

From: Lester R. Brown Published November 16, 2007

Is world oil production peaking?

Is world oil production peaking? Quite possibly. Data from the International Energy Agency (IEA) show a pronounced loss of momentum in the growth of oil production during the last few years. After climbing from 82.90 million barrels per day (mb/d) in 2004 to 84.15 mb/d in 2005, output only increased to 84.80 mb/d in 2006 and then declined to 84.62 mb/d during the first 10 months of 2007.

The combination of world production slowing down or starting to decline while demand continues to rise rapidly is putting strong upward pressure on prices. Over the past two years, oil prices have climbed from \$50 to nearly \$100 a barrel. If production growth continues to lag behind the increase in demand, how high will prices go?

There are many ways of assessing the oil production prospect. One is to look at the relationship between oil discoveries and production, a technique pioneered by the legendary U.S. geologist M. King Hubbert. Given the nature of oil production, Hubbert theorized that the time lag between the peaking of new discoveries and that of production was predictable. Noting that the discovery of new reserves in the United States peaked around 1930, he predicted in 1956 that U.S. oil output would peak in 1970. He hit it right on the head.

Globally, oil discoveries peaked in the 1960s. Each year since 1984, world oil production has exceeded new oil discoveries, and by a widening gap. In 2006, the 31 billion barrels of oil extracted far exceeded the discovery of 9 billion barrels.

The aging of oil fields also tells us something about the oil prospect. The world's 20 largest oil fields were all discovered between 1917 and 1979. (See data at www.earthpolicy.org.) Sadad al-Husseini, former senior Saudi oil official, reports that the annual output from the world's aging fields is falling by 4 mb/d. Offsetting this decline with new discoveries or with more-advanced extraction technologies is becoming increasingly difficult.

Yet another way of assessing the oil prospect is to look separately at the leading oil-producing countries where production is falling, the ones where production is still rising, and those that appear to be on the verge of a downturn. Among the leading oil producers, output appears to have peaked and turned downward in a dozen or so and to still be rising in nine.

Among the post-peak countries are the United States, which peaked at 9.6 mb/d in 1970, dropping to 5.1 mb/d in 2006; Venezuela, where output also peaked in 1970; and the two North Sea oil producers, the United Kingdom and Norway, which peaked in 1999 and 2000.

The pre-peak countries are dominated by Russia, now the world's leading oil producer, having eclipsed Saudi Arabia in 2006. Two other countries with substantial potential for increasing output are Canada, largely because of its tar sands, and Kazakhstan, which is developing the Kashagan oil field in the Caspian Sea, the only large find in recent decades. Other pre-peak countries include Algeria, Angola, Brazil, Nigeria, Qatar, and the United Arab Emirates.

Among the countries where production may be peaking are Saudi Arabia, Mexico, and China. The big question is Saudi Arabia. Saudi officials claim they can produce far more oil, but the giant Ghawar oil field—the world's largest by far and the one that has supplied half of Saudi oil output for decades—is 56 years old and in its declining years. Saudi oil production data for the first eight months of 2007 show output of 8.62 mb/d, a drop of 6

percent from the 9.15 mb/d of 2006. If Saudi Arabia cannot restore growth in its oil production, then peak oil is on our doorstep.

In Mexico, the second-ranking supplier to the United States after Canada, output apparently peaked in 2004 at 3.4 mb/d. U.S. geologist Walter Youngquist notes that Cantarell, the country's dominant oil field, is now in steep decline, and that Mexico could be an oil importer by 2015. Production in China, slightly higher than in Mexico, may also be about to peak.

A number of prominent geologists are convinced that global oil production has peaked or is about to do so. "The whole world has now been seismically searched and picked over," says independent geologist Colin Campbell. "Geological knowledge has improved enormously in the past 30 years and it is almost inconceivable now that major fields remain to be found."

Kenneth Deffeyes, a highly respected geologist, said in his 2005 book, *Beyond Oil*, "It is my opinion that the peak will occur in late 2005 or in the first few months of 2006." Youngquist and A. M. Samsam Bakhtiari of the Iranian National Oil Company each projected that production would peak in 2007.

The Energy Watch Group in Germany, which recently analyzed oil production data country by country, also concluded that world oil production has peaked. They project it will decline by 7 percent a year, falling to 58 mb/d in 2020. Bakhtiari projects a decline in oil production to 55 mb/d in 2020, slightly lower than the German group. In stark contrast, the IEA and the U.S. Department of Energy are each projecting world oil output in 2020 at 104 mb/d.

The peaking of world oil production will be a seismic event, marking one of the great fault lines in world economic history. When oil output is no longer expanding, no country can get more oil unless another gets less.

Oil-intensive industries will be hit hard. Cheap airfares will become history, for instance. The airline industry's projected growth of 5 percent a year over the next decade will evaporate. The food industry will be severely affected by rising oil prices, since both modern agriculture and food transport are oil-intensive. The automobile industry will suffer as well when demand for cars plummets. Pressures will intensify on the three or more major auto companies that are developing plug-in hybrid cars that run largely on electricity to bring them to market quickly.

Higher oil prices have long been needed both to more accurately reflect the indirect costs of burning oil, such as climate change, and to encourage more-efficient use of a resource that is fast being depleted. While higher prices are desirable, the rise should not be so abrupt that it leads to severe economic disruptions.

Some countries are much more vulnerable to an oil decline than others. For example, the United States—which has long neglected public transportation—is particularly vulnerable because 88 percent of the U.S. workforce travels to work by car.

Since options for expanding supply are limited, efforts to prevent oil prices from rising well beyond \$100 per barrel in the years ahead depend on reducing demand, largely within the transportation sector. And since the United States consumes more gasoline than the next 20 countries combined, it must play a lead role in cutting oil use.

A campaign to reduce oil use rapidly might best be launched at an emergency meeting of the G-8, since its members dominate world oil consumption. If governments fail to act quickly and decisively to reduce oil use, oil prices could soar as demand outruns supply, leading to a global recession or—in a worst-case scenario—a 1930s-type global depression.