas plays. That represents 12% of the all rigs actively drilling unconventional plays and 73 more rigs than the next most active operator Exxon/Mobile. If we only examine gas shale plays and measure footage drilled, Chesapeake represents 18% of the total drilling in gas shale plays. Chesapeake has a greater share of drilling in the deeper more prolific Haynesville play which accounts for the greater percentage market share. For this reason Chesapeake becomes the bell weather for drilling activity. They may have the code to unlock gas from stubborn formations that are reluctant to liberate gas but have yet to turn that into

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making money for shareholders. Considering their significant market share, their success has become their own worst enemy.

Chart 4



Stockwatch

In the first six months of 2010, Chesapeake has incurred \$5.1 billion of capital expenditures with \$2.3 billion of internally generated cash flow (excluding hedging gains). This level of spending seems impossible to maintain particularly with \$11.5 billion of liabilities. Chesapeake has been masterful at attracting over \$5 billion of capital largely in the form of joint venture funds from foreign companies wanting to cash in on the US shale gas phenomenon. One has to wonder about their impressions today about the full cycle of gas economics of the heavily promoted investments. There has been an estimated \$20 billion of foreign capital committed to investment in US gas shale plays since 2008. Unless gas prices increase, it is very unlikely that we see continued funding from foreign investors in gas shale plays and this funding is likely to be exhausted mid 2011 coincident with the drilling for lease retention.

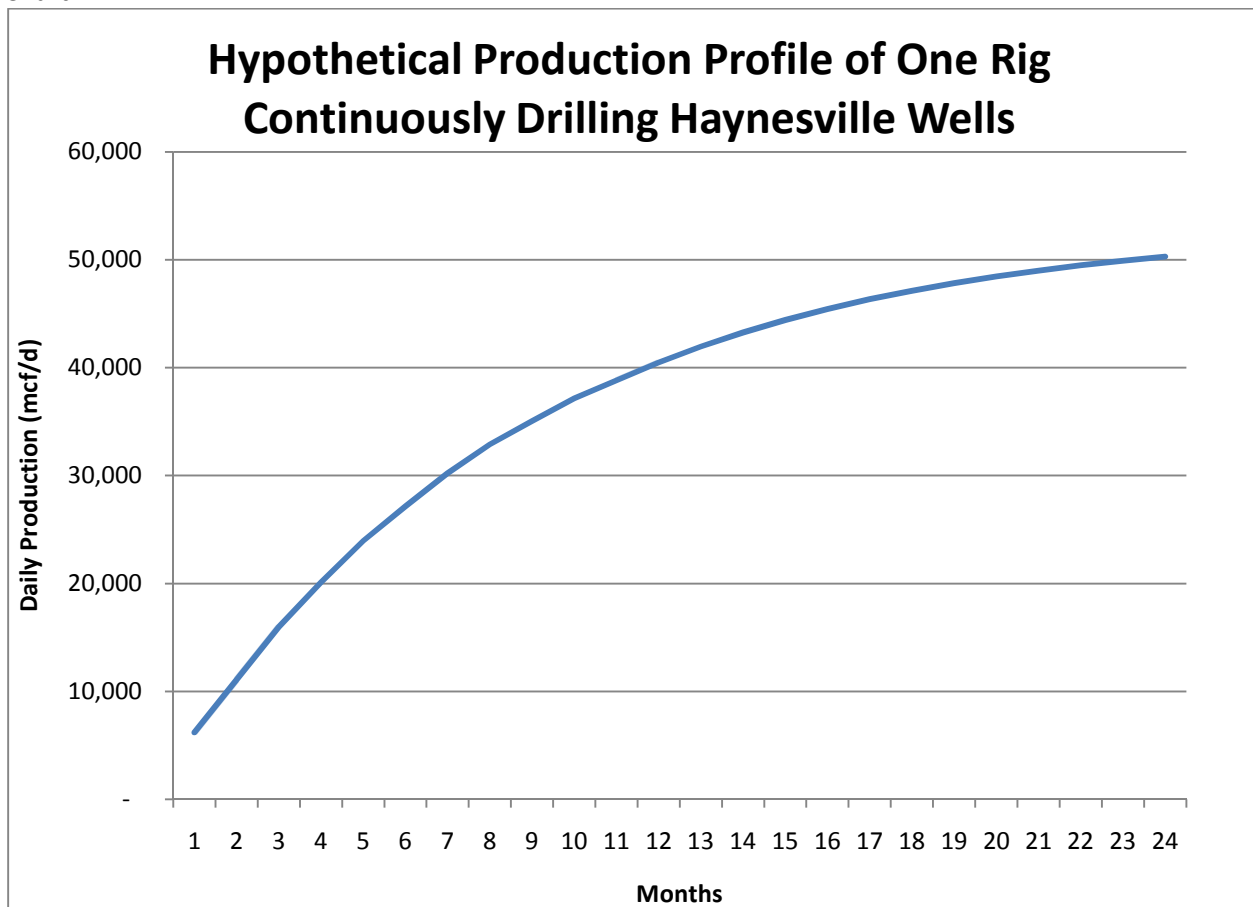
***Even with drilling activity falling off don't expect an immediate improvement in fundamentals.***

The number of wells drilled and yet to be completed is staggering. For example in the Haynesville there are currently 657 wells producing, 123 wells drilling, and 450 wells standing waiting on completion representing 68% of the producing wells. A prolonged down turn in drilling activity is required to absorb much of the backlog generated by an overly enthusiastic industry. We experienced much the same in 2009 and 2010 when there was an estimated 3,000 well backlog of completion that were eventually

completed and put on stream through 2009 and early 2010, muting the expected production declines over that period. (Chart 3 – US Production)

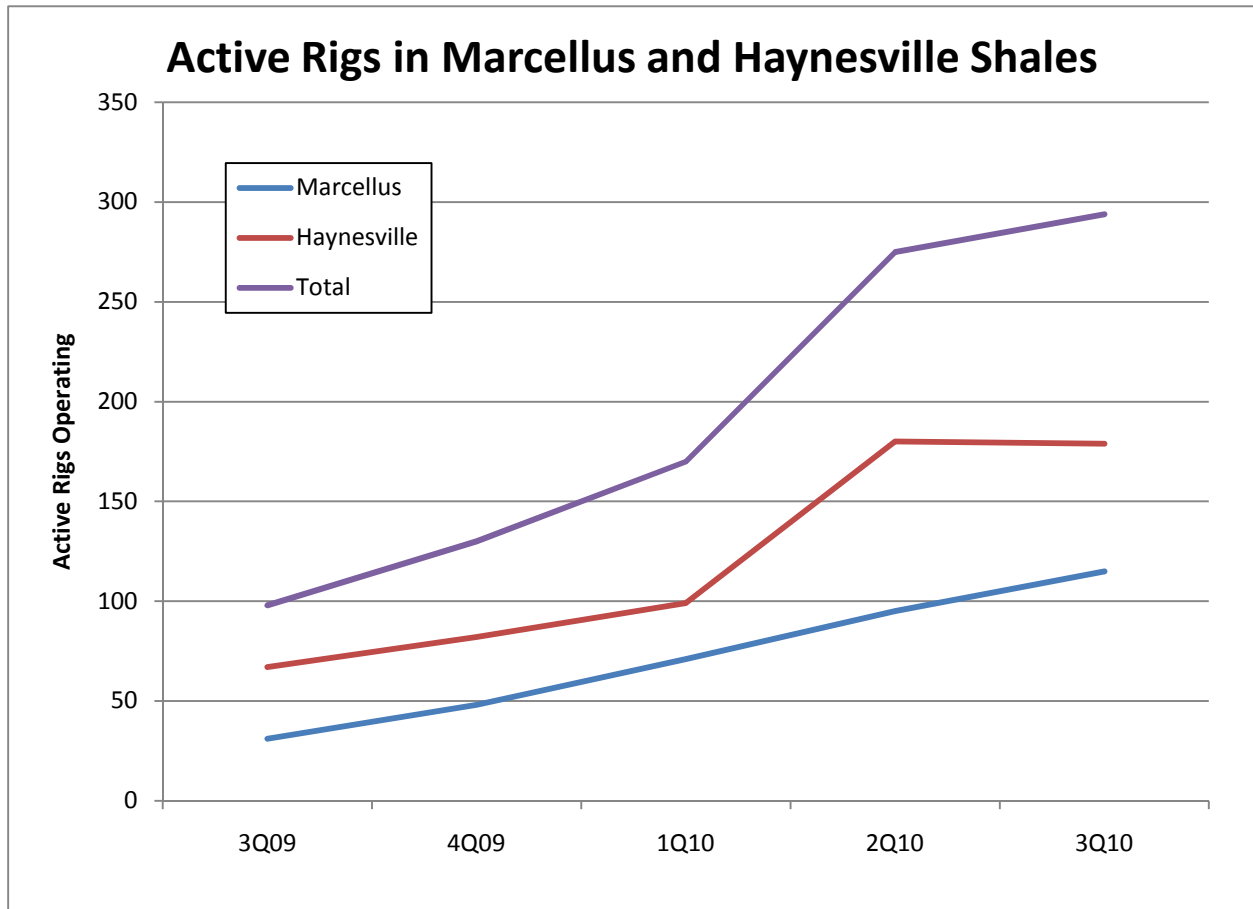
Considering the high decline rates of the shale gas wells in the first year of production, and how early we are in the life cycle of most of the shale wells placed on stream, a small change in rig activity will have a more pronounced affect on gas supply than the last drilling down turn in 2009. The following is a calculated production profile of one rig drilling a well every 50 days with an initial production rate of 10mmcf/d and a decline rate of 75% a typical result in the Haynesville Shale. The mathematics tell us that we experience big percentage gains in the early days but an ever increasing number of rigs and wells are required to continue to replace production (Chart 4).

Chart 4



The Haynesville and the Marcellus Shale plays are a still barely two years old, and we have seen a triple of gas drilling activity in the past year.

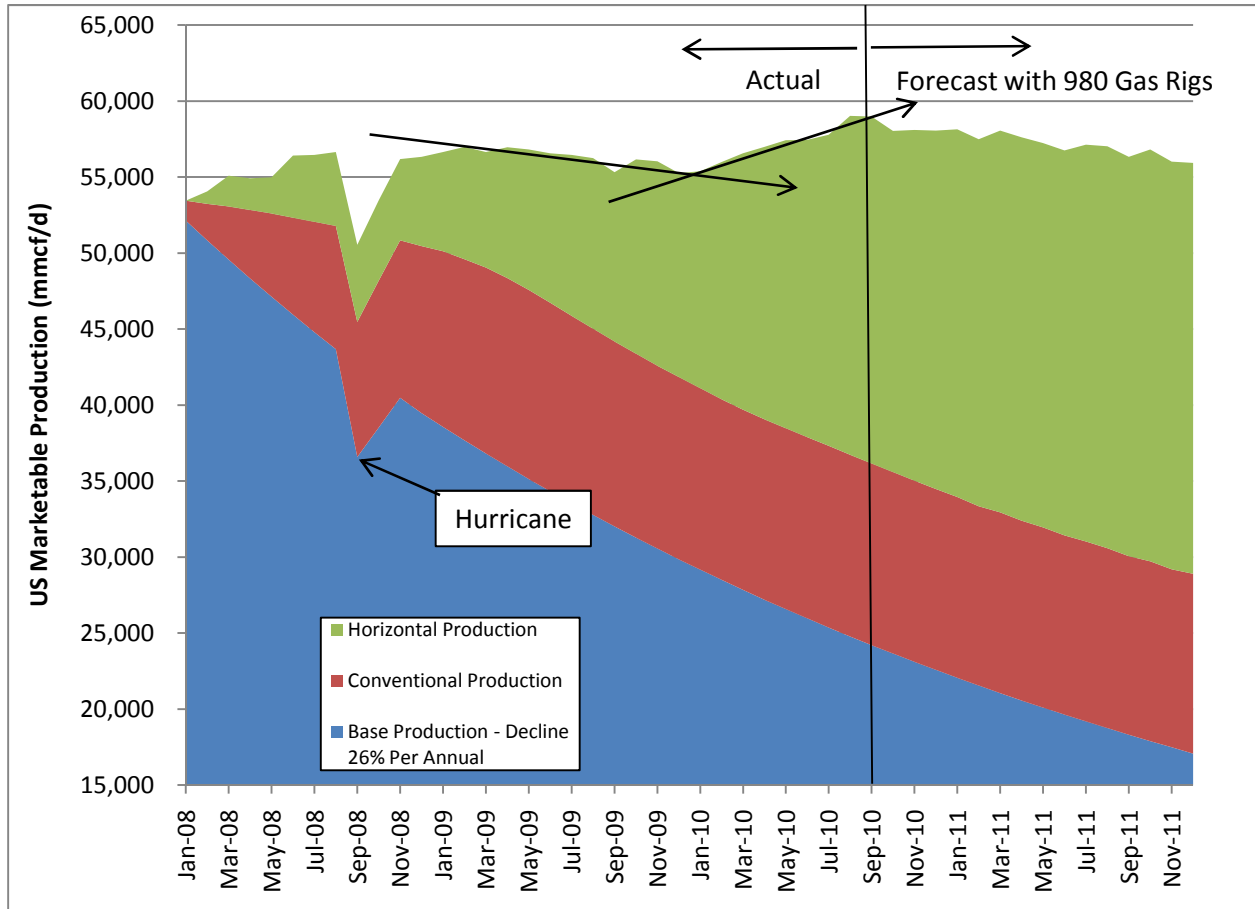
Chart 5



#### Rig Data

A dramatic change has occurred in the US gas production portfolio with an increasing amount of natural gas being sourced from high decline shale gas and tight sand reservoirs. Today 71% of all gas wells being drilled are targeting the highly productive shale gas up from an estimated 33% in January 2008. The result of this concentration of shale directed drilling is that close to 50% of US production may come from shale and tight sands by the end of 2011. When we apply the math to the entire United States gas drilling activity with 980 gas directed rigs currently active, it appears that production growth may have peaked unless more rigs are deployed (Chart 6)

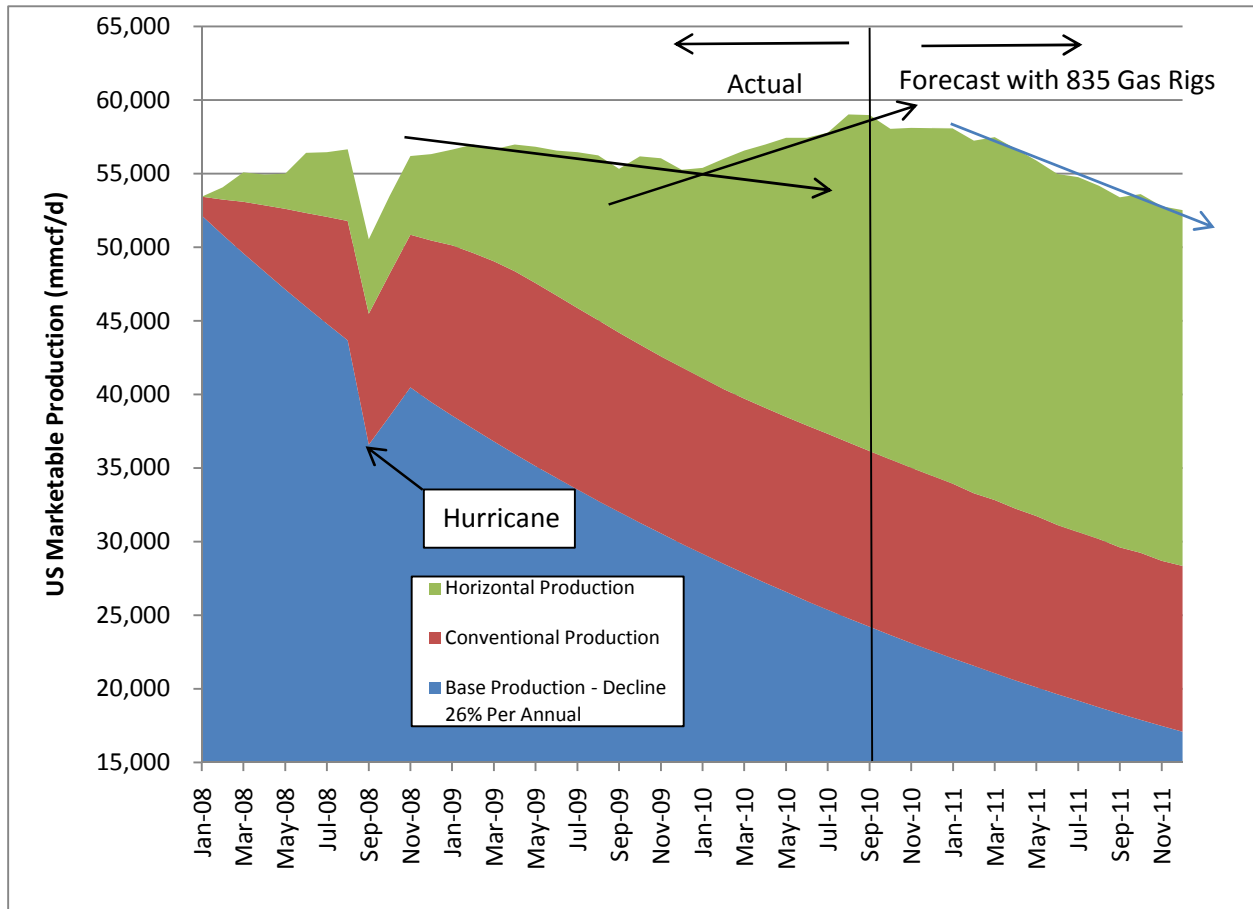
Chart 6



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What happens if drilling activity falls? Without at least 980 rigs operating of which over 70% focused exclusively on resource plays, production will fall quickly. Below is an illustration of US production if natural gas directed rig count drops by 15% (Chart 7).

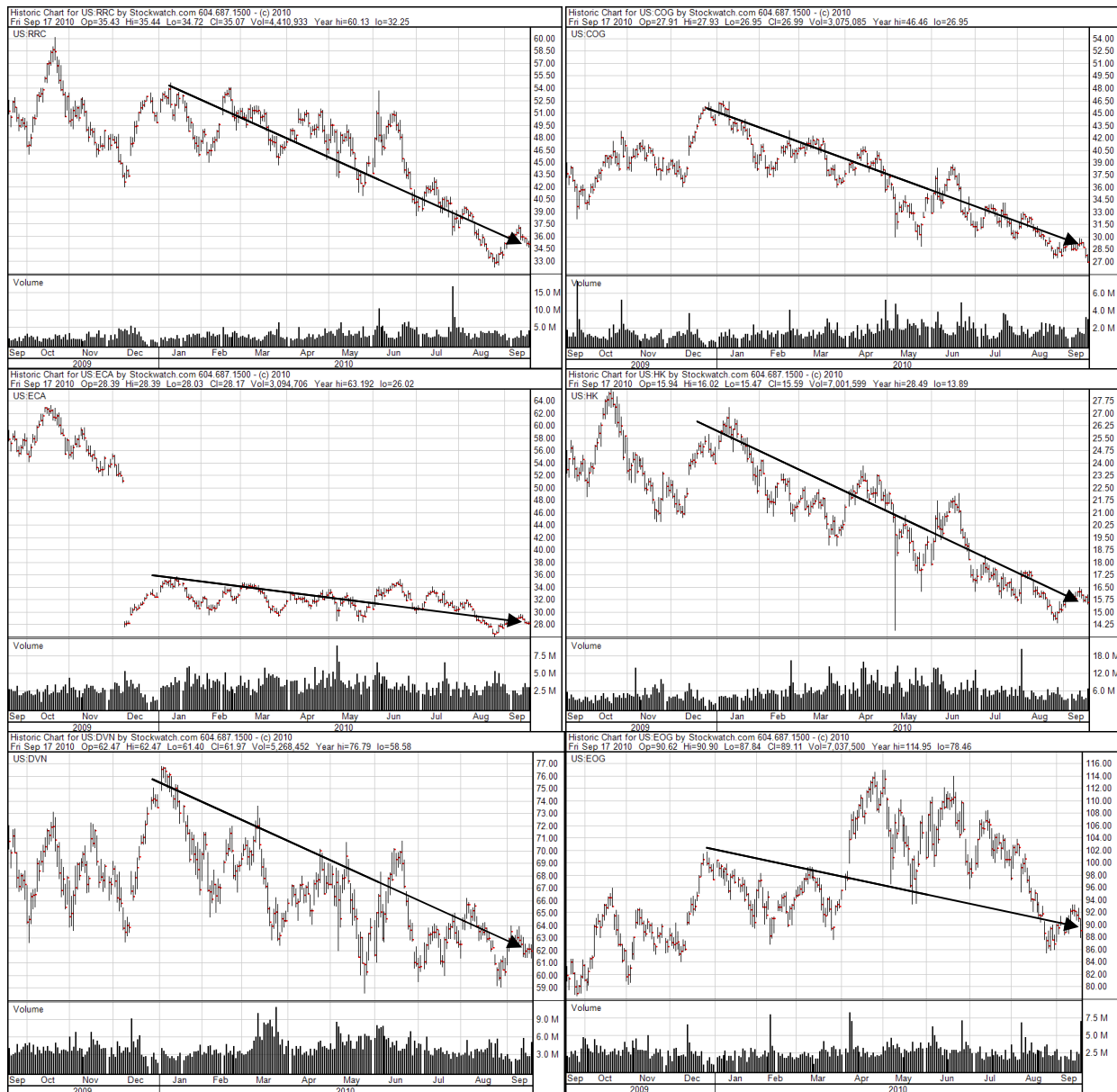
Chart 7



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With a mere 15% drop in rig count, it is possible to experience a decrease in US production from current levels of 59 bcf/d to 52 bcf/d at the end of 2011. This would set up the biggest bull market in gas since the first half of 2008.

Considering the “game changer” the “technological revolution”, the overwhelming success of adding to US self sufficiency of gas supplies, investment returns have been elusive. The champions of the shale revolution Petrohawk, Cabot, Range, Chesapeake Devon, EOG, Encana - have any of them generated a positive returns for investors considering the amazing efficiency of adding new natural gas supplies?



So, just who is benefiting from the irrational exuberance being displayed by the shale gas producers? Pressure pumpers, directional drilling companies with increasing field activity, pipeline companies carrying the gas to market, and consumers in the form of inexpensive natural gas.

There has been recalibration of value of natural gas in the past two years resulting in falling share prices of natural gas producers. It was once common to see companies trading at a premium to underlying asset value. Today gas producers are trading at a fraction of underlying asset value, lenders have been busy revising future price assumptions downwards along with lowering lending value. With lower gas prices the expected reserves in the form of Proven Undeveloped and Probable Reserves and drilling program evaporate. It appears that investing in natural gas is a "hedge against profits".

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If “successful investing is anticipating the anticipations of others” (John Maynard Keynes), then we simply need to anticipate the actions of Chesapeake?

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