



Tech Talk: A Review of North American Future Oil Production

Posted by [Heading Out](#) on November 14, 2011 - 3:18pm

Topic: [Supply/Production](#)

Tags: [american petroleum institute](#), [decline rate](#), [haynesville](#), [marcellus](#), [outer continental shelf](#), [wood mackenzie](#) [[list all tags](#)]

This is a good point to recap the intent of the current series of Tech Talks that appear here on Sundays. Internally, this marks the end of the segment that has dealt with North American oil and natural gas production. The series is not an in-depth review of individual fields but rather seeks to paint a broad background against which to judge the realities of the coming changes in the global supply/demand balance. More detailed discussions are provided by the excellent analysis of such folks as [Jean Laherrère](#), who is even now examining in more detail the production records from the wells in the deep waters of the Gulf of Mexico.

Perhaps more critically, it comes when there are increasing indications that the investment being placed on renewable energy around the world as a replacement for fossil and nuclear power generation might not be adequate to meet the need. For example, this week the British [Institution of Mechanical Engineers](#) has pointed out to [the Scottish Parliament](#) that their renewable targets for 20% total energy and 100% of electricity production by 2020

did not appear to be supported by a rigorous engineering analysis of what is physically required to achieve a successful outcome in the timescale available.

It is relatively easy for politicians to promise that energy supply is adequate into the foreseeable future. Euan Mearns, for example, has repeatedly written and [guest hosted](#) articles on The Oil Drum which show that supply requires infrastructure and planning over many years, without which (and the absence is evident) those promises become not only unrealistic, but also unattainable.

Just as I wrote this, the White House announced that the decision on the Keystone pipeline [would be postponed](#) until after the election next year. In a sense the Administration view echoes the opinion of one of those [opposed to the pipeline](#):

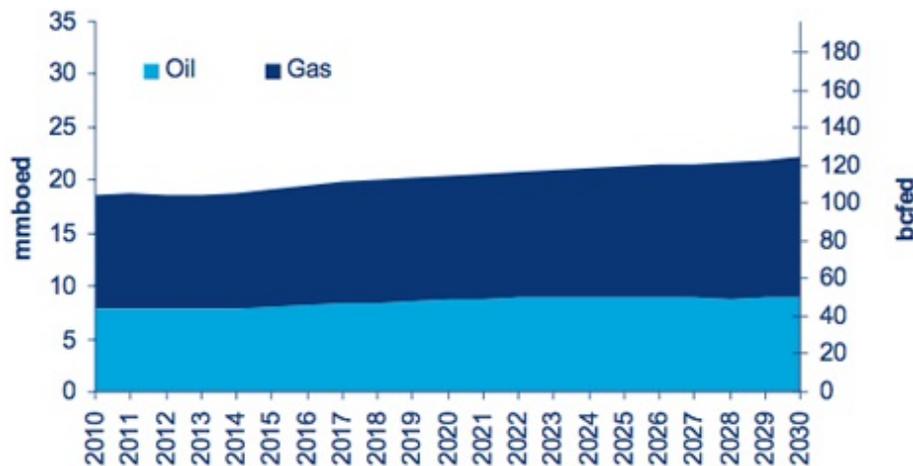
“It’s not like we’ll have an oil shortage,” said Mark Lewis, a partner at the law firm Bracewell & Giuliani who specializes in oil and gas pipelines. “We’ll continue to get product from the sources we get product from.”

If Canadian tar-sands oil moves to Asia, Lewis said, then the U.S. would just continue getting its oil from regions like the Middle East. And the Canadian oil sands would most likely still be developed, with that product entering the same global market.

This series is testing the truth of those remarks and that opinion by looking at the realities of future production and the oilfields that it will come from. As mentioned above, this began with a look at the resources of North America, and it is time to review what was found.

UPDATE The new figures for the Alaskan pipeline were posted and have been added at the end of the post.

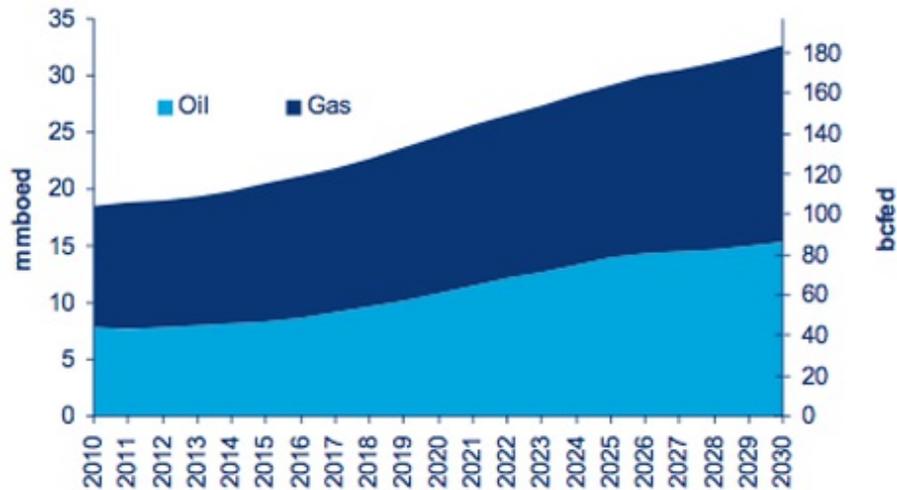
When this series began [last April](#) it set out to look at the potential future changes in the North American oil and natural gas supply. There were three different parts to that supply. The first is the historic oil, that coming from existing wells and fields, often coming from [stripper wells](#) around the country. Then there were the supplies from fields that are currently being developed and where production is continuing to rise, such as in the [Bakken fields of North Dakota and Montana](#). And then there is the potential that will come from finding and developing new fields in the relatively near term. Perhaps as an indication of my own [“Oops” moment](#), I used the Energy Plan proposed by Governor Perry to illustrate the potential future additional fossil fuel that might be available over the next two decades. That was very similar in promises to a [Wood MacKenzie Report](#) prepared for API, and released in September. To give my comments on those projections, I will look first at the summary of projected increase in oil production from that report. This is divided into two parts, the first assumes that current policies continue, and it sees energy supply growing as follows:



Total US Production – using current conditions. ([Wood Mackenzie](#))

The plot shows an increase in oil production from 2010 to 2030 of some 1.2 mbd, which in the overall scheme of things is not really that much change from the present over the twenty year time interval (0.7% per year). Natural gas, on the other hand, is expected to rise some 14.4 bcf/day (1.2% per year), which is a little more impressive.

However, if all the wishes of the industry were to come to pass, (the development policy case) then Wood Mackenzie sees considerable potential for supply growth.



Production with an accelerated development program ([Wood Mackenzie](#))

In that developed condition, Wood Mackenzie sees oil production increasing 7.6 mbd to 15.4 mbd by 2030, while natural gas production rises by 36.8 bcf/day to 96.9 bcf/day.

The first concern that I have with these plots is that of the declining reserve. In [previous posts](#) I have discussed various estimates for the decline in production that occurs in existing wells over time. This occurs with both oil and natural gas wells, and changes with rock type, well type and other factors. For example a recent post by [Fractracker](#) on the performance of 756 Marcellus wells notes that horizontal gas wells declined an average of 39% in the last year, while vertical wells declined 47.6%, though those numbers do not reflect wells that were closed because they were no longer producing (16.7% of the horizontal wells and 6.9% of the vertical wells). Figures from other gas shales have reported decline rates in the Haynesville, for example, [of 85%](#). In conventional oil wells (and reservoirs such as the Bakken are, for this discussion, considered as unconventional) the decline rates now lie [above 5%](#). What this means for US production is that, just to stay even, the industry has to add at least 360,000 bd of new production each year, to maintain a roughly 7.2 mbd level of total oil production. (and that is likely to be, at best, the average gain in production over the next ten years from the [Bakken](#) and [Niobrara](#) combined).

So where does Wood Mackenzie see the gains in production from the “development” case?

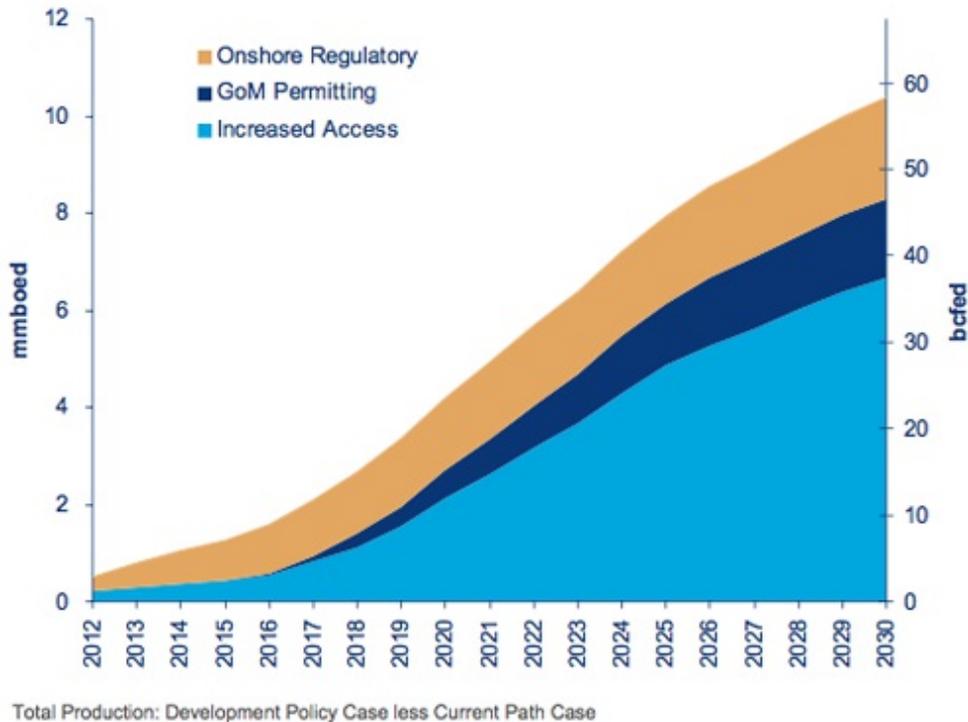


Regions where additional production may be obtained ([Wood Mackenzie](#))

The problem that the map shows is that much of the new discovery and development is anticipated to come from the offshore, whether it is East Coast, West Coast, Gulf of Mexico or Alaska. In comments on the post discussing [drilling off the Atlantic coast](#), my quote on it taking four to ten years for production following the start of leasing led to kindly admonishment by Art Berman, [Harry Flashman](#) and [Rockman](#) on the overly optimistic view that this represented, with the reality of development being more likely to occur over decades. This holds even more true for resources off the Alaskan coast, where the on-land infrastructure is not currently in place. And it fails to recognize the antagonism that state governments (such as those I mentioned from [New Jersey](#)) have toward offshore drilling on both coasts.

The current increase in oil production in the United States is, in part, due to the development of long horizontal wells, with multiple fractures along those wells to improve flow to economic levels from shales that were previously uneconomical to drill. As long as enough production can be achieved from such wells to keep them viable for the oil industry they will be developed. When they cease to be then they won't. The rapid decline rates that are found for these wells (as was shown in the posts on Bakken and Niobrara) mean that as production moves from the sweeter spots in the reservoirs out to the leaner fringes, a point will be reached in a few years where those economic factors will come into play. As that time approaches, the price of oil (for a variety of reasons) will be sufficiently higher than it is today to encourage greater overall production than might be anticipated from today's figures, but it will be nowhere near enough to meet the levels of US demand. And it will still curtail overall production.

The gain in production that Wood Mackenzie sees in moving to the "development phase" does not really kick in, were all things to come to pass, until about 2016. And even then the main initial gains are assumed to come from the easing of regulations, which is, I rather suspect, a wish rather



Possible gains in future production over the current condition ([Wood Mackenzie](#))

The delay in granting permission for the Keystone pipeline will shift some 700 kbd of US supply out another year at least. But that does bring up the issue of [the oil sands](#). They are the one source where the deposit size is known and adequate, and where gains to help meet demand could be achieved. However, with the delay and possibly even denial of the pipeline, it is now quite possible that the Canadian Government and the other parties concerned might hear again the same blandishments from China that persuaded the Turkmen; and when we finally get around to giving grudging permission for Canada to sell us more oil, that additional oil sand crude may already be heading overseas through pipelines running west.

Whether, at that point, we can then

continue to get our oil from regions like the Middle East

is a point that I will look at as this series continues, and we start to examine the long term potential of sustained oil supply from regions overseas.

Oh, and a quick P.S. for those who remember the [post on the Alaskan pipeline](#), in August it was running at an average of [538,623 bd](#), with the annual average now running at 568,471 bd. In August they were still publishing the data from the previous month, but the site does not show either September or October averages!

UPDATE The new Alyeska numbers have now been posted, thank you. October average flow was 589,068 bd, and that brings the annual average to 574,616 bd. So the numbers have risen a little. Winter has, however, now arrived.



This work is licensed under a [Creative Commons Attribution-Share Alike 3.0 United States License](#).