Production of Global Hydrocarbon Liquids: Is There a Near-term Peak?

Dr. Richard C. Vierbuchen

Vice President, Caspian/Middle East Region, ExxonMobil Exploration Company
PO Box 4778, Houston, Texas, 77210-4778, USA
rick.vierbuchen@exxonmobil.com

1. Introduction

The demand for petroleum liquids is rising, and forecast to increase from approximately 85 MBD in 2006 to 115 MBD in 2030. Forecast demand growth raises questions about whether the petroleum zxresource base is adequate to satisfy long-term demand. This paper addresses these questions, in particular, the validity of predictions of a near-term peak in global liquids supply that are based on the widely used methods developed by Hubbert (1956).

2. Key Features

An evaluation of global production history and the global resource base suggests that a peak in global liquids production, resulting solely from a resource-base limitation, is unlikely to occur in the next 25 years. Furthermore, it appears that Hubbert's (1956) method, made famous by his correct prediction in 1956 that U.S. Lower-48 oil production would peak in the late 1960's or early 1970's, is not readily applicable to forecasting global liquids production.

3. Conclusions

(1) Estimates of the liquids resource base have increased over the last 50-100 years, and are likely to continue to do so. Forecasts of an imminent peak in global production appear to underestimate major sources of growth in the resource base, particularly improved recovery and resources made economic by new capabilities. Hubbert's method does not encompass the timing or the volume of future increases in the resource base.

(2) Although annual global production has exceeded annual discoveries since the early 1980's, annual global reserve adds still exceed annual production because of reserve growth in existing fields.

(3) Advances in technology are increasing recovery, opening new producing areas, lowering thresholds, and thereby changing estimates of the resource base and production outlook.

(4) Non-OPEC supply has grown steadily for the last ten years, and continued growth for at least the next five to ten years is highly likely, based on new development projects underway or planned. OPEC countries have numerous opportunities to increase production.

(5) Nations with the largest liquids resources typically have production histories with long-term restraints and interruptions in production that are not envisioned in Hubbert's method.

(6) Sources of conventional liquids other than crude oil, such as condensate, NGL's, GTL, and refinery gains, are growing, and typically excluded from applications of Hubbert's method.

(7) Production from "unconventional" sources, such as very heavy oil, bitumen, and shale oil is growing, and often overlooked in global forecasts of peak production based on Hubbert's method.

(8) The interactions among supply, demand, and price cause demand growth to slow as supply tightens, and bring on new sources of supply.

(9) Current tightness in liquid supplies results from rapid demand growth and interruptions to supply, not from a decrease in supply.

(10) Many previous predictions of a peak in global production, based on Hubbert's method, dating back to Hubbert's own prediction (made in 1969, for a peak in 2000) have been proven wrong.

Focus on the application of Hubbert's method to predicting global peak production has distracted attention from important questions regarding the global liquids resource base, such as these: (1) What improvements in technology are likely to provide the largest improvements to supply and supply cost? (2) What factors limit growth in global liquids supply, today and in the future? (3) What alternative methods can be applied to better assess the global resource base and the multitude of factors that influence the rate of resource consumption?

4. References and Bibliography

1. Al-Husseini, M., 2006, "The Debate Over Hubbert's Peak: A Review," GeoArabia, vol. 11, no. 2, pp. 181-210.
2. Association of Petroleum Geologists Bulletin, vol. 50, no. 12, pp. 2504-2518.
3. Deffeyes, K.S., 2001, "Hubbert's Peak – The Impending World Oil Shortage," Princeton University Press, pp. 208.
4. Hubbert, M. K., 1956, "Nuclear Energy and Fossil Fuels. American Petroleum Institute," pp. 7-25.
5. Hubbert, M.K., 1966, "History of Petroleum Geology and its Bearing upon Future Exploration," American Association of Petroleum Geologists Bulletin, vol. 50, no. 12, pp. 2504-2518.
6. Hubbert, M.K., 1969, "Energy Resources," *in* P. Cloud (Ed.), Resources and Man. Freeman, San Francisco, pp. 157-242.

Speaker's Biography

Richard C. Vierbuchen is Vice President, Caspian/Middle East Region, of ExxonMobil Exploration Company, USA. He joined ExxonMobil in 1978 and has held numerous positions including Research Division Manager, Corporate Exploration Advisor, Exploration Manager of Imperial Oil, Canada, and of Esso, United Kingdom, and Exploration Director of ExxonMobil International Ltd.

Prior to joining ExxonMobil, Mr. Vierbuchen received a Ph.D. in Geology and Applied Geophysics from Princeton University. He also worked for several years as a geologist for the governments of Venezuela and Ethiopia, and as a university professor.