THE ASSOCIATION FOR THE STUDY OF PEAK OIL AND GAS

"ASPO"

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ASPO is a network of scientists, affiliated with European institutions and universities, having an interest in determining the date and impact of the peak and decline of the world's production of oil and gas, due to resource constraints.

The following countries are represented: Austria, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Missions:

1. ***To evaluate the world's endowment and definition of oil and gas;***
2. ***To study depletion, taking due account of economics, demand, technology and politics;***
3. ***To raise awareness of the serious consequences for Mankind.***

Newsletters on Websites

This and past newsletter issues can be seen on the following websites:
http://www.asponews.org
http://www.energiekrise.de (Press the ASPONews icon at the top of the page)
http://www.peakoil.net
A Spanish language edition is available on www.crisesenergetica.org

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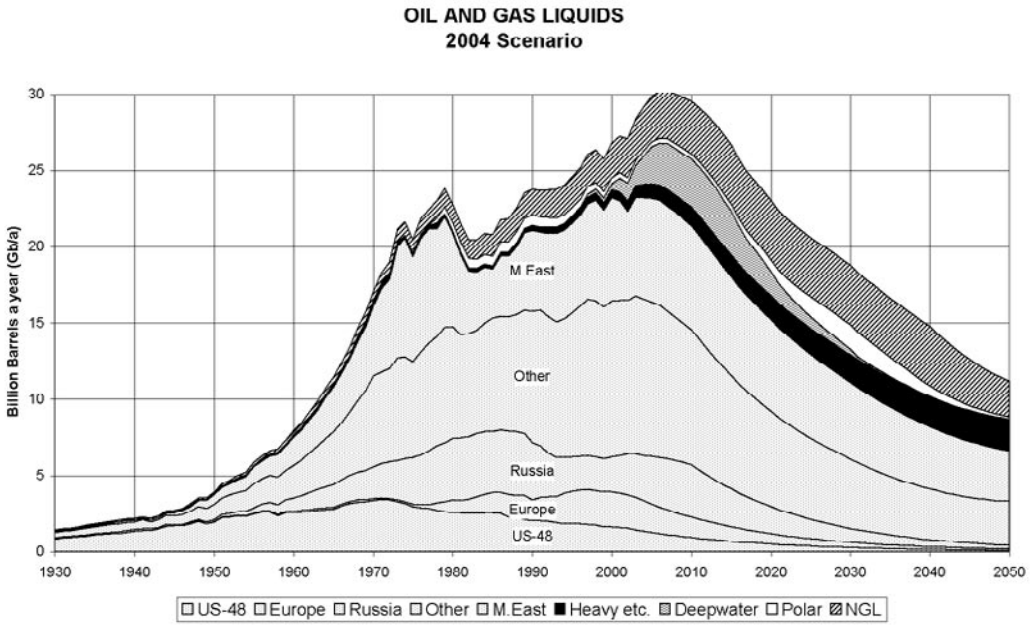
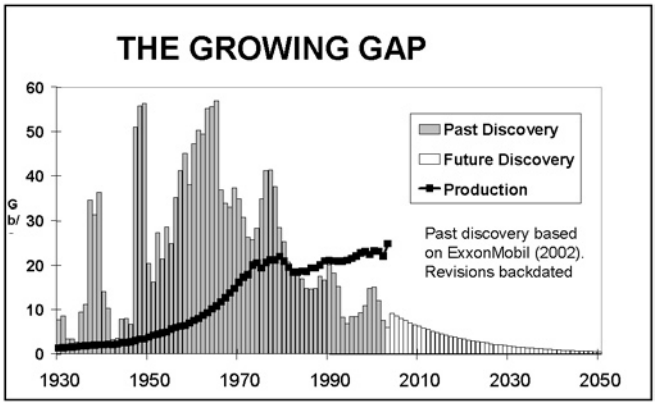
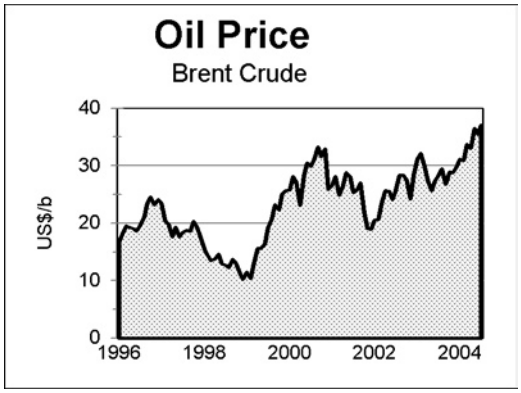


ESTIMATED PRODUCTION TO 2100									End 2003	
Amount			**Gb**	**Annual Rate - Regular**					**Gb**	**Peak**
Regular Oil					**2005**	**2010**	**2020**	**2050**	**Total**	**Date**
Past	Future		Total	US-48	3.7	2.8	1.7	0.4	200	1971
Known Fields		New Fields		Europe	5.1	3.6	1.8	0.3	75	2000
	780	150		Russia	9.1	10.0	5.3	0.9	210	1987
920	930		1850	M.E. Gulf	19	19	17	10	675	1974
All Liquids				Other	27	29	25	11	690	2012
990	1510		2500	**World**	64	58	43	20	1850	2005
2004 Base Scenario:				**Annual Rate - Non-Regular**						
M. East producing at capacity				Heavy etc	2.6	3	4	5	195	~
(anomalous reporting corrected)				Deepwater	4.7	7	5	0	55	2014
				Polar	0.9	1	2	0	50	2030
Regular Oil excludes oil from coal, shale, bitumen, heavy, deepwater, polar & gasfield NGL				Gas Liquid	8.2	9	11	6	270	2027
				All	80	78	65	32	2500	2006
Revised 26-07-04										





386. Russia faces depletion too

It seems that Russia is also beginning to face production constraints, no doubt exacerbated by the threatened collapse of the Yukos Company, which is in conflict with the government over tax claims.

Russia: Oil production to be flat in 2005

THE ASSOCIATED PRESS

MOSCOW -- Russia's oil production will probably stay flat or even drop in 2005, a top Russian energy official said Friday.

"Those years where we hit growth rates of 20 percent are behind us," Federal Energy Agency head, Sergei Oganesyan said.

Russia's booming oil production in recent years has made it the world's second largest producer, behind only Saudi Arabia. At the end of the 1990s, it posted several years of double-digit growth rates.

In May, Russia pumped more than 9 million barrels a day, a post-Soviet high.

Russia plans to keep boosting production this year in a bid to take advantage of high world prices for oil, its main export commodity. Oganesyan said his agency expects oil output to increase between 7 percent and 8 percent this year.

But in the years to come, he said, production would remain relatively steady.

"I expect Russia's oil production to stabilize, or even slightly dip, in 2005," he said.

(Reference furnished by Douglas Low)

387. It's the same story for Natural Gas

Jean Laherrère presented a comprehensive review of the status of gas depletion at the Berlin ASPO workshop. Evidently, the public data are even less reliable than is the case for oil, with much confusion over what is actually measured by failing to properly identify flared and re-injected gas or take into account the non-flammable components. It is noteworthy that world discovery peaked in 1971 with the discovery of the huge accumulation of the North Field of Qatar, including its Iranian extension (South Pars), and has been declining ever since, as confirmed by ExxonMobil.

The analysis indicates that about 8800 Tcf have been found, of which 2700 Tcf have been produced. Extrapolating the discovery trend indicates that about 1200 Tcf awaits discovery. Non-Conventional gas, principally coal-bed methane and so-called "tight"gas, may contribute perhaps another 2000 Tcf this Century, being constrained more by extraction rate than the resource itself.

World production has been rising steadily over the past decades to the present level of about 100 Tcf/a. It is likely to reach a general peak around 2030 at about 135 Tcf/a, and then decline, being far below the notional demand as forecast by most official institutions (EU, IEA, DoE etc).

North American gas production (Canada,, USA, Mexico) is set to decline sharply from 22 Tcf/a to about 6 Tcf/a by 2015, reflecting falling earlier discovery after a time-lapse of 23 years. Europe too is in steep decline with production falling to half its present level of 11 Tcf/s by 2030. The former Soviet Union is likely to reach a second peak of about 30 Tcf/a by around 2012, reflecting an earlier discovery peak in the late 1980s as well as the anomalous post-Soviet fall. Production will have fallen to about 15 Tcf/a by 2030, meaning that it will be unable to meet Europe's import demands. Individual countries will face shortages before the global peak because of the transport constraints.

In all these cases, production is constrained by pipeline capacities, which generally have the effect of capping the natural peak to deliver a plateau with a subsequent steeper decline. Britain was exceptional in this regard in that it did not rely on long distance pipelines, and its open market environment achieved a high peak, now followed by a precipitate fall.

No doubt imports of liquefied gas by the main consuming countries are set to rise, although some 12% of the energy is lost in the liquefaction process. The availability of specialised LNG tankers is another constraint.

It is now evident that the World approaches the end of the first half of the Oil Age, but the second half of the Gas Age does not theoretically dawn until around 2030, giving a short respite. However a survey of actual development projects by the Petroleum Review suggests that supply shortfalls may appear quite soon

388. Comparison with BP Reserves Estimate

The following table compares this Newsletter's current model with BP's 2002 initial and revised reserve estimates, and its 1993 estimate. The countries are listed in order of their total endowment. The discrepan-

cies between the two data-sets are largely explained by the fact that they measure different things, and have different objectives. We try to distinguish the several different categories of oil (Regular Oil, deepwater, polar, heavy oil and gas-liquids) because each has its own costs, characteristics and, above all, depletion profile, whereas BP lumps them all together. BP accepts the official numbers on the Middle East countries without question, despite the fact that they have implausibly barely changed for many years, despite production. The discrepancies for the US, Brasil, Angola and Nigeria are easily explained in terms of BP's inclusion of deepwater reserves. BP also includes Extra-Heavy Oil, bitumen and derivatives in Canada and Venezuela, applying some arbitrary cut-off for what it deems to be *Reserves*.

The BP estimates refer to what it calls *Proved Reserves*, although admitting that they do not necessarily comply with SEC rules. Our estimates refer to best estimates of what actually remains to be produced from known fields, assuming maximum economic incentive and the application of known technology. This roughly equates with what is meant by the terms *Proved & Probable, 2P, P_{50}, or Mean Probability*, although each term has a slightly different definition.

Our model refers to so-called *Regular Oil*, which includes condensate, but excludes heavy, deepwater, Polar, and NGL from gasfields. The grand total for all categories is not in fact far from what BP reports on a different basis, but there are many marked differences for individual countries.

The scale of confusion on the whole topic is well demonstrated. The object of the exercise is to forecast future production with appropriate depletion profiles for each category, taking into account past production and discovery trends.

The most fatuous and misleading approach is to take the Reserve number and divide it by current production to say that the Reserves support current production for 41 years, ignoring the natural decline observed in all fields and countries. It is in this regard that BP deserves serious criticism. If its objective is to evade the issue of depletion to impress the stockmarket with the pretence that finding oil is just a matter of economic incentive and technology, it risks being accused of culpable fraud.

	BP 2002	BP2002 Revised	BP 2003	ASPO 2003
S.Arabia	261.8	262.8	262.7	144
Russia	60.0	67.0	69.1	60.0
US-48	30.4	30.7	30.7	25.2
Iran	89.7	130.7	130.7	59.9
Iraq	112.5	115	115	62.2
Kuwait	96.5	96.5	96.5	60.3
Venezuela	77.8	77.2	78.0	34.6
Abu Dhabi	97.8	97.8	97.8	48.5
China	18.3	23.7	23.7	24.3
Libya	29.5	36.0	36.0	28.8
Mexico	12.6	17.2	16.0	22.4
Nigeria	24.0	36.0	36.0	25.0
Kazakhstan	9.0	9.0	9.0	36.0
Norway	10.3	10.4	10.1	13.9
UK	4.7	4.5	4.5	9.3
Indonesia	5.0	4.7	4.4	9.4
Algeria	9.2	11.3	11.3	14.1
Canada	6.9	17.6	16.9	5.8
Azerbaijan	7.0	7.0	7.0	12.7
Oman	5.5	5.7	5.6	6.9
Argentina	2.9	2.8	3.2	5.6
Egypt	3.7	3.5	3.6	3.4
Qatar	15.2	15.2	15.2	4.1
India	5.4	5.6	5.6	4.9
Australia	3.5	3.7	4.4	4.4
Colombia	1.8	1.8	1.5	3.4
Malaysia	3.0	4.2	4.0	4.0
Angola	5.4	8.9	8.9	3.9
Romania	1.0	1.1	0.9	1.6
Ecuador	4.6	4.6	4.6	2.2
Syria	2.5	2.3	2.3	2.5
Brasil	8.3	9.8	10.6	2.0
Turkmenistan	0.5	0.5	0.5	1.8
Brunei	1.4	1.1	1.1	1.2
Trinidad	0.7	1.9	1.9	1.2
Gabon	2.5	2.4	2.4	1.5
Yemen	4.0	0.7	0.7	1.2
Vietnam	0.6	2.5	2.5	2.4
Peru	0.3	4.6	4.6	0.7
Denmark	1.3	1.3	1.3	1.0
Uzbekistan	0.6	0.6	0.6	1.5
Congo	1.5	1.5	1.5	0.7
Tunisia	0.3	0.5	0.5	0.6
Italy	0.6	0.7	0.7	0.7
Sudan	0.6	0.5	0.5	1.0
Thailand	0.6	0.7	0.7	0.7
Cameroon	0.4	0.2	0.2	0.4
Papua	0.2	0.4	0.4	0.4
Other	5.6	6.9	6.9	17.4
World	**1048**	**1146**	**1148**	**780**

That contrasts with the stance of other oil companies. ExxonMobil has stressed how discovery has been declining for forty years, despite every incentive, a worldwide search, always aimed at the biggest and best prospects, technological progress and greatly improved geological knowledge. Chevron-Texaco gives the same message (Item 401)

389. Crude turns sour

Not only is crude supply getting scarcer but it is getting more sour, as the percentage of high sulphur

heavy oil rises in the global mix. Sour oil is more difficult to refine, which gives an additional price premium to light oil.

390. The Rimini Protocol and an over-populated world

William Stanton, author of *Rapid Growth of Human Populations 1750-2000* ISBN 0-906522-21-8, writes

I enjoyed reading your booklet *The Truth about Oil*... and agreed with everything until page 37, where you choose Option 3, Consumer Restraint. You go on to propose the Oil Depletion Protocol, for the best and most humane reasons, I'm sure. However, I fear that Option 2, Profiteering by War, will be what actually happens. When I try to quantify the 'smaller population' that you predict (See p.140 my book) I arrive at the shockingly low figure of 0.5 to 1 billion for the world in about 2100. My reasoning is based on the hopeless performance of 'renewables' (so far) at generating energy in anything like the amounts needed to replace oil and the other fossil fuels.

Before about 1750, when fossil fuel use took off, world population was around 0.6 billion (World graph, p. 7), with most people poverty-stricken by our standards. I very much doubt whether in 2100 our advanced technology (depending on limited electricity and scarce liquid fuels produced from biomass, tar sands, coal, oil shale etc.) could sustain a comfortable standard of living for 0.6 billion, which is why I suggest that 0.3 billion will be living at lower standards. Arguing from a different direction, if peak production of fossil fuels, today, provides a comfortable standard of living for about one billion people, that comfort will be available to only a small fraction of one billion when fossil fuels are nearly gone.

So unless a miracle happens and nuclear energy plus new currently undreamed-of renewables can close the energy gap very soon, the present Century will see a reduction of world population from a peak of 7 or 8 billion to less than one billion. On precedent (e.g. sections 5.8 and 6.3 of *Rapid Growth...*), I cannot believe that this will happen peacefully, as following the Protocol requires. I am convinced, by many precedents, that the strong nations will seize what they want, leaving weak ones to their fate.

You may find my conclusions too awful. I must be very cold-blooded. But if you accept them, what can be done? As I see it, the humane thing would be to minimize ultimate human misery by taking all possible steps to peacefully reduce the numbers of people worldwide while there is still time. Again, I can't see this happening, because it is not politically correct.

391 Heavy oil of Canada

Walter Youngquist, author of Geodestinies, comments as follows (slightly edited)

Shell has essentially given up on conventional oil and gas exploration in Canada, knowing it to be a markedly declining situation. There are just not many good prospects left. Oil sands are a sure thing, which will allow Shell to survive in Canada in some form for a long time to come, although as a shadow of its former self.

The same thing goes for Imperial Oil (an ExxonMobil Subsidiary). It is buying back its own stock which helps per share earnings even as basic income goes down. It, like Shell, is already concentrating on the oil sands, having a 25% stake in Syncrude, the largest Operator. It too will survive as an oil company, but based on oil sand operations.

How far this game can be pushed and how many can get into it is the question for there are two physical limitations. One is water supply, and the other is the energy needed to produce the oil sands. Now they use natural gas, but that is declining, and will have been exhausted long before the oil sands. So what will they do then?

Perhaps they can be self-sustaining, by consuming some of their product to supply the needed energy. This would show what the real net energy recovery for the oil sand is. Equating a barrel of oil sand oil with conventional oil, where the net energy yield is high is not a valid thing to do. This throws into doubt the decision by the Oil & Gas Journal to start including oil from the Athabaska tarsands in its global compilation of conventional oil.

392 Updating the Depletion Model

Several people have pointed out various inconsistencies in the depletion model as shown in the graphs and table in the Newsletter - one doing so in abusive terms. It will be readily understood that modelling depletion is far from an exact science, given the appallingly unreliable data, especially in the public domain. The model accordingly evolves all the time as new information and insights come in. Furthermore, there is plenty of scope for clerical errors in compiling all the many spreadsheets, especially when done by someone lacking mathematical aptitude.

The date of peak for so-called *Regular Oil* is reported as computed, but it is stressed that it is a rather flat peak, so that relatively minor changes in the input can shift the date by a few years. The currently preferred scenario assumes that the key Middle East Gulf countries are in practice producing at maximum capacity, such that their production will be flat to their midpoints of depletions (save in Iraq where a minor increase is anticipated). This explains why the current peak has moved forward to 2005 from the earlier scenario

which had assumed that these countries could act in a swing role making up the difference between world demand and what the other countries deliver, giving a peak in 2010. Consideration is now being given to a new scenario that would extend plateau production beyond midpoint for countries with low depletion rates, which might make better sense. It could be called the *Infanticide Case* insofar as it leaves less for the next generation

The *Non-Regular* categories present greater difficulties. They were modelled out to 2050, but provision was made for subsequent production to deliver rounded totals out to 2075, based on little more than a guess as to what might be eventually available. However, as Jean Laherrère has pointed out, extrapolating the production trend to 2075 did not in fact yield the indicated numbers. The first solution was to extend the cut-off from 2075 to 2100, recognising that the tail end could drag on for a long time, delivering a fair amount at very low rates. But now by actually modelling the production profiles for heavy oil, deepwater oil, polar oil and NGL to 2100, it transpires that this is not an adequate solution unless of course there is some unforeseeable late stage increase from for example miracle new technology. On balance it seems better to correct the Table as shown. The total works out at 2420 Gb, but it is rounded to 2500 Gb so as not to imply more accuracy than justified.

The new calculation still delivers a peak for all liquids in 2006, but there is less in the tail end than had previously been indicated.

The revision highlights the need to run a thorough audit of the model, which hopefully can soon be achieved. But whatever the uncertainties of the details, not forgetting the clerical errors, there can be little doubt that we do reach the end of the first half of the Oil Age..

The shortcomings that remain in the Depletion Model itself should not be allowed to deflect attention from this greater issue, which stares us in the face (see Item 402 below)

AZERBAIJAN		Regular Oil
Population M		**8**
Rates Mb/d		
Consumption	2003	0.08
per person b/a		4.1
Production	2003	0.3
	Forecast 2010	0.8
	Forecast 2020	0.7
Discovery 5-yr average Gb		0.01
Amounts Gb		
Past Production		8.23
Reported Proved *Reserves**		7.00
Future Production - total		14.7
From Known Fields		12.7
From New Fields		2.1
Past and Future Production		23
Current Depletion Rate		0.74%
Depletion Midpoint Date		2014
Peak Discovery Date		1871
Peak Production Date		2009

* Oil and Gas Journal

393. Country Assessment - Azerbaijan

Azerbaijan covers an area of about 86 000 km^2 between Russia and Iran on the western shore of the Caspian Sea. About one-third of the country is made up of fertile lowlands, while the rest comprises the Caucasus Mountains rising to almost 4500m. It enjoys a dry sub-tropical climate of cold winters and hot summers, although much affected by altitude. The lowlands are cultivated partly with the help of extensive irrigation canals

The present population amounts to about 8 million. The country has lain at the cross-roads of history between the Russia, Iran and Turkey. Originally populated by nomadic Turkic tribes having links with Iran, it came briefly under Christian influences based in Armenia, before reverting to the Shi'ite Muslim world of Iran.

Russia conquered much of the territory during the early 19th Century, taking the Aphseron Peninsula where surface seepages of oil had long been known. Baku, the capital, soon developed into an important oil centre, attracting immigrant labour to work in the oilfields. By 1900, it was providing more than half of the World's supply of oil, which was being developed mainly by the Nobel Brothers of Sweden and Shell Oil in co-operation with the Rothschilds bank. Operating conditions were appalling, and formed a natural breeding ground for revolution and revolt. The interior of the country was a no-mans-land of divergent ethnic and religious groups, given to banditry and conflict. The Christian factions generally prospered from the oil wealth more than did the Muslims, who were substantially disenfranchised by lack of property rights. The situation gave rise to much resentment, amongst not only the workers themselves but various intellectuals who supported their cause. A particularly bloody uprising in 1905 brought to prominence no less than Josef

Stalin, an oil workers' leader, in a movement that culminated in the Bolchevik Revolution of 1917, changing the World.

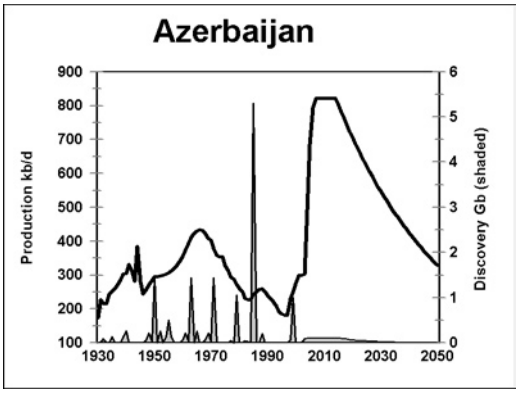
It paved the way for the establishment of an Azerbaijani State in 1918 by nationalists, backed by the Turkish Army. It was followed by a massacre of predominantly Christian Armenians. A British Army briefly occupied the territory after the war, but put up little resistance when the Red Army marched into Baku on January 15th 1920. The territory then became a fully-fledged member of the USSR, remaining under the close control of Moscow, which no doubt was particularly interested in retaining access to its oil.

The long-standing conflict with the Christian Armenians in an enclave, known as Nagorro-Karabakh, erupted again in 1988 and continued for two years until suppressed by Russian forces. Political instability ensued until 1993, when Haydar Aliyev, a former KGB Official and Communist leader, came to power. He has managed to survive, despite various pressures and abortive coups.

In 1998, he was granted an enthusiastic welcome in Washington on signing oil concessions to eight Western oil consortia. Much attention has since been devoted to the means of exporting oil from this land-locked territory. The shortest route is through Iran, but that was rejected on political grounds. An alternative proposal for a line through Georgia to the Black Sea was also considered. But it involved either the risks of increased tanker traffic through the environmentally sensitive Bosphorus, or trans-shipment in Bulgaria to a second pipeline to the Adriatic passing through Kosovo, where a large US military base was established for possibly not unrelated reasons. But finally it was decided to choose the most costly route to Cayhan on the Mediterranean coast of Turkey. This 42-inch line, which is 1760 kms in length, is now under construction under the management of BP at a cost of some $3 billion. The project may carry the hallmark of the Washington Think Tank, aiming to forge a Turko-Caspian alliance under US military and economic dominion, built on the common interest of royalties from the production and transport of oil. If and when completed, it will have a capacity of as much as 1 Mb/d. But serious doubts must remain as to how reliable the flow of oil will be. The pipeline passes through mountainous country, which is occupied by disaffected people with a long tradition of violence, based on deep-seated ethnic and religious conflicts. Their passions have no doubt been further inflamed by recent events in Iraq. Yet further political turmoil may be expected to accompany the selection of a successor to Aliyev, who is now 81 years of age and one of the last of the old-style Communist strongmen, in the tradition of Milosovic and Saddam Hussein. Political risks apart, the pipeline probably has a useful life of no more than 10-15 years before natural depletion begins to reduce through-put. That the West places so much emphasis on this uncertain supply of oil demonstrates just how few alternatives there are.

In geological terms, the country straddles the palaeo-delta of the Volga River, comprising a sequence of much-faulted Tertiary sands and clays, giving multiple reservoirs. The interbedded clays in the lower part of the sequence provide rather lean, gas-prone source rocks. Gas seepages have given rise to mud-volcanoes, being large mounds of mud brought to the surface by gas, which sometimes catch fire. To the south and east, the sequences is buried beneath a Pliocene fill in the foredeep of the Elburtz Mountains of Iran, where the source-rocks are over-mature, yielding gas-condensate.

Azerbaijan boasts some of the world's oldest giant fields, including Balakhany-Sanbunchi with about 2.5 Gb (1871), Bibi-Eybat with slightly less (1873), and Surakhany with almost 1 Gb in (1904). A second phase of exploration during the last half century delivered a further batch of generally smaller discoveries onshore and in the near offshore. The entry of foreign companies after the fall of the Soviets brought in two already identified major offshore fields Azeri-Chirag-Guneshli and Shakh Deniz, but the results have failed to live up to early expectations. About 150 wildcats have now been drilled on what is quite a small prospective area. Production is currently running at about 300 kb/d at far below capacity pending the construction of the new export pipeline when it may triple. The midpoint of depletion is forecast for around 2015, when production would decline at about 2.5% a year. The country, with a relatively small consumption, is set to remain an exporter for many years, the uncertain political environment allowing.



394. Britain becomes a net oil importer and the Archbishop gives a warning

Britain came within an ace of becoming a net oil importer for the first time in 13 years in May, helping the country's trade deficit widen unexpectedly to £3.4 billion. National Statistics said that the surplus on trade in oil was £137 million in May compared with £184 million the month before and nearly £400 million in March. By volume, imports have already exceeded exports, with inflows of 4.91 million tonnes of oil in May exceeding inflows of 4.80 million tonnes.

Britain has not since August 1991 announced, by value, higher imports of oil than exports from its North Sea fields. While deficits were initially reported for September and April the figures were later revised to show surpluses.

Analysis of underlying data, however, has revealed that Britain may soon take on permanently to the status of oil importer, with North Sea production, which peaked at 2.9 million barrels a day in 1999, set to fall to near half that level by 2007. The country's position in oil trading has become particularly important in recent months when Middle Eastern tensions, and shortfalls in US stockpiles, have sent oil prices to their highest levels since the 1980s.

The data was announced as National Statistics revealed that the UK trade deficit widened in May despite a 4 per cent surge in goods exports to European Union nations. Exports to countries outside Europe fell by 3 per cent. National Statistics said: "The latest estimate of the rend suggest that the goods deficit is widening. The trends in the value of trade show exports falling and imports flat."

The data was viewed as offering little short-term threat to the UK economy. However, the Centre for Economics and Business Research warned of "a nasty surprise may well come sometime in the next few months".

The CEBR said: "The UK's trade in oil is steadily moving from comfortable surplus to deficit, and economic slowdowns in China and the US may hamper UK export growth to these key markets. Meanwhile the UK's appetite for imports remains voracious.

(Contributed by Douglas Low)

The Archbishop of Canterbury has also addressed the moral issues of Oil Depletion, commenting perceptively "*How supplies are to be secured at existing levels becomes a grave and moral question for the wealthier states, and a real destabiliser of international relations..... And in a world of severely limited supply, it is also clear that for the less economically advantaged countries the chances of equal access to fossil fuel supply is negligible*" see www.gci.org.uk/speeches/Williams.pdf

It sounds as if he would keenly endorse the proposed Depletion Protocol, see Item 395 below

395. Depletion Protocol

The Pio Manzu Research Centre has announced that it will be organising a world conference in 2005 on the oil situation, including the proposed Depletion Protocol. It will be held in Rimini in Italy with the anticipated participation of world leaders and key experts. An outline of the proposed Protocol, which addresses some of the concerns expressed by the Archbishop, is contained in the booklet *The Truth About Oil and the Looming World Energy Crisis*, available from info@eagleoffice.net

396 China orders power-cuts

The Times of July 9th reports that the Chinese Government has been forced to impose crippling power cuts, leaving luxury hotels in Beijing without air conditioning or elevators, and many factories on short or staggered time. Energy consumption has been growing at 10% a month as the country utilised its cheap labour force to feed world markets with consumer goods. The situation underlines that manufacturing depends on energy for which cheap human labour is no substitute.

The country relies heavily on coal for power-generation, and is flooding large areas of fertile land for hydro-electricity, both carrying heavy environmental costs.

China's population increased three-fold from about 400 million to 1.3 billion during the first half of the Oil Age. Its recent turn to capitalism has brought affluence to 100 million people who are now equipped with television sets, air-conditioning and private cars which however become little more than status symbols without the energy to power them. The country's oil supply is at peak and set to decline at about 4% a year. Ironically, its recent economic success leaves it ever less prepared for the second half of the Oil Age, which now dawns. It is an over-stretched environment in other respects too with advancing desertification and falling water tables. If this huge population cannot be sustained at home, where will it go? and will it be well received elsewhere?

397 House of Commons Presentations

C.J.Campbell and Chris Skrebowski, Editor of the Petroleum Review, gave presentations on oil depletion to two Parliamentary Committees in London on July 6th. The Minister of Energy had agreed to open he occasion but predictably did not in the event appear, no doubt having been warned off by his handlers in view of the sensitive nature of the subject. An ex-Minister of Blair's government did however take a keen interest, offering support for new initiatives, being now free of Cabinet constraints and the politics of power.

398. Oil Drought could be our Saviour

The Guardian Newspaper, Monday July 19 2004 by Colin Hines

When Lord Browne, BP's chief executive, recently stated that oil reserves were enough to support current production for around 40 years, it would have been music to the ears of the politically complacent. Thus the economic and social pain of our having to be quickly weaned off cheap oil and gas could safely be filed away under Nimtoo (not in my term of office).

What, however, if another former oil man and geologist Dr Colin Campbell is right. He worked for BP and Amoco and is founder of the Association for Study of Peak Oil. This group of former oil men and academics are on record as stating that discovery has declined since 1964, that the world started finding less oil than it consumed in 1981 and that it now finds about one barrel for every five it consumes.

Their conclusion is that peak production could be reached by around 2007 followed by a decline, if it has not already done so. The resulting continued and rising energy prices could be devastating economically since, according to Dr Campbell, all company accounts assume a "business as usual" supply of the cheap energy on which their operations depend. Politically this brings us firmly into the domain of Yimtoo - Yikes! In my term of office!

Given the gravity, immediacy and potentially all-encompassing implications of this projection, there must by an urgent government-initiated debate over the validity of the statistics and the potentially devastating short term economic and political implications of oil peaking in next two or three years. Big oil must also feature centrally in the frame. Shell's shameful over-reporting of its oil reserves led Dr Jeremy Leggett, another former geologist who has worked for the oil industry and who is now chief executive of Solarcentury, to call upon shareholders and governments to force the oil industry to open its books.

If ever higher energy prices is not just the short term, but also the medium and long term future, this poses a potentially destabilising and fast approaching economic threat to the way the global economy is at present organised. Such a rapid reappraisal of energy reality can, however, also provide an opportunity to shape dramatic yet positive changes in what is at present a range of negative activities.

Economic globalisation with world trade taking place over ever greater distances has accelerated the shift worldwide to an environmentally and socially destructive form of energy intensive agriculture. This concentrates less on supplying local markets and instead contributes to evermore long distance food exports. But perhaps most important in terms of the future of our planet this new and inescapable world of continued high energy prices can lead to a rapid and massive investment in energy efficiency and renewables. This is also crucial in attempting to head off climate change at the pass. Thus geology, with its unavoidable constraints on oil supplies, could well become the planet's Seventh Cavalry.

NGOs and unions concerned about the environment, poverty and jobs, and business people looking for new markets could all find their agendas actually coincide with what needs to be done to speedily unhook us from the oil economy. This will include an urgent shift to a new global economy where more local production, less long distance trade, and more low input agriculture becomes the norm and at the same time where there is a crash programme of saving energy and shifting to a range of renewables.

While not underestimating the vast scope of such a rapid and dramatic change and the dangers inherent in it, I have to confess that my schadenfreude cup will overflow with the end of the flood of 4x4s, presumably deemed by their idiotic owners to be de rigeur for negotiating the Somme-like mud they have to cope with during the school run and in Tesco's car park.

399. Running Flat Out

Only a few months ago there was much discussion of how OPEC would keep oil prices in a $22-$28 band, but those days now seem like distant history. The traders do from time to time grasp at straws and mark prices down on the basis of some ephemeral comment by someone, but before long the upward pressure re-exerts itself. The flat-earth community in government and the official international institutes like to explain this in terms of political tensions in the Middle East or as a demand spasm in China, being unable to bring themselves to admit that the world is now running flat out with no material spare capacity. This reality is doubly offensive to the Economic Fundamentalist because it undermines his doctrines proclaiming

that high prices inevitably deliver more supply under classical laws of supply and demand. His pathological myopia prevents him seeing that such laws cannot conceivably apply to the geological past when oil was formed.

The second half of the Oil Age now dawns and can only be characterised by declining supply, which means that prices must rise until demand can be reined in, whether by sensible policy and planning or the inane workings of the liberalised market.

OPEC was formed to restrict production to support the revenue of the main producing countries facing uncontrolled competition from the private industry, which was working flat out to bring in new production from places it did control such as the North Sea.

The Organisation was only marginally successful in its mission, largely because some of its members failed to respect their agreements. It is likely to be even less successful in any move to increase production to reduce price, even to the extent that it is physically possible. In fact, OPEC has effectively passed its peak becoming substantially redundant as Nature now does its job for it.

400. The Wolf at the Door

Actions sometimes speak louder than words. Mr Maugeri, the Chief Economist of the Italian oil group ENI, recently wrote a scathing article in Science, dismissing warnings of depletion as "Crying Wolf". This week his company announced that it was closing its North Sea office in Scotland, making a large number of its staff redundant. Its operating company Agip was known for its high technical and managerial performance, so it was certainly capable of developing any remaining reserves in the North Sea. The obvious conclusion is that it sees that the North Sea is heavily depleted and that no amount of skill and expertise can change that situation. Nota bene Leonardo : the Wolf really is at the door.

(Information furnished by Douglas Low)

401. Chevron Texaco confesses

Robert Ryan, the General Manager of Global Exploration for Chevron-Texaco, states in the July issue of the AAPG Explorer that world new discovery is down to 40% of production. In other words, the companies are far from replacing their reserves in any real sense, whatever may be claimed in financial terms. This follows the earlier splendid example of ExxonMobil who courageously published valid information showing that discovery has been declining for forty years. Shell too has evidently been unable to replace its reserves, as its massive downgrading confirms. BP may soon have to take its turn at the Confessional, especially if its Russian venture feels the cold wind from the threatened bankruptcy of Yukos. Evidently, the Russian State can no longer countenance the plunder of national resources.

402. Our final Century

Sir Martin Rees (The Astronomer Royal of United Kingdom) discusses human extinction in a recent book entitled *Our Final Century*.

Within the next few years, we face the "End of the First Half of the Oil Age". It lasted 150 years and allowed industry, transport, trade, agriculture and eventually the population to expand in parallel with oil. It also created vast amounts of new financial capital, which in turn led to the subject of Economics by which to manage and manipulate money.

It seems that this system created money out of thin air in the form of interest on loans that banks made without actually having the corresponding amounts on deposit. The system required ever more loans, which somehow made their own collateral in the form of the expanding economy. In other words it needed growth to survive which in turn was made possible by an abundant supply of cheap oil-based energy.

The Second Half of the Oil Age now dawns. It is characterised by the decline of oil production and all that depends on it, including most significantly the Financial System. In logic, the onset of oil decline undermines the very foundations of the economic system, which may accordingly collapse long before oil runs out or becomes in serious short supply. It sounds as if we therefore face a repeat of the Great Depression of the 1930s, which lasted ten years before being rescued by the economic impetus of the Second World War. It is not just a matter of trying to perpetuate the present system by turning to a windmill, solar panel or nuclear reactor, but of facing a fundamental discontinuity without precedent, triggered by the perception of peak as such. The recognition of the End of Economics will likely have a greater impact than

the actual gradual physical decline of oil itself. The enormity of the issue explains why Governments cannot bring themselves to plan or prepare. It may even prompt some to indulge in resource wars to evade the situation for as long as possible or at least until after the next election.

In logic it sounds as if not more than about two billion people can survive this Century, which is still roughly double the number that the Planet supported before it had the help of oil. Meanwhile, Australia provides financial incentives for three-child families, in an effort to expand the indigenous population in the face of pressure from its over-crowded neighbours to the north, while Sudan confronts the limits of its barren lands with a policy close to genocide.

403 Next ASPO International Workshop

The next ASPO International Workshop on Oil and Gas Depletion will be held at the Gulbenkian Foundation in Lisbon on May 19 and 20, 2005. Details of the programme and arrangements will be announced later.

404 The End of the Oleocene

The July Issue of the *Geoscientist* (Published by the Geological Society of London) contains an article on oil depletion and population with the above title.

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