Parabolic Projection of World Oil Production for a High Resource Case

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The outlook for the world production of oil from both conventional and non-conventional sources is now a subject of much controversy. On the one hand, there is a substantial body of opinion that believes that the world is reaching a peak in conventional production (and possibly all production) very soon if it has not done so already. On the other hand, there are those - including at least one major oil company and a prominent firm of consultants - who believe that a peak is not likely and in any case would not adequately describe the probable outcome.[1] According to the latter view, if in fact there are difficulties in supply in the future, the situation would best be described by a plateau and not a peak. The level of this plateau could fluctuate or undulate for an extended period of time according to circumstances as they unfold.

In this note, a high estimate of the remaining conventional oil resources of the world frequently quoted in the press or in industry sources to support the latter point of view has been interpreted by the parabolic projection methodology devised by this author.[2] In the plot in the graph, a peak is in fact found which occurs not greatly later than the estimates by those on the other side of the controversy that appear in the literature. Furthermore, when additional future supplies from non-conventional sources are taken into account, it is quite possible the joint projection could be interpreted as an undulating plateau for a time extending for several decades. Thus, even in the case when a high value for the remaining world resources of oil is assumed, there is in fact no major conflict between the two opposing views of the future.

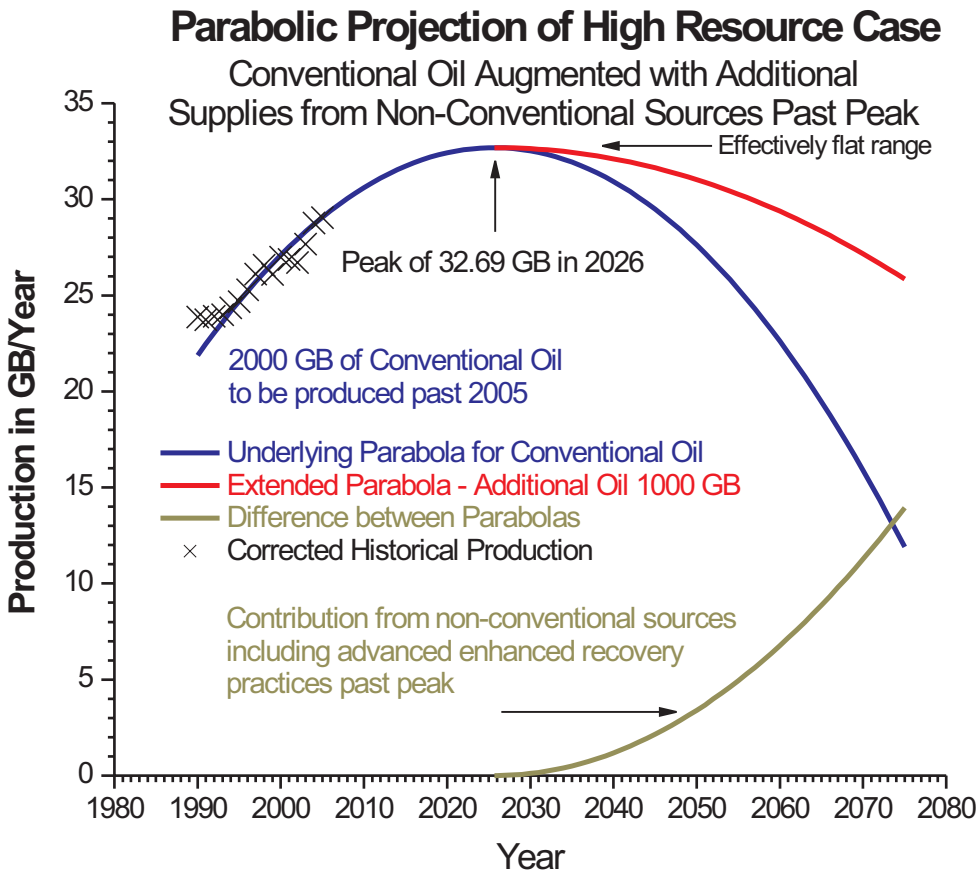
The high values assumed here to prepare the graph were, for conventional oil, a total recoverable endowment of 3000 gigabarrels (GB) with cumulative production to the end of 2005 set as 1000 GB. Thus the conventional oil yet to be produced was taken as a high 2000 GB. The non-conventional oil to be produced was assumed to be 1000 GB with all production from these sources occurring after the peak. The peak was found to occur in 2026 as compared to values ranging from 2005–2020 appearing in the 'peak oil' literature for lower resource endowments. The peak date thought most likely by this author is between 2015–2020 [2]. In summary, the high values of the resource data cited by those who deny that a peak will form is shown to merely delay the formation of a peak from six to twenty-one years compared to other values in the literature, and only nine years after this author's mid-range estimate.

It is true, however, as may be seen in the graph, that the high value of the non-conventional resources assumed, with this oil appearing entirely past the peak, results in a situation indistinguishable from an undulating plateau given the normal variability to be expected in a practical situation. This period of effectively constant production could be as long as four decades if it were accepted that it began before the peak calculated here to be in 2026. The duration of this constancy in production will depend upon how much variability from some arbitrary average would be accepted as noise in the system which is a matter of judgement.

Notwithstanding a period that could be approximated by an undulating plateau, the assignment of a date for the peak production has theoretical importance. The energy system will tend to behave one way before the peak and another way after. In particular, the price of oil could be in a wide range before the peak but would tend to be supported by the technical costs of the least costly alternative(s) on either the supply or the demand side after it has passed [3].

Notes

The historical values for the world's oil production were taken from the *BP Statistical Review of World Energy* which includes most liquid sources though not the small production of oil from coal in South



Africa. To estimate the production from conventional sources alone, these figures were adjusted year-by-year by deducting an estimated value of the world's production of non-conventional oil on a linear basis from 1990 to 2005 determined from 500,000 barrels per day in 1995 and 1.5 mbbl/day in 2005. This correction was made primarily to remove the production from the oil sands of Alberta and certain other minor sources from the published values.

In plotting the graph, no production from non-conventional sources was assumed prior to the peak on the grounds that the values were too minor to affect the conclusions of this note.

References

1. Press Release announcing the publication of the proprietary report ($US 1000) *Why the Peak Oil Theory Falls Down – Myths, Legends and the Future of Oil Resources* by Peter M. Jackson, Cambridge Energy Research Associates Inc. Cambridge, Massachusetts, November 2006.

2. J.H. Walsh, *Procedure for the Parabolic Projection of Geological Assessments of Conventional Oil and Gas Resources with Examples*, December 2003. (Web: pages.ca.inter.net/~jhwalsh/wpara1.html)

3. J.H. Walsh, *The Twin Crises Revisited*, Proceedings of the Canadian Association for the Club of Rome, Series **3** No. 9 (November) 2006. (Web: www.cacor.ca or pages.ca.inter.net/~jhwalsh/TwinCrisesRevisited14pages.pdf)

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