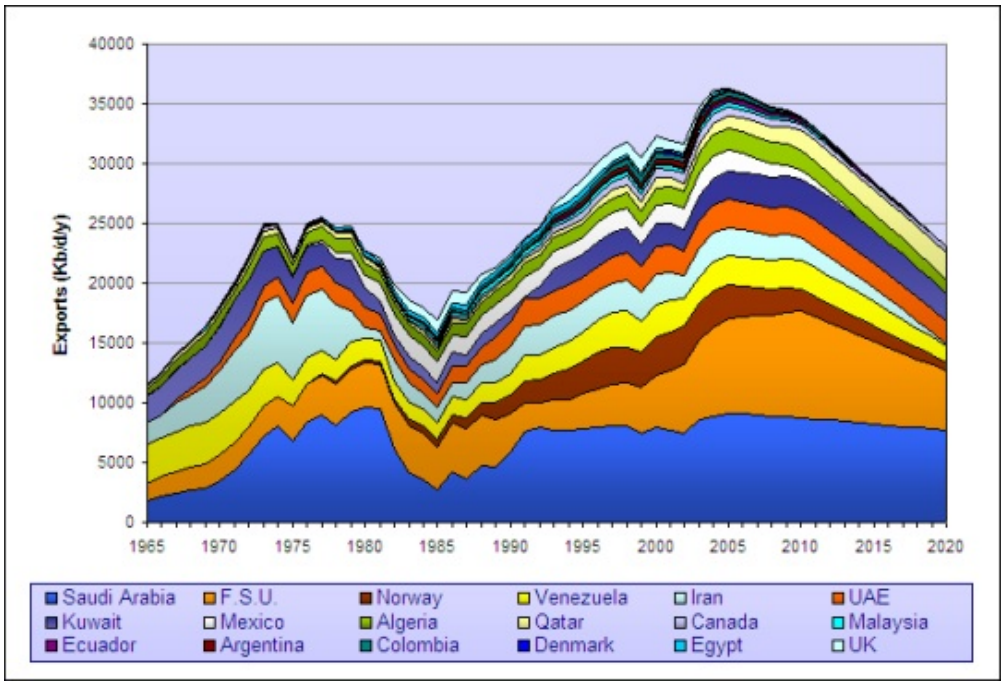
The Oil Drum: Europe
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

World Oil Exports [00] Introduction

Posted by Luis de Sousa on June 27, 2008 - 9:55am in The Oil Drum: Europe
Topic: Miscellaneous
Tags: export land model, exports, oil exports, original, woe, world oil exports [list all tags]



World Oil Exports model as of November 2006. Click to enlarge.

History

Probably the earliest assessment of future oil exports on a worldwide level was that authored by John Halloc *et al.*, entitled Forecasting the limits to the availability and diversity of global conventional oil supply published by the Energy magazine in 2004. In spite of being produced before the first oil price rises of 2004, this work has the merit of going beyond the traditional Hubbertian analysis of oil supply. The authors found not only that the volume of oil available to the market will follow a dynamic of its own, declining faster than total production, but also that the number of exporting countries would diminish, compromising the diversity of supply.

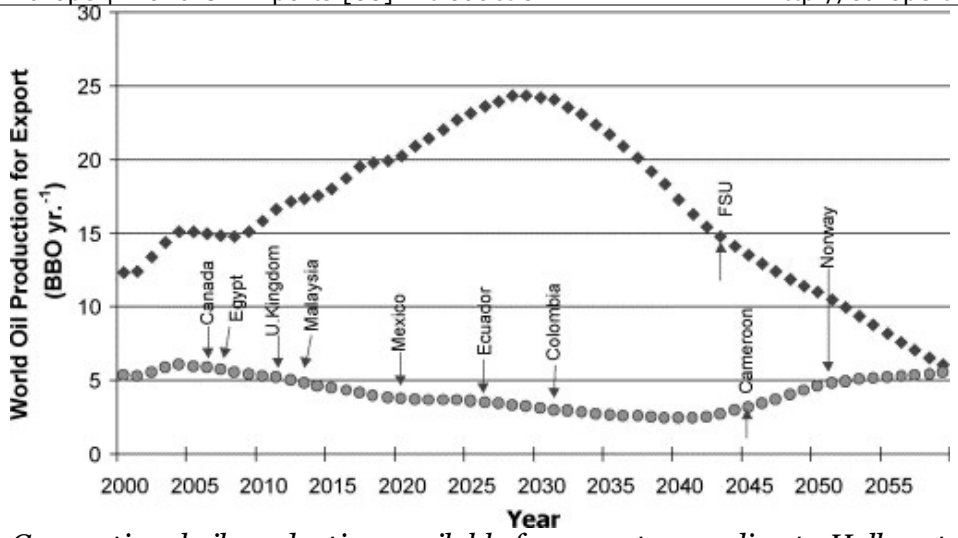


Figure 1 – Conventional oil production available for export according to Halloc et al. (2004). Diamonds represent net exports from FSU, Iran, Iraq, Kuwait, Nigeria, Saudi Arabia, and the United Arab Emirates, dots exports from the rest of the world. Arrows show forecast moments in time when producing countries cease exporting oil. Click for article.

Later, prices would start increasing in the wake of vanishing spare capacity in the Middle East. The accelerating flow of events fostered communication through faster means, overriding the slow processes of traditional submission, peer review and printing. The internet became quite alight with resource depletion news sites, fora and weblogs, were the idea of a singular concept of oil exports would be pursued.

Early in 2006 Jeffery Brown laid down the idea of "Export Land", a model where an oil exporter faces both a decline in production and an increase in internal consumption. He observed that the world's top three oil exporters were facing similar conditions. Then, together with Khebab, further analysis would be produced reaching similar conclusions for the top four oil exporters. The latest update to the Export Land Model resulted in the following forecast:

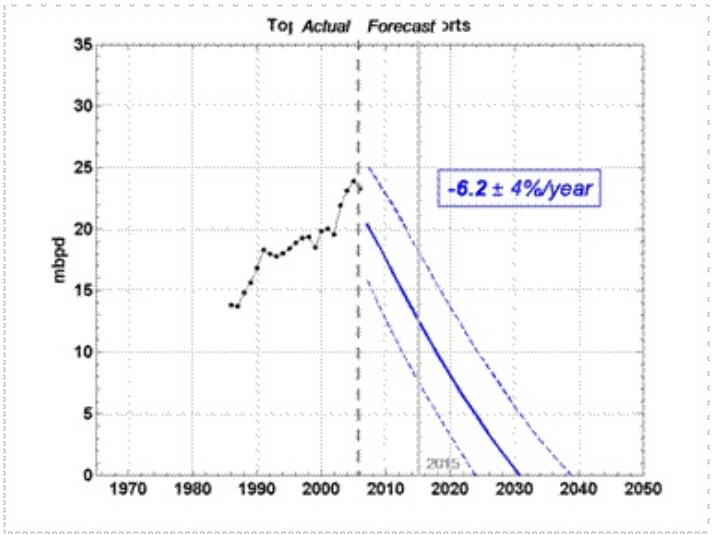


Figure 2 – The Export Land Model for the top five oil exporters. Click for article.

In 2006 The Oil Drum would harbour the first version of World Oil Exports (WOE) a country by country forecast of future export volumes up to 2020. Although a simple accounting exercise, based upon rudimentary forecast tools, the outcome would give another dimension to the international oil market's future. Exports were peaking (possibly already in decline since 2005) and where in for a decline at an accelerating rate. After an update later in 2006, the picture

devised was the following:

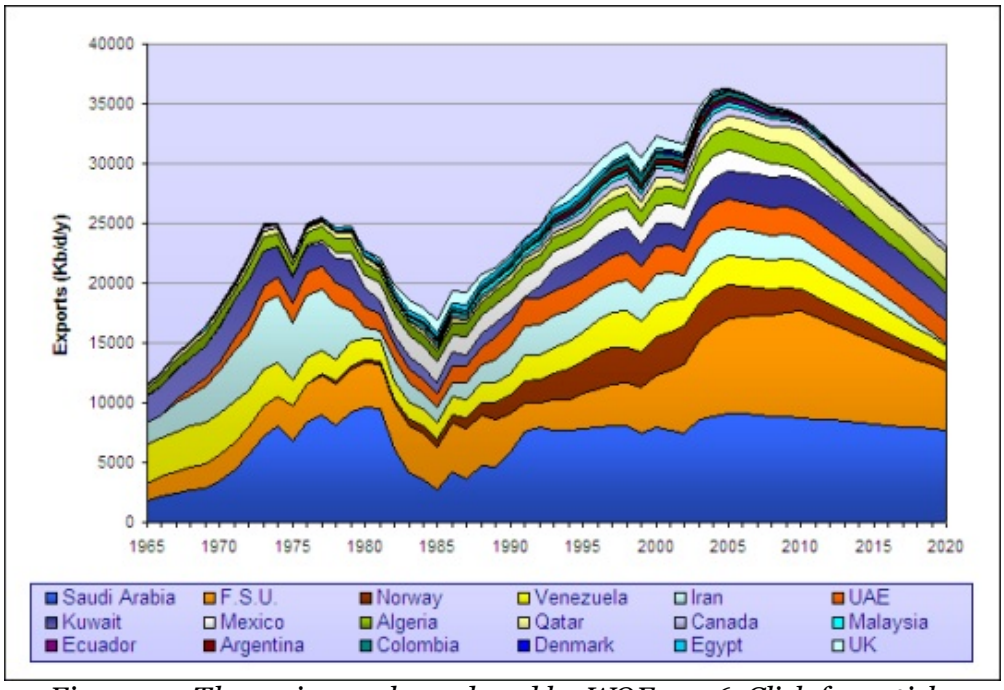


Figure 3 – The main graph produced by WOE 2006. Click for article.

WOE 2006 lacked some important countries for which data on consumption wasn't satisfactory at the time: Angola, Iraq, Libya and Nigeria, together with a large number of small exporters. WOE 2006 missed almost 20% of the international oil market.

In large part due to the continuous efforts of Jeffrey Brown, the concept of an unfolding decline in the volumes of oil available for international trade slowly reached larger audiences. CIBC economist Jeff Rubin would embrace the concept as a reason to invest in North America's unconventional oil resources, eventually bringing it to main stream media.

With oil prices doubling in less than one year, a broader conscientiousness has yet to be built of a real shortage of oil flowing to the market. Public cries of market speculation or manipulation, geopolitics and above ground factors in general as being the main drivers of current high oil prices continue to be the norm, in spite of stark export numbers. It is therefore due time for a new WOE assessment.

Concept

The present world oil market can be perceived vividly in this graph published by Kenneth Deffeyes:

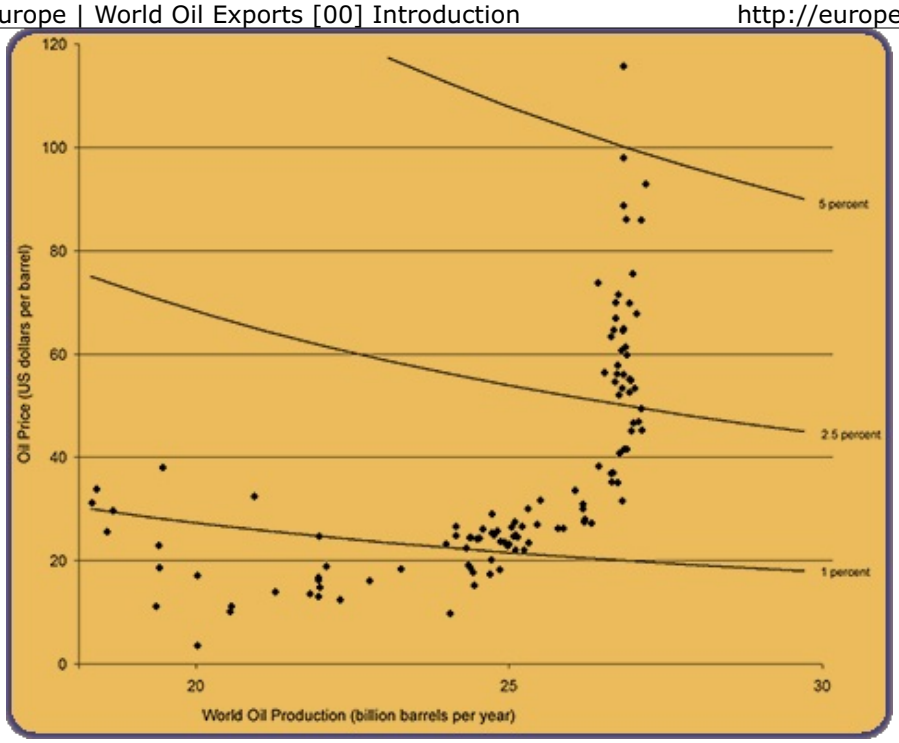


Figure 4 – The Supply vs Demand plane compiled by Kenneth Deffeyes. Click for article.

The crude oil Supply curve is getting vertical with elasticity virtually at zero. But with oil prices climbing from 40$ a barrel in 2005 to a record of 139$, so far, in 2008, Demand stood still. Importers have no short term answers to supply constraints and keep bidding higher prices. It is a market were Supply rules.

This price increase represents an enormous wealth transfer from oil importers to oil exporting countries, as calculated by Kenneth Deffeyes now summing up to several points of the world's GDP. In its turn, this new found wealth in exporting countries will foster higher consumption internally, leaving a shorter fraction of production available for export. Population in exporting countries tends to grow, along with consumption patterns (if not for everyone at least for some section of society) with access to technologies that provide a better quality of life but invariably consuming more energy (cars, homes, home appliances, air conditioning, etc). This is the basic dynamics behind the oil exports model.

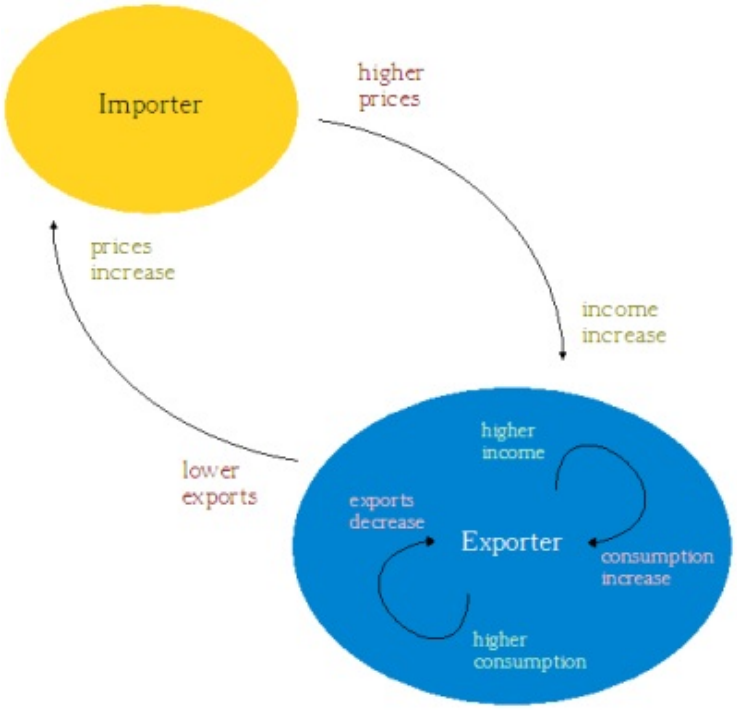


Figure 5 - A simplified scheme of the dynamics behind the WOE model. Click to enlarge.

The main change from a sufficiently supplied market is for mature exporters facing terminal declining production. Rising prices offset an otherwise declining income, and if the production decline rate is lower than the price increase rate that income will actually rise. In such environment oil exporting countries find little incentive to either try increase production or curb internal demand. Production and internal consumption run towards each other, rapidly swallowing exports. Jeffrey Brown and Khebab captured this effect on the following graph.

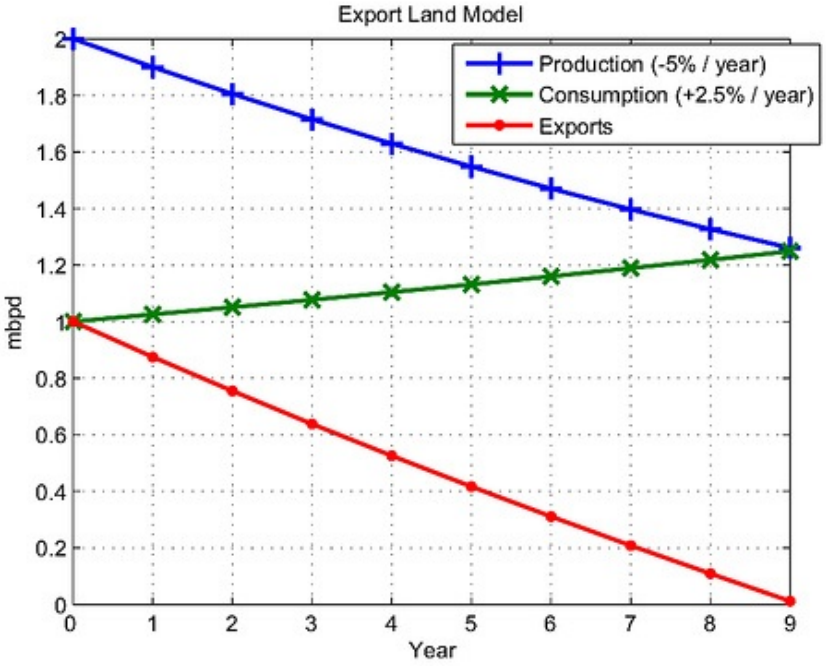


Figure 6 – The Export Land Model. Click for article.

Criticism

These concepts have received some criticism, that can't be dismissed upfront. Two main aspects must be addressed, first oil importing countries cannot bid ever higher oil prices continuously, and secondly at some point, when exports dwindle below a certain threshold that start hurting the exporting country's economy, action should be expected. While these observations seem prescient, up to now events are not unfolding that way. It is worth understanding why.

Oil demand has kept healthy for several reasons, lack of alternatives (especially on Transport) and subsidized consumption in some countries are perhaps two of the most important. In the short term the most likely factor to curb world oil demand is economic recession (for which a change in current loose monetary policies might be a catalyst). But this recession may not be effective worldwide (or it may affect only certain economic sectors). Moreover, an economic recession that would induce a retraction of demand would effectively reduce world oil exports, possibly at a faster rate than that envisioned now.

On the exporters side there are two very interesting cases of countries that turned net importers just recently, the UK and Indonesia. Although two markedly different countries in economic terms (one developed, another developing) both show similar patterns of internal consumption and production fast running to each other without any action taken to avoid the *rendez-vous*.

In Indonesia action to curb internal demand was only taken several months after exports sunk to zero, with subsidies on oil products reduced just recently.

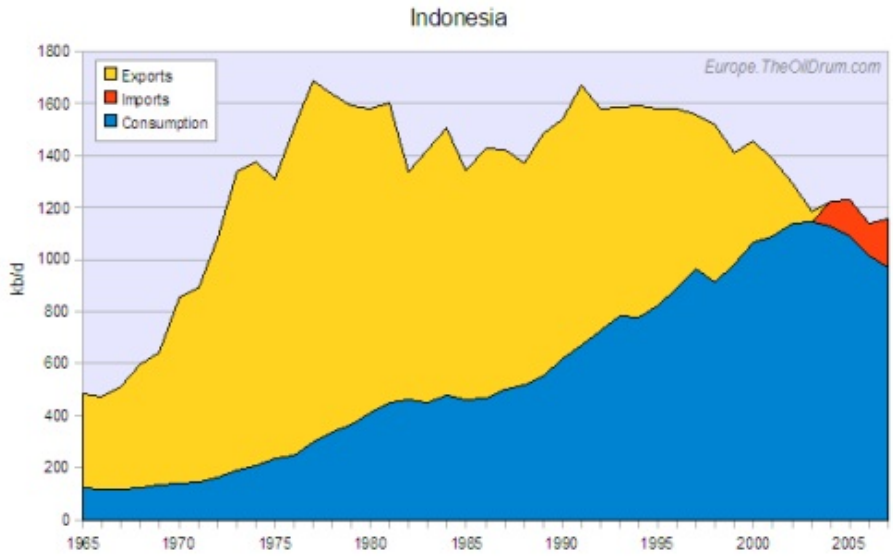


Figure 7 – Indonesia Oil production and imports. Red: imports; blue: indegenous oil consumed; yellow: exports. Click to enlarge.

In the UK any visible action to change the situation is yet to be seen. Government is just leaving to high fuel prices the task of curbing demand, facing at the same time a wide budget deficit opening ahead.

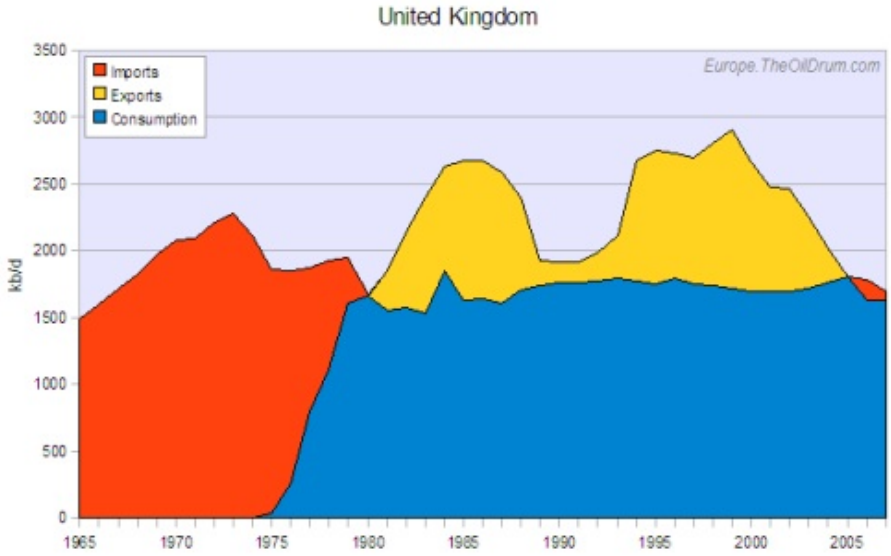


Figure 8 – UK Oil production and imports. Red: imports; blue: indigenous oil consumed; yellow: exports. Click to enlarge.

Both countries also share the unavoidable effects of terminal oil decline. The option to increase production is left out, and governments seem unwilling to take unpopular measures towards energy efficiency.

Methodology

Despite the weaknesses identified, the main objective of the present update is to complete WOE, assessing the countries up to now left aside. Still some improvements will be tried.

The main data sources used are:

- ASPOs Newsletters edited by Colin Campbell;
- BP's Statistical Review of World Energy;
- EIA's country by country Energy Profiles;
- Oil Megaprojects database;
- United Nations Population Forecasts;

Production

The model will continue to rely on Colin Campbell's thorough country by country assessments published monthly in ASPO's newsletter. While the forecasts contained there were the only ones considered in the 2006 version, this time other projections will be analysed (if existent) and curve fitting methods employed whenever practical. These will also be cross checked with the data gathered by the Oil Megraprojects database.

Consumption

This is where the model will hopefully get better improvements. Instead of searching for consumption increase patterns in plain consumption values, this time the past evolution of consumption per capita will be the model's main driver. For many countries a long-term trend emerges on oil consumption per capita; in such case consumption forecast resumes to an exercise of population growth for which the UN provides worldwide public data.

Objectives

World Oil Exports doesn't aim to be an accurate picture of the future, it is a possible picture. No error bars are given or alternative cases, first for the number of countries is such that gathering each one with alternative cases in one graph would be near to impossible and secondly because WOE pretends to present just the most likely path and not all or several possible paths.

The final outcome of WOE aims to be a guide for policy makers and stakeholders in general from oil importing countries. It will show from which countries oil will likely be available in the future and in which quantities. Hopefully it will help them prepare in advance for the challenges to come.

WOE will provide a macroscopic view of the present and future world oil market, hence care should be taken when relying too heavily on it for individual country assessments (although all effort will be taken to produce a clear picture). Deeper assessments on individual countries are both welcome and encouraged.

Format

This time, instead of an extended article, WOE will be a series of articles, of which this one is the first. Subsequent articles will deal individually with each country. This will both provide for a more comprehensive assessment and enforce it as an open, ongoing work. At the end of each country assessment the main macroscopic graphs will be updated.

Luís de Sousa
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