



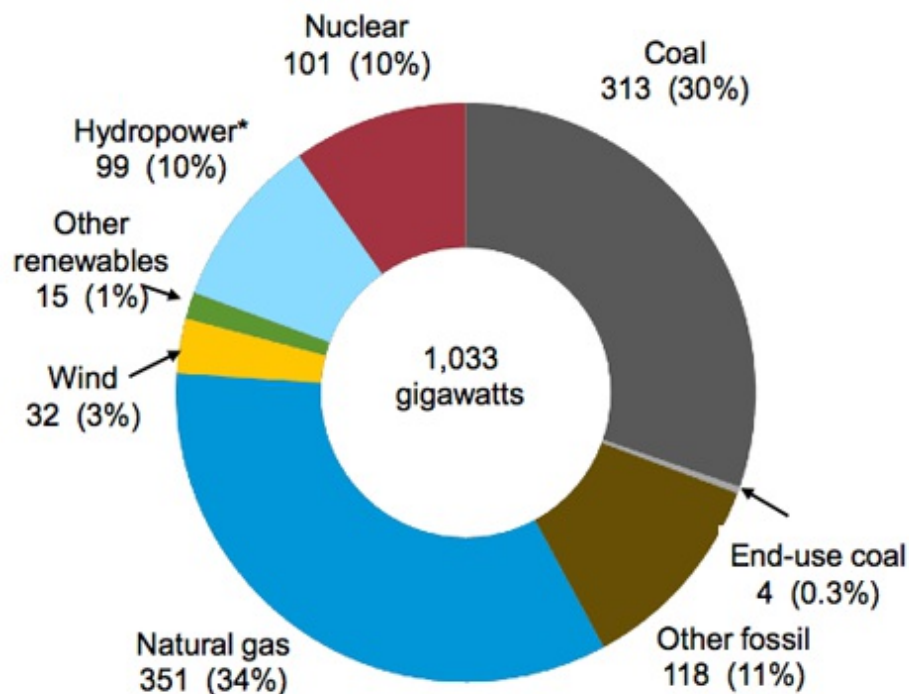
Tech Talk - natural gas production, as shale gas arrives

Posted by [Heading Out](#) on July 24, 2011 - 6:33am

Topic: [Supply/Production](#)

Tags: [barnett shale](#), [eagle ford shale](#), [gas shale](#), [gas to electricity](#), [haynesville shale](#), [natural gas](#) [[list all tags](#)]

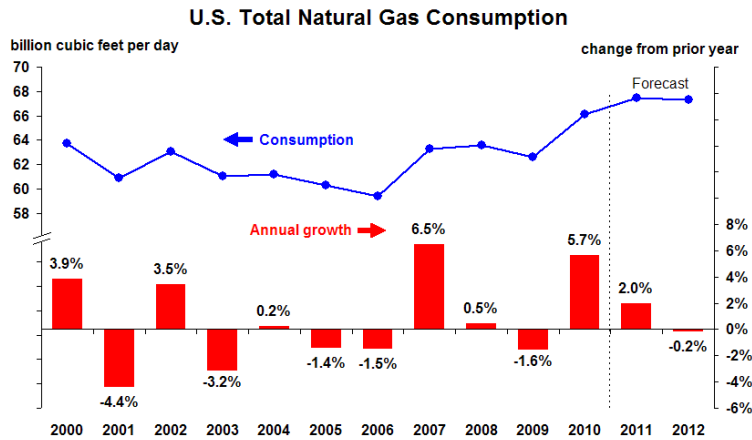
The natural gas industry in the United States has undergone significant changes in the last twenty years. As I noted last time, until 1993 the industry was beset by regulation that controlled both price and flows. With the removal of those regulations, the industry was able to make considerable strides to increase market share. As it became able to do so, the problems perceived from the burning of coal in particular as a power plant fuel led to moves to increase the amount of electricity produced using natural gas. By 2009, the installed capacity to generate electricity included 34% that could be supplied from natural gas.



Sources for installed electricity generating power 2009 ([Newell EIA](#))

The EIA further anticipate that over the next 25 years that natural gas will continue to dominate new plant construction, comprising about [60% of the 223 gigawatts](#) anticipated, with wind, at 11% coming second, while other renewable sources (which include a number of varieties) has about 12% of the growth. Now that doesn't mean that the US actually produces 34% of its power from natural gas. In fact it is down at around a quarter of the current total, the difference being that companies prefer to use nuclear and coal -fired stations for their base load, and use natural gas more to meet variations in the demand cycle.

Because of this increased use US natural gas consumption has been rising in the past few years.



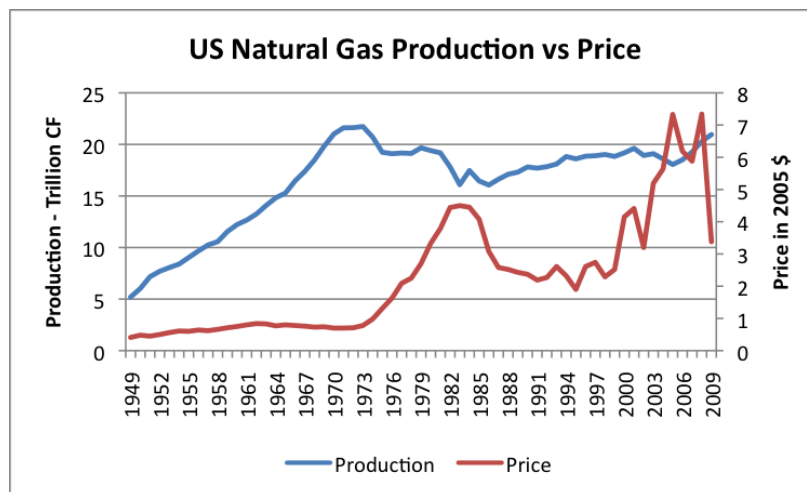
Source: Short-Term Energy Outlook, July 2011



U.S. natural gas consumption over the past decade (EIA) Note that 68 bcf/day is equivalent to 24.8 Tcf per year.

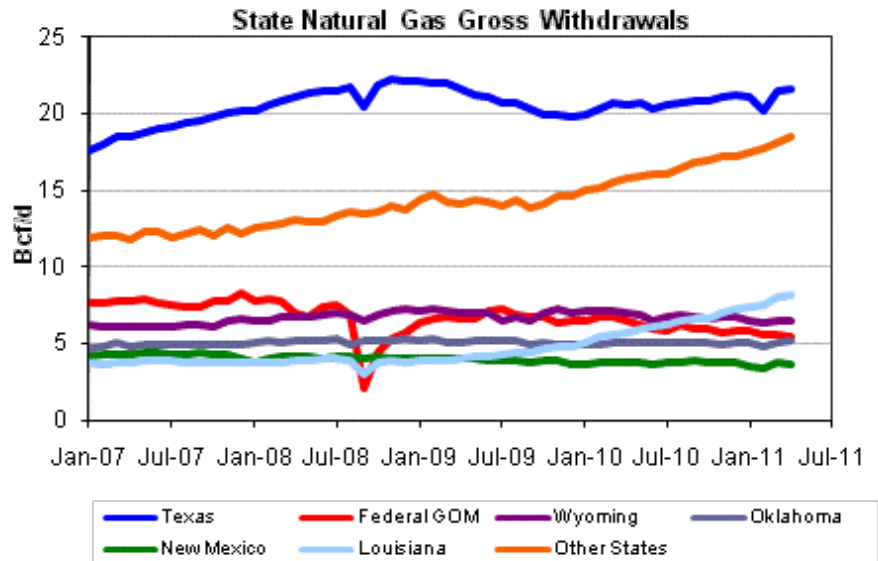
The total withdrawals of natural gas from domestic sources in 2009 totaled 28 trillion cubic feet (Tcf) of which 78% came from domestic gas wells, and 22% from oil wells. 13% of the 2009 total came from shale gas wells, and 8% from coal beds. Of the gas produced some 14% was re-injected to help maintain pressure in producing wells, and about 1% was flared. 3% of the volume was of non-hydrocarbon gases. The United States also imports around 11% of the gas that is consumed.

I am indebted to Gail Tverberg for the following plot that shows the longer trend in production, as well as the price (note that the difference in production volumes, relative to my number above, is that the figure below is net dry production. It is net of reinjection, vented and flared, and extraction loss).



Production of natural gas from US wells, and price of that NG. (Gail Tverberg)

Natural gas production by State, which I previously just ranked, shows that Texas continues to be primary, but that the combination of states outside of the big 5 is rising steadily.



Production of natural gas from different states (source [EIA](#)).

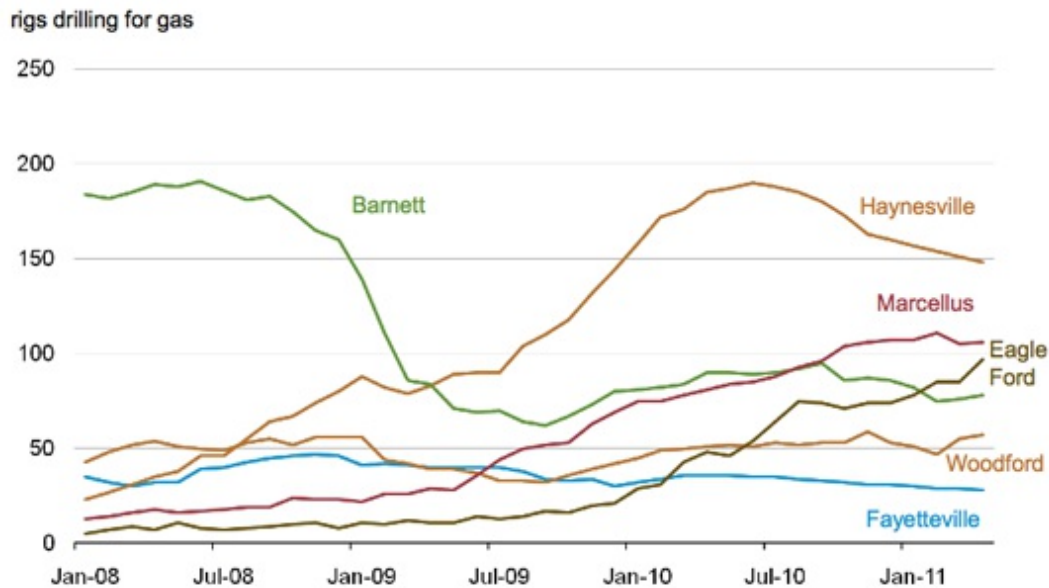
It is worth noting that New Mexico, Oklahoma, Wyoming and the Federal offshore Gulf of Mexico (GOM) are declining while Louisiana is showing the greatest growth. In fact, it is so great that Cheniere Energy will [convert their LNG plant](#) in the state so that it will be able to export Liquefied Natural Gas (LNG) rather than just store and re-gasify supplies after they have been imported. The hope is to have it on line and allowing the export of LNG by 2015. That growth in production has come largely from the development of the natural gas found in the [Haynesville shale](#).



Location of the Haynesville gas shale drilling ([Geology.com](#))

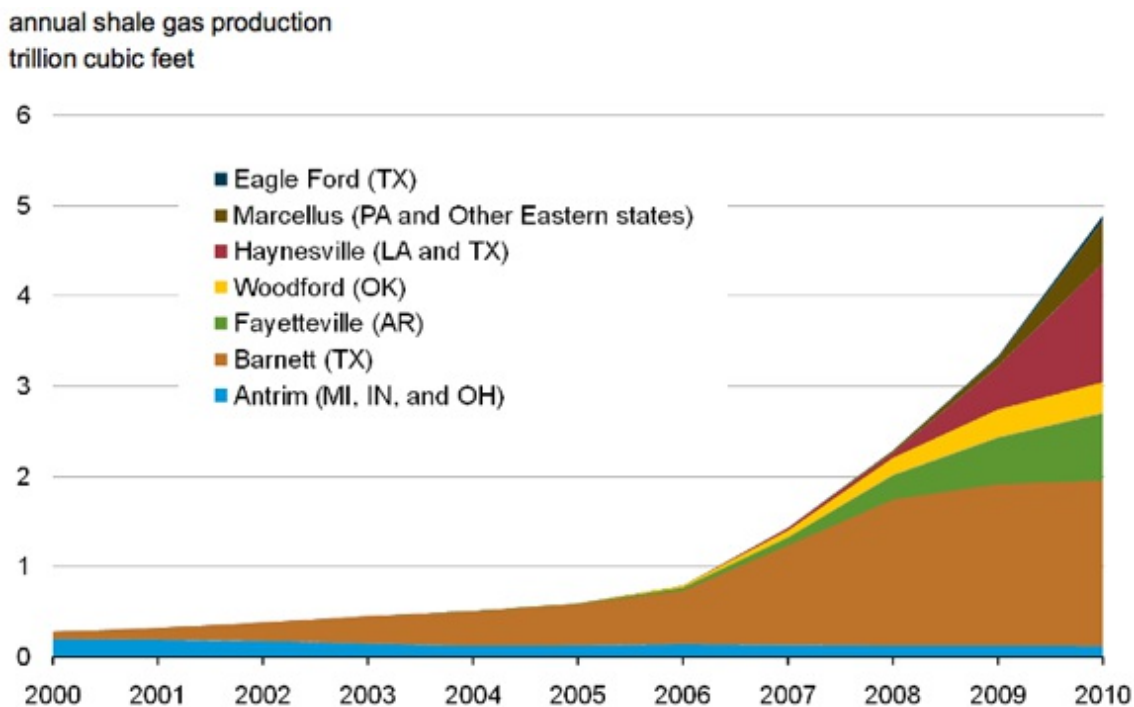
It was in [February of this year](#) that the Haynesville took over the lead in gas production from the Barnett Shale in Texas [producing 5.5 bcf/day](#) to the Barnett's 5.25 bcf. The field has more than a thousand wells in production, with around 2,000 permitted, and over 500 having been drilled but not completed. Part of the more rapid success of the Haynesville, the first successful well was only 3 years ago, has been because the gas could be fed more easily into existing pipelines than the case in Texas. The [well location](#) lies south of Shreveport.

The EIA plot of drilling activity in the gas shales shows the growing popularity of the Eagle Ford



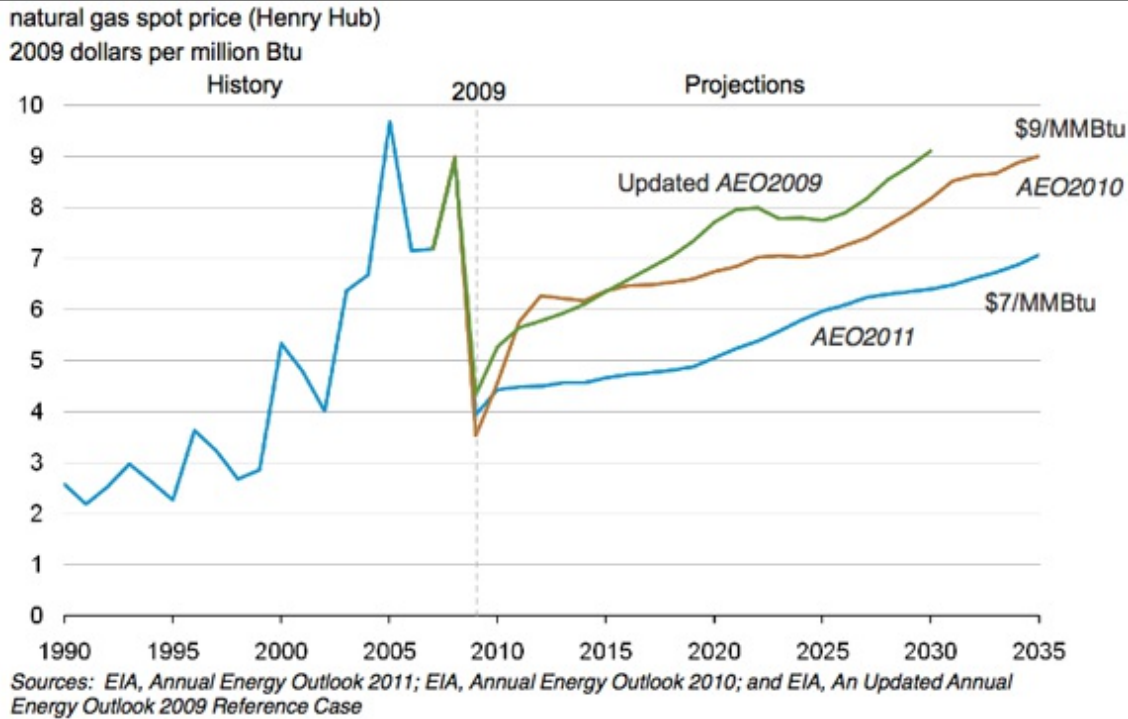
Drilling activity in the gas shales of the United States ([Smith International via EIA](#))

The changing emphasis also is an indicator that the day of the Barnett shale appears to now be passing into afternoon.



Production from the different gas shales ([EIA Newell](#))

One of the big questions with gas shale production, however, relates to how long they will continue to produce if the production decline rates fall at levels of 85% per annum that have been reported in the past. The long-term production from these fields also depends on their profitability, and in this regard it is interesting to see how the EIA sees the price of natural gas moving over the course of the next 25 years.

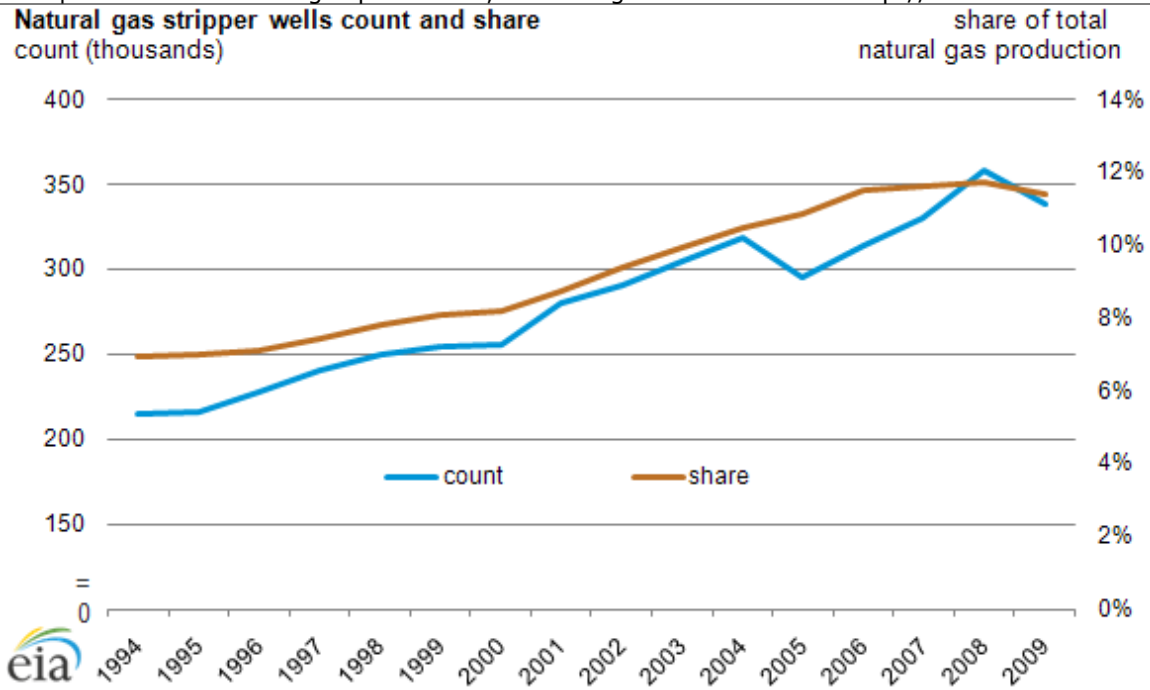


EIA price projections for natural gas made in the past three years ([EIA](#))

One question continues to lie in the costs required to produce and transport the gas, since this price ties in to the volumes of gas that will be produced. If that remains below the selling price and the new estimate price would appear to keep that distinction for the full 25 years, then the amount of gas produced will be much less. The EIA appears to hang their hat on long-term sustained production from these wells. That may not be as true for the tighter shale rock than it is for more conventional gas reservoirs of the country.

The EIA has just noted, in their [Energy Today post](#) that stripper gas wells produce 11% of the volume of natural gas produced in the United States.

Individual natural gas stripper wells produce no more than about 90 thousand cubic feet of natural gas-equivalent per day over a twelve-month period (some wells also produce natural gas liquids), but because there are so many (nearly 340,000) they collectively account for a significant portion the nation's total natural gas production—2,912 billion cubic feet, or over 11% in 2009.



Stripper well numbers and contribution to US natural gas production (EIA)

The 11% of volume translates to about [2 Tcf per year](#). They are most commonly found in Appalachia, Texas, and Oklahoma. The roughly 300,000 stripper gas well total should be put in the context of a total of around [493,000 total gas wells](#) in the USA in 2009.

There is likely thus to be some engagement in terms of the price of the product and thus volumes sold, between imported LNG, domestic conventional gas and shale gas. It will be interesting to see how that develops in the near future.



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