

THE ASSOCIATION FOR THE STUDY OF PEAK OIL AND GAS “ASPO”

NEWSLETTER No. 75 – MARCH 2007

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 associates are in existence or formation in Australia, Austria, Canada, China, Egypt, France, Germany, Ireland, Israel, Italy, Luxembourg, 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.*

Foreign language editions are available as follows:

Spanish: www.crisisenergetica.org

French: www.oleocene.org (press “Newsletter”)

CONTENTS

802. *Regional Assessment – MIDDLE EAST GULF*

803. *Post-Peak Agriculture*

804. *Optimism in Britain*

805. *Apres-Pic*

806. *Further Update of the Depletion Model*

807. *ASPO in Japan*

808. *The Buffer of Storage*

809. *Signs of the times*

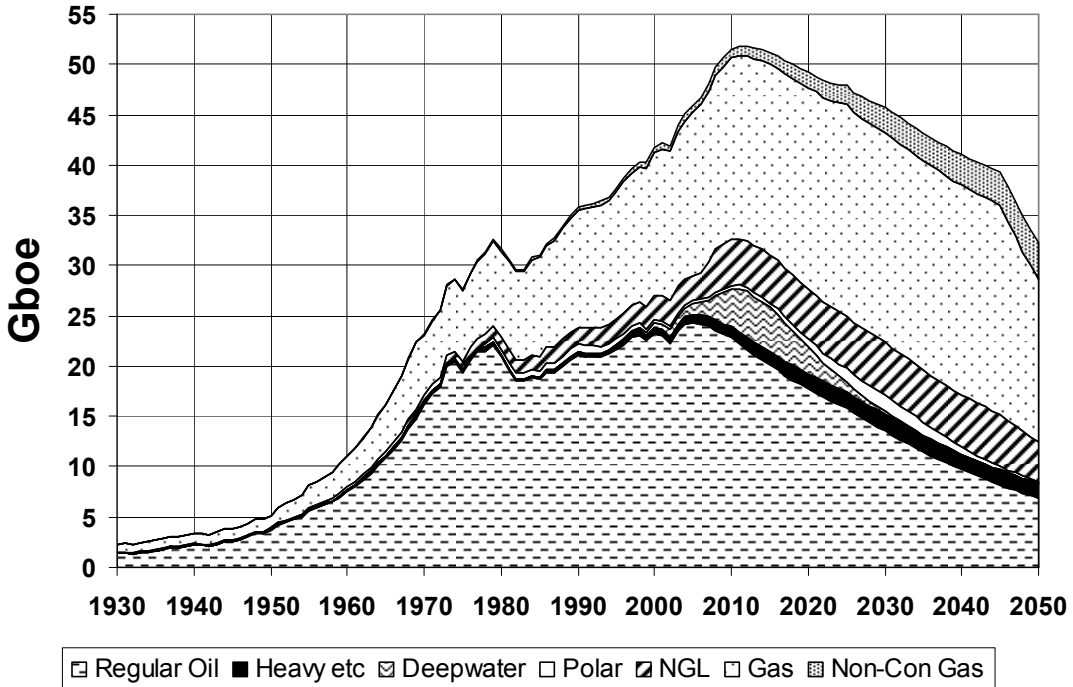
810. *Boston Oil Conference DVD’s available*

Index of Country & Regional Assessments with Newsletter Reference (*revised)

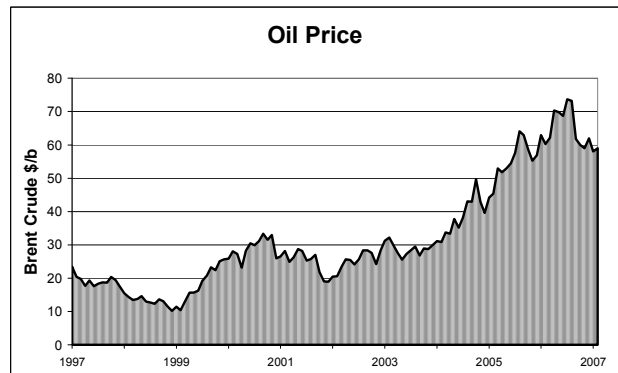
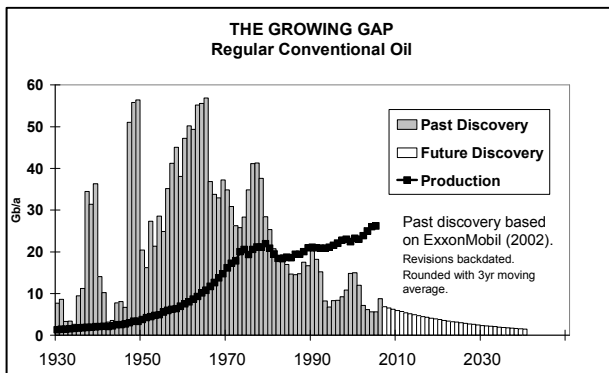
| | | | | | | | | | |
|------------|----|-----------|-----|-------------|----|-----------|-----|----------------|----|
| Abu Dhabi | 42 | China | 40 | Kazakhstan | 49 | Romania | 55 | REGIONS | |
| Algeria | 41 | Colombia | *62 | Kuwait | 38 | Russia | 31 | AFRICA | 68 |
| Angola | 36 | Denmark | 47 | Libya | 34 | Syria | *60 | EURASIA | 69 |
| Argentina | 33 | Ecuador | 29 | Malaysia | 51 | S. Arabia | *66 | EUROPE | 70 |
| Australia | 28 | Egypt | 30 | Mexico | 35 | Trinidad | 37 | L.AMERICA | 71 |
| Azerbaijan | 44 | Gabon | 50 | Netherlands | 57 | Turkey | 46 | N.AMERICA | 72 |
| Bolivia | 56 | India | 52 | Nigeria | 27 | UK | *68 | THE EAST | 73 |
| Brasil | 26 | Indonesia | *61 | Norway | 25 | USA | 23 | M.E. (Minor) | 74 |
| Brunei | 54 | Iran | 32 | Oman | 39 | Venezuela | *67 | M.E.GULF | 75 |
| Canada | 48 | Iraq | 24 | Peru | 45 | Vietnam | 53 | | |
| Chad | 59 | Italy | 43 | Qatar | 58 | | | | |

The General Depletion Picture

**OIL & GAS PRODUCTION PROFILES
2006 Base Case**



| ESTIMATED PRODUCTION TO 2100 | | | | | | | | | | End 2006 | |
|---|---------|-------|------|----------------------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Amount | | | Gb | Annual Rate - Regular Oil | | | | | Gb | Peak | |
| Regular Oil | | | | Mb/d | 2006 | 2010 | 2015 | 2020 | 2050 | Total | Date |
| Past | Future | Total | | US-48 | 3.2 | 2.6 | 2.1 | 1.7 | 0.4 | 200 | 1970 |
| Known Fields | New | | | Europe | 4.5 | 3.6 | 2.5 | 1.7 | 0.2 | 75 | 1997 |
| 994 | 775 | 131 | 1900 | Russia | 9.5 | 9.5 | 7.7 | 6.2 | 1.7 | 230 | 1987 |
| | 906 | | | ME Gulf | 20 | 20 | 20 | 20 | 11 | 693 | 2015 |
| All Liquids | | | | Other | 29 | 27 | 23 | 19 | 6 | 702 | 2004 |
| 1102 | 1448 | 2550 | | World | 66 | 62 | 55 | 49 | 19 | 1900 | 2005 |
| 2005 Base Scenario | | | | Annual Rate - Other | | | | | | | |
| M.East producing at capacity (anomalous reporting corrected) | | | | Heavy etc. | 2.4 | 3 | 4 | 4 | 5 | 152 | 2030 |
| Regular Oil excludes Heavy Oils (inc. tarsands, oilshales); Polar & Deepwater Oil; & gasplant NGL | | | | Deepwater | 2.7 | 10 | 12 | 7 | 1 | 69 | 2012 |
| | | | | Polar | 0.9 | 1 | 1 | 2 | 4 | 52 | 2030 |
| | | | | Gas Liquid | 6.9 | 12 | 13 | 14 | 14 | 355 | 2035 |
| | | | | Rounding | | 1 | 0 | -1 | -3 | 23 | |
| Revised | 13.2.07 | | | ALL | 79 | 90 | 85 | 75 | 40 | 2550 | 2011 |



802. Regional Assessment – MIDDLE EAST GULF

Finally, we come to the important region of all, the Middle East Gulf Region, which is also the most difficult to analyse, having the world's largest remaining reserves, which are also the least reliably reported.

The Region as defined herein, comprises Abu Dhabi, Iran, Iraq, Kuwait, Saudi Arabia and the Neutral Zone, whose oil is owned jointly by Kuwait and Saudi Arabia.

MIDDLE EAST GULF

The combined land area of these countries is 4.3 million km², together supporting a population of 127 million. In regional geological terms, they all fall within the limits of the Middle East basin, where prolific oil was generated at a time of global warming about 150 million years ago in a rift that opened between the African and Eurasian continents. It has what may be described as a concentrated habitat, such that the gentle growth of structures over time allowed the oil to be concentrated into a few very large fields. Considered in greater detail, there are in fact two productive systems : the prime one relies on Mesozoic (mainly Jurassic) generation which has charged overlying reservoirs both in the relatively complex structures of the Zagros Foothills and in the gentler foreland to the west; and a secondary one that taps oil and gas generated in the Silurian, giving oilfields in marginal areas and deep gas-condensate elsewhere. A total of almost 950 exploration boreholes have been drilled, which is a relatively modest number, given the size and potential of the area. Yet, discovery peaked in 1948 after 100 boreholes had been sunk, and the discovery trend has flattened markedly since, suggesting that only relatively modest finds remain to be made in the future.

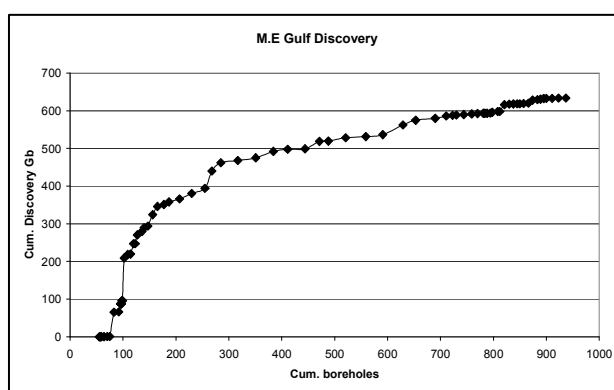
The Middle East is commonly regarded as the cradle of civilization, having been inhabited by early *Homo sapiens*, being his first stop when he stepped out of Africa about 60 000 years ago. Archaeological remains span 27 000 years, although the site of the Biblical Garden of Eden, where Adam met Eve, has not been specifically identified. Some of the world's great religions, including Judaism, Christianity and Islam, grew up in this part of the world. Being monotheistic, they tended to splinter into factions, with each claiming greater proximity to the Divinity which conveyed more earthly political influence, causing conflict.

The Persians of what is now Iran established a great empire about 2500 years ago but went into decline after conflict with the Greek and later Roman Empires, being later invaded by Arabs of the Shi'a branch of Islam. The Middle Ages saw the growth of the great Ottoman Empire, based in Turkey, which espoused the Sunni branch of Islam, and eventually held dominion over most of the Middle East, apart from Persia, much of southeast Europe and North Africa. These two sects reflect a dispute as to whether the son, or the son-in-law, of the Prophet Muhammad, who died in Medina in Saudi Arabia in AD 632, should inherit the mantle.

A kingdom for the Jewish people had developed in the Jordan valley some 12 000 years ago and after earlier conflict with the Egyptians became incorporated in the Roman Empire in 47 BC. It proved a difficult place to administer, and by AD 135, the Romans had had enough, razing Jerusalem to the ground and driving its inhabitants into exile. Evidently these threads of history run deep in the culture of the region.

While the quest for Empire has long been a predilection, the coal-fired industrial revolution of Europe during the 19th Century gave it a new impetus as Britain, France, Germany and Russia vied with each other for new markets and financial hegemony. India was the pearl of the British Empire but its trade route was at times threatened. France was, seeking to build a North African empire, constructing the Suez Canal in Egypt, while the land-locked Russians for their part were expanding southwards to the Black Sea area in the quest for an export route to the Mediterranean. The British evidently had no great designs upon the Middle East itself, but wanted to secure their trade route to India, establishing various bases in the Persian Gulf, partly to control piracy. The Ottomans found themselves as something of a buffer zone between the British and Russian spheres of influence, being later wooed by Germany, which sought to take a position in the Middle East, planning to build a railway from Berlin to Baghdad. These European powers endeavoured to maintain a certain balance by various complex alliances, including one between France and Russia, which left the Germans feeling threatened on two sides. They believed that a lightning strike against France, whom that had readily defeated in the Franco-Prussian War of 1870, would be successful, leaving them free to tackle the Russians. The assassination of an Austrian Archduke in Serbia triggered the First World War in 1914, being something of a catalyst for previous imperial tensions. Wars had been a useful means of settling political disputes in the past, but now advances in military technology and improved railway communications converted them into appalling conflicts of attrition. German influence installed a general, Liman von Sanders, to take charge of the Turkish army, making the country an ally in the war, which in turn prompted the British to foster Arab nationalism and revolt in the Ottoman territories of the Middle East.

The United States entered the war on the side of Britain and France in 1917, ending the stalemate, and later proposed to settle the conflict on terms of *Peace but not Victory*, which reassured the Germans but did not exactly appeal to its victorious British and French allies. The United States accordingly had a place in the eventual Peace Treaty of 1919, which amongst other things determined the fate of the Ottoman Empire of the Middle East, indirectly paving



the way for the entry of American oil companies. New administrations with arbitrary frontiers were established, eventually becoming independent States, variously under British and French supervision, some being termed *Protectorates*.

The imposition of post-war reparations on Germany, which was held responsible for the war, led to great economic hardship, providing an environment that was receptive to socialism, taking inspiration from the 1917 Communist Revolution of Russia. The Great Depression of 1929 made the situation even worse, paving the way for the rise of so-called National Socialism that sought bring order to the country under strong government and rediscover its past grandeur, including eastward expansion to integrate various German communities in eastern Europe. It reached an accommodation with Russia for the division of eastern Europe, but the balance of European power and economic hegemony was again disrupted, leading to a resumption of hostilities in the Second World War. This time the Middle East was not directly affected.

The British Government had decided to facilitate a homeland for the Jews in Palestine in 1916 under the so-called Balfour Declaration, which was announced when America entered the war a year later, suggesting a link. Immigrants began to arrive facing increasing degrees of resentment from the indigenous people. A terrorist movement was established in 1942 to oust the British. An atrocity in 1947 caused a war-weary Britain to turn responsibility for the place over to the United Nations, which paved the way for the unilateral declaration of the State of Israel a year later. Floods of new immigrants arrived from war-torn Europe. The dispossessed indigenous people were driven into refugee camps, but succeeded in enlisting the support of neighbouring countries, which led to subsequent wars and conflicts.

So much for the general historical background: allowing us to turn to the region's specific oil history, as admirably documented in Daniel Yergin's book, *The Prize*.

Oil had of course been known since Biblical times, being used as mortar for the walls of Babylon, as the seal for the basket of reeds in which Moses made his escape, while gas seepages fired the Fiery Furnace of Nebuchadnezzar, and oil shales lit the eternal flames, worshiped by the Zoroastrians.

Modern oil history opened with an endeavour by a British entrepreneur, by the name of Knox D'Arcy, who had made a fortune in Australian gold-mining, to successfully secure oil rights from the Bakhtiari's, controlling the Zagros foothills of Iran. After initial disappointments, and close to abandonment, the effort was finally rewarded when a well at Masjid-i-Sulaiman blew out in January 1908. It had tapped a fractured limestone of the Miocene Asmari Formation, fed by deeper, then unknown, source rocks, throwing a plume of oil high into the sky, which opened what was to prove the world's largest oil province. The British Government took a 51% stake in the company, which became British Petroleum or BP, just prior to the First World War in order to obtain a secure source of fuel for its Navy which was converting from coal to oil.

Meanwhile, German engineers, building Berlin to Baghdad railway, encountered oil seepages in Iraq. The railway concession included mineral rights on either side of the track. The Ottoman Sultan asked a young Armenian connected with the Caspian oil business, by the name of Calouste Gulbenkian, to investigate. His interest led to the formation of the Turkish Petroleum Company, floated in London, which included German capital that was sequestered during the First World War. Gulbenkian, displaying consummate negotiating skill, somehow resurrected the rights after the war, which were duly transferred to representatives of the victorious allies in the form of Shell, BP, Exxon, Mobil and CFP of France in what became the Iraq Petroleum Company, with Mr Gulbenkian retaining his famous 5%. Its geologists had little difficulty in identifying a huge prospective structure near Kirkuk in northern Iraq, which came booming in as a giant find in 1927.

The foothills of the Zagros Mountains of Iran and Iraq expose obvious prospective surface structures, but initially sceptical attention later turned to the plains to the west where the prospects were less obvious being partly covered by the desert sands. The explorers were now helped by seismic surveys to map the buried structures, being rewarded by major discoveries in successively Bahrain (Chevron) in 1931; Kuwait (Gulf Oil and BP) in 1938; and the largest of them all, Saudi Arabia (Chevron, later joined by Texaco, Exxon & Mobil as the Arabian-American Oil Co) in 1940. The latter discovery sprang from the work of Nestor Sander, a palaeontologist who was able to map the structure on the basis of the depth to a particular layer rich in microfossils penetrated in shallow boreholes. The great potential of the Middle East was established.

The United States government had been forced to intervene in its own oil industry in 1933 restricting production to support price during a glut that followed the Great Depression, such being administered by the Texas Railroad Commission. This was the inspiration for moves by the Venezuelan government leading to the formation of OPEC in 1959 to cut world production to support price. Iran had already expropriated the rights of BP in 1951, setting an example followed by Iraq in 1972, Kuwait in 1975, and Saudi Arabia in 1979. The international companies, which had lost their prime sources of supply in this way, responded by stepping up exploration elsewhere, especially offshore, when there were still large finds to be made. Even so, the Middle East countries retained a critical control of world supply, and when several of them decided to stop exports to the United States in 1973 in response to its support for Israel, world oil prices soared, creating what is known as the First Oil Shock. The Second Oil Shock followed in 1979 as a result of panic buying occasioned by the fall of the Shah of Iran. Both were politically inspired events, not reflecting any physical constraint to production as such, albeit highlighting the dominant endowment of the Middle East.

Prices fell as production from other areas, including the North Sea, rose during the 1980s, and the OPEC countries found themselves facing low revenues and competing with each other for production quota which was based largely on reported reserves. Kuwait had been consistently reporting reserves as originally determined by Gulf and BP, but in 1985

announced a massive increase from 64 to 90 Gb (billion barrels), although nothing particular had changed in the oilfields. Having already produced 22 Gb, this was close to the sum of past production and remaining reserves. Two years later, it added further 2 Gb, which exhausted the patience of its neighbours, causing Abu Dhabi to match Kuwait, reporting the same 92 Gb (up from 31 Gb), for Iran to go one better at 93 Gb (up from 49 Gb) and Iraq to cap both with a rounded 100 Gb (up from 47 Gb). Saudi Arabia could not match Kuwait because it was already reporting more, but two years later announced a massive increase from 170 to 258 Gb, probably following Kuwait's example of reporting the total found, not the remaining reserves. Abu Dhabi continues to report the same 92 Gb, despite 11 Gb of subsequent production, and the reports of the other countries are barely changed. Accordingly, little credence can be placed on these reserve estimates, with as much as 300 Gb being in doubt.

These developments were of course intimately related to wider political events, which can only be summarised here.

An aristocrat by the name of Mossadegh, who had been campaigning for many years to end the autocratic rule of the Shah of Iran, was eventually elected Prime Minister in 1951. He moved promptly to expropriate BP's oil rights, seeing oil revenue as the pillar of the Shah's power. British and American pressure then led to the formation of the so-called Consortium, to which BP was readmitted with 40% of its once exclusive position : the balance being taken up by group of American companies, together with Shell and CFP of France. However, the underlying tensions festered, eventually seeing the growth of popular support for a Muslim cleric, the Ayatollah Khomeini and culminated in an attack on the US Embassy in 1979 at which hostages were taken. Anti-American feeling swept the country, leading to the fall of the Shah.

Iran was also in conflict with its neighbour, Iraq, over the ownership of a key waterway, the Shatt-al-Arab, through which Iraq's oil exports passed. It led to a war between the two countries in 1980 which dragged on for several years with appalling loss of life. The United States, reeling from the hostage crisis in Iran, found itself closer to Iraq under its leader, the late Saddam Hussein.

During the 1980s, the United States and Britain decided to try to bring down the Soviet Regime of Russia by economic means, identifying oil as a weapon, given that the country relied heavily on oil exports as a source of revenue. King Fahd of Saudi Arabia was persuaded both to raise exports to lower the price, and fund freedom fighters in Afghanistan to undermine the Soviet occupation of that country. It was a successful strategy but carried the cost of low price which was adversely affecting other oil producers, including those in Texas. Meanwhile, Iraq found itself in dispute with Kuwait over two issues: first, it was losing revenue from low oil prices, caused in part by Kuwait's manipulation of its agreed OPEC quota, as described above; and second it was losing physical oil as Kuwait pumped from its end of the South Rumaila Field that straddles an ill-defined border. Now, the United States moved to strengthen the price of oil, and, to judge from the words of its Ambassador in Baghdad, did not object to plans by Saddam Hussein to resolve the boundary dispute by military means. In the event, that escalated into the full scale occupation of Kuwait, which was more than the United States had bargained for. Joined by Britain and other countries under a UN mandate, it then successfully liberated Kuwait in what was known as the Gulf War of 1991. Iraq's oil exports were embargoed, causing much hardship to the people but helping to support oil price : the embargo being from time to time relaxed for humanitarian reasons when prices rose uncomfortably. A degree of stability returned to the region, lasting until the Anglo-American invasion of Iraq in 2002, justified by President Bush on BBC TV in December 2006 with the words : *our energy supply was at risk*. The dictum that *oil and politics are never far apart* evidently applies full well to the Middle East.

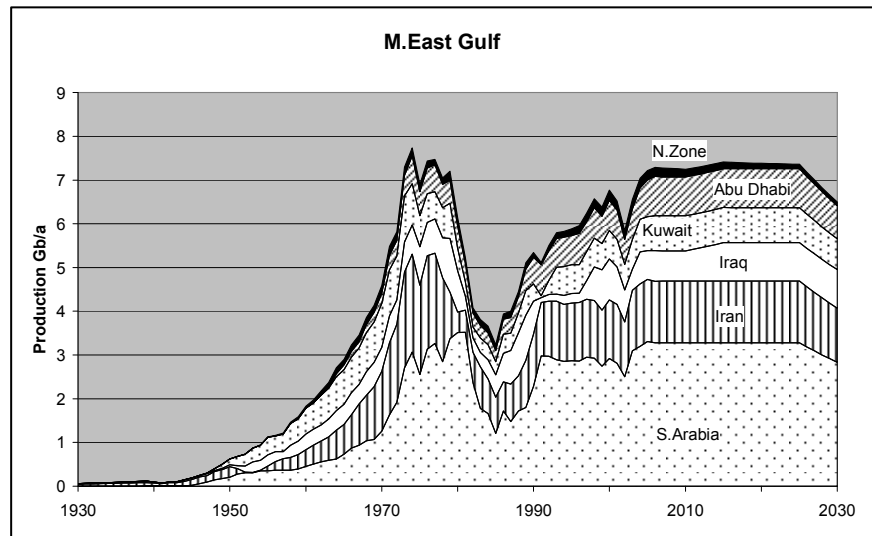
Another factor was the rapid rise in population in the Region, with these five countries alone increasing more than four-fold from about 30 million to 120 million over the past fifty years, which, given the largely barren terrain, was made possible by oil-related income, however unevenly distributed.

Trying to determine the true oil position of the Middle East is a difficult task. The details of reserves and production are State secrets, and it is virtually impossible to obtain valid data, although officials in one country do from time to time question the reports from their neighbours, and the Kuwait Petroleum Company did recently hint that the country's reserves were less than officially reported.

Analysts are accordingly forced to make hopefully intelligent guesses of what the true position might be, having looked at the long-term trends, the early unbiased records of reserves, and the current range of official and industry data. Notwithstanding the uncertainties, it is clearly important to take a position as a working model, as summarised in the following table, being at the same time very ready to revise it as new information comes in.

| Gb | Production in Known Fields | | Total Found | "Official" Reserves | Yet-to-Find | TOTAL | Dep. Rate |
|-------------------|----------------------------|--------|-------------|---------------------|-------------|-------|-----------|
| | Past | Future | | | | | |
| S.Arabia | 107 | 156 | 263 | 259.8 | 17 | 280 | 1.9% |
| Iran | 60.0 | 68 | 128 | 136.27 | 12 | 140 | 1.7% |
| Iraq | 30.0 | 72 | 102 | 115 | 13 | 115 | 0.8% |
| Kuwait | 33.8 | 44 | 78 | 99 | 2.3 | 80 | 1.7% |
| Abu Dhabi | 21.1 | 40 | 61 | 92.2 | 4.4 | 65 | 2.0% |
| N.Zone | 7.5 | 5 | 12 | 5 | 0.6 | 13 | 3.7% |
| Region | 259 | 384 | 644 | 707 | 49 | 693 | 1.7% |
| % of World | 27% | 50% | 35% | 53% | 35% | 37% | |

It shows that all the countries (save from the Neutral Zone, which, having two owners, was not subject to the anomalous reserve reporting) are depleting their reserves at exceptionally low rates, suggesting that, if anything, the estimates may still be too generous, although far below the official reports. They are nevertheless taken as a basis for forecasting future production. Only the Neutral Zone is past its depletion midpoint and in natural decline at its current depletion rate. The other countries could increase production in resource terms, albeit with superhuman effort and investment, but it is here assumed that, apart from Iraq, they will have no reason to do so, preferring to maintain current levels for as long as possible, given their heavy dependence on oil revenues. They certainly have no motive to increase production if that would serve to reduce price. Iraq is a special case, due to the Anglo-American invasion, and is tentatively forecast to increase its production at 5% a year from 2010 to 2015,



assuming an improved political environment which may well prove to be an optimistic assumption, given the continuing tensions. Iran is currently under threat from the United States, and if this should result in a new armed conflict, it could inflame passions to the extent that turmoil spreads throughout the region. Despite these risks and uncertainties, production in each of the countries, except Iraq and the Neutral Zone, is here assumed to plateau until its Depletion Rate rises to about 3%, which is taken to be a reasonable point for the onset of terminal decline in resource terms (see figure). We may note however that some analysts think that Saudi Arabia is already in terminal decline, being much influenced by conditions in the aging Ghawar Field, the world's largest, found in 1948, where the water-cut is rising, and horizontal drilling is having to be employed to tap the less productive reservoir intervals. It may hold large reserves, but the extraction rate looks set to decline.

Production in the Region as a whole stands at 20 Mb/d, and is here forecast to rise only slightly before starting its terminal decline at just under 3% a year in 2020. Consumption is running at 4.6 Mb/d, meaning that the region can continue to export some 15 Mb/d over the forecast period before decline sets in. This is almost 20% of world annual consumption, explaining the importance of the region, and the pressures likely to be exerted upon it. In per capita terms, consumption is relatively high at 14 b/a, which is equivalent to European standards.

The Region also has substantial gas resources. Some 190 Tcf have been produced so far, with 1700 Tcf reportedly yet to produce from known fields. Production stands at about 9 Tcf/a meaning that there is ample supply for both local consumption and export for many years to come. Iran, however, has become a small net importer, producing 8.4 and consuming 8.6 bcf/d., which perhaps explains its interest in developing nuclear energy for electricity generation.

It is evident that the Middle East Region has a crucial role to play in the years ahead. Its share of critical *Regular Conventional* oil was 4% in 1930, but rose to 37% in 1974, making possible the First Oil Shock. It then fell to 17% in 1985, largely in response to rising production from the North Sea, Alaska and Russia. It has recovered to 30% in 2006 and is expected to rise to about 50% by 2030. It faces however increasing competition from *Non-Conventional* categories, such that its share of *All Liquids* rises from 25% in 2006 to almost 30% in 2030. The price of oil is nevertheless clearly set to rise in the years ahead as world supply falls short of the current trend of demand. The Middle East is the principal beneficiary, profiteering from shortage on a massive scale as production costs have not risen significantly. Much of this new wealth is recycled back as petrodollars into western financial markets by the Middle East elite, being eventually inflationary and destabilising.

But at the same time, it is entirely possible that the high prices will themselves trigger world economic recession if not the Second Great Depression, in turn causing a collapse of oil price, which would wreak havoc in the Middle East that has come to depend on oil revenue so heavily. Thus, all the indications are for rising tensions caused either by more direct invasion, internal disintegration, global economic depression, or a combination. It is not a rosy picture.

803. Post-Peak Agriculture

Jeremy Leggett reports on an important conference hosted by the Soil Association of the United Kingdom on January 25-27th (Guardian website)

On Friday and Saturday last week, a potentially historic meeting took place in the rather unpromising location of the CIA, otherwise known as the Cardiff International Arena. Britain's organic farming community gathered en masse for the annual meeting of the Soil Association, and their theme was peak oil and farming in the post-petroleum era. Organisers and peak-oil whistleblowers alike thought that

perhaps this was the first time an organisation in a critically affected sector has held a conference on the theme of peak oil.

If the peak-oil proposition is correct, the tipping point of global oil production will happen - largely unexpectedly - in this decade or early in the next, accompanied by a dire energy shock. The people in the room will be in the front rank of those first affected. They can also be in the vanguard of those who can offer a proactive vision of what a survivable post-shock future could look like.

Discussion ranged across many potential impacts and implications. Let me choose just two: the number of farmers, and where they farm. So oil-dependent is modern industrial agriculture, and so relatively few are the people employed in it, that we will need to redefine the very concept of a farmer after the peak hits us. Today our typical farmer might tend 500 acres with tractors and other expensive bits of oil-addicted kit. But in the post-peak era - with the oil price sky high, and oil supplies fast-shrinking and therefore probably rationed - our farmers will need to be tending an area of maybe one-tenth the size, using more human labour and strategic use of a tractor powered by something other than petroleum, plus good old-fashioned draft animals. Many more people will need to be working the land if we are to feed ourselves. When the collapsing Soviet Union turned the oil taps off on Cuba, 15-25% of the population had to take to the fields in some form or other. (The good news is that they succeeded, to the extent that nobody starved.) Today in the UK, 1% of us farm. In 1900, before mass addiction to oil, fully 40% did.

We will need to be farming in the cities and towns as well as the countryside. The conference heard encouraging stories of urban farming in Cuba, and how surprising amounts of fruit and veg can be grown on astonishingly small areas of land in cities.

Who is planning for this kind of counter-intuitive impact? Not governments, for certain, and very few individuals and organisations. There are oases of foresight. In the US, the City of Oakland has a target of growing 30% of its own food within the city boundaries by 2020. In the British Isles, community-level responses are underway in Kinsale, Totnes and other towns. The list is not long. Most people and institutions are either unaware of the coming tsunami, or in denial.

However, as became clear over the two days of discussion, there is much that organic farmers are doing that moves us away from oil and other fossil fuels. And there are many ideas on offer for what more could be done. As the director of the Soil Association, Patrick Holden, put it: *What I have found is that the prospect of developing a strategic plan to do everything we can to equip ourselves for a post-fossil fuels age is, strangely, an inspirational proposition*

Let us hope it proves so to many people. Different it will surely be.

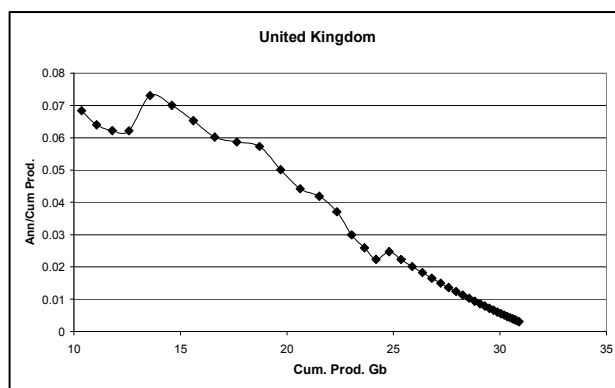
804. An Optimistic Minister

The February Edition of the *Petroleum Review* reports the following words of the British Minister of Trade and Industry, Alistair Darling, commenting on the commencement of production at the Buzzard Field in the North Sea:

"We know that there are still between 15 and 20 bn barrels remaining in the North Sea, and with Buzzard, the UK should return to being a net exporter over the next couple of years".

The attached plot, based solely on historical production, delivers a firm trend pointing to an ultimate recovery of about 32 Gb, confirmed also by the discovery trend. With 24 Gb having been already produced, it means that 8 Gb are left for the future. This is about double the officially reported reserves yet half the low end of the Minister's claim.

The peak of oil production in Britain was in 1999 at 2.94 Mb/d, since when it has declined to 1.68 Mb/d in 2005, with the Oil & Gas Journal forecasting 1.48 Mb/d for 2006. Consumption stands at about 1.8 Mb/d, meaning that imports stand at 300 kb/d. The



Buzzard Field, which is reported to have 0.55 Gb of Reserves, is expected to produce at about 200 kb/d (or 0.073 Gb/year), giving it a plateau life of about seven years, followed by decline. The addition of the 200 kb/d from Buzzard will lift the national depletion rate (annual production as a percent of what is left) from the current 6.5% to 7.9% a year, accelerating the long term decline.

It is difficult to know how the Minister calculates that Britain will return to being an exporter on the above numbers, unless he anticipates a slump in demand, but even if he uses a different dataset, for example confusing the issue by combining oil and gas in terms of oil-equivalent or exaggerating the yet-to-find, it is evident that Britain will be hard pressed to return to exporter status for more than a few months. The wisdom

of welcoming exports at all in the face of the rapid depletion of Britain's own resources is also open to debate.

805. *Apres-Pic*

ASPO-IRELAND continues to plan the ASPO-6 Conference for September 17th and 18th to be held in Cork in Ireland. The plan is that the first day would address the issue of Peak Oil itself and that the second would be devoted to political, social and economic consequences. An impressive list of speakers is being assembled. Up-to-date details can be found on the official conference website www.aspo-global.org/asp06

Experience from earlier conferences is that the value of the occasions is as much in the opportunity for the participants to meet informally, develop relationships and exchange ideas in an agreeable setting as it is in the formal presentations. To this end, we contemplate organising an opportunity to see something of the splendid country of the west of Ireland with a post-conference stay in a good hotel in a beautiful lakeside setting near Killarney. There are many attractions from first class golf-courses, to trips in horse drawn jaunting-cars, mountain walks, fishing and visits to museums and Neolithic sites. The subject of depletion can also be covered in the evenings with the help of good Irish beer.

Anyone interested in this idea could e-mail the undersigned at aspotwo@eircom.net as it would be helpful to have an indication of numbers. We may be able to negotiate special hotel rates, and would tentatively contemplate September 19th to 22nd expecting the cost to be about 125 euros a day including transport.

806. *Further Update of the Depletion Model*

The task of updating the depletion model and database continues, and thanks to a valuable contribution from a generous benefactor will now be more systematic with the engagement of a dedicated analyst, working full time.

The 2006 model has been revised on the basis of new information, allowing the correction of the table and graph on Page 2 of the Newsletter. It will be noted that the revision returns to the earlier assessment of the *Regular Conventional* total at 1900 Gb, including a rounding item of 30 Gb, described as *Unforeseen*. These numbers are far from set in stone given the appalling and deteriorating quality of the input data, and so it is well to emphasise that they are subject to continual review and revision. The new model delivers peaks of respectively *Regular Conventional* in 2005 and *All Liquids* in 2011, but the differences are small.

It will be noted that reference to the term *Reserves* is avoided because it is subject to so much confusion. Instead, we speak of *Estimated Future Production from Known Fields*, which introduces a time factor as illustrated in the table.

| | Produced | | Remaining |
|------|-------------------|------|-------------------|
| | Reg. Conventional | All | Reg. Conventional |
| 2006 | 994 | 1102 | 1092 |
| 2030 | 1424 | 1763 | 476 |
| 2050 | 1618 | 2105 | 282 |

By defining production in a time-frame we avoid having to worry about irrelevant tail-end production, as represented for example by the well drilled in 1859 in Pennsylvania which still delivers a few pints a day for visitors to a local museum. It is unrealistic to forecast how much of the *All Liquids* category will remain at the indicated dates. The deepwater and polar oil will be virtually exhausted by 2030 and 2050 respectively, but there might be about 70 Gb of Gas Liquid left by 2050. There will be plenty of the *heavies* (tarsand, shale oil etc), left in the ground by the end of the Century, but production will presumably end before then when the net energy yield turns negative. Exactly when that happens is hard to know but a date around the mid-Century might be reasonable.

807. *ASPO in Japan*

Professor Ishii, of the University of Tokyo, has been an enthusiastic supporter of the work of ASPO, and has formed *The Mottanai Society* in Japan. (It is an old Japanese expression meaning *Do Not Waste*) and will effectively represent ASPO in the country. It plans an active programme:

see <http://www.mottainaisociety.org>

808. *The Buffer of Storage*

The present weakness in crude oil price (if that is the word considering that it is more than double what it was only three years ago), seems anomalous in terms of supply, as there no sign of major new production coming on stream. Perhaps the weakness is induced from the demand side. One investment banker has drawn attention to the role of storage, both physical and financial in the form of futures. The market knows two conditions, termed *Contango*, when futures are above present prices, and *Backwardation* when they are not. In a *Contango* situation, it makes sense to build physical storage, which costs nothing and appreciates in

value. Traders probably have a view of the future counted in days or hours: the refiner and marketer are probably unaware of the long term supply trends; and even the motorist may run on near empty, confident of being able to fill up when the urge takes him. On a larger scale, OPEC countries may have massive storage both in tanks and tankers which they can hold or release at will; and the consuming governments maintain what are called strategic stocks.

When prices are rising it makes eminent sense for everyone to build maximum storage, but if price weakens or even flattens, the justification for a storage diminishes, leading operators to reduce stocks under normal economic short term principles, which in turn releases more to the market, further depressing the price. In addition to the direct market are the hedge funds and speculators, who are obviously in a position to influence the market to some degree. A stable price is the last thing they want, so with their eagle eyes they watch the movements and take positions which to some degree are self-fulfilling.

So, some part of the present weakness may reflect such market behaviour. On the other hand, the high prices may indeed have started to prompt recession, dampening real demand. Financial operators may themselves successfully obscure recessionary trends by range of mechanisms, such as interest rates, debt and other esoteric elements beyond the grasp of mortals. But it is said that eventually truth will out, and the real situation reveal itself to those with eyes. If, or perhaps, when the Second Great Depression strikes, the game will be up, and demand and price may collapse in parallel. But it may well take further price spike to, say, over \$100 a barrel to prompt a full reaction. One thing however is clear : supply cannot rise for long in the face ever growing depletion : indeed any increase in production would simply raise the underlying depletion rate.

809. Signs of the times

It seems obvious that soaring oil prices must trigger recession, given the central role of oil-based energy in the modern economy. The underlying reason for rising oil prices is the capacity limits imposed by natural depletion, but this is not widely understood with a tendency to attribute them to a wide range of short term economic and political factors. However there do seem to be certain hints of a looming recession which are filtering through. For example, the price of farmland in England and Wales rose 18% last year, while that in Scotland increased by 29%. This may not simply be speculators trying to cash in on the soaring price of wheat, which has risen by 50%, but a desire by people to own something real which could support them. The rate of bankruptcy is also soaring in Britain from 29 000 in 1999 to 105 000 in 2006, and the situation is even worse in the United States, where according to the Centre for Responsible Lending it is *exceeding the worst foreclosure in the modern mortgage market, which occurred during the oil patch disaster of the 1980s*. The link with oil is significant. Some supermarkets are beginning to question the viability of their just-in-time, long-distance supply chains, which will be adversely affected by soaring energy costs. One chain in Britain even contemplates opening *100-mile Counters* to sell and encourage local produce.

The National Petroleum Council in Washington has started taking hearings on Peak Oil on the instruction of the Secretary of Energy. Meanwhile, some commentators speak of a new Cold War as the West pressures Russia to accelerate the depletion of its oil and gas by stepping up exports. An added dimension here is control of the Arctic Ocean, from which the ice is receding thanks to global warming. As always, areas closed to exploration are depicted to be brim full of oil and gas, leading one analyst to comment : *Unless something slows him (Putin) down, there's no way for the West to prevent him putting his hands on some of the most prized resources of the planet*. (Robert Hueber, Centre for Security and International Studies). The prize for taking the Arctic may well turn out to be no more than a string of dry holes, as prime oil-source rocks were confined to tropical regions, having been only locally transported to high latitudes by plate tectonic movements. Britain is rebuilding its nuclear weaponry with no as yet declared target. On the other hand, growing Middle East instability, arising from the Anglo-American invasion, could carry an unintended silver lining as a fall of current production there would leave more in the ground for the future, when it will be desperately needed.

(References partly furnished by Hugh Sharman; and partly coming from The Times of Feb 24)

Postscript

The last few days have seen a strengthening of oil price to above \$60, and a strong fall of world stock markets. It is the sort of relationship to be expected, but time will tell if it is merely blip on a volatile market or a portent of what the post-peak world has to expect.

810. Boston Oil Conference DVD's available

ASPO-USA has produced DVDs of the Boston Oil Conference held last October. The set consists of 9 DVDs covering the complete two day Conference including Q&As. They have been edited to show

PowerPoint slides integrated into the speeches from the original presentations, so text and graphics are easy to read. The DVD sets may be ordered on the ASPO-USA website: <http://www.aspo-usa.com/>

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.

2007

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|-------------|--|
| March 8 | Norwegian Oil Tax Office, Oslo [Alekklett] |
| March 9 | Business Meeting, Limburg , Netherlands [Alekklett] |
| March 10 | Minerals, Energy & the Environment, ASPO-ITALIA, Florence , Italy [Bardi] |
| March 13 | Flame 2007, Amsterdam , Netherlands [Alekklett] |
| April 17 | Oil & Gas Summit, Paris [Alekklett] |
| May 28-30 | Planning for Oil Depletion ASPO-SOUTH AFRICA Conference Cape Town [Ratcliffe] |
| Sept. 11-12 | Geological Society bi-Centennial Conference, London [Campbell] |
| Sept. 17-18 | ASPO-6 International Conference, Cork , Ireland |

2008

ASPO-7 International Conference, Norway

NOTE

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