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Peak Oil: Two Views

INTRODUCTION

Worldwide demand for oil has reached new heights in recent years, led by China and other rapidly industrializing countries. Global oil demand is expected to average 85 million barrels per day in 2006.(1) The margin between oil production capacity and demand, once considerable, has been shrinking rapidly. These developments are largely responsible for the rapid rise in the price of oil in recent years.

The tightness in oil markets has re-ignited concerns amongst certain observers that the world is fast approaching the point where oil production will peak and then decline irreversibly. Given the extent to which the industrialized world has come to depend on oil as a pillar of its economy, proponents of this "peak oil" theory warn that declining oil production is likely to result in an era of abrupt and disruptive change as countries struggle to adapt to a new oil-constrained reality.

While oil resources, like other hydrocarbon resources, are certainly finite, most analysts reject this gloomy scenario. In their opinion, the economic and technological dimensions of oil production are at least as important as geological considerations. They are of the view that high prices will promote energy efficiency and stimulate exploration, the development of new technologies and, ultimately, an increase in production. At the same time, technological advances will also help accelerate the development of unconventional sources of oil, such as Alberta's vast oil sands.

There will always be considerable uncertainty concerning how much oil exists under the earth's surface and how much of it can be extracted. This, however, may prove to be a moot point as oil, certainly in its conventional form, will undoubtedly be replaced by other forms of energy long before it runs out.

PEAK OIL? – YES

Proponents of the so-called peak oil theory maintain that the planet has been thoroughly explored and that its geological structure is well understood. They argue that most, if not all, of the world's large oil fields have long been known and are being depleted. "There is only so much crude in the world," the argument goes, "and the industry has found about 90% of it."(2) Recent discoveries are replacing only about a quarter of global annual oil production. Peak oil theorists therefore conclude that a global peak in production has already occurred or is inevitably imminent.

A model developed in the 1950s by a geophysicist named M. King Hubbert provides the theoretical underpinnings for this theory. According to Hubbert, oil production in any given oilfield follows a bell-shaped trajectory over time (the Hubbert Curve), with production rising to a maximum and then, when about half the recoverable resource has been extracted, gradually falling to zero. In 1956 Hubbert fitted a bell curve to U.S. oil production statistics and rather accurately predicted that production in the continental United States would peak in the late 1960s. Since then, a number of geologists have analyzed global oil discoveries and production rates and have used the methods developed by Hubbert to predict that global oil production would before long peak and then inexorably decline, leading to significant price increases and economic and political tensions.

PEAK OIL? – NO

Energy analysts point out that the many predictions of an impending peak in oil production have to date been proven wrong. They argue that peak oil theorists overlook or minimize the role that prices and technology play in determining the quantity of oil that can be found and exploited.

From this perspective, oil reserves are dynamic; indeed, they have continued to grow. Reserves can be thought of as "on-shelf inventory that producers replenish from the resource base through exploration and development."[3] Higher prices and advances in technology and know-how make it profitable to explore for oil in new areas, and further facilitate the extraction of a greater percentage of the oil that is trapped underground. The recovery rate from world oil fields has increased by over 50% since 1980 due to the introduction of new exploration, drilling and recovery technologies.[4] Partly as a result, proved oil reserves are now 55% larger than they were 20 years ago and currently total over 1.1 trillion barrels (annual oil consumption stands at about 30 billion barrels).[5]

The U.S. Department of Energy recently released a study showing that carbon dioxide-enhanced oil recovery techniques could improve recovery rates further still.[6] Applied broadly, this technology, and others like it, could boost reserves even more substantially, not only in the United States but around the world.

The International Energy Agency (IEA) reports that the Middle East harbours vast oil reserves that could be used to meet rising global demand for the next 25 years and beyond.[7] These reserves, however, are under-exploited, as Persian Gulf countries have in recent years been loath to invest in boosting oil production for fear of creating excess capacity that could lead to a collapse in the price of oil, as occurred in 1986 when prices fell below US$10 per barrel.[8] These countries are also, it must be noted, largely closed to foreign investment. The result is that important oil fields remain undeveloped and/or poorly analyzed while old fields are exploited using technologies and techniques that are, in the words of one observer, "obsolete."[9] The IEA concludes that massive investments (over $1.5 trillion in the period 2004-2030) in exploration and production are needed in the Middle East and elsewhere to satisfy the global growth in oil demand. Oil at US$70 a barrel provides a substantial incentive for oil-rich countries to invest or to open the door to foreign investment in order to boost production from this enormous resource base. Most analysts agree that the risk that production will not keep pace with rising demand is geopolitical rather than geological in nature.

Energy economists observe that high prices reduce demand, give rise to improvements in energy efficiency, stimulate research and development in new drilling and recovery technologies, and encourage further exploration and production, not only in known oil-bearing areas, but also from unconventional sources such as ultra deep-sea oil, oil sands, oil shale and other heavy oils. These unconventional sources of oil are expected to play an increasingly important role in meeting market demand in the coming years. Ultimately, high oil prices will accelerate the development of alternative fuels (synthetic fuels) that can be manufactured from abundant biomass, natural gas and coal.[10]

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(1) International Energy Agency, *Oil Market Report*, 10 February 2006, www.oilmarketreport.org.

(2) C. J. Campbell and J. H. Laherrère, "The End of Cheap Oil," *Scientific American*, March 1998.

(3) M. Jaccard, *Sustainable Fossil Fuels: The Unusual Suspect in the Quest for Clean and Enduring Energy*, Cambridge University Press, Cambridge (U.K.), 2005.

(4) L. Maugeri, "Oil: Never Cry Wolf – Why the Petroleum Age is Far From Over," *Science*, Vol. 304, 21 May 2004.

(5) British Petroleum, *BP Statistical Review of World Energy*, June 2005.

(6) Advanced Resources International, *Undeveloped Domestic Oil Resources: The Foundation for Increased Oil Production and a Viable Domestic Oil Industry*, prepared for the U.S. Department of Energy, February 2006, http://www.fossil.energy.gov/programs/oilgas/publications/eor_co2/Undeveloped_Oil_Document.pdf.

(7) International Energy Agency, *2005 World Energy Outlook: Middle East and North Africa Insights*, Paris, 2005.

(8) R. Skinner, "The International Setting," presentation to a Public Policy Conference entitled "Fueling Our Future: Strategic Energy Policy Opportunities in Canada," Ottawa, 29-30 November 2004.

(9) Maugeri (2004).

(10) Jaccard (2005).