

Peak Oil: A Catastrophist Cult and Complex Realities

By Vaclav Smil

Proponents of the imminent peak of global oil extraction—led by Colin Campbell, Jean Laherrère, L.F. Ivanhoe, Richard Duncan, and Kenneth Deffeyes—resort to deliberately alarmist arguments as they mix incontestable facts with caricatures of complex realities and as they ignore anything that does not fit their preconceived conclusions in order to issue their obituaries of modern civilization. Ivanhoe sees an early end of the oil era as “the inevitable doomsday” followed by “economic implosion” that will make “many of the world’s developed societies look more like today’s Russia than the U.S.” Duncan’s future brings massive unemployment, breadlines, homelessness, and a catastrophic end of industrial civilization.

These conclusions are based on interpretations that lack any nuanced understanding of the human quest for energy, disregard the role of prices, ignore any historical perspectives, and presuppose the end of human inventiveness and adaptability. I will raise just three key points aimed at dismantling the foundations of this new catastrophist cult. First, these preachings are just the latest installments in a long history of failed peak forecasts. Second, the peak-oil advocates argue that this time the circumstances are really different and that their forecasts will not fail—but in order to believe that, one has to ignore a multitude of facts and possibilities that readily counteract their claims. Third, and most importantly, there is no reason why even an early peak of global oil production should trigger any catastrophic events.

The modern tradition of concerns about an impending decline of resource extraction began in 1865 with Victorian economist William Stanley Jevons (1835–1882), who concluded that falling coal output must spell the end of Britain’s national greatness as it is “of course...useless to think of substituting any other kind of fuel for coal.” Substitute oil for coal in the last sentence and you get the erroneous foundations of the doomsday sentiment shared by the peak-oil catastrophists. There is no need to elaborate how wrong Jevons was. The first half of the 20th century had its share of peak forecasts but Jevonsian sentiment was forcefully reintroduced by M. King Hubbert with his correct timing of the U.S. oil production (minus Alaska!). This feat led the peak-oil groupies

to consider Hubbert’s Gaussian exhaustion curve with the reverence reserved by the Biblical fundamentalists to Genesis. In reality, it is a simplistic “geology-only” model based on rigidly predetermined reserves and ignoring any innovative advances or price shifts.

Not surprisingly, it has repeatedly failed. Hubbert himself put the peak of global oil extraction between 1993 and 2000. In 1977 the Workshop on Alternative Energy Strategies forecast the global oil peak as early as 1990 and most likely between 1994 and 1997. In 1979 the U.S. Central Intelligence Agency believed that global output must fall within a decade. In the same year British Petroleum, the world’s second largest oil company, predicted the world production peak in 1985 and the total output in the year 2000 nearly 25 percent below that maximum. In reality, global oil output in the year 2000 was nearly 25 percent above the 1985 level! Some of the latest peak-oil proponents have already seen their forecasts fail: Campbell’s first peak was to be in 1989, Ivanhoe’s peak was in 2000, Deffeyes had it in 2003 (and now, ridiculously, on Thanksgiving 2005). But they would argue that this makes no difference as that inevitable event will take place within months or years. Moreover, they claim that matters are now entirely different.

They are convinced that exploratory drilling has already discovered some 95 percent of the oil originally present in the Earth’s crust and that nothing we do, be it SUV replacements or new offshore drilling, can help us to avoid a bidding war for the remaining oil. And, so we are repeatedly told, “the oil era is over.” But in chanting this patently false mantra the devotees continue to ignore several fundamental facts.

True, there is an unfortunate absence of rigorous international standards in reporting oil reserves and many official totals have been politically motivated, with national figures that either do not change at all from year to year or take sudden suspicious jumps. But this uncertainty leaves room for both under- and overestimates, and until the sedimentary basins of the entire world (including deep offshore regions) are explored with an intensity matching that of North America and the U.S. sector of the Gulf of Mexico, I see no persuasive reason to prefer the most conservative estimate of

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Oil platform under tow in the Caspian Sea

the ultimately recoverable conventional oil offered by Campbell & Company (no more than 1.8 trillion barrels) rather than substantially higher totals favored by other geologists, including those at the U.S. Geological Survey (their latest

estimate is just over 3 trillion barrels). Campbell's total means that the world has already reached its peak annual production in 2005, while the estimates that are 50–70 percent higher imply the peak sometime after 2020.

Even if the world's ultimately recoverable oil resources were known with perfection, the global oil production curve could not be determined without knowing future oil demand. We obviously have no such understanding because that demand will be shaped, as in the past, by unpredictable technical advances (who would have predicted in 1930 the new huge market for kerosene that was created by commercial jets by 1960, or in 1970 that the performance of an average U.S. car would double by 1985?) and by shifting prices. As Morris Adelman, who spent most of his career as a mineral economist at MIT, put it: "finite resources is an empty slogan; only marginal cost matters."

Steeplly rising oil prices would not lead to unchecked bidding for the remaining oil but would accelerate a shift to other energy sources. This lesson was learned painfully by OPEC after oil prices rose to nearly \$40/barrel in 1981. It led Sheikh Ahmed Zaki Yamani, the Saudi oil minister from 1962 to 1986, to conclude that high prices will only hasten the day when the organization "will be left staring at untouched fuel reserves" because new efficient techniques "will have cut deep into demand for transport fuels" and much of Middle Eastern oil "will stay in the ground forever." And yet, as already noted, price feedbacks are inexplicably missing from all accounts of coming oil depletion and its supposedly catastrophic consequences. Instead, there is a risible assumption of demand immune to any external factors. In reality, rising prices do trigger powerful adjustments. Between 1973 and 1985 the U.S. Corporate Average Fuel Economy standard was doubled to 27.5 miles per gallon, but further improvements were not pursued largely because of falling oil prices: a mere resumption of that rate of improvement (technically easy to do) would have us averaging 40 mpg by 2015. A more aggressive adoption of hybrids could bring the rate to 50 mpg, more than halving the current U.S. need for automotive fuel and sending oil prices into a tailspin.

And although oil prices are still relatively low (when adjusted for inflation and lower oil-intensity of economies, even \$70/barrel is at least 35–40 percent below the 1981 peak!), their recent rise has already reinvigorated the quest for tapping the massive reserves of non-conventional oil. Commercial recovery of oil sands is already rewarding and there are encouraging prospects for further advances with lowered energy cost of production: boundaries between conventional and non-conventional reserves are dissolving. Moreover, global reserves of conventional natural gases contain about as much energy as does conventional crude oil (and major discoveries await), but current gas extraction is equivalent to less than two-thirds of oil output and a truly worldwide market for gas is only now emerging as liquefied natural gas deliveries are converting the previously "stranded" reserves into a massively traded global commodity.

Technical advances—ranging from conversion of gas to liquids to increasing recoveries of coalbed methane and, perhaps already within two or three decades, to the first extrac-

tion of methane from hydrates—will gradually supply more gas. And beyond nonconventional oil and a variety of natural gases lie the challenging opportunities of harnessing renewable energy flows, above all by more efficient photovoltaics and even better wind turbines, and introducing smarter and inherently safe ways of nuclear fission. As with all energy transitions, it will take decades rather than years to bring them into the supply mainstream but potential rewards will be immense. And keep in mind that judging their eventual contributions by today's performances may be akin to judging today's computer or aircraft performance by the standards of 1950.

When seen from broader resource, technical, and historical perspectives, the recent obsession with an imminent peak of oil extraction has all the marks of a catastrophist apocalyptic cult. Realities are different. Conventional oil resources may be substantially larger than the lowest estimates of peak-oil catastrophists. Even so, it is highly probable that their annual global extraction will peak within the next two decades and it is inevitable that conventional oil will become relatively a less important part of the world's primary energy supply. But this spells no imminent end of the oil era as very large volumes of the fuel, both from traditional and non-conventional sources, will remain on the world market during the first half of the 21st century. As oil becomes dearer we will use it more selectively and more efficiently, and we will intensify a shift that has already begun: a new global energy transition, from oil to natural gas and to both renewable and nuclear alternatives. As result, there is *nothing inevitable* about any particular date of peak of global oil extraction. More fundamentally, there is *no reason* to see an eventual decline of oil's share in the global energy supply as a marker of civilizational demise.

Energy transitions—from biomass to coal, from coal to oil, from oil to natural gas, from direct use of fuels to electricity—have stimulated technical advances and driven our inventiveness. Inevitably, they bring enormous challenges for both producers and consumers, necessitate the scrapping or reorganization of extensive infrastructures, are costly and protracted, and cause major socioeconomic dislocations. But they have created more productive and richer economies, and modern societies will not collapse just because we face yet another of these grand transformations. Unless we believe, preposterously, that human inventiveness and adaptability will cease the year the world reaches the peak annual output of conventional crude oil, we should see that milestone (when-ever it comes) as a challenging opportunity rather than as a reason for cult-like worries and paralyzing concerns.

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