NPG Footnote

# Peak Oil. Are We There Yet?

By Lindsey Grant

## THE PEAK OIL CONCEPT

In the 1950s, Shell Oil geologist M. King Hubbert predicted that oil production in the United States would peak about 1970 and thereafter inescapably drift downward. He was generally derided, but production did indeed peak in 1970. After that, several other petroleum geologists applied "Hubbert's curve" to world recoverable oil resources, and many of them arrived at a peak sometime between 2005 and 2025. They were dismissed shrilly by the oil companies and others who have a stake in more or less perpetual oil supplies, but their predictions are looking better and better.

Now, a new report by a Dutch study group shows that the peak may have passed already.[1] It cites the U.S. Energy Information Administration (EIA) as showing conventional world crude oil production peaking at 74.27 million barrels per day (mb/d) in May 2005. For all liquid fuels, EIA puts the peaks at 85.38 mb/d in May 2005 and 85.54 mb/d in July 2006.[2] (That includes crude oil plus heavy oils and tar sands, natural gas liquids, coal-based liquids, gas-based liquids and even biofuels – the proposed substitutes for crude oil.) Another authority, the International Energy Agency (IEA) puts the peak for all forms of liquid fuels at 86.13 mb/d in July 2006. By August 2007 output was 1.2 percent below the 2006 peak.

Oil production has been on a plateau since 2004, with signs of decline just appearing. That follows an era of remarkable growth. Consider these figures for oil: 1960: 20.97 mb/d. 1970: 45.89. 1980: 59.56. 1990: 60.49. 2000: 69.37.[3]

The evidence is more convincing because it comes from two groups that have resisted the very concept of peak oil. The EIA has heretofore based its projections on demand rather than supply, and thereby regularly made serious errors.[4] The IEA in July for the first time concluded (reluctantly?) that the oil market will be "extremely tight" by 2012, though it was silent about the longer term.

Even the industry-dominated National Petroleum Council, which is selected by the U.S. Secretary of Energy and dominated by the oil spokesmen who have been most vociferously skeptical about an energy peak, published a detailed report in July which cited various peak estimates, stated that oil supply is unlikely to meet projected demand over the next 25 years, and called for conservation measures such as tighter automobile mileage standards.[5]

One peak is not necessarily a proof. The peak we have seen may reflect transient factors or voluntary restraints on oil output by OPEC, but OPEC production has reflected its capabilities more than OPEC quotas, and the Saudis' claim of excess capacity beyond current output is suspect.

The peak oil approach assumes that peak production occurs when half the recoverable resource has been extracted. There is no requirement in logic that it should occur at exactly that point. Moreover, we cannot know the exact size of the recoverable resource in advance, because technical changes have made it possible to recover more of the oil in any given field. But those are cavils. The resource is finite, and production in any given field (and in the world at large) will peak when

the readily available oil has been extracted. The petroleum geologists have studied the world pretty carefully by now and found no evidence that there is enough potentially exploitable oil to replace the fields now running down.

The problem of course is the astonishing level of demand. If somebody discovered a one billion barrel field tomorrow, it would provide only 13 days' consumption at the current rate, and less than that if demand keeps growing. And it might take a decade to bring the hypothetical field into full production.

A look at the major oil producers underlies the threat to present oil output levels. Of the 21 major producers – those countries that have achieved an output of more than one mb/d – 10 have already passed their peak, some of them a generation or more ago. Others may be close behind. Saudi Arabia is heavily dependent on the huge but old Ghawar field. That field is undergoing emergency resuscitation, but several experts have expressed doubts that it can sustain current production very long. The second largest field, and a major supplier to the United States, is Mexico's Cantarell field. It is in sharp decline, following a worst-case scenario that could reduce its output by 75 percent from 2004 to 2008.[6] Future production in Canada and Venezuela depends on success in extracting petroleum from oil sands and heavy tars. Those resources are huge but, at best, they have low net energy yields. Only the richest of them justify mining, because the rest would require more energy inputs than they would yield – even disregarding their demands for water and their serious impacts on climate and the environment.

Optimists' hopes are pinned on (1) Central Asia, but already the oil majors face serious technical and political problems in trying to develop the Kashagan field in the Caspian Sea and other fields in Kazakhstan; (2) the Atlantic off Africa, where political turmoil in Nigeria has held production down; or (3) the Arctic, where there are dreams of exploitable resources as global warming melts the pack ice. Those are slim hopes, compared to the declines I have cited.

The big oil companies are behaving as if they expect a decline. They haven't built a new refinery in the U.S. since the 1970s, presumably because they see no assurance of rising oil supplies over the several decades it takes to build and amortize a refinery. They are using current profits to buy back their own stocks, which means that they don't see profitable investment opportunities for that money in the industry. Such behavior of course accelerates the decline of future production. To compound that problem, producers such as Mexico and Venezuela are using their oil profits to underwrite their national budgets, rather than reinvesting them in oil production.

We have been living in an era when rising demand chased a rising supply. We are now entering the much more dangerous era of rising demand chasing declining supplies. If we do indeed manage another peak, it will be very soon, before the resource is further depleted. And it will be achieved only by pumping the existing fields faster, which will very soon lead to an even steeper decline. Economists were predicting $25 oil. Now some of them warn of oil at $100 per barrel. I have news for them: that is just the start of the problem.

## THE CONSEQUENCES OF PRODUCTION DECLINE

Is this prognosis important? It is more than important. It is epochal. It is much more far reaching than the current worry that rising oil prices will drive inflation and that real

incomes will decline. Beyond that, as oil declines, consumers will shift to gas and coal, depleting them. As we run out of fossil fuels, we will face a future, over the coming century, of fundamental changes in the way we live, and lower consumption levels. There are some hopes for continued electricity production from nuclear energy and, more erratically, from renewables such as wind and solar energy, but there is no substitute in sight for the portable, concentrated energy and the chemical feedstocks that fossil fuels provide.

I have dealt with those problems at length elsewhere.[7] I will simply offer a few dramatic examples here, focusing upon the United States' future.

The early consequences will be felt in transportation, which depends on oil. Aviation will be the first to go, priced out of most people's reach by oil prices that are already rising. Farewell to vacations in exotic places, blueberries from South America, or cut flowers from Israel. Farsighted investors will move away from that sector. Luton Airport, outside of London, provides an early example. The UK Government in 2003 published a white paper on air travel that envisaged traffic at the airport rising to 15 million passengers annually by 2015 and 30 million by 2030. The airport's Spanish owners at first developed a plan to expand the airport to meet that demand, but have since reversed course and announced they will finance no further expansion.[8] Apparently, they have absorbed the news about petroleum. Others will follow, and that will hasten the decline of aviation.

We will need to move from cars and trucks to trains. They are the most energy-efficient mode of transport, and the decline of petroleum will deprive us of the asphalt to maintain our roads. On the ocean, we will shift to sail and perhaps, while it lasts, nuclear energy. Food from afar will become much more expensive than food grown nearby, and that will affect our choice of where we live.

The worst impact will be upon food production. World food supplies are already strained, and prices have risen as the U.S. has (unwisely) subsidized corn-to-ethanol as a gasoline supplement. The competition will get much worse, as we look to forests and arable land for substitutes for the petroleum that feeds the chemical industry.

U.S. agriculture now relies on fertilizers, pesticides, trucks and farm machines based on oil and gas. U.S. food production will probably decline by 60 percent or more as we relearn an agriculture dependent upon horses for power and fertilizer, and as some of the arable land must return to pasture, fodder crops and green manure.

We will need to rebuild or replace most of our housing stock within this century to make it more energy-efficient, and relocate it to adjust to reliance upon sources such as distributed and passive solar energy. Heating will become much more expensive, and air conditioning a rare luxury, and our choice of where to live will be shaped by those realities. Add to that the need to relocate present populations away from seashores in the face of global warming, rising sea levels and more powerful hurricanes, and we face an investment bill unlike anything in human experience.

Population size becomes the critical determinant of whether we can make those changes. We cannot afford to watch U.S. population grow at 1.12 percent a year, as it has been. We must turn it around as swiftly as possible to lessen our demand for energy, food and water, to reduce the investments that I described above, and to save money for those investments rather than spending it on the infrastructure needed to accommodate a larger population.

Population size, in the United States, depends critically on our immigration policy. Mass immigration drives most of our growth, and present policy favors the immigration of the fertile, who in turn drive up U.S. fertility. A "two child policy" (two children as the desired maximum), with net annual immigration reduced to something like 200,000, could turn U.S. population growth around in this century.[9] That may not be fast enough, given the increasingly ominous news about petroleum, but it would be a start.

One can only speculate as to the domestic and international turmoil that will threaten the world as the rich and poor compete for the necessities of life.

I have focused on the United States. The energy and population issues are global. We must relearn how to offer encouragement and support to common efforts to address them if we are to navigate the return from the brief era of fossil energy. The future may be more frugal than the present, but it can be better, since at least it will be sustainable, as the fossil fuel era is not.

That report from the Netherlands is a warning bell. It reminds us that the changes will not happen in some theoretical future. They are starting now. And we had better start now with the policies to deal with them, or we will never catch up.

## NOTES

1. ASPO Netherlands, Oilwatch Monthly, 9-13-07 report by Rembrandt Koppelaar. Www.peakoil.nl.
2. EIA *August 2007 International Petroleum Monthly, 9-20-07,* "World Oil Supply", Table 1.4.
3. EIA *Monthly Energy Review,* "Table 11.5. World Crude Oil Production, 1960-2006."
4. For example, the EIA *International Energy Outlook 1996* predicted "By 2015, the world's daily consumption of oil is expected to reach about 99 million barrels, ... oil prices are not expected to rise above $25 per barrel,..." partly because of "the existence of vast quantities of producible oil reserves..." (p.21)
5. Wall Street Journal 7-16-07 and Science 7-27-07, p. 437.
6. Wall Street Journal, 8-2-06, p. A4.
7. See *The Collapsing Bubble: Growth and Fossil Energy* (Santa Ana: Seven Locks Press, 2005) and *Valedictory: The Age of Overshoot* (Available from Negative Population Growth, 2007.)
8. Financial Times, 7-6-07, reported by ODAC News 7-11-07.
9. See Lindsey Grant, *The Two Child Family* (NPG FORUM series, May 1994) and *The Collapsing Bubble* (op cit), pp.65-66.

**About the author:** Lindsey Grant is a writer and former Deputy Assistant Secretary of State for Population and Environment. His books include: *The Collapsing Bubble: Growth and Fossil Energy, The Case for Fewer People: The NPG Forum Papers (editor), Too Many People: The Case for Reversing Growth*, *Juggernaut: Growth on a Finite Planet*, *How Many Americans?*, *Elephants in the Volkswagen*, and *Foresight and National Decisions: the Horseman and the Bureaucrat.*

NPG

**Negative Population Growth, Inc.**
2861 Duke Street, Suite 36
Alexandria, VA 22314

voice: 703-370-9510
fax: 703-370-9514
email: npg@npg.org
www.npg.org