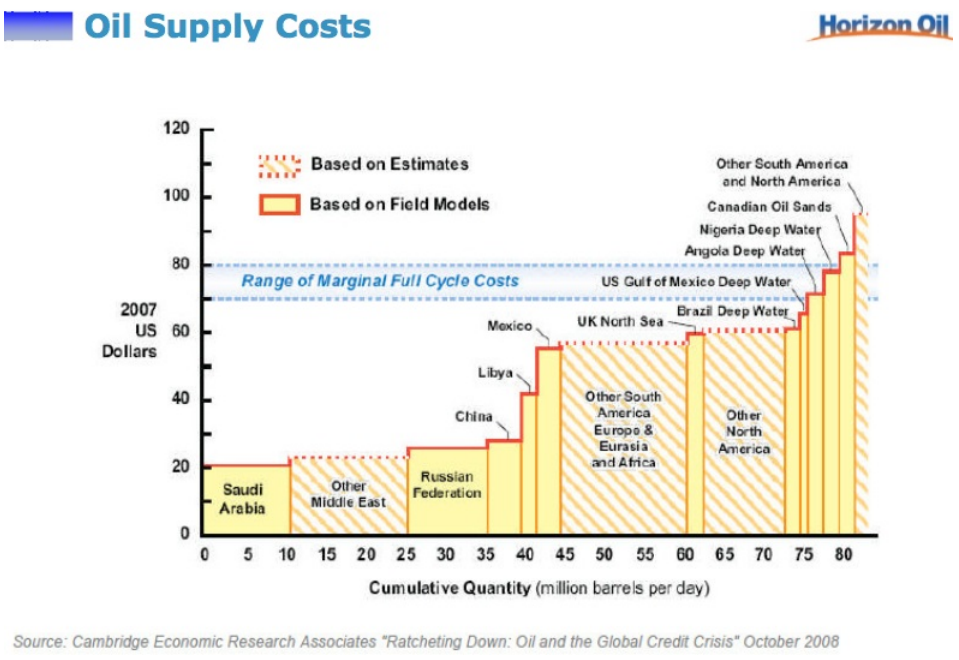
The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Reserves and Resources

Posted by Heading Out on October 8, 2009 - 10:44am
Topic: Supply/Production
Tags: clean coal, natural gas, natural gas prices, reserves [list all tags]

In trying to estimate the size of the problem that will face the world as the available reserves of fossil fuel begin to decline, one has to make some assumptions about the size of the volumes that are available. It is a debate that can lead to people talking past one another if they make different assumptions about the size of those reserves. This holds true in discussions that dot the web sites of those that write about energy, whether writing about oil, natural gas, coal or uranium.

The issue that becomes important is the fact that the amount of oil, coal, natural gas or uranium that can be economically extracted varies with the price of the fuel.



Source: Cambridge Economic Research Associates "Ratcheting Down: Oil and the Global Credit Crisis" October 2008

CERA estimate of full cost of production of various oil sources, at time when oil was about $90 a barrel, so blue line represented then-highest cost of new production justified by $90 price, from Horizon Oil presentation.

This current post was motivated by a couple of different stimuli, firstly there was an article on Seeking Alpha about the natural gas reserves of the USA and then I was asked a question about the coal reserve assumptions for Alaska.

The natural gas article illustrates, in some ways, the problem of discussing the remaining gas that the United States has available, and whether we have a problem in future supply. With a consumption of around 23 tcf per year, it questions whether the remaining gas reserve is 337 tcf

or 1,747 tcf. It was followed, interestingly, by a second article on natural gas that points out the folly (as it turns out) of being in the natural gas market this past year, as an example of the "no free lunch" argument.

> "Natural gas is probably the best demonstration of the 'no free lunch' law in commodity indexing, as evidenced by the S&P GSCI Natural Gas Index which commenced at 100 in January of 1994, ended September at 2.63. Over the same period, the natural gas future has increased about 125%. While 2008 served as a strong reminder 'to know what you own,' 2009 has reminded investors 'to know how to be properly exposed to commodities.'"

This ties into estimating the size of the reserve, because, in raising money to develop reserves, you have to be confident that the money that you invest will give you a financial return on that investment. If the price of natural gas has tumbled to $3 or less (per kcf) then you may not make that return, and may even lose money. You will therefore look more cautiously at what are potential sources and be more selective on where you drill. Some of the more questionable areas will no longer be sites that justify the investment. And thus these areas move from being in the reserve account into that of being a resource that is available, but not justifiable as being exploitable AT THE PRESENT TIME.

Yes I know I was shouting, I did because it is that qualifying clause that gets overlooked time and again when discussions arise over what the fossil fuel base is for the world. The condition as to whether the volume has enough worth to justify being developed changes with conditions. Coal in the UK had a considerable future before the oil and gas reserves of the North Sea were developed. At that time the reserve was proven at over 45 billion tons and the coal was being mined at around 200 million tons a year - but times change, and the cheapness of the liquid fuels, relative to the cost of mining, meant that a lot of the coal, although still there, is currently too expensive to produce – relative to the alternative. It is thus no longer counted as being part of the reserve.

Now this gets into the climate change debate a little, since one of the arguments that are raised is that the users of coal do not pay the full price, since the price they do pay does not include some of the social and environmental costs associated with burning the product. Since the customer ultimately pays for the product, this seems in part to be an argument to justify raising the price of coal based energy to the point that other sources become cost effective. The problem is that in some locations it is hard to find current technologies, even at cost equality, that can provide a replacement for coal as oil and natural gas supplies run down.

Which gets us back to the question as to how much of a reserve of oil and gas we have, and how long will it last before we have to face the reality of a return to coal.

And this is where the price of the product controls, transiently, the volume of fuel available. In the short term natural gas prices are down and it becomes harder to justify continuing to drill new wells, if they aren't going to make money. But as more folk stop drilling, then with the very transient life of the existing wells, the supply will shorten, and after the stored volumes begin to be used up, then prices will rise to the point that an effective market can be reestablished. How long will that take? Probably until sometime next year is my current guess, though it depends in part on how hard a winter Europe and North America experience this year.

In the longer term there are so many power plants that now rely on natural gas that demand will sustain a higher price, and lead to an increase in the drilling rate, until price:supply and demand reach a more stable platform. At that time the reserve volumes that are currently moving into the resource category will start to move back and the projections for a longer "age of Natural Gas" will start to assume a little more reality.

However I would like to throw a small caveat into that debate, at the beginning of the year the SEC changed the rules for counting the validity of an oil or gas resource, loosening the requirement that the fuel be "proved" to be there. This is a link to the new regulations. The ramifications of the new rules are likely to have some impact on this debate.