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A world without oil

Scientists challenge major review of global reserves and warn that supplies will start to run out in four years' time

By Daniel Howden

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Scientists have criticised a major review of the world's remaining oil reserves, warning that the end of oil is coming sooner than governments and oil companies are prepared to admit.

BP's Statistical Review of World Energy, published yesterday, appears to show that the world still has enough "proven" reserves to provide 40 years of consumption at current rates. The assessment, based on officially reported figures, has once again pushed back the estimate of when the world will run dry.

However, scientists led by the London-based Oil Depletion Analysis Centre, say that global production of oil is set to peak in the next four years before entering a steepening decline which will have massive consequences for the world economy and the way that we live our lives.

According to "peak oil" theory our consumption of oil will catch, then outstrip our discovery of new reserves and we will begin to deplete known reserves.

Colin Campbell, the head of the depletion centre, said: "It's quite a simple theory and one that any beer drinker understands. The glass starts full and ends empty and the faster you drink it the quicker it's gone."

Dr Campbell, is a former chief geologist and vice-president at a string of oil majors including BP, Shell, Fina, Exxon and ChevronTexaco. He explains that the peak of regular oil - the cheap and easy to extract stuff - has already come and gone in 2005. Even when you factor in the more difficult to extract heavy oil, deep sea reserves, polar regions and liquid taken from gas, the peak will come as soon as 2011, he says.

This scenario is flatly denied by BP, whose chief economist Peter Davies has dismissed the arguments of "peak oil" theorists.

"We don't believe there is an absolute resource constraint. When peak oil comes, it is just as likely to come from consumption peaking, perhaps because of climate change policies as from production peaking."

In recent years the once-considerable gap between demand and supply has narrowed. Last year that gap all but disappeared. The consequences of a shortfall would be immense. If consumption begins to exceed production by even the smallest amount, the price of oil could soar above \$100 a barrel. A global recession would follow.

Jeremy Leggett, like Dr Campbell, is a geologist-turned conservationist whose book *Half Gone: Oil, Gas, Hot Air and the Global Energy Crisis* brought "peak oil" theory to a wider audience. He compares industry and government reluctance to face up to the impending end of oil, to climate change denial.

"It reminds me of the way no one would listen for years to scientists warning about global warming," he says. "We were predicting things pretty much exactly as they have played out. Then as now we were wondering what it would take to get people to listen."

In 1999, Britain's oil reserves in the North Sea peaked, but for two years after this became apparent, Mr Leggett claims, it was heresy for anyone in official circles to say so. "Not meeting demand is not an option. In fact, it is an act of treason," he says.

One thing most oil analysts agree on is that depletion of oil fields follows a predictable bell curve. This has not changed since the Shell geologist M King Hubbert made a mathematical model in 1956 to predict what would happen to US petroleum production. The Hubbert Curve shows that at the beginning production from any oil field rises sharply, then reaches a plateau before falling into a terminal decline. His prediction that US production would peak in 1969 was ridiculed by those who claimed it could increase indefinitely. In the event it peaked in 1970 and has been in decline ever since.

In the 1970s Chris Skrebowski was a long-term planner for BP. Today he edits the *Petroleum Review* and is one of a growing number of industry insiders converting to peak theory. "I was extremely sceptical to start with," he now admits. "We have enough capacity coming online for the next two-and-a-half years. After that the situation deteriorates."

What no one, not even BP, disagrees with is that demand is surging. The rapid growth of China and India matched with the developed world's dependence on oil, mean that a lot more oil will have to come from somewhere. BP's review shows that world demand for oil has grown faster in the past five years than in the second half of the 1990s. Today we consume an average of 85 million barrels daily. According to the most conservative estimates from the International Energy Agency that figure will rise to 113 million barrels by 2030.

Two-thirds of the world's oil reserves lie in the Middle East and increasing demand will have to be met with massive increases in supply from this region.

BP's Statistical Review is the most widely used estimate of world oil reserves but as Dr Campbell points out it is only a summary of highly political estimates supplied by governments and oil companies.

As Dr Campbell explains: "When I was the boss of an oil company I would never tell the truth. It's not part of the game."

A survey of the four countries with the biggest reported reserves - Saudi Arabia, Iran, Iraq and Kuwait - reveals major concerns. In Kuwait last year, a journalist found documents suggesting the country's real reserves were half of what was reported. Iran this year became the first major oil producer to introduce oil rationing - an indication of the administration's view on which way oil reserves are going.

Sadad al-Huseini knows more about Saudi Arabia's oil reserves than perhaps anyone else. He retired as chief executive of the kingdom's oil corporation two years ago, and his view on how much Saudi production can be increased is sobering. "The problem is that you go from 79 million barrels a day in 2002 to 84.5 million in 2004. You're leaping by two to three million [barrels a day]" each year, he told The New York Times. "That's like a whole new Saudi Arabia every couple of years. It can't be done indefinitely."

The importance of black gold

- * A reduction of as little as 10 to 15 per cent could cripple oil-dependent industrial economies. In the 1970s, a reduction of just 5 per cent caused a price increase of more than 400 per cent.
- * Most farming equipment is either built in oil-powered plants or uses diesel as fuel. Nearly all pesticides and many fertilisers are made from oil.
- * Most plastics, used in everything from computers and mobile phones to pipelines, clothing and carpets, are made from oil-based substances.
- * Manufacturing requires huge amounts of fossil fuels. The construction of a single car in the US requires, on average, at least 20 barrels of oil.
- * Most renewable energy equipment requires large amounts of oil to produce.
- * Metal production - particularly aluminium - cosmetics, hair dye, ink and many common painkillers all rely on oil.

Alternative sources of power

Coal

There are still an estimated 909 billion tonnes of proven coal reserves worldwide, enough to last at least 155 years. But coal is a fossil fuel and a dirty energy source that will only add to global warming.

Natural gas

The natural gas fields in Siberia, Alaska and the Middle East should last 20 years longer than the world's oil reserves but, although cleaner than oil, natural gas is still a fossil fuel that emits pollutants. It is also expensive to extract and transport as it has to be liquefied.

Hydrogen fuel cells

Hydrogen fuel cells would provide us with a permanent, renewable, clean energy source as they combine hydrogen and oxygen chemically to produce electricity, water and heat. The difficulty, however, is that there isn't enough hydrogen to go round and the few clean ways of producing it are expensive.

Biofuels

Ethanol from corn and maize has become a popular alternative to oil. However, studies suggest ethanol production has a negative effect on energy investment and the environment because of the space required to grow what we need.

Renewable energy

Oil-dependent nations are turning to renewable energy sources such as hydroelectric, solar and wind power to provide an alternative to oil but the likelihood of renewable sources providing enough energy is slim.

Nuclear

Fears of the world's uranium supply running out have been allayed by improved reactors and the possibility of using thorium as a nuclear fuel. But an increase in the number of reactors across the globe would increase the chance of a disaster and the risk of dangerous substances getting into the hands of terrorists.

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