Viewpoint

Peak Oil

David Bennett*
Kea Petroleum Plc, PO Box 19-140, Wellington 6149

'Peak Oil'[1], and the entire subject of oil economics and supply and demand would only be lightly scratched by an entire semester of lectures; so what I have to say here is of necessity very summary.

Oil is a valuable substance. But at US$100 per barrel, crude oil is still only 1/30 the price of beer for the same volume. Even at the petrol pump, petrol is still only one-tenth of the price of beer at the tap. Yet the production and delivery of the food we eat, the clothes we wear and the articles we use in our normal life are heavily dependant on the continuing supply of oil and gas. So it is rational to consider how certain the continuation of this supply is.

Over half a century ago, M King Hubbert, a Shell geologist, fairly correctly predicted the timing of the peak of US domestic oil production, and hypothesised its continuous decline thereafter, down the slippery backside of a bell curve (Hubbert 1956).

The 'Peak Oilers' have sought to apply this in a global sense, to state that the peak of global oil production is now upon us, half the world's oil reserves have now been used, and that it is all downhill from here in terms of supply, and hence, of course, uphill in terms of price.

If this view is correct, much of the world's population is on track to face starvation, misery and hardship, until and unless some other forms of energy supply can meet the energy supply-demand equation.

[1]The point in time when the maximum rate of oil production is reached before entering what is hypothesised to be a terminal decline.

**Correspondence: davidbennett@keapetroleum.com*

This is an edited version of Dr Bennett's Cafe Scientifique presentation at Te Papa Tongarewa, 5 July 2012.

Dave Bennett has 30 years of international oil and gas experience, and is a past Exploration Manager of New Zealand Oil and Gas Ltd and former Chief Executive of Austral-Pacific Energy Ltd., and a past director of Rift Oil Plc, Trans-Orient Petroleum Ltd and TAG Oil Ltd - all public listed companies. Most recently he has been Chief Executive of Kea Petroleum Plc, a London-based explorer focused on New Zealand, from which position he recently retired but where he continues as a director. He has been closely involved in several oil and gas discoveries, in New Zealand and Papua New Guinea.

Dr Bennett has a physics degree from Cambridge, and a PhD in geophysics from Australian National University, and in the 70s was a postdoctoral fellow at University of Texas at Dallas and at Victoria University of Wellington. He also worked as a marine geophysicist at Geophysics Division, DSIR, later incorporated as part of GNS Science.

But this is a static view of the world, which assumes that new ideas about where and how to discover oil do not emerge, and is at variance with what is actually happening.

First let's look at the oil price as a signal for what is happening.

In 2008, a year of economic turbulence, the all-time record oil price of US$134 per barrel was achieved in mid-year, but this had collapsed due to economic recession to US$43 before the end of that year.

This year we have seen the oil price rise to US$125 a barrel in March, only to fall to below US$90 in June. By August it had risen again to above US$110, but ongoing world economic woes could see it fall before the year end, with predictions it will drop to around $60 by then. Equally, it could rise on such possibilities as an Israeli strike at Iran nuclear capability..

These huge swings suggest that it is demand, driven by economic and political concerns, far more than supply, that's dominating the price.

Underlying these swings, there has been an underlying growth in the long-run oil price since the late 1990s of a few per cent per annum above the average inflation rate (from around US$20 to getting on for US$100). This is not surprising, and is much more a reflection of investment in necessary refining and production capacity than it is of any real inability to supply crude due to falling reserves.

So what is the status of world reserves?

For this I refer to the highly regarded BP Statistical Review of World Energy, the 2012 edition of which was released in June.[2]

At year 2011 consumption of 88 million barrels per day, or approximately 32 billion barrels per year, and with quoted world proven reserves of 1652 billion barrels at end 2011 (an increase over the decade of some 30%), Reserves/Life cover stood at 54 years. Natural gas is even more positive, with a Reserves/Life cover at end 2011 of 64 years, with an increase in proven reserves over the decade of 25%. And we have good cause to be thankful that these ratios hold, and may even improve in years to come.

At the present time, oil and gas account for around two-thirds of total primary energy supply. BP projects that by 2030, despite an overall growth in energy demand of around 40%, oil and gas between them will still account for just under 60% of primary energy supply.

This is despite a huge projected growth in biofuels production, in excess of 8% per annum, but still only meeting much less than 10% of energy demand.

So to what should we ascribe this growth in reserves figures, in contradiction of Hubbert's model?

Basically, the explorers have continued to generate new ideas of where and from what it is possible to produce oil and gas, and have developed new techniques to do so. They have done this because of an economic incentive, and even a necessity, to do so, which has sharpened the minds of a highly educated workforce.

To name but a couple out of the many new technologies which have contributed to the improvements in the discovery and development of new reserves, and the enhancement of existing reserves in already discovered fields, I would just mention horizontal drilling and fraccing[3] ('fracking'), both of which have led to the ability to improve the rates and efficiency of production of oil and gas from previously little-considered reservoirs.

A classic example would be the Bakken Shale of North Dakota, Montana and Saskatchewan, which until recent years was regarded as only a source rock rather than a reservoir, yet today is producing in excess of half a million barrels of oil per day, thanks in large part to both these techniques.

As a result, and in contradiction to the Peak Oil hypothesis, US domestic reserves actually grew over the decade to end of 2011. This is despite US extraction over the same period averaging in excess of 7 million barrels per day, i.e. 25 billion barrels removed from the ground during the decade.

US present oil production is more than a million barrels per day greater than four years ago. At the same time, US gas production has been so successful that the many planned liquified natural gas import projects of a few years ago have all been cancelled, or are now being reconsidered as export projects. US gas prices have dropped to a quarter of the level of five years ago.

In other words, it is the efforts of the explorers that are maintaining a sustainable business model, and thus ensuring the world does not slip into misery and chaos during the coming decades as we wait for other technologies to emerge to pick up the energy supply baton.

In New Zealand, too, this successful sustainable model could emerge, due to New Zealand's relatively under-explored basins. Also, to a large degree many of these emerging modern technologies are yet to be applied in this country.

However, this sustainability can only be achieved in New Zealand if such issues as the debate over fraccing can be re-directed from the hysterical to the rational, and if groups such as Greenpeace adopt less nihilistic attitudes than their present publicly stated intent to stop all exploration.

Reference

Hubbert, M.K. 1956. Nuclear energy and fossil fuels. American Petroleum Institute Conference, San Antonio, Texas (7–9 March 1956). *Publication 95, Shell Development Co*. (June 1956).

[2] *bp.com/statisticalreview*

[3] *Induced hydraulic fracturing, is a technique used to release petroleum, natural gas (including shale gas, tight gas, and coal seam gas), or other substances for extraction.*