Peak Performance?

By Vaclav Smil : **BIO** | 23 Feb 2007

Peter Odell, one of the most astute, life-long observers of global oil scene, calls them "peak-oilers." Some of them were quite unhappy when I pointed out (in *Energy at the Crossroads*, in these pages, and in *Worldwatch* in January 2006) their propensity for wholesaling catastrophic scenarios of the world once the global oil production peaks and begins to decline. But how else can one label such writings as Richard C. Duncan's "Olduvai theory" according to which the declining oil extraction will plunge humanity into life comparable to that experienced by some of the first primitive hominids who inhabited that famous Kenyan gorge some 2.5 million years ago?

And no one else can be blamed for the repeated failure of their forecasts but the prominent peak-oilers themselves. According to Colin Campbell the global oil extraction was to peak in 1989; Ivanhoe's peak was in 2000; Deffeyes set it first in 2003 and then, with ridiculous accuracy, on the Thanksgiving of 2005.

Well, the numbers for 2006 are in. And they show that even after OPEC once again cut its production (by 1.2 million barrels a day effective November 1, 2006) in order to arrest yet another rapid fall in prices, the global oil supply for the entire year rose once again, by about 0.85 million barrels a day. That is about 42 million metric tons a year, or more than the annual output of Oman or nearly twice the annual extraction in Azerbaijan, a major oil power on the Caspian Sea. But once we take into account the need to replace worldwide reserve depletion (currently amounting to more than one million barrels a day) this means that some 2 million barrels of new oil found their way on the global market, an equivalent of adding a bit more than UK's entire North Sea production or Iraq's annual extraction.

This supply had fully covered the global demand even with OPEC's production cuts and with China's record imports of oil bought in order to start filling the country's new massive strategic oil reserve. The average price of OPEC's basket of exported crude oils dropped from the peak of about $70/barrel in July to $55/barrel by the end of the year. And then it slid below $50/barrel in January 2007. In 2006 non-OPEC production rose strongly in the countries of the former Soviet Union, surpassing the level of 12 million barrels a day for the first time since the collapse of the USSR and coming within 5 percent of the record annual production reached in 1987 So much for the rumored inability of Russia to maintain its production, and for the "disappointing" results in Azerbaijan and Kazakhstan.

Higher outputs came from Africa, particularly from Angola, as well as from Latin America, and even China recorded a small increase. Extraction in the United States, still recovering from the Katrina damage in the Gulf, dipped a bit but it is expected to increase this year (by about 4%) and again in 2008. And the world's largest oil company, Saudi Aramco, continues with its plans to expand its production capacity from the current 11 million barrels a day to

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12 millions barrels a day by 2009. .

If one is to believe the catastrophic prophecies of Matthew Simmons, another prominent peak-oiler, this must be the stupidest business decision of the 21st century. Simmons claims that Saudis have falsified their oil reserve data so much that in reality they have only a fraction of the claimed oil left in the ground, and that their, and the world's, largest oilfield, al-Ghawar, has been so damaged by waterflooding (used for enhanced recovery of oil) that it faces imminent and massive extraction downturn. And yet Saudis will be investing nearly $50 billion between 2007 and 2011 to get this nonexistent oil to the global market. Perhaps they know something that Simmons is not aware of (these days it is, after all, *de rigueur* to say only bad things about Saudis).

And, of course, market forces eventually assert themselves as prices rise. In 2006 oil demand was down in all of the leading importing affluent countries (US, EU and Japan) and no dramatic increases are expected this year. Consequently, global oil extraction may be lower in 2007 than it was in 2006, but if such a dip were to take place (China's and India's imports will make it unlikely) it would reflect a reaction to prices, not any physical inability to produce more oil or outright absence of requisite oil reserves in the Earth's crust.

That another non-peak year came and went is no surprise (merely a rational expectation). But I was surprised with what I found when this non-event led me to return to King Hubbert's original peak oil forecasts and to discover how badly off they were.

Hubbert is the patron saint of peak-oilers, seen as an infallible and astonishingly prescient seer because he correctly predicted the peak of the US oil production in 1970. Not quite. In his March 8, 1956 presentation before the Spring Meeting of the Southern District Division of Production of the American Petroleum Institute, Hubbert plotted two production curves, one for the ultimate US output of 150 billion barrels that peaked in 1962 at 2.6 billion barrels a year, and another one for the ultimate output of 200 billion barrels that peaked in 1968 at 3 billion barrels a year. In later revisions of this original work (the last major one was published in October 1968 and published as a chapter in the National Academy Science's *Resources and Man* in 1969) he put the peak of the complete cycle of US petroleum liquids (that is crude oil and natural gas liquids) at "about 3.5 billion barrels a year . . . during the first half of the 1970-decade." The actual peak came in 1970 at 4.12 billion barrels, 18% above Hubbert's prediction.

That is not an insignificant miss, but it is a small error compared to Hubbert's insistence that the complete production curve of a resource is perfectly symmetrical -- that is, that the post-peak decline of extraction is a mirror image of the incline. This led Hubbert to produce a curve that put the US oil output in 1980 at about 3 billion barrels (while the actual production was 3.7 billion barrels) and the 2000 extraction at 1.2 billion barrels. The actual extraction was 2.8 billion barrels or 2.33 times higher, hardly an enviable accuracy for a 30-year forecast.

And Hubbert's record is no better in forecasting the peak of global oil extraction. In 1969 he put it (for two different estimates of ultimately recoverable oil) either in 1990 at 25 billion barrels, or in 2000 at 37 billion barrels, projecting again a symmetrical curve and continuing high demand that prevailed during the 1960s.

He could not, as nobody did, anticipate a substantial decline of oil demand following OPEC's two rounds (1973-74, 1979-81) of extortionary price increases. Consequently, the global oil extraction did not peak either in 1990, when it was actually about 4% below the level forecast by Hubbert, or in 2000, when it was, at 27.4 billion barrels, 26% lower than Hubbert's predicted peak. And while the global production still keeps going up, it was still below 31 billion barrels a year in 2006. So in this case Hubbert was nowhere near being correct either on the timing or the production level.

These facts, I am sure, will not make the least difference to the devotees of an imminent oil peak whose mantra has been to elevate the timing of an obviously inevitable event to a dreadful watershed of history, and whose insistence has been on pinpointing its largely

irrelevant arrival. Irrelevant because once the extraction of conventional liquid oil peaks we will intensify our (already advancing) efforts to produce more non-conventional oil and to use more natural gas and accelerate the production of gas- and coal- and biomass-derived liquids.

Finally, a practical reminder: If there is an imminent peak of oil extraction, should not then the prospective shortage of that increasingly precious fuel result in relentlessly rising prices and should not buying a barrel of oil and holding onto it be an unbeatable investment? But a barrel of a high-quality crude, say West Texas intermediate, bought at $12.23/b in 1976 as a nest-egg for retirement and sold before the end of 2006 at $60/b would have earned (even when assuming no storage costs) about 1.2% a year, a return vastly inferior to almost any guaranteed investment certificate and truly a miserable gain when compared with virtually any balanced stock market fund. And a freedom-at-55 investor who bought that barrel at 30 years of age in 1980 and sold in 2005 would have realized a nearly forty per cent loss on his precious investment. Being a true believer in imminent peak oil may be fine as a provocative notion but not as a means of securing a comfortable retirement.

Vaclav Smil (website http://home.cc.umanitoba.ca/~vsmil) lectures at the University of Manitoba in Canada. His latest published books are Transforming the 20th Century: Technical Innovations and Their Consequences and Energy: A Beginner's Guide. Energy in Nature and Society will appear later this year.