Peak Energy

The Limits to Oil & Gas Production

Sheet 1

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10p (where sold)

The laws of physics make it quite clear that once we degrade the value of an energy source we can never use it again. So it is with oil and natural gas; we are using the reserves far faster than new reserves are being discovered, and eventually we will run out. However, geological deposits of oil, gas and other minerals are not like the petrol tank of a car. We will not suddenly run out. Instead global production will reach a peak and then fall away. Recent studies suggest that this point may be sooner than most governments wish to believe is true.

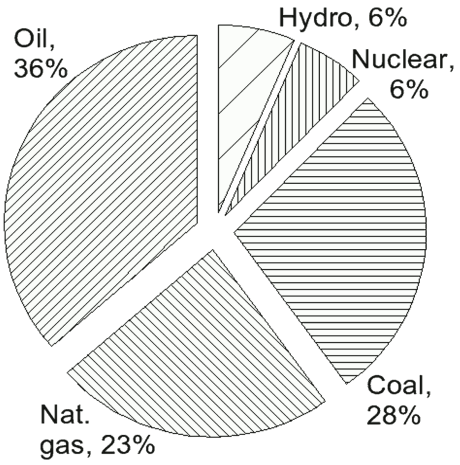
Oil and gas "make the world go around"

The world runs on oil, gas and coal. It's not just that these energy sources provide the energy that drives human civilisation; the money generated by the production of energy resources also powers the world's economy. Reducing the availability of these minerals therefore harms the national or global economy because a shortage will drive prices ever higher, and it will reduce activity within the economy.

Each year BP collates information from around the globe for its annual *Statistical Review*. The last edition (2006) showed that 36% of the world's traded energy came from oil and 23% from natural gas (see graph below). Both oil and gas will reach a peak of production, and even the most optimistic studies say that this will be in the first 50 years of this century; the pessimistic put both peaks just one to two decades away. So we can be certain that at least half of the world's current energy supply will go into decline in the near future, with a third (the oil) in perhaps three to six years.

The peak of production is inevitable; it's an inescapable fact of geophysics. For this reason it is important that the world predicts and acts before the peak to address its consumption of these finite resources.

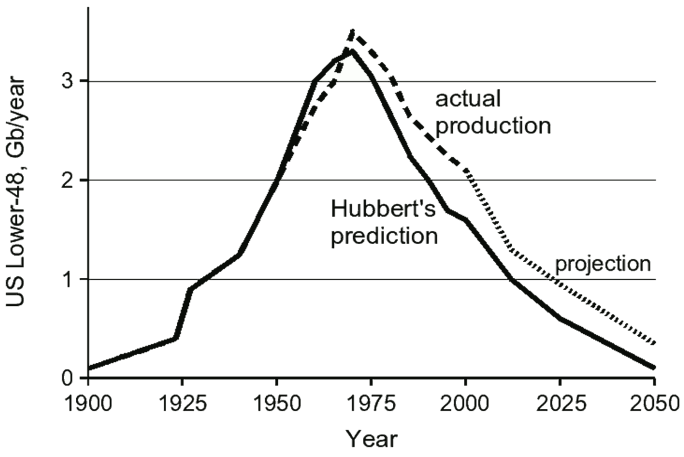
Fig. 1. Globally Traded Energy, 2005



Predicting the peak

The concept of the "peak" of supply was developed by the geologist M. King Hubbert in the 1940s and 1950s. After World War II he worked for Shell, studying the production records of US oil fields (from the "lower 48" states of the USA) in order to assess the future for oil production. He produced papers on his work from the late 40s, but his landmark paper was presented to the American Petroleum Institute in 1956. In this paper, depending on the level of consumption, he predicted a peak, and then unstoppable decline, in US oil production in 1970.

Fig. 2. *Hubbert's Peak* or *Hubbert's Plot*



Following the presentation of his paper Hubbert's reputation was discredited amongst many in the oil industry. But 14 years later, in line with his prediction, US oil production peaked and, although the fall isn't exactly in line with the prediction (because of the slight growth in reserves), the trend of the fall is correct (see graph above).

The "peaking" of oil or gas production is, in mainstream academia, not an issue. The greater argument today is whether the same analysis that Hubbert carried out for the USA can be carried out for the whole globe. The problem when doing this for global production is that we don't have complete, or consistent data for oil and gas resources; it is further clouded by national political agendas (e.g., in the USA).

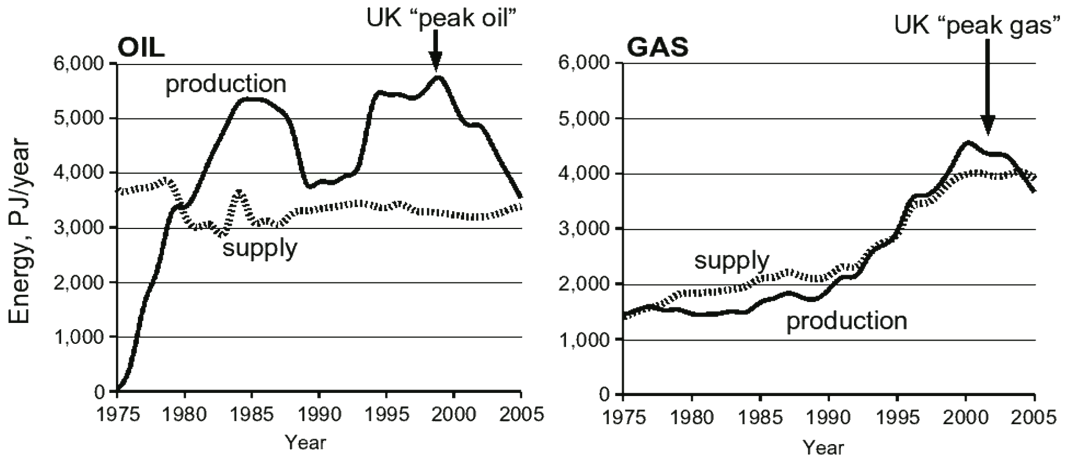


Fig.3. The Peak of UK Oil Gas Production

In the UK "peaking" is not an issue... we've peaked! In 2007 the UK will consume more oil and gas than it produces from the North Sea. In 15 years we will be importing most of our oil and gas. No combination of energy sources – coal, renewable or nuclear power – can avoid this outcome.

The Global Oil Production Peak

Four-fifths of the world's oil is owned by nation states, who guard the data on their oil and gas reserves as state secrets. Extracting minerals from the ground is also not carried out with absolute certainty. These two factors combine to make the debate over the peak of world oil and gas production difficult: there are often inconsistencies between studies, which generates confusion in the minds of the public and politicians.

The graph below shows the recent predictions from the *Association for the Study of Peak Oil and Gas* (ASPO). Before we can produce oil we have to find it. Therefore, 30 or so years before the production peak, we can see that there is a peak in oil "discovery". This isn't just significant because "it's a peak", but because from then on we will, on average, discover less oil each year. At the moment new discoveries are declining in line with the depletion model.

Oil consumption – with the exception of economic recessions – has been climbing steadily for a century. But with the fall in discoveries we are now consuming between four and five barrels of oil for every new barrel of oil discovered. This accelerates depletion.

If we look at the "business as usual" (B.A.U) studies from those who do not accept that world oil production will peak soon – which means many of the industrialised nation and the International Energy Agency – then oil production is going to nearly double by 2030. However the assumptions upon which these conclusions are based are highly questionable. For example, in 2000, the US Geological Survey (USGS) produced a study which put the peak in oil production beyond 2030. This study used a "probabilistic" analysis, and whilst in statistical terms it's absolutely correct, the probability of their "mean" peak date being correct (because it's a mean of oil production, not probability) is around 34% – i.e., there's only a one in three chance of it happening (use only the USGS's 95% certain data and it produces a peak date around 2014!). Even so, officials and politicians often use this figure as if it's an absolute certainty.

Peak Oil + Peak Gas = *Peak Energy*

Based upon the results of more certain studies, oil production is likely to reach a peak between now and 2015. Although not as easy to predict, gas production is likely to peak between 2015 and 2025. Oil and gas make up the majority of the world's energy supply. Consequently, following the oil and gas peaks, the availability of energy globally will reduce – hence *Peak Energy*.

There is an elegantly simple answer to this problem... *LESS*. By various means, we *can* get by with less energy. Unlike the "business as usual" solutions promoted for climate change, solving Peak Energy is definitely "business as unusual". However, unlike the solutions to climate change, which are promoted on a voluntary or altruistic basis, the "less" solution will have to be adopted by all – there is simply no other solution permitted within the laws of physics.

Fig. 4. Global Projections for Peak Oil