

Oil energy security in the Asia-Pacific region

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For at least 100 years the world has depended on cheap energy - primarily oil - to fuel economic growth. Outside of periods of disruption caused by war and general political instability, oil, which still makes up 40% of our energy needs, has been abundant, and it will continue to be abundant until global peak production capacity has been reached. Thereafter, should no cheap alternatives or major energy savings be identified, supplies will become scarce. I am going to discuss the timing of this global peak – a period critically important to economic growth in the Asia-Pacific region.

Oil already found

There is no doubt that global oil supplies are depleting. We discover around 10 billion barrels each year but last year produced over 26 billion to satisfy global demand. In contrast we have only produced just under half of what we have already found - around 970 billion barrels - and some argue that “reserves growth” in discovered fields, especially through recovery improvements, will keep on satisfying us as it has done over the last 30 years.

There is not space here to fully discuss the misleading term “reserves growth” but, suffice to say, although the apparent reserves attributed to the world’s portfolio of oil fields has increased year on year, this is mostly a function of conservative or false reporting in the past. The total original oil reserves deemed to be already found plus reserves yet-to-find has, in fact, lingered at around 2000 billion barrels throughout the period.

Oil yet-to-find

There is also an argument that plenty of oil remains that has not yet been found. However, in truth, there is scant chance of finding substantial new accumulations. There are the deepwaters of the Gulf of Mexico and West Africa and there is the Caspian Sea but where after that? We already know where nearly all our undiscovered oil is located, none of it is cheap and it is still insignificant compared to the Middle East.

What’s more around 60% of the world’s oil is located in just a few giant fields found before 1970. Without more giants there is little chance of adding substantially to oil reserves but giants, being so large, are the first to be found. To prove it, in the last 20 years there has been a massive decline in giant field discovery rates.

Consequently most unbiased estimates of yet-to-find oil reserves fall in the 150 to 250 billion range. Here it is estimated that around 240 billion barrels may be recoverable over the long term, a volume representing just over 10% of reserves already discovered.

Pitfall of reserves/production ratio

So, given that the world has around 1200 to 1300 billion barrels of remaining plus yet-to-find reserves, we would seem to have around 45 to 50 years of production left, at current production rates. The numbers are arguable but whether its 40 or 60 years we'll be feeling the pinch well before that. The reserves/production ratio is the most misleading number of them all. Never mind that the current discovery rate is insufficient to add all yet-to-find reserves in the time available. The reserves/production ratio, which, owing to "reserves growth," has hardly changed in 30 years, disguises the true critical point – the year of peak production when available supply cannot meet global demand.

There is now no question that oil, freely produced from a sedimentary basin, rises to a peak at a roughly steady rate (as new fields come onstream) then begins to decline at a roughly steady rate (as the first fields begin to deplete and the last few are unable to make up the difference). The same is true for most countries although new regions accessed through new technology can sometimes disrupt a profile, as can local and global political events.

There are now 56 countries in the world where production is in decline and all but a few special exceptions empirically prove that peak year occurred when between 40% and 60% of total reserves had been extracted. Analysis of cumulative production, remaining reserves and yet-to-find reserves in the outstanding producing countries, using the 56 as models, provides the approximate year in which these will also begin to decline. The summed data provides global peak year.

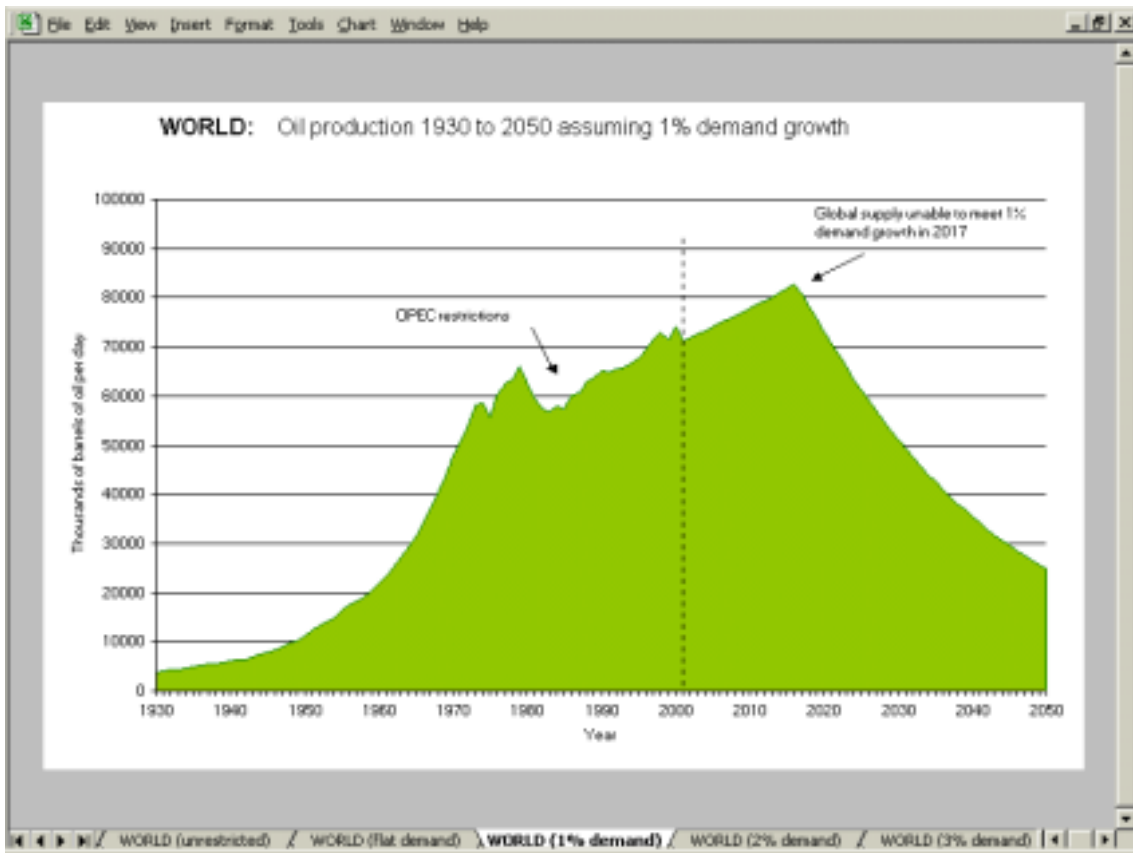
When is peak year?

The critical point - when available daily supplies permanently fail to meet demand - has not normally been a concern to those who set the price of oil. This is because, ever since the beginning of commercial oil production, the world has been in oil oversupply, even when demand has been growing rapidly. At times of instability, for example during the oil shocks of the 1970's, there were supply shortfalls but these were short-lived and driven by politics or lack of investment rather than a real lack of global supply.

The dawning of a global peak is still disguised by the actions of OPEC; the only organisation over the last 40 years that has conserved oil. Off and on since 1960, OPEC has exerted direct control on the world's production levels making demand fluctuate in a rather unpredictable way. Whilst attempting to keep the oil price higher than market forces would permit, OPEC has conserved oil and delayed peak and it is very likely it will continue to do so for as long as it can.

The short term gluts and shortfalls influence perceptions of supply and the oil price which in turn influence economic growth and global demand. To account for the actions of OPEC, global peak year must be estimated as a

function of different fixed demand levels. For a fixed 1% demand growth I determine the world has sufficient oil to last until 2016.



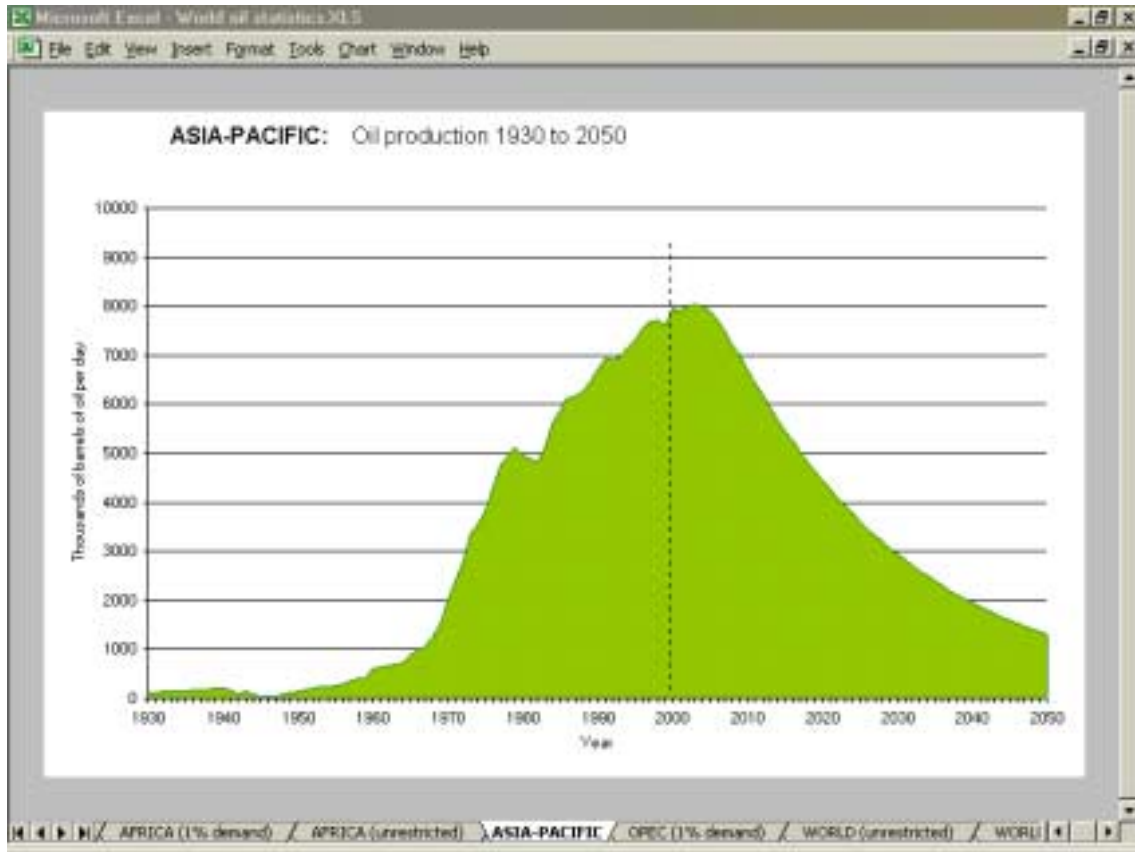
Peak year in the Asia-Pacific

The Asia-Pacific region possesses just 6.5% of the worlds estimated discovered plus yet-to-find reserves. Although China for its size is relatively oil poor, at one time it possessed in the order of 60 bn bbls or 40% of the total original reserves of the Asia-Pacific region. Indonesia held around 20% and the bulk of the remainder were located in Malaysia, Australia and India. Indonesia has already produced nearly two-thirds of its original reserves whilst the others have produced between 40 and 50%.

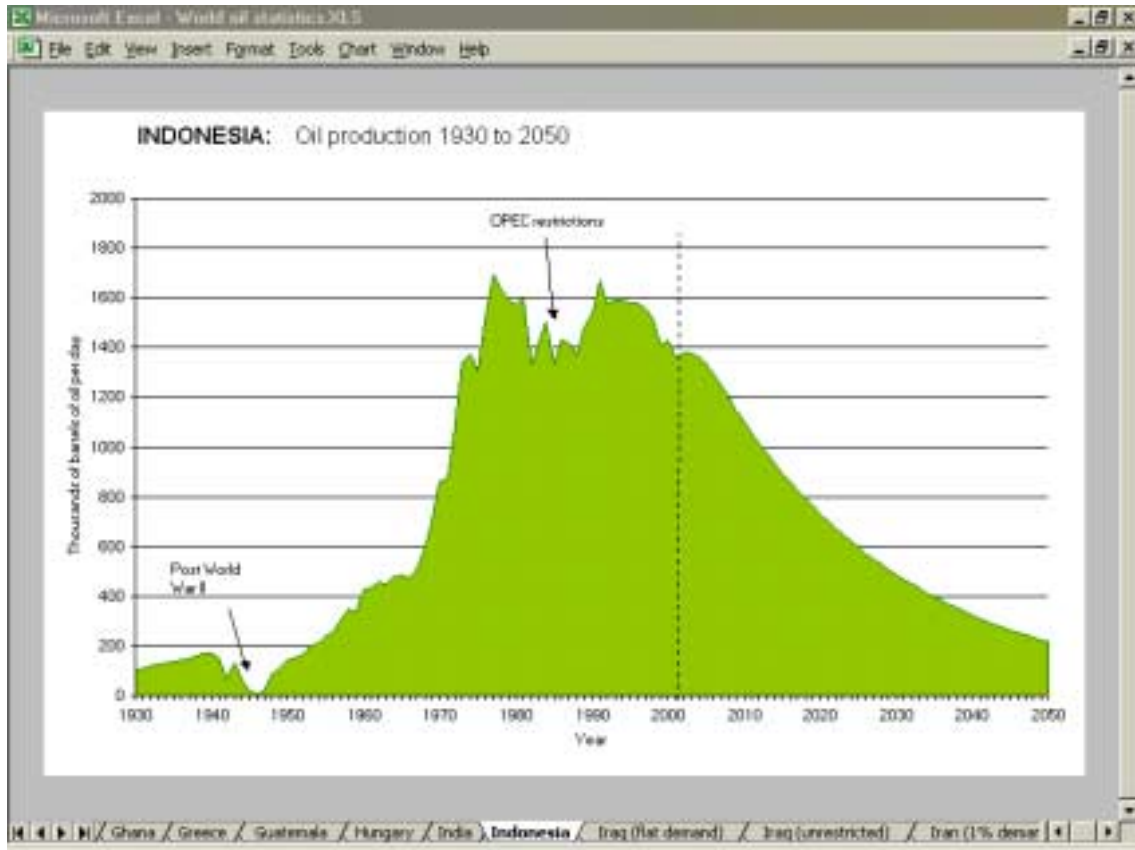
Peak oil in the Asia-Pacific		
<i>WELL PAST PEAK</i>	<i>NEAR PEAK</i>	<i>FAR FROM PEAK</i>
China Taiwan (1987)	Bangladesh	Australia (2005)
Indonesia (1991)	China	Brunei (2009)
Japan (1992)	India	
Myanmar (1979)	Malaysia	
New Zealand (1997)	Thailand	
Pakistan (1991)	Vietnam	
Papua New Guinea (1993)		
Philippines (1979)		

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The Asia-Pacific, a region with the lowest oil production after Europe, has now produced around 57% of its discovered reserves. Yet-to-find reserves are relatively low, and peak year is believed to be imminent (perhaps as soon as 2003) at around 8 million barrels per day or 11% of current global production.



Only Malaysia is a significant exporter. Indonesia will soon need to import and all the other countries require large volumes of imported oil with Japan and, to a lesser extent South Korea, China and India leading the field. In fact the region consumes around 27% of the world's oil, almost as much as North America, and it has to import nearly 70% of this. Clearly the Asia-Pacific region will have major supply problems to contend with once world oil supplies tighten during the next decade.



Remedial measures

From the beginning of the 20th Century oil demand has always been met and there has been a downward pressure on prices. Economies have boomed, demand has increased and, like any commodity, increasing demand has been met by increasing investment and lower costs through better technology.

Once global peak oil production occurs in the next decade new oil supplies will be unavailable to meet demand. There will be an undersupply and oil prices will be pushed upwards. Apart from brief attempts to ration oil to keep prices up, most recently by OPEC, the world has always had oil oversupply so it is difficult to convince economists that undersupply is a real threat. When the permanent flip occurs it is inevitable that many will be caught unawares.

Moreover energy supply problems in the Asia-Pacific region, whose peak year is imminent, could be felt even sooner. Notwithstanding the increasing role that OPEC, with over 60% of remaining reserves, is set to play in the global oil market, the few who recognise an impending problem early will develop strategies that could tie up alternatives well before peak year is upon us. The US and many European governments are right now building new energy strategies.

And lack of opportunity has already forced the major oil companies - who should know the problem better than most - to cut costs, campaign for the

release of protected areas, tinker with alternatives and forge alliances. But with the stock market to think about they don't talk about decline and neither do the Paris-based International Energy Authority nor the US-based Energy Information Administration (EIA).

Globally around 70% of oil is used in transport - automobiles and aeroplanes, trucks and tractors - and in China and India oil demand is set to surge. Perhaps under a global scenario of rising prices a new stable energy mix could ultimately be achieved with alternative fuels and massive energy efficiency improvements. However the length of the transition and who suffers least depends on how soon tax and other ameliorating measures are implemented by governments and the energy-using industries.

The first step for Asia-Pacific governments and concerned organisations must be to fully understand the problem and determine just where the world's oil will be coming from over the next 20 years, how much of it will be available and who will want it. Having done this the second step is to consider alternatives. There are gas resources, heavy oil sands in Canada and Venezuela, gas-to-liquids projects, oil shales, renewables projects, and coal and nuclear power but these are expensive and time-consuming, some are environmentally questionable and mostly are, as yet, ineffective as oil substitutes in transport. The following solutions are recommended:

- Continue to promote exploration and development of gas reserves in gas-bearing countries such as Pakistan, Bangladesh, Myanmar, Thailand, Malaysia, Indonesia and Australia. But regardless of low oil prices and reserving sufficient volumes for long term local use;
- Encourage continued replacement of oil with piped gas and LNG for electricity generation and heating using appropriate tax structures;
- Gas-poor countries, particularly China, Japan and India must negotiate long term gas and LNG supply contracts that span the critical years;
- Research into gas-to-liquids projects and create fiscal regimes that encourage project set-up in countries with stranded gas reserves such as Australia and Indonesia;
- Promote local renewables projects, especially wind and solar power, to encourage replacement of both oil and gas
- Research into biomass programs to develop alcohol-based fuels in the land rich countries like Australia;
- Re-invigorate the coal industry in China by developing and using new methods for processing and cleaning coal and flue gases;
- Commence programs for massive improvement in energy efficiency especially in initiatives to promote electrified mass transit systems and reductions in car use (as Singapore has done for many years);
- Develop fuel replacement strategies for automobiles, in particular concentrate on distribution systems using CNG (such as those tried in New Zealand), LPG and, over the longer term, hydrogen;
- Accept that the cost of air travel will rise considerably.

In conclusion fewer and fewer oil companies are already looking for less and less oil. After around 2016, a fairly modest demand growth of 1% per year will not be achievable and users will need to ration oil. There will be upwards pressure on prices and economies will be hit by inflation, recession and, above all, international tension. With nearly half the world's population and a recent history of strong economic growth the oil-poor Asia-Pacific region will feel the pinch more than most unless remedial strategies are implemented very soon indeed.

A full, independent and detailed analysis of oil supply, sources, substitutes and price along with a supply forecast for every country and region in the world is contained in a 350 page report entitled "*Analysis of global oil to 2050.*" The report is commercially available from **Energyfiles**. Please email admin@energyfiles.com for information.