NEWSLETTER No. 68 – AUGUST 2006

ASPO is a network of scientists and others, 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.

Independent national affiliates are in existence or formation in Australia, Austria, Canada, Egypt, France, Germany, Ireland, Israel, Italy, Japan, Mexico, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, United Kingdom and the United States.

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.

Newsletter: The newsletter is currently compiled under the auspices of ASPO IRELAND, which maintains a full and searchable archive of past issues at www.peakoil.ie.

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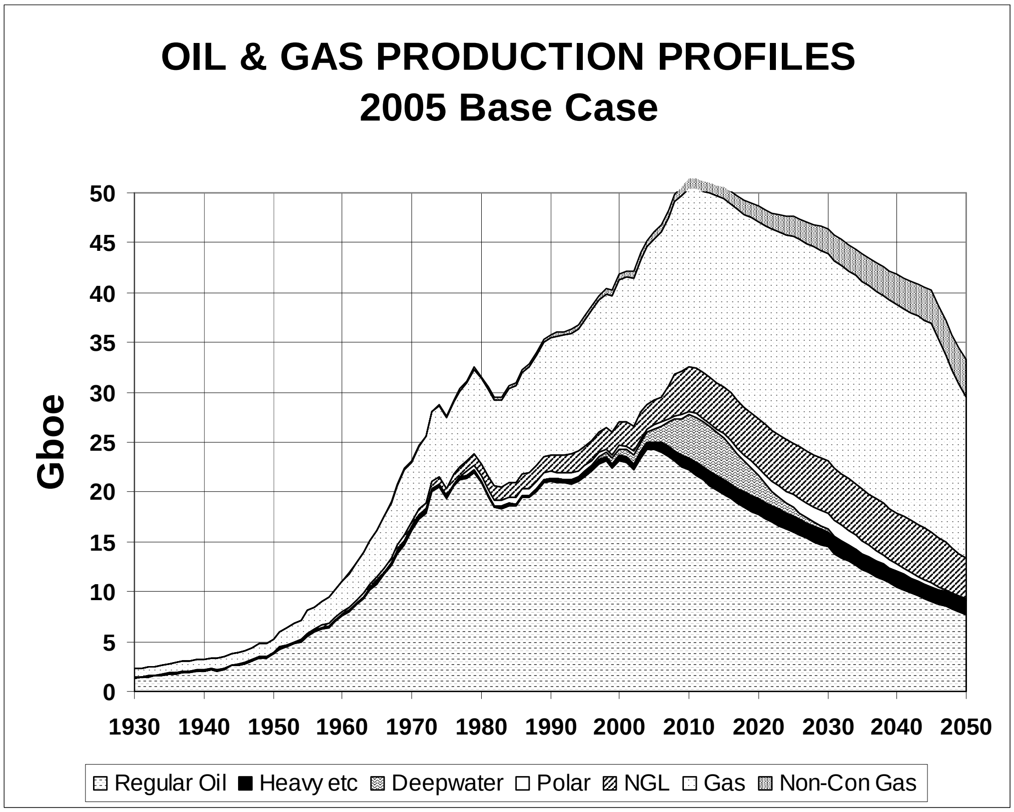
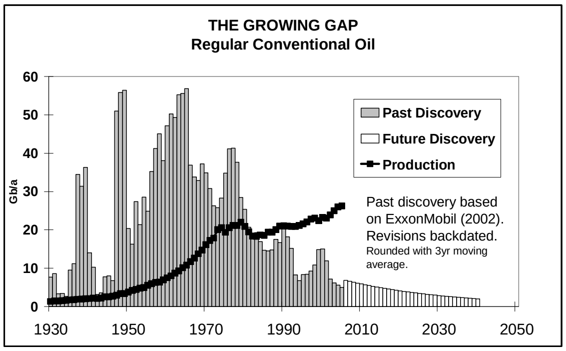
The General Depletion Picture

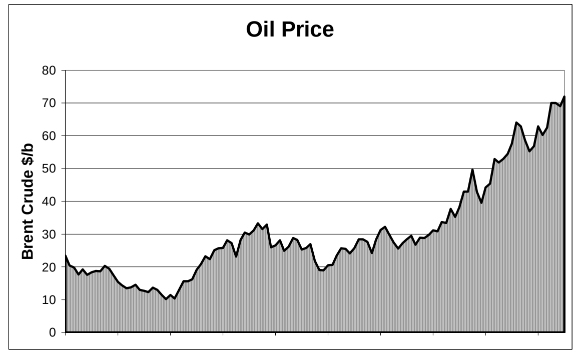


ESTIMATED PRODUCTION TO 2100 End 2005

Amount		**Gb**	
Regular Oil			
Past	**Future**		**Total**
	Known Fields	New	
968	790	142	1900
	932		
All Liquids			
1043	1457		2500
2005 Base Scenario			
M.East producing at capacity (anomalous reporting corrected)			
Regular Oil excludes Heavy Oils (inc. tarsands, oilshales); Polar oil; Deepwater oil, & gasplant NGL			
Revised 13/07/2006			

Annual Rate - Regular Oil						**Gb**	**Peak**
Mb/d	**2005**	**2010**	**2015**	**2020**	**2050**	**Total**	**Date**
US-48	3.6	2.8	2.2	1.7	0.4	200	1971
W.Europe	5.0	3.4	2.3	1.6	0.2	75	2000
Russia	9.2	8.5	6.9	5.7	1.5	220	1987
ME Gulf	20	19	19	19	11	680	1974
Other	29	27	23	20	8	725	2004
World	**66**	**61**	**54**	**48**	**21**	**1900**	2005
Annual Rate – Other Categories							
Heavy etc.	2.3	3	4	4	4	150	2021
Deepwater	3.6	12	11	6	4	69	2011
Polar	0.9	1	1	2	0	52	2030
Gas Liquid	6.9	12	13	14	11	354	2035
Rounding		1	2		-1	-25	
ALL	**80**	**90**	**85**	**75**	**40**	**2500**	2010





732. When will they ever learn ?

The Financial Times of July 4th discusses the energy situation, explaining how sticks and carrots are being deployed at the G8 Meetings to try to persuade Russia to liberalise its energy industry. The notion evidently is that Western companies and capital should flood into Russia to exploit its oil and gas as fast as possible and export the surplus to Europe.

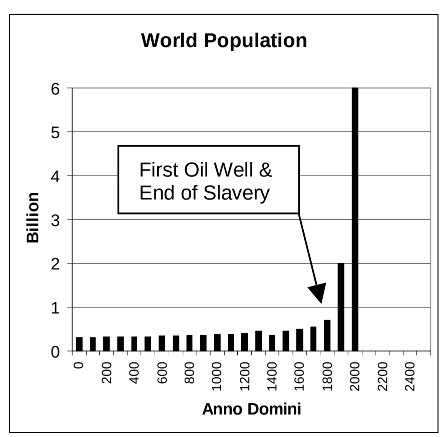
The negotiators have evidently failed to study the experience of Britain. Prolific oil and gas came to this country with the opening of the North Sea in the 1960s. At first, responsibility was largely in rather slow-moving State hands with security of supply being one of the priorities. But then, Mrs Thatcher's Government liberalised the market, releasing all the well-known attributes of enthusiasm, initiative, enterprise, and competition, accompanied by monumental engineering achievements. At first, it seemed a remarkably successful policy, raising employment in a huge new industry and yielding a massive flow of revenue, while at the same time reducing energy costs to the consumer. The coal and nuclear industries went into decline as new prosperity opened the flood gates for immigration to a consumer society relishing cheap labour.

But there is an irony to depleting a finite resource: namely, that the better you do the job, the sooner it ends. Oil and gas production peaked in Britain in respectively 1999 and 2003 being now set to decline at respectively about 7% and 10% a year, meaning that the resources will be virtually exhausted by 2020, as the responsible government department has admitted. Furthermore, rights to the remaining production are largely in foreign hands with freedom to export, whatever Britain's needs.

So is it wise to press Russia to follow this example based on outdated economic principles and mindsets ? Would it not be better if Russia were to produce and export more slowly for a longer period, and encourage Europe to use what time is left to find some sustainable basis on which to approach the next Century.

733. People Eat

While admittedly some people eat less than others, no one has found out how to live without eating. The question is : what do they eat ? The image the diners have at their groaning tables is that they are swallowing beautiful fruit, ripened by sunshine in the golden orchards or wheat nourished by the rich prairie soil. The image of the steak is slightly less appealing, but even so, they can picture the herds having had happy lives, munching luscious grass on the ranches, before facing the slaughterman.



A new book *Eating Fossil Fuels* by Dale Allen Pfeiffer (New Society Publishers ISBN 978-0-86571-565-3) answers the question of what it is we really eat : in short energy. Some is indeed captured from sunlight by photosynthesis, but much comes from oil and gas. The *Green Revolution* of the 1960s was hailed as a scientific breakthrough that would feed the world's burgeoning population, but in reality it destroys the ecosystem. Irrigation, and petroleum-based synthetic nutrients and pesticides have increased crop yields, as have oil-fuelled tractors and harvesters working the fields. Massive corporate agri-business has replaced smallholders, while cheap transport has moved food around the world such that strawberries are available everywhere on every day of the year. The peasants in some countries starve as cash crops are exported.

The physical cost has been monumental as the deserts encroach and the water tables fall, which is bad enough, but this Century will see the decline to exhaustion of the critical oil and gas supply that made it all possible. There are plenty of precedents. The potato was introduced to Ireland in the 1600's as a highly efficient source of energy and nourishment, allowing the population to increase three-fold until a fungal blight decimated the crop in 1846. A million people died of starvation, and more were forced to emigrate, such that the population halved over the next fifty years, never to recover.

Some 400 million people occupied the Planet at the time of Christ, and the number no more than doubled over the next seventeen centuries. They lived sustainable lives relying on human and animal muscle-power, supplemented by wind for sail, and water mills. Then came coal, followed by oil and gas, which provided a massive flood of new cheap energy, derived from concentrated photosynthesis of a few rare epochs in the distant geological past, which allowed the population to increase six-fold in parallel. It is no coincidence that slavery ended as the oil age began. It poses the awful question of how many people the Planet can support by the end of this Century when oil and gas will be virtually exhausted. Pfeiffer's important book provides a compelling insight as well as guidelines for the survivors. (A pre-publication offer is available on http://www.newsociety.com/bookid/3933)

734. Country Assessment Series - United Kingdom revisited

The United Kingdom was last evaluated in Newsletter 20 of August 2002 and may merit an update.

UNITED KINGDOM

The United Kingdom had a strong Neolithic culture, highlighted by the famous astronomical observatory of Stonehenge, long before falling to the Romans in 55 BC. The Roman occupation lasted only a few centuries, but left an indelible mark. It was followed by the dark ages of Viking and Saxon invasions, culminating in the arrival of recycled Danish Vikings from Normandy in 1066, the last military invasion, apart from William of Orange who landed with an army of mercenaries in 1688 to oust a Catholic monarch.

UNITED KINGDOM	*Regular Oil*
Population	60 M
Rates	Mb/d
Consumption 2005	1.75
per capita b/a (Mcf/a)	11
Production 2005	1.86
Forecast 2010	1.25
Forecast 2020	0.56
Discovery 5-yr average Gb	0.1
Amounts	**Gb**
Past Production	22
Reported *Proved Reserves**	4.49
Future Production - total	8.2
From Known Fields	7.4
From New Fields	0.8
Past and Future Production	30
Current Depletion Rate	7.7%
Depletion Midpoint Date	1997
Peak Discovery Date	1974
Peak Production Date	1999

*Oil & Gas Journal

General stability brought political and economic progress, including the creation of Parliament, as one of the earlier democratic institutions. The Kingdoms of Wales and Scotland were absorbed into what became the United Kingdom in 1801, and Ireland was forced to join.

Seafarers stimulated trade and exploration throughout the world, paving the way for the British Empire. At its peak in the reign of Queen Victoria, Britain had become the premier world power. Great achievements were recorded in the fields of science, literature and culture.

Britain also led the Industrial Revolution at first with mills powered by water to make cloth for export to its colonial markets. The wealth, created by trade, led to the rapid growth of capitalism, banking, usury, investment and a financial economy. The pound sterling became the world trading currency delivering a massive hidden tribute to the home country. Self-sufficient peasants became wage-earners, consumers and taxpayers, many working in gruesome industrial slums. Mechanisation based on iron and steel took many directions. Iron smelting made new demands for energy. Firewood gave way to coal, which had been collected from beaches and outcropping seams before mining commenced. The development of steam-driven pumps made it possible to deepen the mines below the water tables, and the pumps evolved into steam-engines, leading to the development of railways for transport. The internal combustion engine, using petroleum refined from crude oil, evolved from the steam engine and changed the world almost beyond recognition.

Britain had defeated an epoch of French expansion under Napoleon before finding itself increasingly threatened in the late 19th Century by a newly united Germany that was overtaking it in industrial prowess and was seeking its own colonial and financial hegemony. These pressures eventually led to two world wars during the 20th Century. Although victorious in military terms, Britain lost economically, surrendering its financial control of world trade to the dollar. It half-heartedly joined a newly united European community, preferring to retain its ties with the United States.

Massive immigration from the former Empire followed the Second World War, being permitted at first in a sense of colonial responsibility, but later exploited as a source of cheap labour. The indigenous population aged from falling fertility due to affluence, but the overall population expanded to 60 million with the immigrants and their descendants making up more than ten percent and rising.

Most of Ireland had seceded in 1922, with 26 counties becoming a republic in 1947, leaving a form of civil war to continue in the remaining six counties of northern Ireland, which had been settled by Scottish immigrants centuries earlier. Scotland and Wales are now recovering earlier autonomies with independent legislatures, while various immigrant cities and ghettos have developed, some becoming almost replicas of Karachi and Kingston, Jamaica. Britain has moved far from its grand imperial past, although echoes remain. They perhaps encouraged the present Government to assist its former ally invade Iraq in 2002. As a result British troops face casualties occupying Basra and fighting Afghans. These actions have alienated sections of its large Muslim community, some of whom retaliated with a bomb attack in London in 2005.

Britain has had a long oil history, both within its own territory, and through the early prominence of its oil companies in the Middle East, Mexico and Venezuela. BP was the flagship with major holdings in Iran, Iraq and Kuwait, while Shell, an Anglo-Dutch enterprise, had a strong position in the Western Hemisphere. BP had a 51% government shareholding, taken up by Winston Churchill prior to the First World War to secure oil supply for the Navy, but Mrs Thatcher's Government disposed of it in the 1980s. A large block of shares was taken up by Goldman Sachs, which evidently still has close links, sharing the Chairman and having the Chief Executive on its board. Formerly, pre-eminent in exploration, making it the World's largest vendor of crude oil, the Company has in recent years had to secure its financial assets by merger and acquisition, as represented by the take-overs of Arco and Amoco.

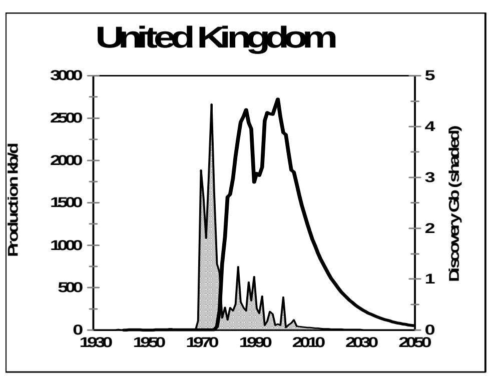
Non-conventional oil shale had been mined in Scotland in the 19th Century, leading to pioneering refinery processes, and minor oilfields had been found onshore in and before the Second World War. But the great thrust came during the 1960s, with the development of the offshore extensions of a prolific belt of gas fields that had been discovered in Holland in 1957. Exploration then moved northwards in the North Sea to be rewarded by the discovery of Jurassic rifts, containing prolific source rocks, deposited 150 million years ago, which yielded one giant field after another.

Britain entered a phase of socialist government after the Second World War, such that the early stages of its oil boom were dominated by State entities : the British Gas Council and the British National Oil Company. That ended when Mrs Thatcher's Government was able to use the new oil supplies coming ashore to break the coal workers' control of energy supply. The State entities, which could have managed long-term depletion to the national interest, were disbanded, and the major international oil companies, along with many small independents, were given every encouragement to deplete the resources as fast as possible.

The early giant fields were brought on stream with the help of impressive advances in offshore engineering, but discovery peaked in 1974. The corresponding peak of production came in 1999 at 2.7 Mb/d, having been slightly delayed by a major accident at Occidental Petroleum's substandard Piper Field, causing a temporary fall in production.

Although the rich deposits of the North Sea dominated production, some other lesser finds were made elsewhere. Lower Jurassic source-rocks gave a solitary large field in Dorset in the otherwise barren English Channel, and a Carboniferous gas field was found in the Irish Sea. Efforts to find another play on the Atlantic margin continue but are likely to be doomed, because the essential prolific Jurassic source-rocks, if present at all, are now too deeply buried to generate oil. The isolated large deposits West of the Shetlands are effectively freak occurrences depending on unique re-migration from earlier accumulations. The scope for gas in this province is more promising, but it will not be cheap.

Britain's brief oil age is in decline. The major companies are withdrawing to be replaced by smaller companies, mopping up small satellites and step-outs, as well as scavenging tail end production from ageing platforms.



Current (2005) oil production of 1.8 Mb/d is set to decline at the current depletion rate of 7.5% a year, meaning that it will have halved in ten years. Consumption stands at 1.75 Mb/d, such that the country becomes a net importer on a steeply rising trend.

Gas production is more difficult to forecast due its very different depletion profile. About 125 Tcf have been discovered, of which 84 Tcf have been consumed. Production peaked in 2003 at 3.6 Tcf/y and is falling at about 10% a year, making the country a net importer on a steeply rising trend. Energy prices have already begun to soar.

It is difficult to imagine the condition of the country fifty years hence. Its own oil and gas will have been substantially exhausted and such imports as are available will be insecure and prohibitively expensive. Failure by the government to recognise natural depletion until too late will likely leave the country unprepared, although it does now turn to the re-development of nuclear power. Re-commissioning old abandoned coal mines will prove difficult and costly. The growing contribution of solar, wind and tide power will be useful but insufficient. It is hard to see how the country can support anywhere near its present population in the new world that opens during the Second Half of the Oil Age. It may however see a new positive regionalism as communities rediscover their identities and find sustainable lives within the environment Nature has ordained them to live.

735. Regional Assessment- AFRICA

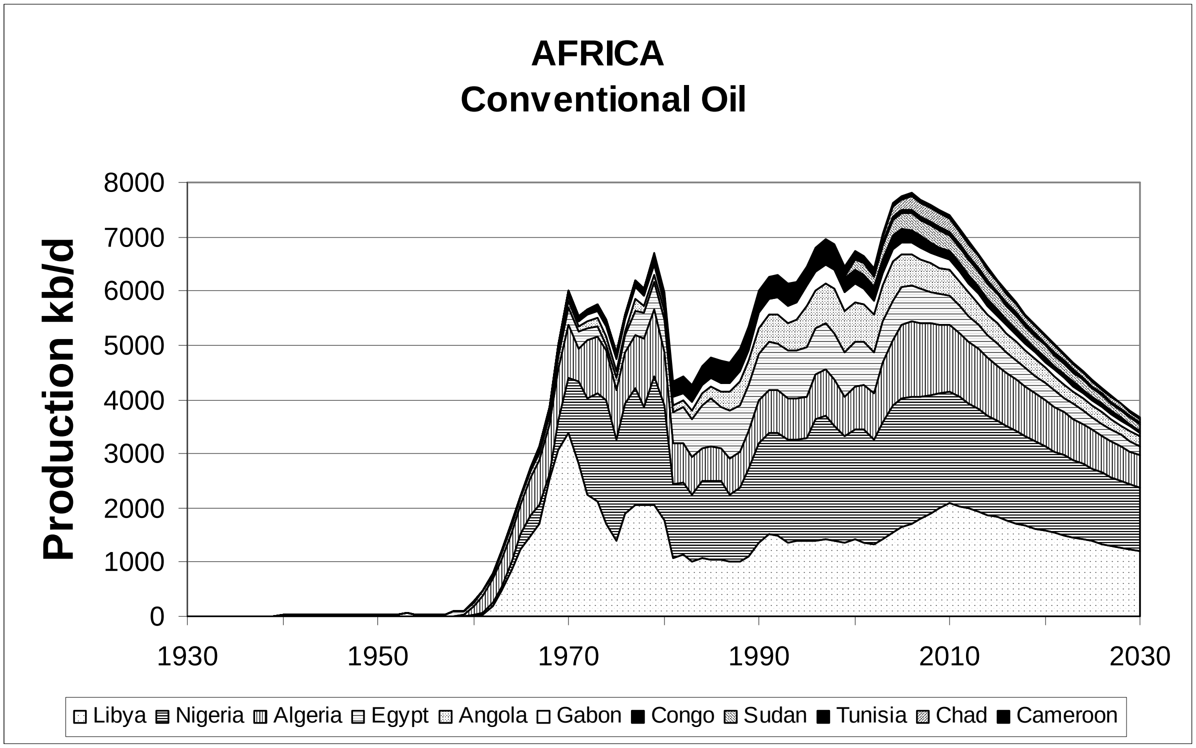
Having assessed most of the important countries individually, it may be instructive to evaluate the eight regions into which the World is divided for the purposes of this depletion study, beginning with Africa. More work is however required to properly take into account conditions in the non-producing countries, especially in regard to consumption and trade.

AFRICA

The boundaries of the Region are straightforward being defined by the physical limits of the continent, although there are a number of associated islands, of which the largest is Madagascar. It covers an area of 30 million km^2. being built primarily of the ancient rocks of the African Shield which are cut by major transcurrent faults and rifts, locally affected by volcanic activity. The Shield is flanked by sedimentary basins, some of which are petroleum-bearing. The tropical rain forests of the equatorial regions give way to widespread deserts, including the Sahara in the north and the Kalahari in the south. Mt. Kilimanjaro, which is a volcanic peak associated with the rift valleys of East Africa, rises to almost 6000m, while Lake Assal, in Djibouti bordering the Red Sea, is actually below sea-level. The continent is drained by several major rivers, including the Nile, the Congo and the Zambezi, flowing respectively northwards, westwards and eastwards. Lake Chad acts as a catchment for the semi-arid central interior, itself emptying into the Niger River.

The Continent supports a population of about 900 million people, living in some 42 countries, many of which are however somewhat artificial constructions, inherited from colonial administrations, being subject to internal tribal and other conflicts. The population density varies widely, but averages at about 30/ km^2., having life expectancy of 52 years and a fertility rate of 5.1 children per woman.

The past and forecast production of Regular Conventional oil in the Continent, ignoring a few minor producers, is illustrated below.



Total production over this Century is estimated to be a rounded 180 Gb, of which 86 Gb have been produced through 2005, leaving 93 Gb to be produced in the future, including an estimated 15 Gb from new discovery. The three principal producers are Libya, Nigeria and Algeria, which are members of OPEC, and together hold about 80% of the estimated future production.

Production commenced in the 1930s but grew rapidly in the 1960s as major fields in Libya came on stream. It then fluctuated as a decline in Libya due political factors was only partly offset by Nigeria and Algeria, supplemented by a number of other small producers. There was an overall early peak in 1979 of 6.7 M/bd when. production then fell sharply, due to OPEC quota constraints, to a low of 4.3 Mb/d in 1983 before recovering to a forecast overall peak of 7.8 Mb/d this year. Future production is expected to decline at about 3% a year, namely the current Depletion Rate, to about 3.6 Mb/d by 2030.

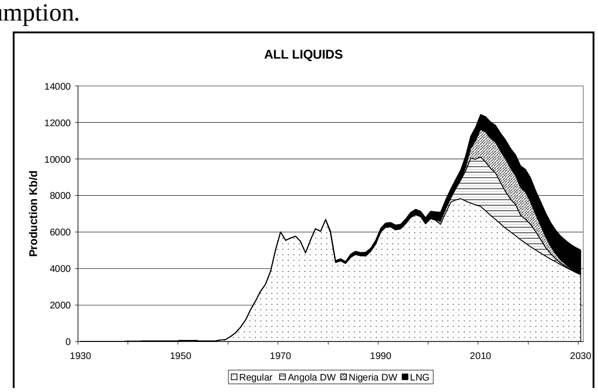
The Continent also has substantial additional deepwater resources in especially Angola and Nigeria, which are at an early stage of depletion. Production is expected to grow rapidly to peak around 2012 at 4 Mb/d and then decline steeply to near exhaustion by 2030.

It also has substantial gas deposits with reserves of about 460 Tcf, principally in Algeria, which are currently being produced at a rate of 5.6 Tcf/a. The related LNG production from gas plants is expected to increase from about 500 kb/d in 2005 to reach a plateau of about 1.3 Mb/d from 2020.

The total production of all liquids is accordingly expected to reach a peak of about 12 Mb/d around 2012 but then fall precipitately to about half that level by 2025. In a certain sense, the addition of the deepwater will make the tensions of the transition to the post-oil age even more difficult by giving this brief yet unsustainable surge.

Oil consumption has been growing consistently from 530 kb/d in 1965 to almost 2.5 Mb/d today. Per capita consumption stands at about one barrel per year, which is extremely low, when compared for example with the United States at 27 b/a but comparable with that in countries such as India (0.8) or Indonesia (1.9). The Continent will be able to remain a net exporter beyond 2030 albeit at a decreasing rate, assuming no particular increase in consumption.

The social structure of the Continent is one of extremes from the downtrodden masses, many facing famine, disease, and turbulence, to the war lords and powerful elite, whose income in large measure derives from the exploitation of natural resources, including gold, diamonds, minerals and petroleum. This prompts a



somewhat ironic conclusion: namely, that the imminent pronounced decline in oil supply may come as something of a blessing, insofar as it will reduce the power of the powerful yet leave the suffering masses, who barely consume oil, not materially worse off. The foreign debt, which did so much to impoverish the African is being forgiven, presumably because the creditors prefer forgiveness to default, which might rock the global system. Presumably, cash crops for export will decline along with the import of military equipment for the war lords, leaving the ordinary African to recover the sustainable way of life he knew before the Oil Age, but it seems unlikely that his numbers will grow.

736. Ireland begins to formulate a post-Peak Energy Policy

Two splendid reports have been published recently in Dublin addressing the Peak Oil issue, before analysing the country's consumption patterns and formulating new policies to cut waste and bring in renewable energy from a range of sources. Ireland's electricity supply is particularly vulnerable. Fifty percent of it is generated from gas, which has to be imported from ever more distant places, as Britain, which previously supplied cheap North Sea gas, becomes a net importer on a steeply rising trend, as noted above. Plans to lessen this dependency on piped gas by the construction of a new LNG terminal have been announced.

While much remains to be done in implementing the recommendations, the reports mark a major turning point of growing awareness, which amply justifies the endeavours of ASPO-IRELAND in this direction. Ireland with its relatively small population and green fields is relatively well placed to weather the storm, especially as it begins to face up to the reality of declining oil and gas supply.

One report, entitled *Review of Energy*, is by the Joint Committee on Communications, Marine and Natural Resources (available from Government Publications, Fax +35316476843). The other is *Future Energy Policy in Ireland* by The Irish Academy of Engineering, info@acei.ie

737. Brilliant Australian Peak Oil Programme

ABC Television of Australia has produced an excellent presentation of Peak Oil on its Four Corners Programme, directed by Jonathon Holmes. It interviews several of the key figures on this issue, including the official institutions, still bent on denial. It is fascinating to watch the expressions on their faces which betray their efforts to choose their words with care and side step the essential issues. Some even come close to admitting to Peak Oil albeit obliquely. For example, Mr Mandil, the Head of the International Energy Agency, admits that the peak of *Regular Conventional Oil* is now here, being forced to rely on dreams of new oil from polar regions and deepwater to leave the door open. Certainly these regions are less well known, but there is no reason to suppose that they will offer good surprises. Mr al-Husseini from Saudi Arabia came over well as an honest man, but naturally could not directly contradict his government. It is promising to find that the Australian Government is now taking a serious interest in the matter, and putting the evasive industry committee on the spot. The programme can be seen on www.abc.net.au/4corners/

738. Nomenclature

Analysing the depletion of oil is intrinsically a simple task based on the volume of oil in the ground and the rates of discovery and extraction. The primary difficulty is the grossly unreliable database, exhibiting a wide range of estimates from different sources, with many displaying serious internal inconsistencies. Another difficulty is the definition of the various terms in wide use. In particular the term *Reserves* is primarily a commercial, financial or political term.

It might be worth trying to establish a new code along the following lines for oil depletion analyses, leaving the existing flawed and confused system in place for those finding it useful for stock exchange reporting and political manouvering. It would also facilitate the flat-earth economists who could predict future production to a cutoff date on whatever basis they prefer, ignoring the physical constraints of geology.

Regular Oil : all liquids excluding

- Extra-Heavy, (<10^{o} API)
- Heavy, (10-17.5 ^{o}API)
- Deepwater (>500m),
- Polar
- Plant Gas Liquids (**PGL**) (liquids extracted from gas plants. Liquids that condense naturally from gas at surface conditions are included in *Regular* oil)

1. Past Production (PP) : sum of past production (at the wellhead) to the reference date. (Note that *Supply* relates to the market place, and should cover storage, refinery gains, tanker bunkers and operating losses).
2. Total Production (TP_{xxx}) : total estimated production to a cutoff date (in subscript). This is similar but not identical to the widely used term *Ultimate or Ultimate Recovery* (URR), with the date cutoff evading the issue of the largely irrelevant tail end (a well in a museum in Pennsylvania is still producing a few pints a day after 150 years);
3. Future Production (FP): comprising the **Yet-to-Produce (Y-t-P)** for known fields (=Reserves), being TP less PP; and **Y-t-F** for the estimated amounts yet-to-find. These estimates would normally be *best estimates* (*Mean Probability* or *Proved & Probable*) but could be qualified with a confidence factor on a scale of 1 to 10 in superscript (ie Gb^5 for the *best estimate*).

Obviously much more thought needs to go into such a classification, but it would be useful to establish a simple classification that would be readily comprehensible to everyone, sparing mortals from probability theory or Stock Exchange rules, which by all means have their places in their own domains.

739.ASPO International Conference; ASPO Conference The Fifth International Conference of the Association for the Study of Peak Oil and Gas (ASPO-5) was held on July 18-18 2006 in San Rossore (near Pisa) in Italy. Over 250 people attended the 25 talks presented by international experts and discussed the numerous poster presentation. The conference was also attended by more than 30 journalists from all over the world and by numerous media teams.

The objective of the ASPO-5 conference was to raise the awareness of the impending peak of oil extraction and the general phenomenon of depletion of all mineral resources. The experts who convened at the conference gave a strong warning that the depletion of mineral resources, and of oil in particular, will have an important effect on the structure of society and on the economy. It is necessary to develop geological and economical models describing depletion and political action is needed in order to reduce the impact of depletion.

The organizers of the conference would like to thank all the attendees, as well as the conference staff for making the event possible, stimulating and enjoyable.

The presentations of the conference will be soon available on www.aspoitalia.net

Calendar - Forthcoming Conferences and Meetings

ASPO members and associates [shown in parenthesis] will be addressing the subject of Peak Oil at the following conferences and meetings. Information for inclusion in future newsletters is welcomed.

August 16-23	Various, Australia [Skrebowski]
September 13	Irish Countrywomen's Association, **Goleen**, Ireland [Campbell]
October	Peak Oil Debate, Limerick University, **Limerick,** Ireland [Campbell]
Oct 30 – Nov 3	South Africa [Laherrere]
November 7	Oil Depletion. Inst Energy, **London** [Bentley, Skrebowski]
November 30	Air Transport & Energy Challenge, **Toulouse**, France, [Bauquis]