

# Peak Curiosity

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Predicting the end of oil era has been a venerable (albeit fruitless) pseudo-intellectual pursuit for most of the 20<sup>th</sup> century. This Nostradamian pastime regained new vigor during the late 1990s when (mostly retired geologists) Colin Campbell, Jean Laherrère, L.F. Ivanhoe, Richard Duncan and Kenneth Deffeyes -- and their groupies gathered under the WWW umbrellas of peakoil.net,

peakoil.com, peakoil.org and hubbertpeak.com --- flooded the media with catastrophist tales of imminent peak of the global oil production to be followed by a precipitous decline of oil availability resulting in the demise of modern civilization. As self-appointed prophets are want to do, these wholesalers of fear have not been cautious when outlining the consequences. In Ivanhoe's rendering "the inevitable doomsday" will be followed by "economic implosion" that will make "many of the world's developed societies look more like today's Russia than the US." In Duncan's telling there is massive unemployment, breadlines, widespread homelessness and a catastrophic end of industrial civilization.

Kenneth Deffeyes, an experienced petroleum geologist and a former professor at Princeton University, has been the most puzzling member of the peak oil cult. As a scientist he must know that the real world is permeated by uncertainties, that complex realities should not be reduced to simplistic slogans aimed to gain media attention, and that (as even a brief retrospective will demonstrate) making precise point predictions is a futile endeavor. Yet he set all of this aside and proceeded to write about the peak of global oil production in a way that leaves no room for any doubt ("no initiative put in place starting today can have a substantial effect on the peak production year"), that portrays the world's energy use merely as a matter of supply (utterly ignoring demand) and, most incredibly, he went farther than any of his confrères by predicting not just the year but the very day when the world's oil output was to peak.

On January 14, 2004 he wrote (albeit admitting that "it is a bit silly") that

"we can now pick a day to celebrate passing the top of the mathematically smooth Hubbert curve: Nov 24, 2005. It falls right smack dab on top of Thanksgiving Day 2005. It sounds a little sick to observe a gloomy day, but in San Francisco they still observe April 18 as the anniversary of the 1906 earthquake."

On June 5, 2004 he confirmed that "I'm still standing by my prediction that the smoothed world production curve will peak on Thanksgiving Day, 2005." The day came and went -- so what is the verdict? In the strictest sense Deffeyes's proposition is not provable by consulting any statistics: oil producing countries do not report their extraction on a daily basis. And

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even if it worked in terms of a mathematically smooth curve we would have to wait for many months to complete such a derivation.

But there is no need for waiting. Amidst the ocean of uncertainties concerning the future of global oil production there are (as Rumsfeld, correctly, would have it) two great known unknowns: we do not know with any satisfactory confidence the ultimate amount of oil that we will be able to extract from the Earth's crust; and we do not know the eventual extent of market reaction to substantial price shifts (a plain way of saying that the elasticity of crude oil's consumption is an elusive variable). And because we do not know either the eventual maximum of potential (resource-limited) extraction or the actual level of (market-driven) production we cannot know with any readily quantifiable certainty the year (forget the day) when the global oil output will peak.

As far as resources go, peak-of-oil catastrophists believe that there is virtually nothing left to be discovered while both the theoretical understanding of sedimentary basin geology and the fact that large parts of the crust (including some regions in the Middle East, most of West Africa and huge chunks of Siberia) have yet to be explored with intensity comparable to that of the North American drilling point to further substantial discoveries. Acting on this, both national and multinational oil companies are now engaged in extensive drilling aimed at adding millions of barrels of new capacity in the coming years.

As for the market reaction, the response, eventually, does come. After OPEC nearly quintupled its oil price in 1973 the global oil consumption declined by merely 1.5% in 1974 and by 1976 it was nearly 4% above the 1973 level. Oil use may have been inelastic to the initial quintupling but it surely responded to an additional near-trebling that took place between 1978 and 1981: by 1983 the world's oil consumption fell by 11%.

The same forces have been at work recently. The day before the Thanksgiving the price per barrel went down by 50 cents, during the preceding month it declined by about 8% and since August it fell by about 17%; it fell again the day after Thanksgiving when it stood, in inflation-adjusted terms, more than 20% below the historic high reached in the spring of 1981. None of this indicates a market spooked by the prospect of global extraction never surpassing the Thanksgiving rate! Headlines and attention grabbing have been always about new bad news, about caricaturing complexities and about reducing the message to the lowest understandable denominator. But scientists should leave this "information" niche to the National Enquirer or to Dr. Phil.

Undoubtedly, there is a finite amount of oil in the Earth's crust, but even if we were to know it to the last drop we could not predict how much of it we will eventually extract (much of it will be simply too expensive to get out, or too unappealing compared to other choices). Undoubtedly, there is continuing (and relatively slowly increasing) oil demand in affluent economies and there is rising demand in China and India, but we do not know how fast the global use will grow and at what levels it will start eventually leveling off because that rate is determined not only by the volume of recoverable oil but also by the fuel's price and by the cleverness and rapidity of our technical advances. Inevitably, sometime in the future global extraction of liquid oil will start declining but we will not be able to pinpoint that event and it may not be of much interest anyway.

The story of the modern world is, most fundamentally, one of continuous energy transitions as the leading fuel changed from wood to coal and then from coal to oil. But oil never dominated as much as coal did because of the concurrent diversification into natural gas and into hydro and nuclear electricity. These, and other sources, await further exploitation: there is no reason to believe that we cannot eventually move past the oil era. Difficulties of this transition should not be discounted but they will be the best stimulants of our inventiveness and of our ability to cope with new challenges.

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