

**THE ASSOCIATION
FOR THE STUDY OF
PEAK OIL
&
THE OIL DEPLETION
ANALYSIS CENTRE
ASPO-ODAC**

**NEWSLETTER No 10
– OCTOBER 2001**

**ODAC Contact:
Dr. R.W. Bentley, Co-ordinator,
Oil Depletion Analysis Centre,
305 Great Portland Street, Suite 12,
London W1N 5DA, UK.
+44 207 436 6544
e-mail : odac@btconnect.com**

Oil and the “Third World War”

The war rumbles on with downright opposition in many countries and not more than muted support in the so-called coalition. It is now compounded by an anthrax scare in the United States of unknown origins. So far, there has been no particular direct link with oil, although to judge from the following quotation from a 1998 interview with bin-Laden, it indirectly may be one of the principal causes.

- On the U.S.-backed fight against the Soviet presence in Afghanistan (bin-Laden said): “Those who waged jihad in Afghanistan ... knew they could, with a few RPGs (rocket-propelled grenades), a few anti-tank mines and a few Kalashnikovs, destroy the biggest military myth, humanity has ever known. The biggest military machine was smashed and with it vanished from our minds what's called the superpower.”

- Bin Laden claimed the United States has carried out the “biggest theft in history” by buying oil from Persian Gulf countries at low prices. According to bin Laden, a barrel of oil today should cost \$144. Based on that calculation, he said, the Americans have stolen \$36 trillion from Muslims and they owe each member of the faith \$30,000.

“Do you want (Muslims) to remain silent in the face of such a huge theft?” bin Laden said.

By DONNA ABU-NASR, Associated Press Writer

The following quotation from the *Spectator* of 20th October points to the wide popular sense of injustice, especially in Middle East countries, which lies behind the conflict.

Throughout the cafes of the Muslim world, hundreds of thousands of young men are saying..... “We have all this oil, yet what happens? It is sold cheaply to westerners, who despise us, to pay the night club bills of decadent pseudo-Islamic rulers. Given our control of oil, we could squeeze the world economy’s windpipe. Yet we have not even been able to dislodge the Israelis from the lands they stole. Our current leaders are wasting our substance and our opportunity; let us rise up against them”. Bin-Laden’s aim is to compress all that café hot air until it explodes.

The Times of London sees the oil risks but doesn’t question the reported reserves

The Last Oil Rush

(October 25 2001)

Could the West survive without Saudi oil? The war on terrorism means that we may have to. The former Soviet Union could fill the gap, but this would bring its own set of pitfalls. It is mid-February, 2002. North America is in the depths of a bitter winter. Consumption of heating oil is at an all-time high and petrol use is back to prewar levels thanks to a long slump in world prices, but the war on terrorism drags on.

Contrary to most forecasts, Osama bin Laden has been captured alive and airlifted to the USS Carl Vinson by triumphant US Marines. In line with other forecasts, the terrorism has not stopped. The Strasbourg anthrax outbreak appears to be contained but a smallpox scare is unfolding in Los Angeles and well-sourced Pentagon leaks say that Saddam Hussein has assembled a “dirty” nuclear bomb with enriched uranium packed around a Scud warhead. Range: 1,300 miles.

The Bush-Blair coalition is intact but under intense pressure from Washington hawks who want to take the war to Baghdad. The nuclear leaks win the argument for them and, with Blair’s regretful non-cooperation, B2 bombers of the 509th air wing resume their 22-hour raids from Whiteman Air Force Base in Missouri, this time on Saddam’s revived military infrastructure and key Iraqi oil assets.

Saudi Arabia erupts. The new offensive persuades millions in Riyadh and Jeddah that the war on terror is in fact the war on Islam against which their imams have railed for months. Following the lead of a prominent dissident cleric, tens of thousands take to the streets to condemn the royal family’s tacit support of the American attackers.

To restore calm, the Saudi Government suspends oil sales to the US in what it privately assures Washington is just a temporary move. But Iraqi exports under the UN-approved oil-for-food programme have already dried up and the damage is done. With a third of the world’s known oil reserves in jeopardy, global prices zoom to \$44 a barrel.

President Bush authorises an emergency withdrawal of 200 million barrels from the Strategic Petroleum Reserve held in underground caverns in Texas and Louisiana. It will make up the shortfall in US imports for

barely a fortnight unless he can persuade voters to switch overnight from conspicuous consumption to manic conservation — a trick he is loath even to try. Instead, flanked by his energy secretary and an uneasy-looking clutch of oil executives gathered in the Roosevelt Room of the White House, he announces an historic ten-year plan to wean the US off Middle-Eastern oil and meet its energy needs elsewhere. “My proposals,” he says, choosing words that would have been unimaginable six months earlier, “will end the Arab world’s unhealthy dependence on the petrodollar. They will boost export-led growth for our friends elsewhere in the world. They will bolster our national security and transform how we define it. They may even transform the health of the planet we call home.”

This scenario could be triggered in any number of ways besides the bombing of Iraq. Al-Qaeda terrorists could sink a supertanker in the Strait of Hormuz. Saudi Arabia could be overtaken by a full-blown revolution, or slapped with embargoes for failing fully to condemn future atrocities.

The result would be a seismic shift in patterns of oil procurement that would define the coming century. The losers, at least in the short term, would be the Gulf states of the Middle East. The winner, in the supreme irony of the post-Cold War period, would be Russia. In fact, it is already happening. Immediately after the September attacks, President Putin endeared himself mightily to President Bush by ordering his armed forces to stand down from the heightened alert they would otherwise have adopted in such circumstances. But he also offered to make up any shortfall in Middle East oil exports to the West that might result from the war on terror.

As if on cue, an Italian tanker left the Russian Black Sea port of Novorossiysk last week with the first load of oil to flow through a new 990-mile pipeline linking the Tengiz field in Kazakhstan to the open seas. To the west, a Russian oil terminal is to open before the end of the year at Primorsk on the Gulf of Finland to bring more crude from western Siberia, Russia’s booming oil zone, to Europe via the Baltic. In the Far North, Lukoil, Russia’s biggest oil producer, is building an Arctic Coast terminal from which to ship 250,000 barrels a day straight across the Arctic Ocean in a fleet of icebreaking tankers.

Plans for former Soviet Central Asia are even more ambitious. Starting in Azerbaijan, at least two pipelines will eventually carry oil and gas to the outside world via Georgia and Turkey, and in Turkmenistan, a land of scorching deserts and vast gas reserves bordering Afghanistan to the north, the current fighting has paradoxically revived hopes of long-term stability making possible the most Herculean undertaking of all: a gas pipeline over the Hindu Kush to Pakistan and India.

These are the outlines of the last great oil rush; a race to open the Caspian basin in the hope that it may replace the Middle East as filling station to the world — and the expectation that even if it doesn’t, its oil will find a market somewhere.

The stakes could hardly be higher. With America alone spending £100 million a day on imported crude, oil remains the world’s great wealth-creator. The rise of the personal computer notwithstanding, it still drives every industrial economy, provides profits for the world’s largest corporations, pays for most of the Middle East’s armies, and funds a sprawling culture of gilded vulgarity stretching from Dubai’s seven-star Burj Al Arab Hotel to the subterranean swimming pools of Kensington Palace Row.

“Access to large sources of oil has long constituted a strategic prize,” writes Daniel Yergin in *The Prize*, his seminal study of oil politics. “It enables nations to accumulate wealth, to fuel their economies, to produce and to sell goods and services, to build, to buy, to move, to acquire and manufacture weapons, to win wars.”

It also forces importing nations to do business with regimes they would otherwise condemn, and the race to the Caspian could lead the West into an array of new strategic relationships every bit as problematic as those now under strain in the Persian Gulf.

Azerbaijan, key to the Caucasus and the oil-drenched Apsheron Peninsula, is one of the most corrupt nations on earth. At the start of the 1990s its capital, Baku, was hailed as the next Houston and enjoyed a brief boom, depicted with surprising accuracy by Robbie Coltrane and a host of dancing girls in 007’s *The World Is Not Enough*. More recently, the multinationals have been pulling out in droves rather than adapt to Baku’s rising violence and bribery. Kazakhstan is still run by its former communist chieftain, Nursultan Nazarbayev, ten years after the Soviet collapse, while his three daughters hold those levers of power that he does not. One is married to the son of the President of neighbouring Kyrgyzstan, another to the head of Kazakhstan’s oil and gas monopoly. The third controls state TV. And Turkmenistan has degenerated from its previous incarnation as a Soviet Socialist Republic (something few thought possible in 1991) to a parody of a Third-World dictatorship under the deeply eccentric guidance of Saparmurad Niyazov, who likes to be known as “Father of all the Turkmens” and has anointed himself President for life.

Qualms over democracy and human rights have not impeded the hunt for oil in the past. A more important question, as Western leaders reassess their energy policies in the light of September 11, is whether the former Soviet Union has enough of it.

Broadly speaking, it does. According to figures from the US Energy Information Administration and the London-based Petroleum Argus, the Middle East produces about 16 million barrels of oil a day, of which Saudi Arabia pumps 7.5 million. The US relies on the region for 2.6 million, or about a third of its imports. The former Soviet Union pumps four million barrels a day, projected to rise to seven million over the next five years and much more within a decade as the Tengiz field and the even larger Kashagan reserves in the northern Caspian come on stream. Kazakhstan, by the most conservative estimates, is sitting on more than 20

billion barrels of recoverable oil. Russia has nearly 50 billion barrels, and exploration has barely begun in some of the remoter reaches of Siberia.

For Putin and Nazarbayev, that is the good news. The bad news is that Saudi Arabia's energy reserve remains the biggest and most accessible on the planet by such a margin that it would take a full-blown revolution there to end its dominance of Opec and the global oil business. "Stick a straw in the ground there, and oil gushes," says Ian Bourne, the editor of Petroleum Argus. "Then you put it in a tanker and ship it for \$2 a barrel. It's almost as simple as that." At 262 billion barrels, Saudi Arabia's known reserves are still biblically huge. Its infrastructure is so extensive that if Iraq were to shut down production altogether, it could summon enough reserve capacity within 90 days to make up the shortfall and stabilise world prices. Over time, its shimmering sands have yielded so many new fields that successive predictions of a peak in production followed by decline have turned instead into a series of peaks — a plateau, as Bourne says, with no horizon in sight.

Iran, Iraq and Kuwait are similarly blessed. This is why, despite the region's record of war, sanctions, ecological devastation and grotesque abuse of human rights, most major Western oil companies were returning there before September 11 in the hope of winning new access to old but reliable reserves. Before the world changed irrevocably, Western companies were competing fiercely for new gas extraction contracts in Saudi Arabia that they still hope to use as toeholds in the Saudi oil business. In Iran, the prospects of an end to the national oil monopoly's supremacy were better than at any time since the 1979 revolution that toppled the Shah. Even Iraq looked a good long-term bet, as pressure from Russia and elsewhere mounted for a complete end to sanctions.

Now Big Oil has fallen silent, sometimes to the point of hostility. No company I phoned would comment publicly on what the war on terror might mean for its business. Bourne says: "They're holding their breath and crossing their fingers." One British spokesman insisted on anonymity before saying: "Nothing will change."

Analysts agree it is highly unlikely that Saudi Arabia will stop selling its oil to the West, or that the West will stop buying it. Yet if nothing changes within the world's only oil superpower, it could detonate a demographic time bomb. The Saudi Royal Family has cleaved to power since the 1930s thanks to an unwritten social contract by which its subjects remain politically submissive in return for free, oil-funded education and healthcare and an average annual income of \$7,000. That contract is crumbling. Saudi Arabia's population is young, fast-growing, underemployed and increasingly resentful of the institutionalised corruption that is said to siphon the revenue from 600,000 barrels of oil a day to fund the louche lifestyles of the country's 15,000 princes.

The Saudi exchequer needs an oil price of \$24 a barrel for the foreseeable future to put the economy back on a sound footing. The price is now \$19 a barrel — barely enough to meet the country's immediate expenses and service its debts — and Opec is loath to raise it for fear of being seen to profit in a time of crisis.

Next to most Middle Eastern governments, Putin's Russia is a model of progressive development, even if the same cannot be said of his Central Asian neighbours. He has a vision of his country as a Eurasian commercial behemoth selling its oil to the highest bidder and earning transit fees on most of Kazakhstan's as it flows from Tengiz to the Black Sea. In this vision, Moscow's profits are limited only by the bore of its pipelines and the size of tanker that can squeeze through the Bosphorus.

There is a catch, of course. As James Bond learnt on his latest adventure, every pipeline is a potential terrorist target. And as Hitler showed with his murderous advance on Stalingrad — and, he hoped, the "oily rocks" of the Caspian shore — a thriving oilfield can drive the world to war even if it is embedded in the heart of Russia.

It is February 2002 again. The pundits are digesting President Bush's brave switch away from the Middle East in search of apolitical oil. They ask if he has found the answer to America's latest energy crisis and conclude that he has probably not, because oil, by its nature, will always be political. Instead they paint a picture of an America turning away from oil altogether in favour of liquefied natural gas, methanol, solar and wind power and hydrogen, the holy grail of alternative fuels. The Wall Street Journal says that America can lead the technological revolution that will lead the world into the post-oil era. Al Gore, with beard, emerges from obscurity to note that this might save the planet. This is a future that could work, the pundits say.

Whether Bush is the man to embrace it is another matter.

Time will tell what the outcome of the struggle will be. President Wilson at the end of the First World War adopted the slogan "Peace without Victory". It did not exactly enthrall his allies, but perhaps offers a useful formula today before more collateral casualties inflame passions further. Some hoped for a Ramadan face-saver, but that has now been lost.

One positive outcome of the war is that the separatists in Northern Ireland appear to be laying down their arms, possibly having realised that their traditional sponsors will be less keen to fund their activities, which for many years have included bombings with collateral casualties.

Meanwhile, World recession, now widely recognised as such, deepens, reducing the demand for oil. It will be necessary to take this into account in updating our depletion models when the new data become available from the *Oil & Gas Journal* in December. There might be a case for adopting the following scenarios:

High Case (previously the Base Case): the World recovers rapidly from the present turmoil with oil demand resuming its previous upward growth at 1.5% a year until Swing Share hits 35%, which is taken to trigger another oil price shock, leading to a plateau of production until it reaches 50%, when production commences its long term decline at the then depletion rate.

Base Case (previously the Low Case) : mild recession holds demand flat until Swing Share reaches 50%, as above.

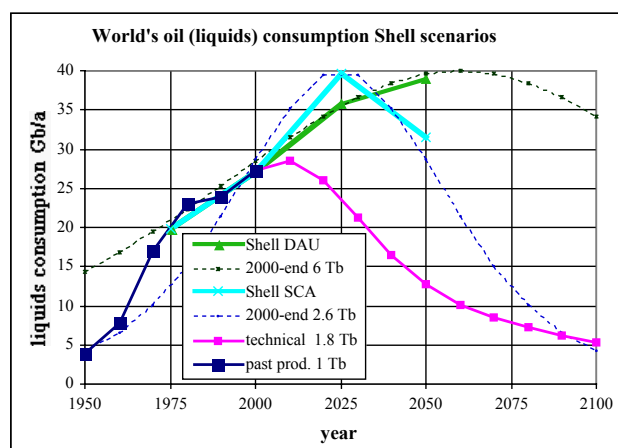
Low Case: deep recession causes demand to fall at 1.5 a year until Swing Share reaches 50%, as above. (It means that peak oil occurred in 2000).

Prices are likely to remain weak under the Base and Low Cases as the low demand is in better balance with supply. The High Case Scenarios does not seem very likely because any economic improvement would lead to a parallel increase in oil demand, which would soon again reach the sloping ceiling of spare capacity, causing a new price shock, which would re-impose recession.

The low prices are however a mixed blessing, for they allow governments to continue to ignore depletion, delaying the introduction of effective energy saving policies. They also inhibit exploration, the development of non-conventional oil and gas, and renewable energy. Oil demand is not however infinitely elastic, meaning that prices will have to firm in due course, as essential needs, especially for agriculture, are faced.

Shell Scenarios

Shell is famous for its scenarios, but how plausible they are is another matter. Certainly, the latest pronouncement includes a bizarre case, termed “*Dynamics as Usual*”, with oil production reaching 105 Mb/d in 2050, implying an Ultimate of 7000 billion barrels, as depicted in the attached graph by Jean Laherrere. This is far out of the range of all published estimates over the past fifty years, including the 2000 Gb estimate by Shell itself in 1998 (published by Bookout). It is even far removed from the recent excessive USGS Mean and High estimates. It probably means that whoever compiled it simply extrapolated the past trend oblivious of the resource constraints. Oil company planning departments evidently have their fair share of “flat-earth” economists, and are often isolated from the exploration departments, whose members have little motive to draw attention to the limitations that their technical knowledge reveals.



(For the Shell scenarios, see:

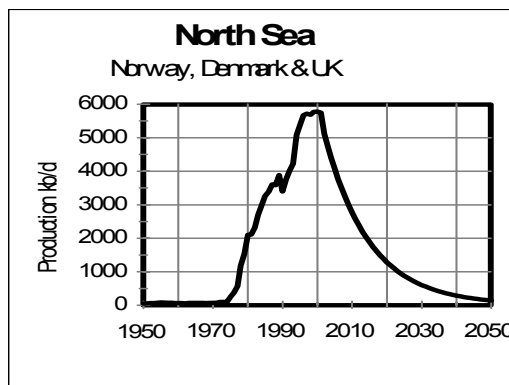
<http://www.shell.com/files/media-en/scenarios.pdf>)

Bakhtiari Scenarios

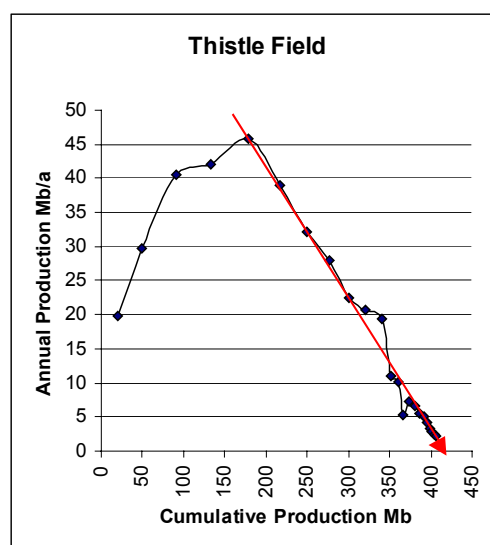
Dr Bakhtiari of Tehran, who is on the ODAC Board of International Advisors, has, by contrast, published some useful scenarios of OPEC supply under alternative price and geopolitical assumptions, using realistic resource estimates. In all cases, they show a peak in the second decade of the Century.

North Sea Peaks

Two studies have been received confirming our own assessment. One by Simmons (also a board member) underlines the bleak future for UK production, which is shown to decline at close to our estimated depletion rate of 7%. The other report documents the evolution of the official reported UK reserves, illustrating that several of the major fields were initially under-reported by as much as one-third. As illustrated by the representative example of the Thistle Field, these fields are now so far depleted that extrapolation of the decline curve leaves no doubt as to what the size of the field is. The first year of decline was in 1983, and its extrapolation would have given a clear indication of the ultimate size of the field, illustrating incidentally the minimal impact of technology on the reserves.



The explanation for the under-reporting is that whereas the explorers made confidential volumetric assessments of the size of the prospect, the initial published reports were based on the planned commercial development with a given number of wells. During the later life of the fields, every effort was made to tap subsidiary reservoirs and satellite traps, bringing the reported reserves closer to the original volumetric estimates. No particular new technology was involved, although knowledge of the details of the field naturally evolved as work proceeded. It is most unlikely that the skilled engineers would have systematically under-estimated the real size of the fields by such a large factor. It was all in the reporting, because they were reporting an initial phase of the project and not the full size of the field. There is however much less scope to under-report the later smaller fields, which accordingly run the risk of giving disappointing results, as Norwegian experience confirms.



There is however much less scope to under-report the later smaller fields, which accordingly run the risk of giving disappointing results, as Norwegian experience confirms.

“Reserve growth”, as under-reporting is confusingly described, is one of the most misunderstood elements of depletion studies.

Hubbert's Peak

An excellent new book with the above title has been written by Professor K.S. Deffeyes, and published by Princeton University Press. The author started his career with Shell, working with the legendary King Hubbert, before moving on to teach at Princeton. He writes in a lucid, at times humorous, non-technical style, concluding that oil production will peak around 2005. He draws attention to the absurdity of the USGS estimates. His explanation of hydrocarbon source-rocks is particularly useful.

The Economist begins to grasp the hard truth

The Economist, as the principal organ of the flat-earth community, cannot be expected to admit to resource constraints, but in an interesting article on November 1st it did, after some rather derisory comments about our endeavour, nevertheless begin to accept the notion of

depletion. It ends by referring to a statement attributed to the IEA that it would take an investment of a trillion dollars over ten years for the industry to make good the decline in non-OPEC production. Translated, that means peak and decline.

Yes even the economists are rational

Our anonymous contributor from the heart of the oil industry writes:

Ever since my involvement with ASPO-ODAC started, one feature has both puzzled and troubled me. Why are otherwise rational economists so violently opposed to even considering the compelling evidence that hydrocarbon resources are limited and that peak production is close?

In the outer reaches of web where the geniuses and the madmen compete for space, there is much to find, and sometimes exciting things to learn. In this case, the relevant article at <http://dieoff.com/page173.htm> cannot be accused of being particularly well written or even very coherent, but by the third reading, its devastating message comes through. It reveals that energy has now become so fundamental and so integral to any sort of developed economy that, without it, there can be no economy at all in any meaningful sense. Thus, energy can no longer be traded and valued within an economy. It is an external because a developed economy is impossible without it. In the absence of energy, no stock, share or bond can have value as it simply represents a share or a charge on something that has no value. Everything then becomes as valuable as Confederate dollars or Russian bonds.

Now, no one is talking of an absence of energy but we are talking of a shortfall and an increasing shortfall in the world's key energy source, namely oil, — and that from some date between 2006 and 2012. We have tended to concentrate rather narrowly on the immediate implications for the oil industry and for supply. It seems that economists have subconsciously grasped that once energy supplies become severely restricted, economics, as we (and they) understand it, cease to have purpose or relevance. Therefore, for them, denial becomes not just important but vital.

To expand a little further, there is near universal acceptance that fossil fuels will provide the bulk of energy supplies for the next 20 years, with oil easily the most important because of its transportability, energy content and ease of use. Gas may be environmentally more acceptable but in terms of transportability and energy content, it comes second by a wide margin.

The economists tell us that a shortfall in supply of any commodity leads to an increase in price, which will re-balance supply and demand. This is fine and we can all agree that this is indeed the best way to allocate goods **within** the economy. If the price of chocolate bars go up, we buy and eat less of them, and the market re-balances. However, if the product is **external**, like energy, rather different things happen. Energy is fundamental and intrinsic to the whole of the modern economy. It is a necessary condition *for there to be an economy at all*.

If the price of energy goes up, the whole economy goes down. It shrinks, as every company becomes less profitable, less valuable. Share prices fall and keep falling. We had a glimpse of this in 1974 when oil supply was restricted and the price rose. In the 1979 crisis, it was purely a price effect as there was no actual supply shortfall, just the fear of one. Now we have the realistic prospect of increasing shortfalls and sustained price rises once oil supply passes peak. The rest I leave to your imagination. So my case is the belief in endless and bountiful energy supplies is a *sine qua non* if you want to be an economist for more than the next five years.

A funny way to run a railroad !

Our faith in market economics is very great. The oil companies are passionate believers, even though \$10 oil nearly wiped them out, and so are most western governments. It absolves them from thought, action and guilt. But for how long? The market is currently driving oil prices down. If prices were to remain significantly below \$20 for any length of time, two things would happen: firstly, high cost exploration and development in the non-Opec countries would rapidly fall. (If you don't believe me just observe how rapidly US gas drilling is falling now that the gas price is right down). Secondly, a number of oil producer governments would run out of money, leading to debt default, instability and quite possibly revolution. Sober and sympathetic analysts have calculated that for the Saudi State to cover all its costs, and service its debt, it needs production of 8 million barrels/day and a price of \$25/barrel. Is our enthusiasm for unfettered market pricing about to become very expensive indeed?

A very good question

The editorial writer in an oil magazine that recently came through my door clearly thought he was being whimsical and clever with the suggestion that there may not be enough carbon available for global warming to be significant. Initially, I dismissed the thought, but it nagged away so I jotted down what I thought were the key points.

1. There is a weak linkage between carbon dioxide concentrations and global temperatures.
2. There is wide range of known and unknown influences on global climate. Carbon dioxide concentrations are by far the easiest to measure.
3. Carbon dioxide concentrations were 285 parts per million volume in 1850 and reached 360 parts per million volume in 2000.
4. Global temperature rose in an erratic pattern over the period averaging 0.5 degrees C higher in 2000 than in 1850.
5. All the climate change modelling is done on the basis of carbon dioxide levels doubling to 500 parts per million.
6. Since 1850, we have burnt 800 billion barrels of oil, 2200 trillion cubic feet of gas and many million tonnes of coal. The human population has increased sixfold, and cattle tenfold. Vast areas of forest have been burnt. But the carbon dioxide concentration has increased by only 75 parts per million.
7. The oil burnt is 35-50% of the most likely reserves, the gas burnt is 15-30% of the likely reserves. For coal we have probably burnt around 15-30% of reserves.

What then becomes clear is that the whimsical journalist, who visited me, is probably right. There just isn't enough available carbon to reach 500 parts per million even if we burn all the fuel, burn the forests and have lots of cattle with excessive flatulence. The IPCC squares this awkward circle by assuming future hydrocarbon supplies in such abundance as to make even the flattest of flat-earth economists blush. Everyone appears to have been too embarrassed to challenge this (all too convenient) nonsense.

The real challenge for ASPO-ODAC is this. Governments are cheerfully spending fortunes on good, bad and indifferent climate change research. Some are already making rules and regulations, and imposing costs on their industries and taxes on their enterprises **without even knowing if there are enough hydrocarbons for the threat to be realistic.**

Unless and until governments have a rather more realistic view of the global hydrocarbon resource:

- there is no chance of building plausible climate change models
- there is no way of knowing whether climate change is a threat that warrants expenditure

As explained above, insufficient energy is many orders of magnitude more important a threat to human welfare than anything else. Yet, governments are either unaware or have their heads in the sand unable to face so large a threat. The delicious irony is that the oil companies (at least those that understand) might like to point out the reality but that would mean telling shareholders, which wouldn't do a lot for the share price or the directors' share options.

It looks as though global warming provides a convenient diversion for governments and oil companies alike. However, for a tiny fraction of the cost of climate change research they could find out the reality of the global hydrocarbon resource and the true magnitude of the problem. Otherwise, they could all find themselves like the British in Singapore with the guns pointing out to sea and the 'problem' coming at them from behind.

House of Lords Select Committee on the European Union

The following submission has been made by ODAC to a House of Lords Committee in the United Kingdom. It triggered a series of intelligent questions, and was followed up by a presentation delivered in person by Dr Bentley and Prof. Meyer on behalf of ODAC.

1. The world faces almost certain near-term hydrocarbon supply shortages. The reasoning is as follows:
 - 1.1 Global oil supply is currently at *political* risk. This is because the sum of conventional oil production from all countries in the world, except the five main Middle-East suppliers, is more-or-less at the maximum set by physical resource limits.

1.2 World oil supply will soon be at *physical* risk. This is because the Middle- East countries have themselves little spare operational capacity, and this will be increasingly called upon as oil production declines elsewhere.

1.3 Large investments in Middle-East production, if they occur, could raise output, but only to a limited extent. The main exception is Iraq, but even here there would be significant delays before prospects are confirmed, and infrastructure put in place.

1.4 In any event, global output of conventional oil will soon decline. The date of the peak depends on the size of Middle East reserves, which are poorly known, and unreliably reported. Best estimates put the global conventional oil peak between five and ten years away.

1.5 The world contains large quantities of non-conventional oil and various oil substitutes, but the rapid decline in the output of conventional oil makes it unlikely that non-conventional sources could come on-stream fast enough to compensate.

1.6 For conventional gas, the world's original endowment is probably about the same, in energy terms, as its endowment of conventional oil. Since less gas has been used so far compared to oil, the world will turn increasingly to gas as oil declines. But the global peak in conventional gas production is already in sight, in perhaps 20 years, and hence the global peak of all-hydrocarbons (oil plus gas) is likely to be in about 10 or so years.

2. The above views have been amplified in a document submitted to the Cabinet Office's Energy Review Team. This is available at:

<http://www.cabinet-office.gov.uk/innovation/2001/energy/submissions/ODAC.pdf>.

3. The background to these statements is that a group at the University of Reading has been studying, for some years, the question of global hydrocarbon supplies [Ref. 1]. The group has seven members (including the author of this submission), and contains petroleum geologists, engineers and physicists. This research has included extensive discussions with oil companies, the UK government, the IEA, the EU and the US Geological Survey. In addition, the group has had sight of the main oil industry resource data set.

4. The conclusion of the group is that the report by Campbell and Laherrère [Ref. 2] represents the best calculations to-date on the future of global hydrocarbon supplies. Their calculations lead to the conclusions summarized above.

5. It is worth stressing that the Campbell/Laherrère calculations are based on:

- the authors' extensive geological knowledge;
- full access to the standard industry oil and gas resource database;
- detailed analyses of current hydrocarbon reserves (where, particularly for oil, neither FSU nor Middle East reserves can be taken at face value);
- a range of *statistical* approaches to assessing the yet-to-find;
- the use of models of future hydrocarbon production rates that the group at Reading has assessed as adequately accurate and robust.

6. The group at the University of Reading discussed these finding with the EU's DG-TREN, and in the course of these discussions had significant input into helping to draft portions of the Technical Background document published as Annex 1 of the EU's Green Paper: *Towards a European strategy for the security of energy supply*, (COM(2000) 769). The latter is currently the focus of Sub-Committee B's attention.

7. In the light of the foregoing, the specific responses of the Oil Depletion Analysis Centre to the questions raised by Sub-Committee B are as follows:

- Q1. The EU faces severe near-term energy security issues.
- Q2. Both supply side and demand side policies will be required.
- Q3. There is a need for an EU Energy policy. A well-thought-out policy can help lessen the shocks from supply limits.
- Q4. Producer/Consumer dialogue will be essential for a peaceful transition.
- Q5. The risks of in-use and after-use of nuclear power need close examination.

- Q6. The EU suggests that taxes on conventional fuel could support renewables. Many technologies for *large-scale* use of renewables are not far from cost-effective.
- Q7. Detailed analysis is required, see ODAC's submission to the PIU.
- Q8. The lessons of the 'fuel protests' is that tax harmonization is vital; the public will understand hydrocarbon limits, but will want to see fairness in the burdens.

References:

- [1]. R.W. Bentley, R.H. Booth, J.D. Burton, M.L. Coleman, B.W. Sellwood, G.R. Whitfield. *Perspectives on the Future of Oil*. Energy Exploration and Exploitation, Vol. 18, Nos. 2 & 3, pp 147-206, Multi-Science Ltd., 2000.
- [2]. C.J. Campbell and J.H. Laherrère. *The World's Supply of Oil, 1930 – 2050*. report from Petroconsultants S.A., Geneva, 1995.

18/September/2001.

R.W. Bentley,
Co-ordinator
The Oil Depletion Analysis Centre,
Suite 12, 305 Gt. Portland St., London W1W 5DA.
(Tel: 020 7436 6544; e-mail: odac@btconnect.com)

The Oil Depletion Analysis Centre aims to supply independent information on global hydrocarbon resources.

Patron: Mr. David Astor. Trustees: Mr. & Mrs. Richard Astor, Dr. Colin Campbell, Mr. Richard Hardman, Mr. Roger Harrison, Mr. Stuart Kemp.

Advisory Board: Mr. A.M.S. Bahktiari, Senior Analyst, National Iranian Oil Company; Mr. R.H. Booth, Visiting Professor of Sustainable Engineering, Oxford University; Mr. B.J. Fleay MIEAust MAWA, Murdoch University, Western Australia; Mr. R.F.P. Hardman, Global Exploration Advisor, Amerada Hess; Mr. A Ianiello, former Managing Director, Agip UK; Dr Klaus Illum, Energy Consultant, Denmark; Mr. L.F. Ivanhoe, M.K. Hubbert Center for Petroleum Supply Studies, Colorado School of Mines, USA; Mr. J.H. Laherrère, Consultant and formerly Deputy Head of Exploration, Total, France; Mr. R.C. Leonard, Director of Exploration, Yukos Oil, Moscow; Dr. S. Peters, Professor of Political Science, Geissen University, Germany; Mr. M. Simmons, Investment Banker and Member of the President's Energy Committee, Houston, USA; Mr. C. Skrebowski, Editor of 'Petroleum Review', Institute of Petroleum, London; Mr. D. Strahan, Producer, BBC, London; Mr. W. Youngquist, former Exxon geologist, and academic; USA; Dr. W.H. Ziegler, former Senior Exploration Geologist Exxon, and Petrofina; Switzerland.

Deepwater Potential

A new data-set suggests that about 30 Gb of oil have been found in water depths of more than 500 m. It lies mainly in Brasil (36%), the Gulf of Mexico (28%) and Angola (26%), confirming that a very special geo-tectonic setting is responsible. The sum of the individual modelled production profiles suggests a peak of about 8 Mb/d by 2012.

An idea for ASPO Co-operation and funding

It is evident that road transport will be particularly affected by oil depletion. Road-building is planned, funded and controlled by departments of national government, lacking any particular expertise in oil supply. Furthermore, it involves long-term planning requiring forecasts of future needs. It might therefore be an idea for ASPO members to approach their national road planning authorities to explain oil depletion and the need for better information and analysis than is provided by government bodies directly responsible for oil supply, which generally have been misled by the IEA, the oil companies and others.

If members succeeded in getting their foot through the door on this basis, they could propose that the road authorities should contribute, say, the equivalent of one kilometer of road-building to a research fund, to be used jointly by ASPO to secure access to the industry database and conduct a proper, but not difficult, analysis of future supply. It would certainly be the best investment the road authorities could ever make, saving colossal wasted effort in unnecessary future roads.

Experience has been that the study of oil depletion does not readily fit the criteria for normal scientific research, because it is primarily a data gathering exercise not involving any particularly advanced science. The analysis itself is straight-forward and simple, being substantially self-evident to anyone employing common sense. So, possibly, it would be better to approach those who have a direct long-term interest in the consequences of oil depletion, such as the road-builders.

Evora Conference

The ASPO member for Portugal has organised an interesting conference on climate and energy issues for November 15th and 16th. For details, see

<http://www.cge.uevora.pt/Climate-Change-Kyoto/index.htm>

Bavaria Workshop

All three ASPO members for Germany will be taking part in a workshop on sustainable transport at a Bavarian university.

ASPO slide library

Arising from meeting with Professor Aleklett of Uppsala, it is proposed that a Power Point slide library should be jointly compiled by ASPO, duly translated into the main European languages, so that members will have ready access to material for their own presentations. As a first step in this project, slides from a presentation to the Evora Conference will be distributed after the event. Clausthal's initiative in placing a video of a lecture on oil depletion on their website sets a good example, as it has attracted a great deal of interest around the world

Hubbert Center Newsletter

The latest issue of the Hubbert Centre Newsletter from the Colorado School of Mines contains a useful analysis of status of production, consumption, imports and exports in the Far East.

Contributions to the Newsletter

The editor of the Newsletter very much welcomes contributions from the members and other readers, who may wish to draw attention to items of interest or comment on the progress of their own research.