Fact sheet Four: Peak Oil

Given what we have learned about oil markets and the politics of oil, we may think that as oil becomes scarce and prices rise, heavy oil and oil sands become more worthwhile to extract, despite the technological difficulty and cost in extracting oil from them. A group of thinkers associated with what is known as Peak Oil, however, assert that this is not the case.

How did Peak Oil Begin?

A geology consultant for Shell named M. King Hubbert (1903-1989) noticed that oil production generally follows a bell-shaped curve, as in Figure 1 below. Given that each bell peaks at one point, he predicted in 1956 that US domestic oil consumption would peak between 1965 and 1970, and that global oil production would peak in 2000. US prices did peak in 1970.

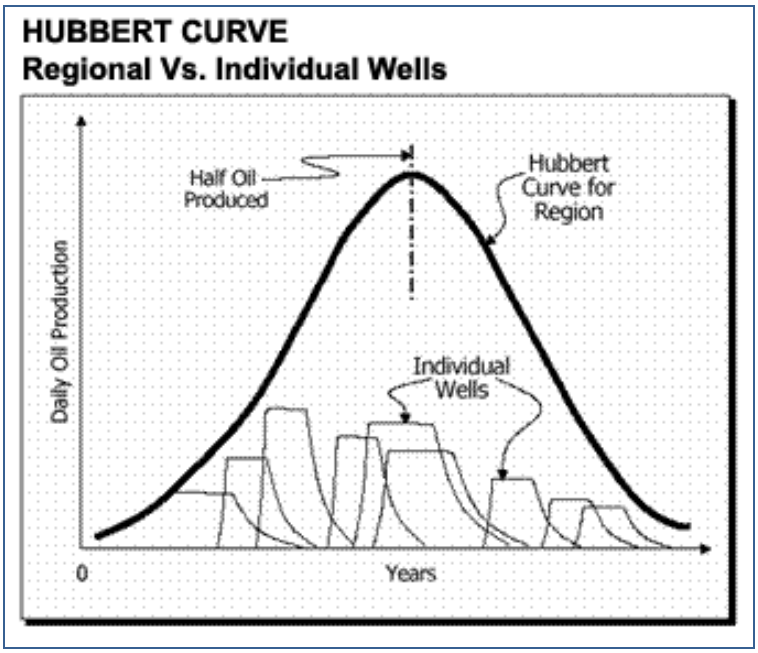

Fig I: The Hubert Curve. Source: http://www.energybulletin.net/

What does Peak Oil Argue?

Hubbert observed that when oil production begins at a given individual well, production at that well tends to increase exponentially at first. As we have seen, the light, sweet oils (those with a lower sulfur content), tend to lie near the surface, and thus are the first oil supplies that are extracted. As extraction intensifies, and the technological competence of the techniques used to extract the oil grows, the oil supply available from an oil well grows dramatically – represented in the graph above by the line outlining the left-hand side of the bell curve.

The oil in any one well is a finite resource, however. As we have seen, oil is formed by the compression of organic material over a long period of time; there is not an infinite supply underground. As the sweet oil begins to run low, production at the well tails off. After the sweeter oil is extracted, the remaining oil is further afield, harder to extract and less valuable.

At the moment of half-oil (represented by the dotted vertical line in Figure 1), oil production falls sharply. This applies not only to individual wells, but also to geographic regions as a whole. Of course, geological and economic conditions cause fluctuations, so this curve is not perfectly identical for every well or every region.

Peak Oil advocates say that the consequence of these bell-shaped production curves is that long before oil runs out we will begin to see severely negative effects from the decreasing supplies of oil. As we move beyond the peak level of production into the right side of the curve, the remaining oils become prohibitively expensive to extract. And since demand for the oil will not stop suddenly, this means that prices will rise considerably as production slows and itself increases in cost.

Production has already passed its peak at many oil wells around the globe. Of the sixty-five largest oilproducing countries in the world, fifty-four have declining rates of production.

Thus, there are two different types of claim made by the peak oil movement. The first is about the type of peak that happens in oil production: oil production does not gradually decline, but peaks and then rapidly declines. The second type of claim is *when* that peak will happen.

Does the evidence support Peak Oil's claims?

M. King Hubbert's prediction regarding *when* the peak in global oil production will happen has already suffered a setback. While production did indeed dip in 2001 and 2002, by 2003 it surged past 2000-levels. In 2000 it was 68,340,000 barrels, but by 2003 it was 69,154,000. And production grew again in 2004, and again in 2005.

Peak Oil theory proponents have responded to this reality by saying that both the movement to conserve energy and the OPEC crisis have delayed the peak of global oil production.

Yet there is certainly evidence to suggest that the global discovery of oil is slowing. According to some predictions, in the 1960s, an average of forty eight billion barrels of oil were discovered every year, and eight billion were consumed. In the 2000s, by comparison, only ten billion were found, while 30 billion barrels of oil are used each year.

Even with such information, predictions are still very hard to make. One of the reasons for this is that statistics about proven oil reserves are not considered reliable, since it is not in the interest of the oilproducing countries that post the statistics to publicize that their oil reserves are running low. As a result, just how much oil is left in the ground has become a cottage industry of estimates. The problem is made even more difficult because until one actually starts drilling, the amount of oil in an untapped field cannot be precisely measured – figures for these fields are merely estimates, or best guesses. For instance, British Petroleum (BP) - an oil company, we should note - estimates that the worlds proven oil

reserves have increased from 910.2 thousand million barrels in 1987 to 1237.9 thousand million barrels in 2008. At the same time, some independent researchers put the numbers much lower than that.

It is especially difficult to make predictions because oil supply and price are affected by many factors unrelated to geological supply: political considerations, as we have seen, can cause large amounts of oil to be unavailable for a time. Insecurity in oil producing regions can also cause sharp price spikes or supply shortages. For example, if an oil-producing country experiences war or civil conflict, its ability to work with oil companies to produce and export oil may be reduced.

Perhaps, if indeed there is a Peak Oil point, it will likely be known only retroactively, long after we have passed the peak, and information becomes clearer.

What are the arguments against Peak Oil?

Almost no one disagrees that oil is a finite resource and that extracting it becomes harder (both financially and in terms of energy) after an initial period. But many people contest the first type of claim Peak Oil theorist make: that oil production does indeed peak. Many non-Peak Oil theorists believe that oil production can instead plateau.

Peak Oil theory, such critics claim, does not appreciate the extent to which an increase in prices and a shortening supply curve drive a technological imperative to exploit heavy oil and oil in shale, which would make a peak point for oil exhaustion unlikely in the near or middle future. If oil production could be kept more or less stable through advances in technology, then the end of oil would be less likely to be a peak point followed by catastrophe, and more likely to be a slow decline as oil is replaced with other fuel sources.

For instance, if the supply of oil in tar sands is considered (which currently take five times the resources of conventional oil to extract and produce), we can vastly expand the estimates of global reserves. In Canada alone, the Athabasca deposits have estimated reserves of 1.8 trillion barrels.

Further questions and discussion

Do you agree or disagree with the Peak Oil theory? What facts support the Peak Oil claims, and what facts suggest that Peak Oil supporters are wrong?

Why do you think different organizations – petroleum companies, environmentalists, oil-producing countries oil-importing countries – give different estimates for the amount of oil remaining in global oil reserves?

What types of pressures on oil consuming countries are created by the idea of Peak Oil, assuming that it is true? How do you think the possibility of Peak Oil would affect the relationship between oil producing and oil consuming countries?

Further Reading

Aleklett, Kjell. 2005: The oil supply tsunami alert. *Energy Bulletin*. http://www.energybulletin.net/node/5655

Hubbert, M. King. 1956: Nuclear Energy and the Fossil Fuels 'Drilling and Production Practice. *API*. 22-27. http://www.hubbertpeak.com/hubbert/1956/1956.pdf.

Simmons, Matthew. 2005: *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*. New York: Wiley.