

FALLING OFF HUBBERT'S PEAK

Facts do not cease to exist because they are ignored. - Aldous Huxley

In 1912, Winston Churchill, then First Lord of the Admiralty, made a fateful decision that oil, rather than coal, would thereafter fuel the ships of the Royal Navy. This had far-reaching consequences because it meant a dependence on foreign oil supplies rather than Welsh coal. It led, through government involvement, to the rapid growth of the Anglo-Persian oil company, later to become British Petroleum (BP). The rest of the great powers rapidly followed suit. Conventional, easily extractable oil now provides ~40% of the world's energy supply. We depend on oil not only for most long-distant transport (cars, trucks, trains, ships, planes) but also as a chemical feedstock for plastics, and for fertilisers and pesticides integral to modern agriculture. Economic growth involving increased industrial and agricultural production over the past century has been inextricably linked to increased oil usage. Growth through globalisation, in particular, depends on cheap long-haul transport which, in turn, is based on an enormous and complex world-wide infrastructure for extraction and distribution of oil. Within the developed world we have become particularly addicted to cheap air travel based on an abundant supply of conventional oil.

In 1956 M.K. Hubbert, a petroleum geologist then working for Shell Oil, noted that exploitation within any oil province follows a predictable bell-curve trend when production is plotted against time - the biggest and easiest exploited oilfields are found early in the history of exploration while second order fields are developed as production from the big fields inevitably declines. In the ascending part of the bell-curve, exploration and production is easy and cheap but in the descending portion of the curve it becomes progressively more difficult and expensive. Ultimately, a limit is reached when the energy required for further exploitation exceeds that produced. Against the wishes of his management and to general disbelief, Hubbert went on to predict that US domestic oil production would peak around 1970, about 40 years after the period of peak discovery around 1930, and would then irrevocably decline. US domestic production did indeed peak within a year of his prediction despite one of the largest original oil-gas endowments in the world. The US now imports ~61% of its oil needs - this proportion is increasing at ~3% per year. Similar patterns of peak production following peak discovery by a period of ~40 years or less have occurred throughout all the world's oilfields. For example, production in the UK North Sea began in the early 1970's, peaked in 1999, and is now declining at ~6% per year.

For the entire globe, oil discovery peaked in the mid-1960's. Approximately 80% of current production comes from fields discovered before 1973 and large discoveries are becoming increasingly rare, despite great advances in exploration and extraction technology, and better understanding of the geological conditions for oil formation and entrapment. Many analysts believe that ~90% of the world's conventional oil resource has already been found - no more big elephants are believed to exist! This is reflected by declining exploration activity world-wide, a lack of investment in new refinery facilities, and a recent series of mergers between the major companies (e.g. Exxon-Mobil, Chevron-Exxon, BP-Amoco, Phillips-Conoco). Oil production outside the Middle East is estimated to have peaked in 1997 and is now in terminal decline. The Gulf States alone have the capacity to meet global demand which continues to rise at ~2% per year. Saudi Arabia holds about 25% of remaining global reserves and Iraq about 11%. Iraq has the greatest recognised potential for further exploration and increased production. Also notable is the growing demand for Middle East oil from oil-poor Asia (China, India, Japan, Korea) which seems set to become the dominant consuming region by 2010.

Put simply, across the Earth, we are currently burning more than 4 barrels of oil for every new barrel discovered while demand continues to rise. Independent analysts estimate that we have produced nearly 50% of the total global resource of recoverable conventional oil. The global 'Hubbert Peak' for conventional oil production is predicted to occur in 2005±5 years, with the peak in gas production following shortly afterwards. Beyond the global peak, oil price will escalate steeply as demand exceeds supply with the Gulf States no longer able to meet the increasing shortfall throughout the rest of the world. Competition for a dwindling oil supply will become increasingly fierce. The world resource of conventional oil, accumulated over several hundred million years of geological time, will effectively be dissipated only 200 years after the first oil wells were drilled in the mid 19th century.

What alternatives exist? There are very substantial reserves of non-conventional oil (tar sands, oil shale, etc.), but extraction will be energy intensive, expensive, slow, and very environmentally unfriendly! Renewable energy sources (hydro, solar, wind, geothermal) along with coal and nuclear power may substitute for oil-gas in electricity and heat generation, but NO known substitutes for long-distance travel and transportation can supplant the oil infrastructure over a short time-frame. Hydrogen-powered fuel cells are being looked at as a clean energy source for short-haul transport, but generation of hydrogen is itself energy intensive. Because of its reliance on cheap long-haul transportation, global trade at its present level seems unsustainable beyond peak oil. Massive disruption to the global economy seems likely by 2010-2015.

Why is this enormous problem largely ignored (at least in public) by the world's leaders, and why do we hear so little about it? Principally because it is very bad news and nobody wants to hear it, especially politicians and shareholders in big oil companies. But note that BP is now reinventing itself as 'Beyond Petroleum'. Only the hugely influential US Geological Survey, for reasons of its own, is extrapolating to a more optimistic future - they estimate that the global endowment of recoverable oil is about 3 trillion barrels, about 50% above most other estimates. On the other hand, there is good reason to believe that published reserve estimates for the OPEC countries, especially, were systematically exaggerated in the late 1980's to win a greater slice of the OPEC allocation cake.

What are the implications for New Zealand? The news for us is particularly bad because of our economic dependence on long-range exporting and on global tourism. We may have to face up once more to the prospect of being an isolated island economy. Self-sufficiency should predominate our thinking wherever possible. Mountaineers tell us that the ascent to a peak is often comparatively easy, it is the 'coming-down-safely' that is difficult - that is the lesson we should all take in as we cross the global Hubbert Peak. We should also take note of a common saying in the oil business: "If you don't deal with reality, reality will deal with you".

Reference Sources for this article include:

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and websites linked to <http://www.oilcrisis.com/>

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