Peak Oil and Investment

The success of the global market economy is totally dependent on the availability of cheap energy from fossil-fuels. But that ready availability is now under threat, firstly due to the need to address Climate Change and secondly due to Peak Oil, the issue which may have a greater impact on our society and economy than climate change in the short term.

Peak Oil takes its name from the bell-shaped curve which typifies the production profile of any oilfield. Once an oilfield is discovered, oilwells are drilled and production rises until drilling saturation is reached, whereupon production levels off and reaches a peak. Production then begins to decline as reservoir pressure drops, following a "depletion curve" which makes up the declining segment of the bell-shape. This profile may be disrupted by extraneous events such as shutdowns due to technical or geopolitical factors, but broadly it has been shown to apply to oilfields worldwide. The concept was originally developed in the 1950's by M. King Hubbert, a senior oil geologist with Shell Oil in the USA, hence the curve is often known as the "Hubbert Curve".

It applies to an individual oilfield, but also, if production profiles are cumulated, to all oilfields in a region, a nation, and to the globe. It has been used to accurately predict regional peaks of oil production; the concern now is with the overall global peak.

The shape of the curve and height of the peak depends on various oil reservoir characteristics, but also, critically, on the estimated total amount of oil that will be recovered – the URR (Ultimately Recoverable Resource). The peak is reached when approximately half of the URR has been produced. Thus if the global URR increases due to improved technology, greater exploration success or the availability of oil from unconventional sources, such as tar sands, oil shales or very deep water exploration, the peak may be pushed back in time.

One of the main criticisms of the Hubbert curve has been that the URR is essentially indeterminate given the potentially large inventory of unconventional resources. For example, there is no dispute that global oil production to date, from the first discovery in the 1850's, is around 1 trillion barrels. There is, however, great dispute over what remains to be discovered and recovered, and hence the global URR.

The "official view", from organizations such as the International Energy Agency (IEA) and the US Geological Survey (USGS), until recently, was that we had abundant resources available, from both conventional and unconventional sources, to meet rapidly expanding global demand as China, and subsequently India, become large consumers. The URR was estimated to be in the 3-5 trillion barrels range, suggesting we were 15-40 years away from the peak, and thus there was no cause for concern.

However it is one thing to have oil resources in the ground; it is quite another to convert those resources into oil flows to the market. The economists took comfort as the oil price rose toward US$80 per bbl, on the grounds that supply will always balance demand and the higher prices would stimulate additional production. They also argue that service-based economies are less dependent on oil despite the fact that advanced economies use higher per capita amounts of oil to generate wealth.

But it now seems that there are unexpected problems in increasing the oil flows, from both conventional and unconventional sources, to meet expanding market demand and to offset the decline of established oilfields. Indeed, the global URR may be considerably below previous "official" estimates, possibly around 2 trillion bbls[i]. If that is so, we are close to the peak, or possibly already past it.

The reasons for this are: first, despite continually improving technology, we are not discovering new oilfields fast enough, and certainly no giant fields. The majority of the giants were discovered in the 1950s and 60s, since when discovery rates, and the size of discoveries, have dropped substantially whilst production has risen, opening up a widening gap. Second, data on existing oil reserves is suspect, particularly in the Middle East which holds the bulk of the world's remaining conventional oil. In some countries, it is believed that reserve estimates were artificially inflated in the 1980s to maximise production under the OPEC quota arrangements in place at that time – the so-called "paper barrels"!. National oil reserves estimates in the Middle East are not subject to the audit and disclosure requirements

of publicly-listed international oil companies. Thus there may be considerably less conventional oil than previously anticipated. Third, many established oil regions have already past their peak and are in decline. It is suspected that their depletion rates are often more rapid than officially admitted. Fourth, the development of unconventional resources is proving to be more difficult than previously envisaged, both technically and economically.

This has generated an increasing note of caution. Current reports from the IEA[ii] and the US National Petroleum Council[iii] are the first, grudging, official admissions that peak oil may soon become a reality.

At the peak, oil does not run out, as we still have half of the URR to produce. However, it is the point at which further expansion of oil production becomes impossible because new production is fully offset by the decline of existing production, irrespective of the oil price. It may take the form of a sharp peak, if for example some of the giant fields start to decline rapidly, or it may be an undulating plateau spread over a number of years if, for example, oil demand is destroyed as a result of developing countries no longer being able to afford high oil prices. This seems to be happening already.

Given the absolute dependency of modern societies on oil and gas, an inability to expand supply to meet demand will be traumatic. Australia is particularly vulnerable, as highlighted by the recent Senate Committee inquiry[iv], but the issue is barely on our political agenda. Whilst still 50% self-sufficient in oil, albeit steadily declining, our imports are currently 85% of daily usage, offset by high exports. Australia, in contravention to its obligations as a member, is the only IEA country not to maintain a 90 day net imports strategic petroleum reserve. It is also heavily dependent upon transport fuels[v], for which there is currently little alternative to oil. The impact of high oil prices and our declining self-sufficiency is now showing up as a substantial trade deficit in our national accounts.

Some obvious solutions to peak oil, for example increased coal consumption or coal conversion to liquids, are carbon emission-intensive and thus would be extremely detrimental to solving the pressing problem of climate change. Other solutions, if they involve overall reduction in fossil fuel consumption, would assist in addressing climate change. The two issues are inextricably linked and need to be treated with consistent and holistic policy to meet both climate change and peak oil objectives.

When oil does move into short supply, it raises the question of who gets the oil that is available? Solutions range from:

- letting the market take its course. The economists argue that supply will always balance demand at some price, but conveniently skirt around the traumatic societal impact of recession or depression arising from the implied higher energy prices, and the potential for failed states as the developing countries are increasingly forced out of the market.

- the "Washington Consensus" of sending in the marines to secure supply. Recent experience suggests this is hardly a sustainable alternative.

- a global Oil Depletion Protocol to provide for equitable sharing of available oil.

Clearly there are major uncertainties associated with the emergence of the global oil peak, but the exact date of the peak is less relevant than acceptance of the principle. The changes the peak implies will fundamentally alter society as we know it. Solutions are available, but there is no "silver bullet", rather we have much "silver buckshot" to address the problem. For example energy efficiency and conservation, transport mode shifts, urban design, pricing/taxation, alternative fuel conversion. Unfortunately these initiatives take time to implement, typically at least a decade. Thus prudent risk management suggests we should be planning for these changes today.

As oil rapidly becomes a premium product, business models, governance and corporate responsibility will have to be fundamentally reassessed. Reducing oil vulnerability and improving the resilience of organizations to respond to oil shortages will become critical success factors in corporate strategy. This will drive a paradigm shift in corporate and investment thinking.

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References:

[i] Association for the Study of Peak Oil, www.aspo-australia.org.au

[ii] "Medium Term Market Report", International Energy Agency, Paris, July 2007

[iii] "Facing the Hard Truths about Energy", US National Petroleum Council Global Oil & Gas Study, 18th July 2007

[iv] "Australia's future oil supply and alternative transport fuels", Senate Committee on Rural and Regional Affairs and Transport, February 2007

[v] "Peak Oil and Australia; Probable impacts and possible options", Bruce Robinson & Sherry Mayo, ASPO Australia, 2006