The Oil Drum: Europe
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Is There A Painless Way To Fill The Oil Supply Gap?

Posted by Euan Mearns on January 31, 2007 - 1:00am in The Oil Drum: Europe
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> This is a guest post by **Dr Michael R. Smith** of **Energyfiles Ltd.** Dr Smith gave an excellent presentation to The Oil Depletion Conference hosted by The Energy Institute in London last year and this post is an abridged version of what he had to say. If you like the post, then please use the "tip jars" or send the link to a friend.

I have been writing on oil supply issues since 1995, in particular the imminent supply gap and the looming new energy era; forecasting a peak in global supply arriving between 2010 and 2020 depending on demand growth. The Energyfiles report "Oil & Gas – Global Ten-Year Projection" (now in its 2007 edition) was published in response to queries about the data used to arrive at these conclusions.

Nonetheless, despite new evidence in the form of higher than expected demand, capacity squeezes and price rises, there remains a view amongst some geologists and economists that the peak is many years away and even that technology, new energy sources, and new efficiencies will make it irrelevant. Although I believe such views are driven by wishful thinking, I do not want to digress on this subject here. Instead I want to address energy supplies after peak; the size of the so-called supply gap and how it might - or might not - be filled by alternative transport fuels and by efficiencies.

The supply gap depends on demand as well as supply. In the past demand has been erratic but yearly demand growth of 1.8%, based on what has happened over the last 25 years, seems to ensure economic stability. This business-as-usual (BAU) growth is depicted, along with a detailed field-based production forecast of 'usual' oil, in Figure 1.

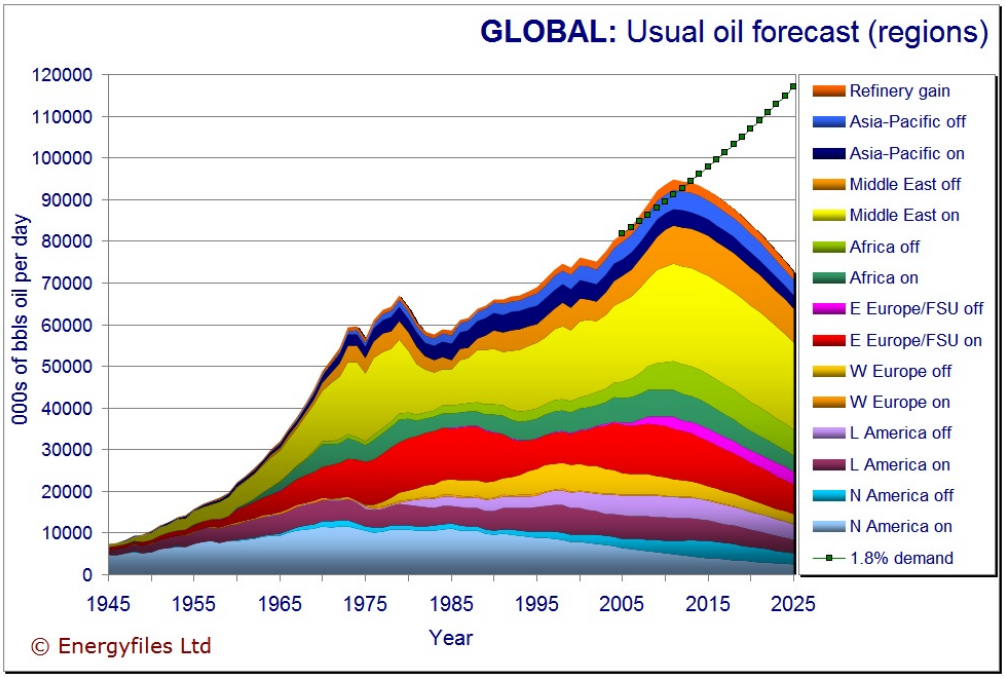

Figure 1. *Forecast of conventional oil production plus NGLs (click to enlarge).*

A small supply surplus up to 2013 is followed by a deficit to the end of the period plotted. The surplus will partly be compensated by shut-in capacity, especially heavier oil in Saudi Arabia, and partly by surges in demand (mostly in Asia) as prices briefly fall.

Filling the gap with alternative liquid fuels

The deficit in 2020 will match all of the current production from the Middle East but a model is needed for oils that do not fall into the 'usual' category. 'Time Magazine' has said that Canada's Athabasca oil sand Belt "...could satisfy the world's demand for petroleum for the next century". The oil sands may be huge (or they may be a huge environmental problem), but they will not go close to filling the gap on their own, even if problems of energy return on investment (EROI) and the need for gas and water supplies to effectively develop them are overcome.

Venezuela's La Faja extra-heavy oil region has also been called a "saviour"; however it will hardly impact on global supply after peak. There are other such areas. The World Energy Council has documented 54 geological basins that contain oil sands. But, considering the time it has taken to develop Canada's and Venezuela's resources substantial short term output from these is unlikely.

Oil shales have been exploited for hundreds of years but rarely commercially due to their poor EROI. Large operations in China and Estonia shrunk in competition with cheaper fuels but perhaps new technology and higher prices will turn this around. In fact 'Rocky Mountain News' portrayed Shell's in situ method of conversion and extraction as "...simplicity itself in concept but exquisitely ingenious in execution". Exquisite it may be but the time needed to develop significant volumes of oil from shales must be measured in decades.

Gas-to-liquids (GTL) has been "ready to arrive" for at least a decade and it will still be ready to arrive a decade from now. In a market where stranded gas is in demand for LNG, GTL can rarely compete. Conversely coal-to-liquids (CTL) technology has massive potential. Up to now CTL has only been used in non-commercial operations, notably in Hitler's Germany and apartheid South Africa. China, with its huge coal resources, is trying to kick-start a new CTL industry and substantial growth is forecast. But again the amount of growth possible within the next two decades, will hardly impact the gap.

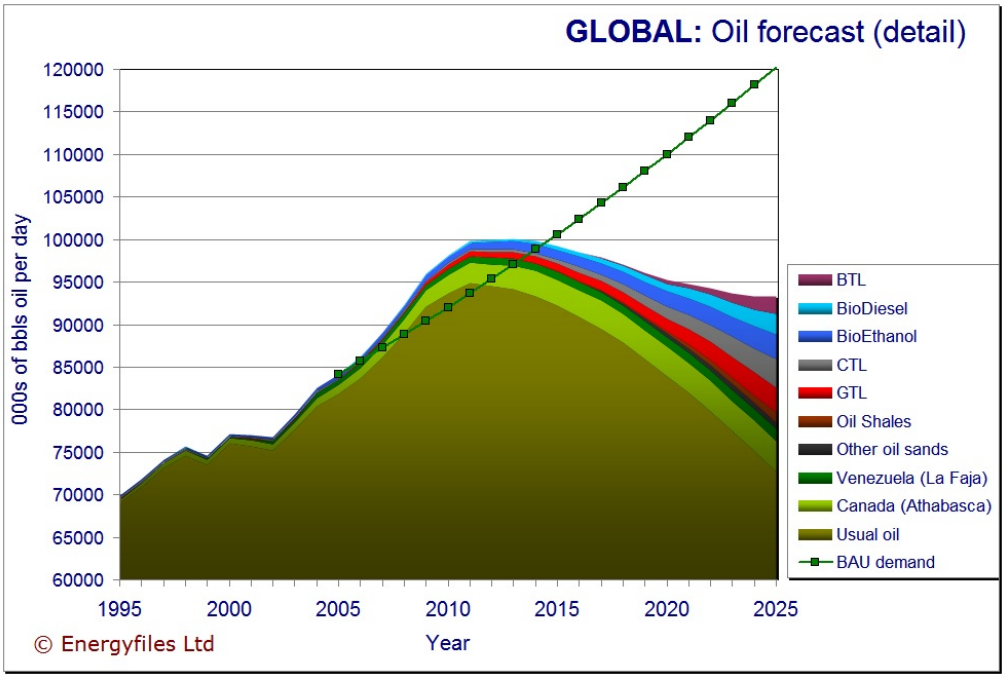

Figure 2. *Forecast of all liquids production (click to enlarge).*

Finally there are the biofuels. Growth of these is coming from a low level and biodesel and bioethanol, whose energy density is less than 70% of crude oil, eat into valuable agricultural land. Even with massive investment they will be incapable of filling the gap. Conversely cellulosic ethanol (BTL) is the holy grail of the biofuels industry; but, still in the pilot plant stage, real year-on-year growth is not likely for at least 20 years.

The gap has thus been pushed to 2015 as shown in Figure 2, with the deficit in 2020, assuming BAU demand, still equalling current production from Saudi Arabia and the USA combined. What's more, with surpluses to 2014 the drive to save oil will remain with the environmentalists, whilst surplus oil, should OPEC allow it on the market, will be rapidly mopped up by the growing Chinese and Indian economies.

There may be room for additional growth in some liquids sources should massive investment programs be instigated before the peak and I have not incorporated significant hydrogen fuels made from gas, nuclear power or renewables. Furthermore the analysis contradicts recent projections by Cambridge Energy Research Associates (CERA) who foresee 'usual' oil growth until 2030 but fail to explain realistically where the oil will come from. Nonetheless mine is a realistic model for a real world which moves at a rapid pace in a free market.

Closing the gap with efficiencies

Once high prices recur there will be every incentive to develop efficiencies, some of which may be realised without pain - unlike conservation, which will requires radical, unwanted and uncomfortable changes to life style.

For instance it may be possible to reduce plastics use by half in 20 years using natural alternatives and less waste. In the USA automobile performance could be significantly increased, perhaps approaching European levels by 2025 which also has room for improvement on current trends.

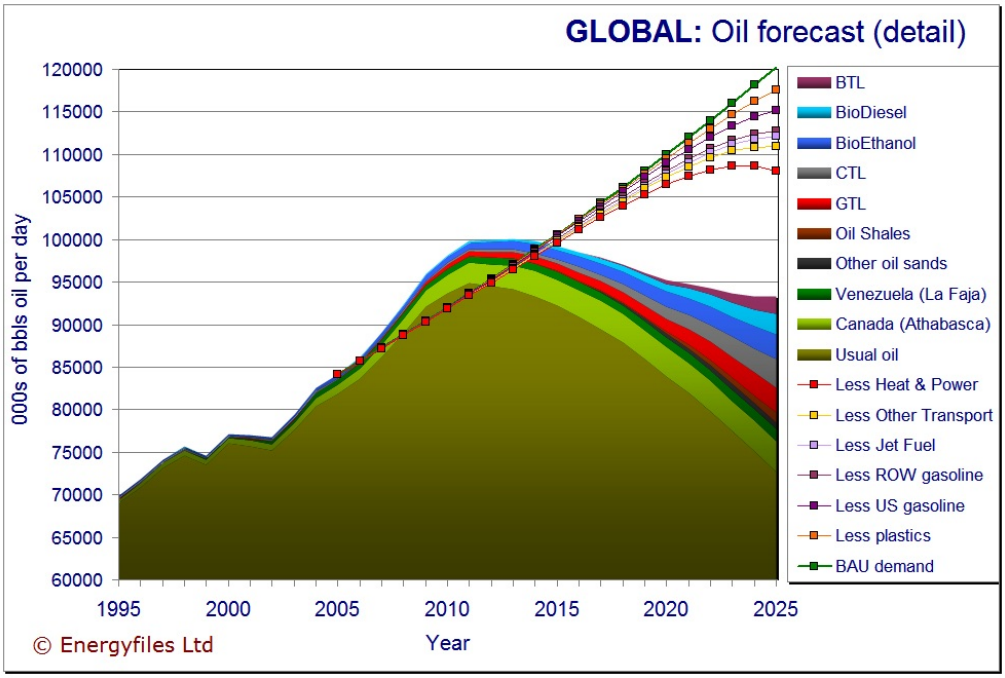

Figure 3. *Forecast of supply gap with demand adjusted for efficiency measures (click to enlarge).*

There are few options to save jet fuel with the current airplane mix although routing modifications may offer some savings. Conversely continued introduction of electrified train, metro and tram systems should offer significant cutbacks in oil use throughout the transport industry. Finally full conversion of all the remaining oil-powered heat and power sources to gas, coal, and renewables could lead to substantial reductions in demand.

Such efficiencies are approximations and involve increased use of natural gas, which in Europe and North America will be difficult, and coal, which will be environmentally damaging. But the gap, now pushed to 2016 as shown in Figure 3, may be reduced to the approximate current output of Saudi Arabia and Kuwait by 2020.

The only realistic option

Thus the answer to the question is no; there is no painless way to fill the gap. Of course it will be filled; partly from traditional sources; partly from new alternatives; partly from simple efficiencies; but a large portion will have to be filled by demand destruction. In the real world demand destruction means poverty and conflict. We should be working towards reducing vulnerability to such destruction.

And if we cannot do it globally we should do it locally; at least to gain a competitive edge. Companies and governments must take energy risks with capital intensive projects, innovative energy sources, new modes of transport and through cutting consumption with taxes and rationing systems. Growth and decline will in truth be erratic as chaotic price movements drive demand up and down. But liquid energy demand will want to grow faster than supply. The global population has reached an unsustainable energy demand level to support the lifestyles we desire. Conservation will be a necessity but it will be painful.

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