



## The other side of the Peak - oil depletion rates

Posted by [Heading Out](#) on May 16, 2005 - 7:14am

The news this past week that world oil demand is likely going to be no more than 1.7 mbd over last years peak level is at first reassuring. A reduction in demand of some 500,000 bd initially makes it more likely that the purported remaining excess production in the Gulf can come quite close to matching the increase in world demand, at least for this year.

There is, however, as always, a catch. In the growing discussion as to when Peak Oil will arrive, and what its effects will be, there is relatively little discussion as to what the back shape of the curve will look like. There are rough numbers thrown around, and many of the curves that are put up anticipate that, for initial modeling purposes, the depletion of oil in a field will mirror its original growth. In other words, production follows what is known as a Gaussian distribution, such as the picture that we have over on the right of this site. Depletion will start out relatively slowly and then accelerate, in the same shape to the right of the peak, as on the left.

Historic numbers for the start of depletion in a field might be around 5 to 6% and then increase as fewer new wells come on line and more drop out of production. The acceleration is also, in part, because later wells in the field are drawing from a smaller remaining resource and thus have a shorter productive life, in general.

In recent years oil field production methods have become more sophisticated. Oil flows out of a well in part as a function of how long the section of the well is that is within the rock that has the oil in it. So if we have (and this is a very simplified case) a well in the rock that is 500 ft long it may produce 5 times as much oil per day as a similar well that only penetrates that rock by 100 ft. This basic idea led to the change from drilling vertical oilwells to ones where the drill turns 90 degrees when it reaches the oil bearing level, and drills horizontally from there through the rock. In this way if the oil layer is only 100 ft thick, one can still have an oil well that has 500, or 1,000 or 5,000 ft of exposure to the oil-bearing rock.

(In our old [cream in the coffee cup analogy](#) this would be the same as going from just dipping a straw in the cream to slowly remove it to changing to a straw that is laid across the top of the cream, with holes along the straw and then sucking across the full width of the cup at one time).

Remember, however, that the total amount of oil in that rock has not changed, so if we are drawing the oil out at a much faster rate, there is a downside. And the downside is that when the oil starts to run out, the drop in production can be a lot faster than it would be from the straight vertical wells. [Figures from Oman](#), for example, found that the rates could get up to around 14% a year. This technique is now becoming predominant in the Middle East and routine in Saudi Arabia.

There are two different impacts to this, one of which is fairly visible, that is where the whole country goes past its peak, and suddenly all can see the decline and configure the numbers into a global assessment. The other is where the overall production of oil in a country is still going up.

Here the amount of new production that has to be set aside just to compensate for drops in production in existing fields can be more difficult to determine. But the effect can be brutal, because on a declining curve you have to replace that lost production every year just to stay even. So that if, for example Saudi Arabia had to use 800,000 bd of new production last year, just to offset production losses in Ghawar, Abqaiq and Berri, then next year it has to find another 800,000 bd to match the further drop in their production. And so it goes.

And for the world that means that at present just over 1 million bd in new oil must be found each year just to match production declines. So when you hear all the news about how many new supplies are being found, remember to take away the declines before you start with the additions. (For more info Chris Skerbowsky talked about this at [the Peak Oil Scotland](#) meeting last month).

The concern however is that this enhanced recovery technique will mean that the downside of the slope will be faster than is currently being expected, and that next year might get grim a little faster than expected.

Technorati Tags: [peak oil](#), [oil](#)

---



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