THE ASSOCIATION FOR THE STUDY OF PEAK OIL AND GAS

"ASPO"

NEWSLETTER No. 71 – NOVEMBER 2006

ASPO started as 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. Now independent national affiliates are in existence or formation in Australia, Austria, Canada, China, Egypt, France, Germany, Ireland, Israel, Italy, Japan, Korea, Mexico, New Zealand, Norway, Portugal, Russia, 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

Foreign language editions are available as follows:

Spanish: www.crisisenergetica.org

French: www.oleocene.org (press "Newsletter")

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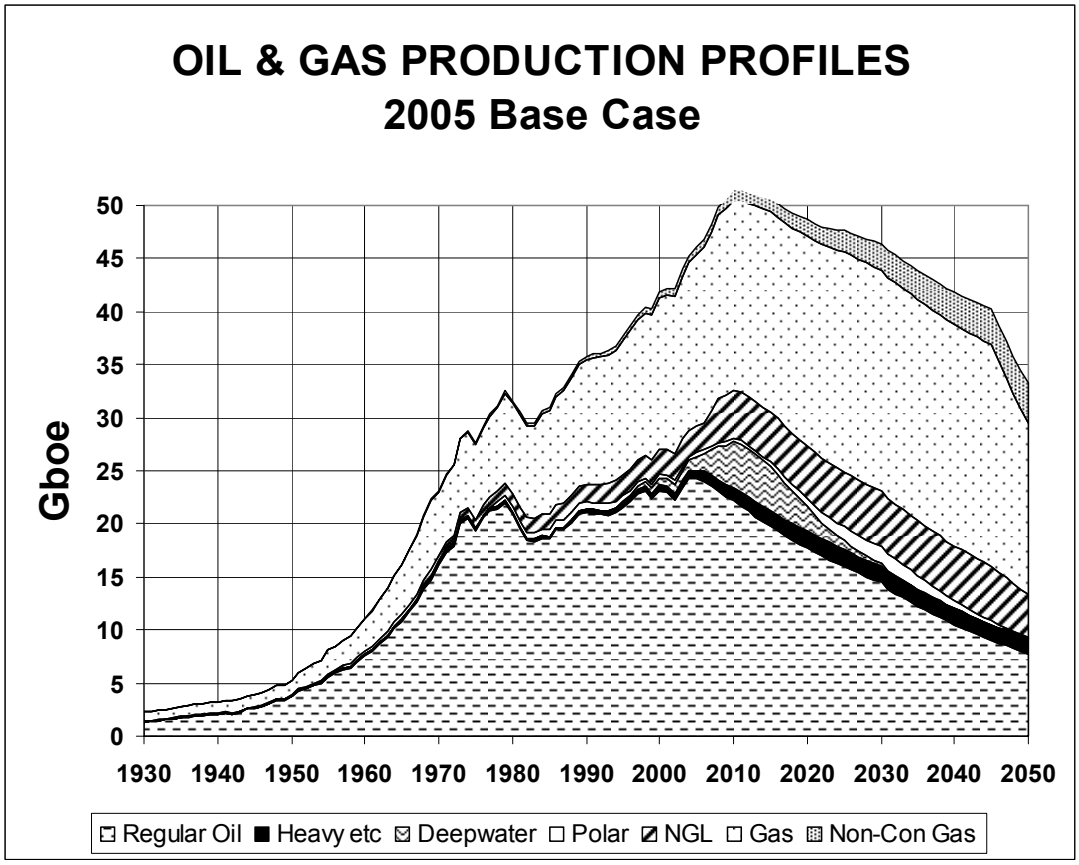
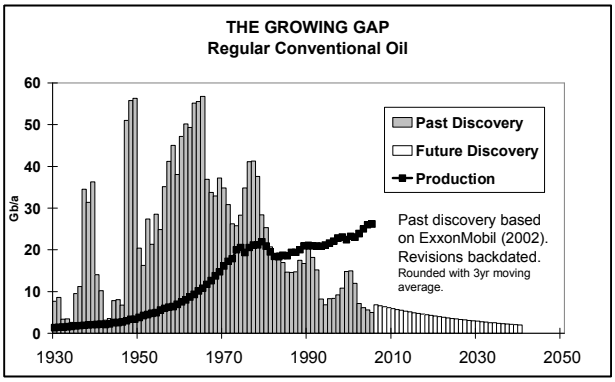
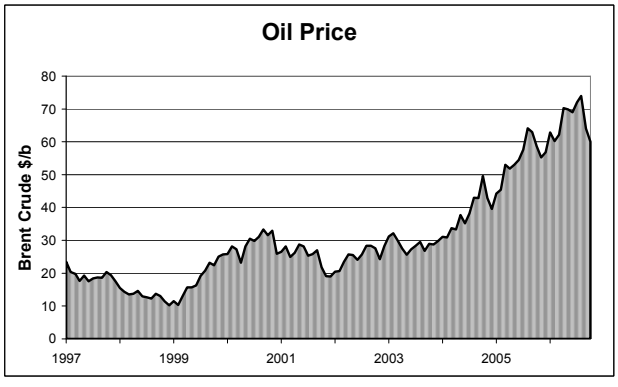


ESTIMATED PRODUCTION TO 2100										End 2005
Amount			**Gb**	**Annual Rate - Regular Oil**						**Gb**	**Peak**
Regular Oil				Mb/d	**2005**	**2010**	**2015**	**2020**	**2050**	**Total**	**Date**
Past	**Future**		**Total**	US-48	3.6	2.8	2.2	1.7	0.4	200	1971
Known Fields		New		W.Europe	5.0	3.4	2.3	1.6	0.2	75	2000
967	788	145	1900	Russia	9.2	8.5	6.9	5.7	1.5	220	1987
	933			ME Gulf	20	19	19	19	11	680	1974
All Liquids				Other	29	27	23	20	8	725	2004
1043	1457		2500	**World**	**66**	**61**	**54**	**48**	**21**	**1900**	2005
2005 Base Scenario				**Annual Rate – Other Categories**							
M.East producing at capacity				Heavy etc.	2.3	3	4	4	4	150	2021
(anomalous reporting corrected)				Deepwater	3.6	12	11	6	0	69	2011
Regular Oil excludes Heavy Oils				Polar	0.9	1	1	2	0	52	2030
(inc. tarsands, oilshales); Polar oil;				Gas Liquid	6.9	12	13	14	11	354	2035
Deepwater oil, & gasplant NGL				Rounding		1	2		-2	-25	
Revised 20/08/2006				**ALL**	**80**	**90**	**85**	**75**	**35**	**2500**	2010





761. Regional Assessment - Latin America

Latin America is the next in the current series of regional assessments.

LATIN AMERICA

The Latin America Region, as defined for the purpose of this study, comprises the Continent of South America, Central America and the Caribbean islands. In topographic terms, it covers an area of 20 M km^2, flanked by the Pacific and South Atlantic Oceans. The great Andean mountain range marks western and northern margins of South America, passing into a Caribbean island arc, with Lake Maracaibo of Venezuela, forming an inland sea. An extension of the Rocky Mountains runs south into Mexico forming the Sierra Madre, which is flanked to the east by lowlands including the Yucatan Peninsula. The great Amazon and Orinoco Rivers flow eastwards across the continent to drain into the South Atlantic.

The Region supports a population of 550 million with an average density of 27.5 per km^2. The fertility rate is about 2.6 children per woman, leading to an expanding population.

The early history is little known but the region was evidently settled by tribes of Amer-Indians migrating south. The great Maya, Aztec and Inca civilisations of Central America and Peru were extinguished by Spanish Conquest during the 16th Century. It is suspected that Arab seafarers may have reached the continent earlier, but its discovery by Europe is generally attributed to Christopher Columbus, who was sponsored by the King of Spain, and made his first landfall on the Bahamas in 1492, reaching Trinidad and the adjoining coasts of Venezuela and Colombia on a third voyage, six years later. Vicente Pinzon, the brother of one of his companions, voyaged south to discover Brasil in 1500, only to be followed a few weeks later by a Portuguese explorer, Pedro Cabral, who claimed the territory for the King of Portugal. The Pope later negotiated spheres of interest for the two rival powers.

Spanish conquest and settlement followed over the next century concentrating on the Caribbean, Mexico and the Andean regions, while the Portuguese took a position in Brasil. The gold and silver resources of the continent, especially of Peru, soon fired the enthusiasm of the Spaniards whose galleons started shipping the bullion home to fund European wars, being often attacked by British pirates. Vice-regal administrations were established in Bogotá, Lima and Mexico City to administer the territory, granting land rights to settlers, who were required to pay a royalty to the Spanish Crown. The Spanish currency at the time was divided into eight units, one of which was reserved for the King. This incidentally is the origin of the 12 ½ percent royalty that characterises many oil rights to the present day.

Like many tenants, the settlers became disenchanted with the system, which led to the wars of independence during the early years of the 19th Century, being championed by Simon Bolivar from Venezuela and General San Martin from Argentina. In 1822, a patriotic immigrant, unsuccessfully declared himself King of Brasil, but final independence did not come until 1889, when a Republic was declared. Bolivar had hoped to unify the Continent, but factional interests led to the development of diverse political units, which after many local wars and disputes have emerged into the present countries, making up the region. Argentina and adjoining territories were settled somewhat later, mainly during the 19th and 20th Centuries, receiving immigrants from especially Italy and Wales. There were also waves of German immigrants throughout the region, especially before and after the Second World War, some of whom rose to political prominence.

In geological terms, the ancient rocks of the Guyana and Brasilian Shields are separated by a faulted transverse rift system, along which the Amazon River flows. It previously emptied into the Pacific until late Tertiary uplift of the Andes caused it to reverse direction. Subduction of the Pacific Margin led to the uplift of the Andean mountain chain as well as the emplacement of granite batholiths with mineralised aureoles. Major transcurrent faults, including the Oca of Venezuela and the Santa Marta of Colombia, reflect lateral movements of the tectonic plates.

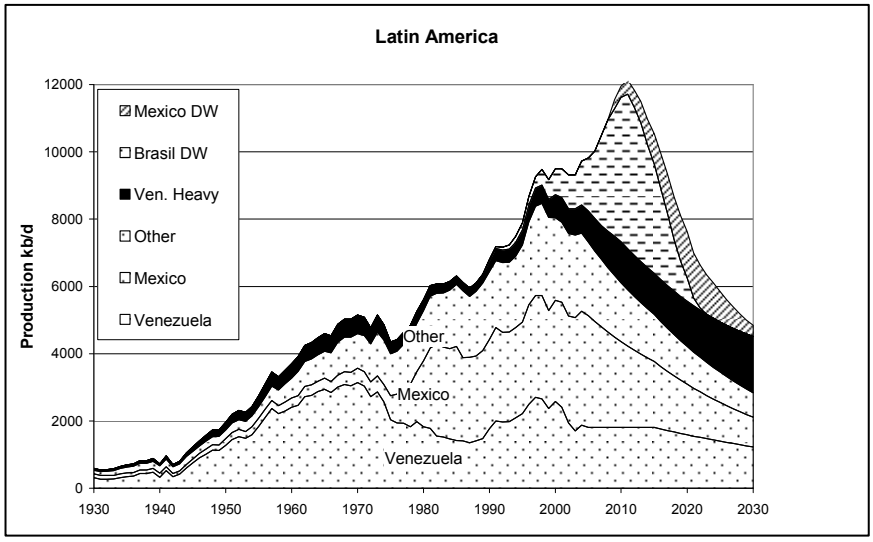
In petroleum terms, particular importance attaches to a major Cretaceous sedimentary basin flanking the Guyana Shield and much of what is now the Caribbean. It contains prolific hydrocarbon source-rocks, deposited during an epoch of extreme global warming, 90 million years ago. Oil derived from this source has migrated upwards and laterally to charge predominantly sandstone reservoirs within and flanking the Andean and Mexican mountain belts. Much escaped at the surface along the Orinoco valley of Venezuela, providing the major tar-belt for which it is well known. Other leaner oil sources were effective in the southern part of the Continent with the Silurian and the Jurassic charging fields in respectively Bolivia and Argentina. An important late-stage development has been the discovery of prolific fields in deep water off Brasil under very special geological conmditions.

The Pitch Lake of Trinidad, a huge natural seepage of tar, attracted the attention of early oil explorers, who started drilling in its vicinity in 1857, two years before Colonel Drake drilled his famous well in Pennsylvania, which is widely acclaimed as the birth of the oil industry. Another tar deposit at La Brea on the coast of Peru was also investigated, yielding the world's first giant field, La Brea-Parinas, in 1869. From these beginnings, the industry turned its attention to Venezuela and Mexico during the early years of the 20th Century which grew to be major oil producing countries. The coastal regions of Mexico proved polific, holding the so-called *Golden Lane*, with its offshore extensions being brought in later during the 1970s.

Oil and politics are however never far apart, and a growing nationalism in Mexico led to the expropriation of the rights of the foreign companies in 1938 and the creation of Pemex, one of the World's first State oil companies. Twenty years later, the oil minister of Venezuela decided to counter foreign exploitation in moves that led to the creation of OPEC and the establishment of a State oil company, Petroleos de Venezuela (PdeV). State companies, with varying degrees of engagement, were also formed in most of the other countries in the region.

The production of *Regular Conventional* oil, which had commenced in the 19th Century, as mentioned above,

reached a peak in 1998 at 8.5 Mb/d, some 21 years after the corresponding peak of discovery. It has since declined to 7.3 Mb/d at a depletion rate of 3.6% a year, which, if maintained, would reduce production to about 4 Mb/d in 2020 and 3 Mb/d in 2030. The resource base by country is given in the following table. In addition, the Region has important resources of *Non-Conventional Oil*, primarily the tarsands of Venezuela and the deepwater deposits of Brasil and Mexico, described below.



The tarsands of Venezuela

Oil generated in the East Venezuelan Basin, primarily in Cretaceous rocks, has migrated to depths of 500-1500m along the margin of the basin in the vicinity of the Orinoco River. The oil was degraded by weathering and bacteriogical action to form deposits of bitumen and heavy oil (here defined as having a density in excess of 17.5^{o} API). These deposits lie too deep for open-cast mining as practised in Canada, and the traditional method of extraction was to drill patterns of five wells, with steam being injected into the peripheral wells to drive the mobilised oil to a central producer. Horizontal drilling and the use of surfactants have also been successfully employed. The resource itself is very large, being estimated to contain some 1200 Gb, but is subject to a low and costly rate of extraction. Production stands at about 915 kb/d and is here expected to rise to respectibvely 1.3 Mb/d by 2020 and 1.6 Mb/d by 2030.

Deepwater Resources

The opening of the South Atlantic led to the formation of rifts during the Cretaceous, forming lakes in which algae proliferated in warm sunlit conditions, partly encouraged by global warming. The organic remains sank to the stagnant depths to become hydrocarbon sources rocks. The sea later temporarily broke into the lakes and was subject to evaporation depositing layers of salt, which formed an effective seal to the underlying oil. The rifts were subsequently buried by Tertiary sediments washed down the continental slopes, partly by turbidity currents, comparable with submarine avalanches. They were in turn winnowed by long-shore currents, which deposited dune-like sand deposits, forming excellent reservoirs for oil. The remarkable combination of geological circumstances responsible for the oil accumulations is evident.

Petrobras, the State oil company of Brasil, pioneered the technology to find and produce these deepwater deposits in excess of 500m. Approximately 20 Gb have been discovered in the country, and future exploration is here expected to yield a further 3 Gb. Production commenced in the 1980s, rising 1.6 Mb/d by 2005. It is expected to continue to rise to a peak of almost 5 Mb/d in 2011 and then decline steeply to near exhaustion by 2030.

Deepwater exploration off Mexico is at an early stage, but is here expected to yield some 7.5 Gb, with production commencing by 2010 and rising to a peak of almost 1.5 Mb/d in 2020.

The Region also has subsantial gas resources, dominated by Venezuela. Production to-date amounts to 165 Tcf with reported reserves standing at 162 Tcf. Current production totals 6.1 Tcf/a.

Regular Conventional Oil 2005	Past	Production (Gb) Future Known Fields	Future New Finds	Total
Venezuela	48.1	25.5	6.38	80
Mexico	33.7	19.0	3.35	56
Argentina	9.01	3.79	0.20	13
Colombia	6.32	3.13	0.55	10
Ecuador	3.82	3.97	0.21	8
Brasil	4.98	2.27	0.25	7.5
Trinidad	3.35	0.98	0.42	4.8
Peru	2.43	0.99	0.33	3.8
Bolivia	0.46	0.63	0.16	1.0
Chile	0.43	0.06	0	0.5
REGION	**112**	**60**	**12**	**185**

Oil consumption stands at about 6.7 Mb/d making the region a net exporter of about 2 Mb/d, but the looming peak and decline of overall production means that exports will dwindle to zero by 2020, or sooner if internal demand rises from an expanding population and if Governments come to recognise depletion and the need to preserve national resources.

We may note that Fidel Castro, a Communist Revolutionary, came to power in Cuba in 1959 with popular support, becoming an inspiration for other Latin Americans who had become dissatisfied with the direction of domestic politics in their countries. Although the United States retained a long-established military base at Guantanamo Bay, it did not move against the new Government, apart from threatening to do so when the Soviets offered to supply it with missiles. It evidentally served US policy to tolorate the Communist Government of Cuba, depicting it as a visible, if minor, threat in order to rally popular domestic support for its position in the Cold War, when it did take steps to frustrate other leftward movements in Latin America, as for example in Chile

and Nicaragua.

The post-Cold War chapter in history has seen the emergence of several national leaders, having a certain resemblence to Fidel Castro in wishing to distribute wealth more evenly and protect national resources, which puts them on a collision course with the United States in its efforts to expand its economic and financial hegemony under globalism. Ugo Chavez of Venezuela is perhaps the most prominent of these leaders, but there are others in Brasil, Mexico, Bolivia and Peru who are not far behind. They seek to change a situation whereby Governments, controlled by local elites, take dollar loans to foster new industry which then exports product and profit, leaving the ordinary people worse off than before, not to mention the adverse effects on the environment and traditional sustainable patterns of life. For example, the entire oil revenue of Ecuador is dedicated to servicing foreign debt.

There is, so to speak, a growing clash of civilisations whose direction may indeed be much influenced be the oil situation as one country after another faces an entirely new situation on becoming a net importer. Neither Mexico and Brasil, with populations of 106 and 180 respectively, will be able to supply their domestic markets beyond around 2020, and many of the other current exporters face that situation even sooner. It would not, therefore, be unreasonable to expect their responses to involve the cancellation of existing concessions to foreign companies that convey the right of export. Bolivia recently took such action, nationalising its industry. Such moves offend the principles of global trade, exacerbating tensions with the United States. It is hard to avoid the conclusion that some radical changes for the World are in store, and it seems quite possible that Latin America will take a lead in defining the new directions.

762. Newsweek Covers Oil

Newsweek of October 9th gives ample coverage to the oil situation under a cover asking *Is the Oil Boom Over ?* While it could n't bring itself to admit to the onset of decline imposed by Nature, it does express concern. One article by Maugeri, the Italian economist, entitled *That Falling Feeling,* dismisses resource constraints; while another explains that soaring costs are denying the oil companies the massive profits that high prices would otherwise bring. The issue also contains a somewhat unfortunate prominent photograph of Lord Browne the CEO of BP, standing by a gilded table beneath a caption *Big Oil's Big Problem*, which seems like a slightly veiled play on the initials BP.

A prominent advertisement refers to a Wind Farm in Colorado owned where Shell, which invites readers to find out how it is working with communities for a better future – evidently not one driven by oil. There seems to be a message in the subtext however obtusely delivered.

BP subsequently delivered poor financial results while Shell came in with better than expected ones. This might set the scene for an oft-discussed merger between the two companies of which rumours again circulate. It would indeed make a certain sense, following the example of the other major companies : Shell is stronger in marketing and could benefit from the inheritance of BP's past successful exploration; and besides, the executives could cash in their stock options.

763. Peak Oil and World War

A remarkable film by Ronan Doyle entitled *Oil, Smoke and Mirrors* may be seen on
http://video.google.com/videoplay?docid=8677389869548020370&hl=en

It contains a penetrating interview with Michael Meacher, the former British Cabinet Minister who may again come to prominence on the fall of Mr Blair. He explains how the events of 2001 were needed to justify in the popular mind a long-planned foreign policy of the United States in its efforts to maintain a dominant position in the global economy and financial structure, of which oil supply is clearly an important factor.

The authorship of these events is questioned by Griffin and Scott in their book *9/11 and American Empire – Intellectuals Speak Out*, but that issue pales into insignificance compared with the response, which seems close to prompting little short of a new world war, cold or otherwise. Russia takes on a new dynamic stance in relation to its oil and gas, no longer welcoming foreign intervention, and re-exerts itself in the oil rich Caspian region, where a new conflict in Georgia, a pipeline transit country, has erupted. North Korea tests an atomic weapon, while the situation in Iraq deteriorates with a tragic soaring civilian death toll, now amounting to some 650 000 innocent people. It remains to be seen if current threats against Iran will be implemented in a final desperate attempt to support global hegemony.

764. Oil Company hints

Shell carries an advertisement in the prestigious Middle East journal GeoArabia volume 11 No 4 opening with the words *"The world is facing two critical challenges: the sustainability of traditional fossil fuel production and the environmental effect of CO2……*while TOTAL a few pages later says *we are drilling to ever greater depths in response to an urgent need to access new energy resources. We have also been preparing the way for the future of solar energy since the 1980s.* Even ExxonMobil says: *By 2030 the world will need 50% more energy: where on earth will it all come from?*

The same issue publishes a letter by the compiler of this Newsletter commenting on an excellent prior article on Hubbert's Peak by M.I.Al-Husseini. It explains the imminent peak of *Regular Conventional Oil*, meaning that more attention passes to what remains in the form of the more difficult and slow–to-produce categories, which indeed will call on all the skill and technology that the companies can hope to provide.

765. A Dip in Oil Price

Oil prices have weakened over the past month to hover around $60/barrel, being some 20% below the high of a few months ago, although the long-term supply/demand balance remains little changed. The New York Times offers one explanation in its report that Goldman Sachs, which operates the largest Commodity Index, reduced its weighting in gasoline futures to the tune of $6 billion, prompting a general sell-off by other traders. President Bush, who is presumably concerned to deliver good news before the imminent mid-term elections, recently appointed Henry M. Paulson, the former Chairman and CEO of Goldman Sachs, to be Secretary of the Treasury. In traders' jargon, there is a procedure called *painting the tape*. The Washington Post also reveals the existence of the PPT (*Plunge Protection Team*), a government agency with a mandate to manipulate the market under Executive Order 12631.

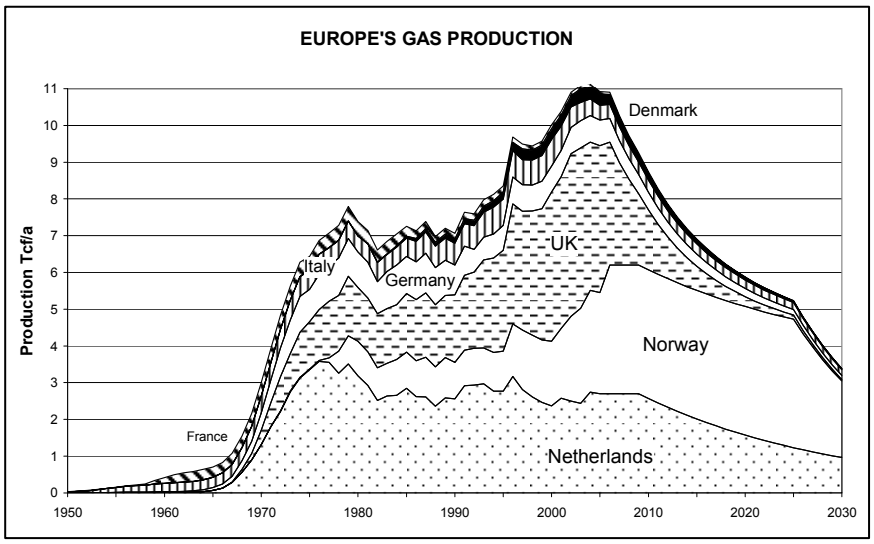
766. Norway addresses Peak Oil

The Journal of the Norwegian Petroleum Directorate (2006/2) gives much attention to the issue of Peak Oil, referring to the work of ASPO. It points out that Norway's peak indeed came at the midpoint of depletion, stressing the need for a proper system of reserve reporting although Norway can be justifiably proud of its own record in this regard offering more reliable data than many other countries.

It offers a scenario of what life will be like in the post-peak world:

> *I was curled up and pulled the duvet well over my body. The night was dark and cold. Colder than usual. The cost of electricity and other energy was high, very high. We had used our ration to cook. The food wasn't like in grandfather's day. He often talked enthusiastically about exotic spices and fruits imported from other countries. Countries we can only dream of visiting. All food today is produced locally. After the great social reconstruction, people moved to the country and formed small, self sufficient communities which avoided the use of oil for transport. Oil was reserved for essential social needs.*

It also stresses the risks of producing too much gas to meet European demands, which lessens the amount available for re-injection into oilfields to improve the recovery of oil. This draws attention to the importance of distinguishing gross from net production. The NPD website lists the values, with the most recent being reproduced in the table. It comes as a surprise to learn that about 60% of the gas produced is flared, re-injected or used as operating fuel, making it doubly important to check which value is being referred to in reported data. Indeed, it is understood that part of the difficulties that Shell ran into last year on reserve reporting was related to the distinction between net and gross.



Gm^3	Gross	Net	%
2005	131	85	65%
2004	128	78	61%
2003	118	73	62%
2002	108	66	61%

The graph depicts a very preliminary evaluation of the gross gas supply from Europe's principal producers, showing the prominent position of Norway for future supply. Net sales after operating usage might be about 20% less. It is noteworthy that the overall indicated peak comes in 2004 close to the midpoint of depletion (55%) despite the tendency for individual gasfields to be characterised by a plateau rather than a peak. The collapse of UK supply is particularly noteworthy, being incidentally confirmed by no less than Mr Blair as his term of office comes to an end. Norway, which is not a member of the EU, may come under increasing pressure as it is never easy to be a rich man in a crowd of beggars.

767. EU Transition to a Sustainable Energy System

The European Union has published a report entitled *Transition to a Sustainable Energy System for Europe* produced by an advisory group of which Heather Greer, a Director of ASPO-Ireland, is Vice-Chairman. It addresses Europe's growing dependence on imported oil and gas, speaking the growing competition for access to declining supplies after peak. It recommends a turn to renewables and nuclear energy, better efficiency, and changed consumer behaviour, pressing also for more coordinated research as a matter of urgency.

768. Russia pressed at G8 Meeting

Russia came under pressure at the recent meeting of the G8 Ministers to meet Europe's energy demands by opening its frontiers to foreign capital to exploit its resources. The Ministers have evidently failed to grasp that stepping up production would simply deplete Russia's resources more quickly. As illustrated in the graph above (Item 766), Europe's indigenous gas supply is falling steeply, despite every effort, incentive and technological achievement. The balance could perhaps be made up by imports from the Former Soviet Union for a few years before these countries too face the iron grip of depletion. It would make more sense for the Ministers to recognise reality, and be content with modest imports with a longer life while they come to brace themselves to adopt new policies recognising the limits of Nature. There does however remain hope that Mr Putin may end up protecting them from themselves with their out-dated faith in market economics to which the geological past is immune.

769. Global Warming and Peak Oil

The British Government has issued a major new report, known as the *Stern Report*, assessing the economic impact of global warming and cost of amelioration policies. There have of course been many epochs of global warming in the geological past, but this one is certainly exacerbated by hydrocarbon emissions. Even Mr Blair has stressed that it is the most important issue faced by his government. But of course the Government stresses that it is a global issue requiring global agreement on remedial actions which in the real world is unlikely to be secured. In short, it is the politician's dream of hot air, with someone else to blame for failure.

A much more viable approach is to adopt the *Oil Depletion Protocol* to cut oil imports to match world depletion rate as explained by Richard Heinberg in his book with the same name (*ISBN 13 978-0-86571 5639*). Countries that adopted such an approach would soon find themselves with competitive advantage in being better prepared to meet the raw reality of declining oil and gas supply, none facing it more seriously than Britain which depleted its resources at the maximum rate possible without a care for the future. Indeed some, albeit modest, measures are already being introduced with higher parking fees for the so-called *Chelsea Tractors*, namely unnecessarily large cars being widely used to transport affluent suburban children to school. Cutting the import, and hence the consumption of oil and gas, would contribute usefully to ameliorating the emissions responsible for global warming. Imports are set to fall and soar in cost in any case as the production capacity limits, imposed by Nature are breached in one exporting country after another.

Great advantages would surely accrue to those who put in place some equitable system of rationing other than by out-dated market economics designed for different circumstances. As the Protocol became more widely adopted, world prices would fall as demand came to balance supply. As a result, the poor countries would be better able to afford their minimal needs; profiteering from shortage, along with the related destabilising flood of petrodollars, would be reduced; and the development of alternative energies encouraged.

770. Major Oil Companies seem to pass peak

As is obvious, production eats into reserves unless new discovery makes up the difference. But the financial accounts of oil companies are not required to distinguish the Reserves added by exploration from those coming from acquisition or revision of previous under-statement. This has obscured the growing gap between discovery and consumption for many years, but it begins to look as if the actual decline can be obscured no longer. The attached table shows that the reported Reserves for the five major companies declined from 2004 to 2005. The table also underlines the declining share of world reserves controlled by the major companies.

Reported Reserves Mb	**2004**	**2005**
Exxon-Mobil	11651	11229
BP	9934	9565
Shell	4888	4636
Total	7003	6592
Chevron-Texaco	7973	8000
Total	41449	40798

(Reference furnished by John Busby, see Ignotum per Ignotius in Sanders Research)

771. ASPO USA Boston Conference Great Success

Congratulations to ASPO USA for organising an impressive conference entitled 'Time for Action: A Midnight Ride for Peak Oil' which was hosted by Boston University. There were over 450 attendees from a wide spectrum of the community. Congratulations also to recipients of the M. King Hubbert Award: Richard Heinberg and Congressman Roscoe Bartlett (R, MD). Next years conference will be held in Texas. See www.aspo-usa.org/fall2006 for more details.

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.

November 4	Univ. of Petroleum, **Beijing**, China [Aleklett]
November 7	Oil Depletion. Inst. Energy, **London** [Bentley, Skrebowski]
November 13-14	Oil Conference, **Kuwait** [Aleklett]
November 20-21	Conference, **Groningen,** Netherlands [Aleklett]
November 26-28	8th SEGJ Int. Symposium, **Kyoto**, Japan [Aleklett]
November 27	Securing Our Energy Future, **Edinburgh** [Low]
November 27	Peak Oil Debate, Limerick University, **Limerick,** Ireland [Campbell]
November 29	Industry Leaders, **Kyoto**, Japan [Aleklett]
November 30	Seoul Nat. University, **Seoul,** Korea [Aleklett]
November 30	Air Transport & Energy Challenge, **Toulouse**, France, [Bauquis]
December 1	National Assembly, Korea, [Aleklett]
2007	
January 18	Lecture, Bayreuth University, **Bayreuth**, Germany [Campbell)
January 20-24	Conference, **Nairobi**, Kenya [Aleklett]
January 26	One Planet Agriculture, **Cardiff,** Wales [Campbell]
February 21st	Boole Lecture, University College, **Cork** [Campbell]
September	ASPO-6 International Conference, **Galway**, Ireland

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