

The Status of U.S. Oil and Gas Production (Spring 2014)

By Roger Blanchard

I find it interesting that many of the individuals expressing the greatest concerns about oil and natural gas supplies are petroleum geologists. The list includes, but is not limited to, Jean LaHerrere, Colin Campbell, Art Berman, Jeremy Leggett, David Hughes and Jeffrey Brown.

Prominent entities expressing the view that there is no problem with oil and gas supplies include media sources, politicians and bureaucrats in organizations like the U.S. Department of Energy. Is it more reasonable to expect experts in petroleum geology to give an honest assessment of petroleum resources or politicians, bureaucrats and media sources who stand to benefit from optimistic pronouncements?

Based upon numerous media reports and statements by politicians you may have the impression that life couldn't be any better for the U.S. oil and gas industry. Production is booming and oil and gas companies are rolling in dough. Fracking has made natural gas very cheap and will soon make oil cheap. Could it be that those reports and statements are not telling the whole story? The petroleum geologists listed above, as well as numerous recent reports that can be found on the Internet, tell a very different story.

According to Art Berman, the vast majority of U.S. oil and gas companies are losing considerable amounts of money on tight oil and shale gas production. He states that the only shale play that has made money is the Bakken shale play of North Dakota.

As an example, Chesapeake Energy, one of the largest natural gas producers in the U.S., lost \$1 billion in 2012 while its total debt increased to \$20 billion. Sales of natural gas only provided Chesapeake with about 23% of their revenues in 2012 while asset sales provide most of the company's revenues. Chesapeake may be an extreme example of an oil and/or gas company that is losing money on tight oil and/or shale gas but most others are losing considerable sums as well.

Many investors are willing to invest large sums of money on energy companies even if those companies are losing money. Rice Energy Inc., a natural gas producer, raised \$900 million in three days recently, \$150 million more than it originally sought. Raising that large sum occurred even though Rice Energy has lost money three years in a row, has drilled fewer than 50 wells and will spend \$4.09 for every \$1 it earns in 2014.

According to Tim Gramatovich, Peritus Asset Management LLC, "There's a lot of Kool-Aid that's being drunk now by investors". Because many investors believe the oil and gas boom is highly lucrative, "People lose their discipline. They stop doing the math. They stop doing the accounting. They're just dreaming the dream, and that's what's happening with the shale boom."

To a large extent, oil and gas companies are using junk bonds to finance the U.S. oil and gas boom. Due to the low interest rate policies of the Federal Reserve in recent years, investors have moved to junk bonds because the possible returns are higher even if the risks are greater.

According to a presentation by Steve Kopits, an energy analyst, major oil companies greatly increased their capital expenditures between 2000 and 2012 (see Figure 1), including on tight oil and shale gas. In spite of that increased investment, their oil production has been declining (see Figure 1). Because of those negative trends, major oil companies have recently decided to cut back significantly on exploration and development until the price of oil increases to at least \$130/barrel. The price of oil, West Texas Intermediate (WTI), is presently a little over \$100/barrel. Reduced exploration and development by major oil companies will accelerate the production decline for the majors.

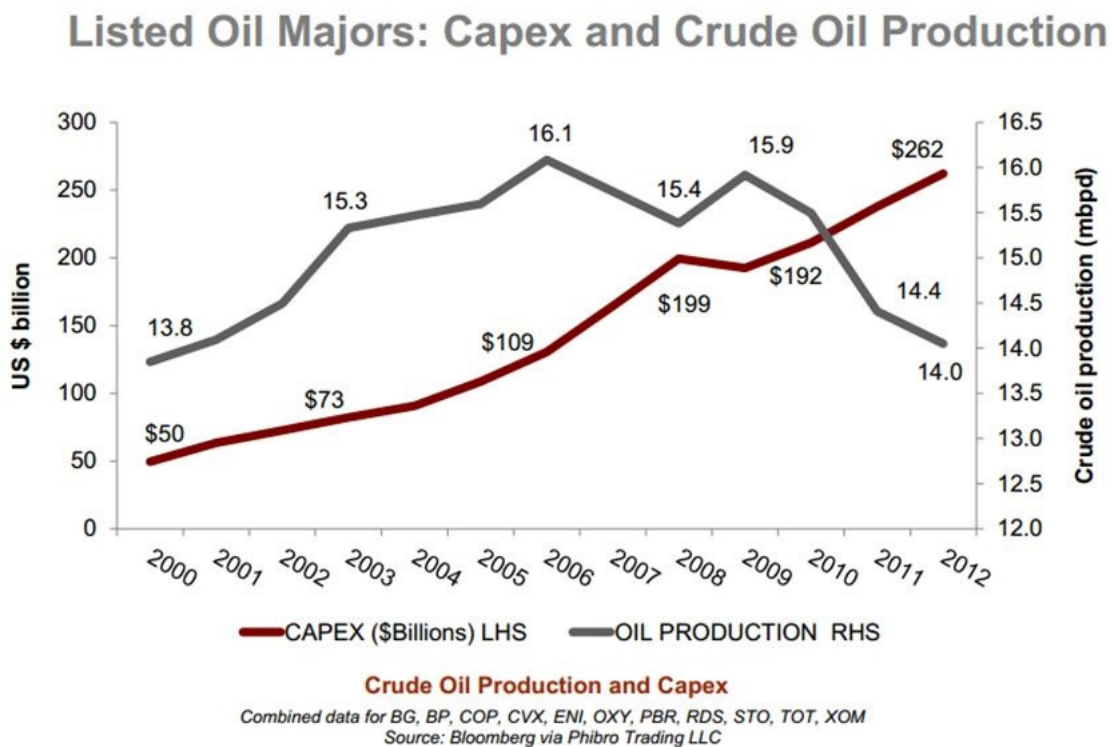


Figure 1

You're probably asking yourself, "if oil and gas companies are losing large sums of money on fracking operations, why do they continue drilling and fracking more wells?" The answer is that the only way they can entice investors to invest in their companies is to highlight their production rates. If their production rates go down, investors may stop investing and the companies could go broke. As Mike Kelly, an energy analyst at Global Hunter Securities in Houston states: "If you're not growing production, you're dying."

In the meantime, the oil and gas industry hopes that the prices of oil and gas go up enough so they can make money at some point in the future. A big question is how long will investors continue to provide

money to the oil and gas industry while the industry loses money on fracking operations? “Who can, or will want to, fund the drilling of millions of acres and hundreds of thousands of wells at an ongoing loss?” states Ivan Sandrea, Oxford Institute for Energy Studies in England. “The benevolence of the U.S. capital markets cannot last forever.”

“The spending never stops,” states Virendra Chauhan, of Energy Aspects in London. That is because the typical tight oil or shale gas well declines more than 50% in the first year of operation. Producers have to keep drilling more and more wells to maintain production. “The whole boom in shale is really a treadmill of capital spending and debt,” Chauhan said. “It’s a perfect set-up for investors to lose a lot of money,” Gramatovich said. “The model is unsustainable.”

Gas producers are pushing the idea of natural gas liquefaction for export overseas. The reason they want to export gas is because the price of natural gas in Asia is roughly \$17/mmBtu while in the U.S. the current price is ~\$4.70/mmBtu. Of course if producers export their natural gas, it means the price of natural gas would increase significantly in the U.S.

The reality is that the price of natural gas is likely to rise significantly in coming years even if natural gas is not exported. It’s unlikely that you heard anything about it from media sources but the storage level of natural gas in the U.S. dropped 1 trillion cubic feet (TCF) below average in the spring of 2014. On average the storage level drops from ~3.8 TCF at the start of the heating season to around 1.8 TCF at the end of the season. This year it dropped to 0.8 TCF. The elevated decline was due to the cold winter of 2013/2014.

Media sources are so engrossed with telling the public about how natural gas production is booming that they don’t want to inform the public of this year’s extraordinarily low storage level. As for the booming U.S. natural gas supply, dry gas production increased 0.9% in 2013.

What I expect to happen this year is that as the summer progresses, the storage level will continue to remain much below where it should be. As we go into the next heating season, I expect the price of natural gas to rise significantly to entice gas producers to produce more gas to try and bring the storage level up to where it should be at the start of the heating season.

You won’t hear this from any media source but the 3 year decline for fracked oil and gas wells is 80-90%. If U.S. oil and gas producers stopped drilling new wells, production of oil and gas would decline rapidly. In the Bakken and Eagle Ford plays, it takes roughly 2500 new wells a year, in each play, just to keep production flat.

In my “Analysis of Well Completion Data for Bakken Region Oil Wells” (<http://www.resilience.org/stories/2013-11-22/analysis-of-well-completion-data-for-bakken-oil-wells>) I showed that about 90% of Bakken oil production in North Dakota comes from 4 counties: McKenzie, Mountrail, Dunn and Williams out of a total of 16 counties in the Bakken region of North Dakota. Average initial production outside of those 4 counties is significantly lower than within the 4 counties. The oil industry is rapidly approaching well saturation within the 4 counties and they will have to resort to drilling outside of the top 4 counties in the near future. I expect that to lead to higher costs and

lower production. I've been predicting a Bakken oil production peak in 2014 +/-1 year and I maintain that prediction.

Based upon information from media sources, and even Josh Fox (director of Gasland and Gasland II), the public is given the impression that because shale plays can cover large areas, that means there are huge amounts of oil and gas within each play. Those promoting tight oil and shale gas want the public to think that a shale play is homogeneous and all plays are comparable. The reality is that most oil or gas in a play is extracted from relatively small areas within the play.

In the case of the Marcellus shale play in PA, almost all of the gas comes from small regions in northeast and southwest PA. Almost all of the gas production in the Haynesville shale comes from a small area in the northern part of the play. In spite of the considerable hype concerning the Monterey (California), Spryberry/Wolfcamp (Texas) and Bone Spring (New Mexico/Texas) shale plays, it appears that they will never produce much oil or gas.

Geologists Art Berman and David Hughes, in particular, make the case that the amount of recoverable U.S. tight oil and shale gas being reported by the mainstream media, politicians, etc. are greatly exaggerated. In the case of Art Berman, he makes the case that the amount of recoverable gas in the U.S. is approximately 25 years worth at present rates of extraction rather than the 100 years or more that is often stated in the media.

In the case of David Hughes, he has published detailed reports concerning tight oil plays in which he concludes that plays such as Bakken and Eagle Ford, where the majority of the U.S. tight oil production comes from, have much less recoverable oil than U.S. government reports state and that the Monterey shale, which the U.S. government has reported as having ~13 billion barrels of recoverable oil, will be limited in terms of future oil production (**Since I wrote this, the U.S. Department of Energy/Energy Information Administration downgraded the amount of recoverable oil in the Monterey shale from 13.7 Gb to 0.6 Gb, a 96% downgrade**). Fracking results to date don't provide a reason for optimism in terms of oil extraction in the Monterey shale region.

The oil industry is presently concentrating on the sweet spots within shale plays as they drill about as fast as humanly possible. The sweet spots are rapidly being saturated with wells in plays such as Bakken and Eagle Ford. As oil and gas companies have to drill in less fruitful areas, I expect production to go down and cost's to increase.

Jeremy Leggett, a petroleum geologist, recently wrote a book about our oil supply situation. The main point he made is that he expects crunch time for global oil supply to be in the period 2015-2020. I think that's a reasonable expectation because I believe that U.S. production from fracking will be declining within that period and many of the world's giant oil fields that haven't yet started to decline are likely to start declining.

There are analysts such as Gail Tverberg and Nicole Foss who make the case that the global financial system can't handle declining global oil production because oil is such a critical commodity for the system. We'll soon find out if that is the case. Many oil analysts make the case that the need for

quantitative easing, ultralow Fed interest rates and high government deficit spending as well as the slow economic growth we've had in recent years are a result of high oil prices.

Environmentalists like the thought of doing away with fracking. The harsh reality is that that isn't going to happen, irrespective of the environmental problems associated with fracking. Approximately 40% of all U.S. oil and natural gas production now comes from fracked wells. Americans would be up in arms if that production were cut off. Even the vast majority of environmentalists can't live without oil and natural gas, including that which comes from fracking. My impression is that most environmentalists don't see the relationship between their lifestyle, fracking, tarsands development, oil and gas pipelines, offshore oil development, etc.

That's not to say that the environmental consequences of fracking aren't significant. I thought the most important aspect of Gasland II was when drilling technology expert Tony Ingraffea stated that 5% of all well cement jobs fail immediately (cement goes between the well casing and the surrounding rock to prevent the flow of fluids and gas along the outside of the casing). He explicitly stated that the methane contamination in the Dimmock, PA aquifer was due to a bad cement job. It was also stated in Gasland II that based upon industry documents, 50% of all well cement jobs fail within 30 years. I expect that means that most aquifers in shale play regions with fracking wells will ultimately be contaminated.