

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

NEWSLETTER No. 86 – FEBRUARY 2008

ASPO started as a European 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, associates are active in Australia, Austria, Belgium, Canada, China, Croatia, Denmark, Egypt, Finland, France, Germany, Hong Kong, Ireland, Isle of Man, Israel, Italy, Luxembourg, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway Portugal, Russia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, United Kingdom, USA, and Venezuela.

(Formally constituted entities are shown in bold face)

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 of oil and gas decline for Mankind.***

Foreign language editions are available as follows:

Spanish: www.crisisenergetica.org

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

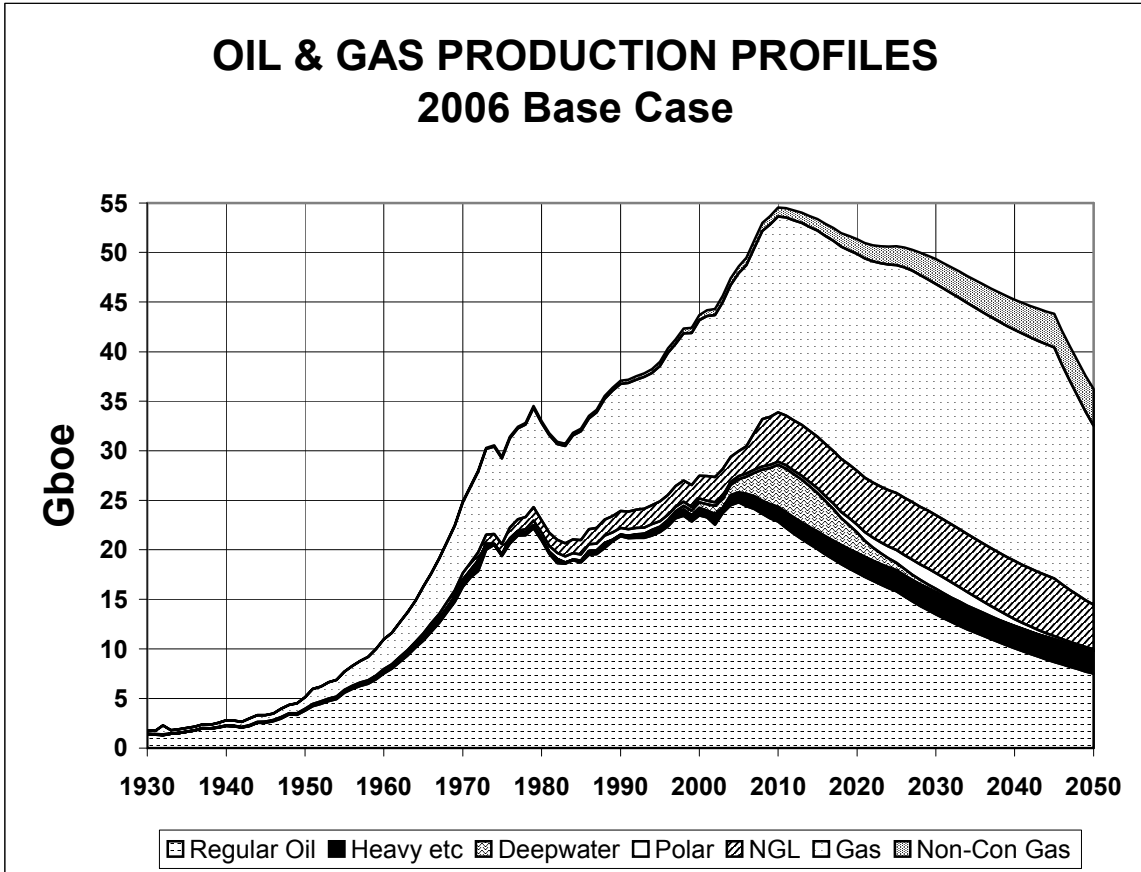
CONTENTS

- 1001. Oil Price***
- 1002. Brasil’s Nuclear Addendum***
- 1003. Peak Oil and Climate Change***
- 1004. Peak Oil on the U-Tube***
- 1005. Oil and Gas Consumption***
- 1006. A Chairman addresses his Shareholders***
- 1007. At last the European Union recognizes Peak Oil***
- 1008. China too recognizes Peak Oil***
- 1009. A Credibility Gap***
- 1010. Lax Accounting***
- 1011. Shell Confesses***

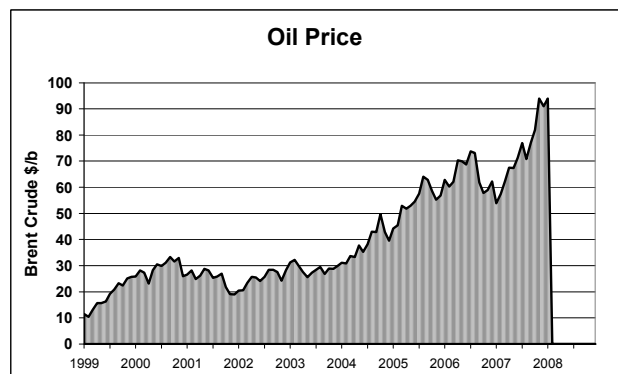
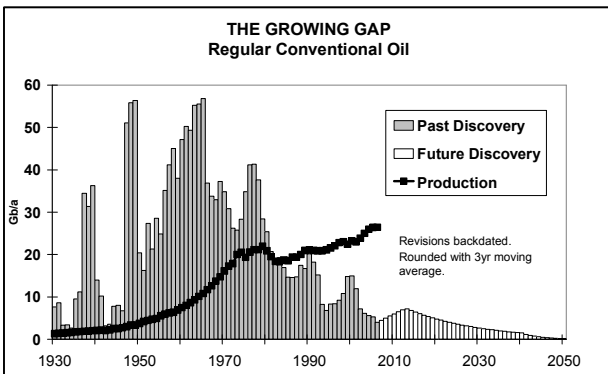
Index of Country & Regional Assessments with Newsletter Reference (*revised)

Abu Dhabi	42	China	40	Kazakhstan	49	Qatar	58	REGIONS	
Algeria	41	Colombia	*62	Kuwait	38	Romania	55	AFRICA	68
Angola	36	Denmark	47	Libya	34	Russia	31	EURASIA	69
Argentina	33	Ecuador	29	Malaysia	51	Syria	*60	EUROPE	70
Australia	28	Egypt	30	Mexico	35	S. Arabia	*66	L.AMERICA	71
Azerbaijan	44	Gabon	50	Netherlands	57	Trinidad	37	N.AMERICA	72
Bolivia	56	India	52	NeutralZone	84	Turkey	46	THE EAST	73
Brasil	*85	Indonesia	*61	Nigeria	27	UK	*68	M.E. (Minor)	74
Brunei	54	Iran	32	Norway	25	USA	23	M.E.GULF	75
Canada	48	Iraq	24	Oman	39	Venezuela	*67	Deepwater	76
Chad	59	Italy	43	Peru	45	Vietnam	53		

The General Depletion Picture



ESTIMATED PRODUCTION TO 2100										End 2007	
Amount			Gb	Annual Rate - Regular Oil					Gb	Peak	
Regular Oil				Mb/d	2007	2010	2015	2020	2030	Total	Date
Past	Future	Total	US-48	3.7	3.1	2.4	1.8	1.0	200	1970	
Known Fields	New		Europe	4.3	3.5	2.5	1.7	0.9	76	2000	
1008	724	143	Russia	9.7	9.7	7.8	6.2	3.9	230	1987	
	867		ME Gulf	19	19	20	20	17	693	2015	
All Liquids			Other	28	27	22	19	13	701	2005	
1155	1345	2500	World	65	62	55	48	36	1900	2005	
2006 Base Scenario			Annual Rate - Other								
M.East producing at capacity (anomalous reporting corrected)			Heavy etc.	6.5	11	5	5	6	212	2030	
Regular Oil excludes Heavy Oils (inc. tarsands, oilshales); Polar & Deepwater Oil; & gasplant NGL			Deepwater	6.5	12	11	6	1	68	2011	
			Polar	0.9	1	1	2	4	52	2030	
			Gas Liquid	7.7	8	9	9	10	261	2035	
			<i>Rounding</i>				-1	3	6		
Revised	04/01/2008		ALL	87	94	80	70	60	2500	2010	



1001. Oil Price

Rising oil prices passed \$100 a barrel early in the New Year, attracting much media comment. There is of course nothing particularly magic about this round number, but the move into three digits did highlight the rising trend. Another way of looking at it is to compare salaries in oil terms. Someone earning say \$20,000 a year in 1970, when oil was trading at \$3.18 a barrel, could have bought 63,000 barrels. Today, he would have to be earning \$6,300,000 to acquire the same amount. This sounds like inflation. There is a certain additional meaning to the equation because a large proportion of earnings is indeed dedicated indirectly to buying oil, given the high oil-based energy content of every item, whether we speak of food requiring mechanization, or the bottle of perfume for a Christmas present requiring transport and manufacture.

Everyone is asking about the future direction of prices. It seems fairly obvious that there is insufficient new capacity to bring on to match a rise in demand, so in that sense there is only one direction for oil prices to go and that is upwards. An upward spike, at say double the present level, is entirely possible from any number of causes ranging from an attack on Iran or a hurricane in Gulf of Mexico. But on the other hand, if world recession deepens, there could be a fall in demand, such that prices could collapse to half their present levels.

The Oil Age opened 150 years ago, releasing a flood of cheap energy, such that to-day's production is equivalent in energy terms to 22 billion slaves working around the clock. The resulting economic prosperity allowed the banks to lend more than they had on deposit, confident that *Tomorrow's Expansion* was collateral for *To-day's Debt*. It sounds a rather dubious principle but worked well enough during the *First Half of the Oil Age* allowing at least some countries to reap great prosperity.

The *Second Half* now dawns, and being characterised by falling supply, effectively removes the collateral for debt. Oil prices have soared over the recent months as production capacity limits were breached. The higher prices reflect profiteering from shortage, especially by the major producing countries, as production costs have not increased proportionately. The resulting flood of petrodollars, representing a form of false liquidity, has no doubt contributed to the devaluation of the dollar and financial instability. Whereas the post-peak physical decline of oil, as imposed ultimately by the immutable physics of the reservoir, is only gradual at perhaps about 2%, the perception that past economic growth must now give way to contraction can come in an instant, prompting radical changes in the financial world.

A combination of high prices and economic recession may well lead to a decline in world oil demand, removing pressure on oil price. The transition around Peak Oil therefore threatens to be a time of great volatility. Soaring prices may trigger political responses as the suffering populace blame their governments for their higher cost of living, which may prompt outbursts such as recently seen in Burma, Pakistan and Kenya. Falling prices on the other hand may stimulate the OPEC countries to re-exert their mission of restricting production to support price. Thresholds for action change : at one time they may have been pleased to support \$30 a barrel; now they may see \$90 as a more desirable — and attainable — floor. The oil wealth of the major producing is also stimulating rapid growth in demand in those countries, some of which still enjoy very low local prices. The energy expended in invading them is also colossal.

The devaluation in the dollar, in which much oil is traded, is an additional important factor with many hidden ramifications.

The western Governments and their financial advisors probably continue to live in the past, imagining a temporary downturn that reacts to traditional medicine such as the issue of new liquidity to stimulate consumerism, when what they may face is the *Second Great Depression*. Apparently many financial and political elements foresaw the arrival of the *First Great Depression* in 1929 but could not act for fear of being held responsible for it. These psychological factors may explain why governments appear to find it easier to react to the perceived threats of climate change than face the raw reality of declining energy supply.

It remains to be seen how the *Second Great Depression* will unfold, but already this month has seen the onset of the long-predicted volatility with oil prices fluctuating from above \$100 to below \$90, and the stock markets falling steeply around the world. There is much talk of the risk of *Recession* — a fairly mild term in the circumstances.

While volatility is the dream of the sharp trader. Others may be motivated to try to calm nerves by speaking of plateau rather than peak. Plateau is indeed a more comforting image, even it does tend to end in a cliff.

1002. Brasil's Nuclear Addendum

It has been pointed out that the review of Brasil's energy situation as given in Item 994 in the January Newsletter failed to mention the country's nuclear capacity. It has two operating stations, Angra-1 and -2, providing 1896 MWe, or 3% of the country's electricity. A third station is awaiting completion, and there are

plans to build additional capacity to supply 8 GWe by 2030. Brasil has uranium resources of 200 000 tonnes, or 6% of the world's total. It has also developed centrifuge enrichment, using the same technology being employed in Iran, where it is depicted as justification for attack if not invasion.

This additional energy supply confirms the earlier assessment that *Brasil is fairly well placed to face the Second Half of the Age of Oil* (Information furnished by Geoffrey Greenhalgh)

We may also note in passing that Petrobras has drilled another deep well, named Jupiter, which reached a total depth of 5252m in 2187m of water, investigating the pre-salt section at a location 37 kms from the Tupi discovery. Exactly what has been found in these two large finds remains obscure, but statements emanating from the company suggest gas-condensate, which indeed is what might be expected from the high temperatures to be expected at such depths. The technical challenges of producing gas in such water depths remain daunting.

1003. Peak Oil and Climate Change

It seems to be increasingly recognized that *Peak Oil* and *Climate Change* are the two greatest challenges facing modern man. They may be intimately related insofar as the abundant supply of cheap oil-based energy led to the rapid expansion of industry, transport, trade and agriculture allowing the population to expand six-fold in parallel. It would be surprising if this sudden explosion of population did not have some environmental impact as forests were cut, cities expanded and industrial smoke filled the air. The atmosphere is, after all, no more than a thin skin, a few kilometers thick, protecting life on earth from excessive radiation.

The climate has of course changed many times in the geological past. Indeed every bedding plane seen on outcropping rocks reflects some climate change, whether between winter and summer or longer cycles. There have also been some extreme events, possibly prompted by massive volcanic eruptions, which led to mass extinctions. They incidentally provided the conditions for oil formation as algae proliferated in the warm sunlit waters and their remains were preserved in the stagnant depths.

In addition, there is the impact of two solar radiation cycles of 11 and 200 years duration, caused by orbital and other astronomical factors. The link with carbon dioxide concentration is not straightforward insofar as it is unsure if it is the cause or effect of global warming, with the oceans being a far larger repository than the atmosphere.

There have been several Ice Ages in the geological past, with the last major one ending only 11,500 years ago. A lesser one, known as *The Little Ice Age*, lasted from 1500 to 1850, when glaciers expanded and sea-levels fell. The Pulkovo Observatory in Russia reports that the Earth has now passed its current warm period, and can expect cooler conditions to build from 2012 to 2041, when solar activity reaches a minimum.

An interesting paper (in French) on the subject by Jean Laherrère has been published in the ASPO-France website (aspo-france.viabloga.com). Amongst other things it questions the validity of carbon-dioxide concentrations extracted from ice cores, which may not be accurate because of diffusion during shallow depths of burial.

It sounds as if Peak Oil is the more pressing issue, and certainly the one that is the more easily tackled by Mankind. Many claims are made that more investment is required to step up production, but ironically that would serve simply to heighten and advance the peak, giving a steeper subsequent decline and thereby make a bad situation worse. What is needed are some new intelligent economic principles by which to manage contraction. It might even be worth buying an overcoat, if falling solar radiation turns out to have a greater impact than man-made emissions.

1004. Peak Oil on the U-Tube

A new U-Tube presentation on Peak Oil is circulating from www.oilrelease.com. It is indeed a first rate presentation, not to mention the attractive dancer who accompanies it. It would be interesting to know the background and authorship, which is not made clear on the material itself.

Another fascinating U-Tube presentation that lifts the lid on the true nature of banking is given by David Icke on www.youtube.com/watch?v=LnCiYaggtMo&Nr=1

1005. Oil and Gas Consumption

As usual in oil statistics, there seems to be confusion about what is measured. Calculating consumption on the basis of EIA statistics, and population data published by the Population Reference Bureau, we find that the highest consumer of all is the Netherlands Antilles, shown to be consuming 121 barrels per person per year, but that presumably includes the export of refined product from large refineries on the island. There may be similar explanations for the seemingly excessive numbers for Singapore (64 b/a); Kuwait (50 b/a); Qatar (43 b/a); UAE (31 b/a) and Saudi Arabia (28 b/a). Luxembourg too is anomalous at 45 b/a, but perhaps explained by the habit of motorists from adjoining countries to top up there for tax reasons.

A more reasonable band follows showing the USA and Canada at 25 b/a, but there still seem to be anomalies with Belgium being the highest in Europe with 20 b/a compared with the United Kingdom at 11 b/a. At the bottom end of the scale comes China, with 2 b/a, and India, with 0.8 b/a. Checking against the BP Statistical Review, another widely used reference which does not cover so many countries, we find in most cases similar numbers, although Kuwait for example comes in at only 36 b/a, compared with 50 b/a for the EIA.

The database also shows what appears to be excessive per capita gas consumption in small producing countries, especially in the Middle East. Some representative countries are listed in the table, but yet again, we are left to question the accuracy and meaning of the statistics.

Per Capita Consumption	Oil (b/a)	Gas (kcf/a)
Australia	15.4	45.1
Brasil	4.3	3.5
Canada	24.7	104
China	2.1	1.3
Denmark	13.3	32
Ecuador	6.2	0.7
France	11.5	28
Germany	11.6	43.3
India	0.8	1.1
Iran	8.6	50.8
Japan	14.8	24.1
Mexico	6.8	16.4
Netherlands	23.5	106.5
Norway	16.9	41.9
Russia	7.0	114
United Kingdom	10.7	55
United States	24.9	73.6
World	4.6	15.7

1006. A Chairman addresses his Shareholders

The Chairman of a fictional oil company might soon address his shareholders in these terms.

Ladies and Gentlemen

It is with great pleasure that I welcome you to this Annual General Meeting, which gives me the chance to review our position properly. I stress that I have but one single responsibility: namely to provide you with regular dividends and support the price of your shares on the stock market with appropriate imagery. In fact, the task has become more difficult than in earlier years when we were drilling in the Zagros Foothills : in those distant days, shareholders gave emphasis to regular dividends, whereas to-day emphasis shifts to facile daily movements on the stock market, divorced from any underlying reality. That said, I am confident that the investment managers would prefer a strategy in which forecasts were met, rather than one built on unrealistic aspirations.

In addition to the daily business under the norms of this country, I have had to conduct operations in many different environments, with my primary concern of ingratiating your company with the authorities so as to secure privilege versus our competitors. These activities took many forms : in Britain it was often expedient to retain a politician as a consultant and contribute to Party funds ; in Norway it helped to sponsor research ; and in some other places it involved no more than servicing the General's bank account in Panama. Naturally, all such activities have been conducted with complete propriety under the norms of the country concerned. Furthermore, I have had to pay careful attention to tax treatment : thus, I spared you having to meet much of the cost of the dry holes, my annual remuneration of six million pounds and chauffeur, by treating them as operating expenses, which are set against taxable income, so that we were able pass much of the burden to the unconscious taxpayer with the full connivance of the tax authorities.

In addition, I must stress that it is simply not my job to take responsibility for the future of mankind or the environment, beyond meeting in full the mandatory obligations under which the industry works.

Your company has been operating successfully over the past Century, and succeeded in securing exploration rights in prime areas, which allowed our production and reserves to grow. As you will understand, our reporting of reserves was subject to Stock Exchange rules, designed to prevent fraudulent exaggeration, which we strictly observed. Accordingly, we reported only enough to provide a satisfactory financial result, building for ourselves a useful stock for the future. I have now to tell you that that stock, derived from under-reporting, has been consumed. It has already prompted us to replace reserves by merger with other companies, which incidentally carried several other indirect financial advantages.

I am satisfied that our exploration department is as competent as any in the industry. It follows that the falling results of exploration over the past decades simply reflect the depletion of the stock of prime prospects in Nature. It has become ever more difficult to find oil, and what has been found was in smaller accumulations, despite the remarkable technical achievements of our engineers. I recognize that there is room for surprise in the realm of exploration, but I think it unwise to plan the company's future on the basis of the unexpected. We do not therefore expect to take on a pioneering role in the Arctic Ocean.

Having reflected long and hard on the subject, I would now like to outline our plans for the future. In brief, we will wind down our exploration effort, while retaining a small staff to monitor world developments so as to be ready to strike if any particular unexpected opportunity should arise. We will do everything possible to extend the life of our existing fields, in part by producing them more slowly. As a result, we expect that our production will continue to decline, as it has been for the past few years. In these circumstances, we will move to dispose of secondary marketing and refining operations, before the worldwide supply constraints bite in earnest. We will not engage in renewable energy activities, recognizing that they lie outside the field of our experience and special expertise, built so successfully over many years.

So far as marketing is concerned, I would like to pay tribute to our loyal customers. In earlier years, we dedicated ourselves to providing a secure supply in our home country, especially in times of war. Later, when the world enjoyed a brief epoch of abundant supply, we moved into a more global posture seeking to supply our worldwide customers at the lowest price under competitive market forces. We also allowed our shareholding to become more international. We now plan to revert to our earlier approach of giving emphasis to security of supply to our home country customers. We will also use share buy-back schemes to strengthen our national identity.

The contraction of our business in the years ahead will call for the reorganization of our administration. It will involve a reduction in personnel, which we will hope to accomplish in an equitable manner by advancing the pensionable age and with other fair inducements, recognizing the loyal service of our staff. We plan to provide our affiliates around the world with substantial autonomy, while continuing to furnish such advice and support as they may request.

I am confident that this new policy of contraction will be well managed and highly profitable, and as a result will support the share price on the markets, as the investment community comes to see the relative strength of our strategy. We plan that the contraction shall last for twenty-five years, after which we will close the doors, having thanked our shareholders for their loyal support. They will then be in a position to transfer their support to businesses with expertise and experience in the new industries that will be needed in the changed circumstances of the future.

Sir Paddy Northumberland,
Chairman,
Boadicea Petroleum Co. Ltd.,
Imperial House, London.

1007. At last the European Union recognizes Peak Oil

Elements within the European Commission have been trying to alert the Commission to the issue of Peak Oil for several years, but generally found their efforts frustrated because of political obstacles. Now at last, the situation changes, as the political advantages of denial expire. The Energy Commissioner, Andris Piebalgs, has at last specifically referred to Peak Oil, as the following report of a recent speech in Switzerland confirms:

Piebalgs argued that while tackling climate change is crucial, policymakers should not lose sight of the issue of security of fossil fuel supply. The combined challenge of climate change and supply security leads to the conclusion that the EU cannot "hang on" to its "old, fossil energy system", he said.

Piebalgs referred to varying predictions about when the oil production peak will be reached, with some experts saying it will be in 20 years and others arguing that the world is already at peak production.

Highlighting the potential gravity of the problem, Piebalgs noted that the oil crisis of the 1970s presented a discrepancy between oil supply and demand of only 5%, but that in a post-peak oil scenario, the gap between supply capacity and demand could widen by 4% annually, leading to a 20% gap within five years.

(Reference furnished by J.N. von Glahn)

1008. China too recognizes Peak Oil

An article in the Oil & Gas Journal of January 14th by scientists at the China University of Petroleum opens with the words: *Peak oil models show a widening gap between China's oil demand and production.*

While expressing optimism that the overall peak of oil and gas can be delayed, the illustrated examples show that the combined production from the established provinces of Daqing, Shengli, Liaohe, Xinjiang and Changqing has already peaked.

(Reference furnished by Professor Feng Lianying)

1009. A Credibility Gap

The following statement by former executives of Aramco in Saudi Arabia, which has been released to the press, confirms the implausible nature of claims promulgated by a consultancy. It is normal for consultants to try to sell their products and please their clients, meeting whatever their wishes may be, but since the clients in this case have not been revealed, it is not possible to identify which vested interest is at work. It is most

commendable that these experienced executives from no less than Saudi Arabia should speak out despite the many pressures.

The January 17 press release by Cambridge Energy Research Associates (Cera, see www.cera.com), which was carried by Reuters, reported the world's oil supplies were to rise to 112 million barrels per day (Mb/d) by 2017. This rise is in spite of their other conclusion that the world's oilfields are declining in capacity at the average rate of 4.5% per year. These conclusions are clearly suspect.

Given the current global production of 86 Mb/d and Cera's 4.5% decline rate, global capacity would have to increase by 7.5 M b/d each year for the next ten years to reach 112 M b/d. This is a total of 75 M b/d of new capacity in 10 years. Even excluding the effect of declining rates, achieving 112 M b/d within a decade represents a massive leap of 26 M b/d in global capacity.

To put this in perspective, 75 M b/d of new capacity is the equivalent of eight new Saudi Arabias or 14 new Irans in just 10 years. Considering the reality that Saudi Arabia, with 25% of the world's best proven reserves, is already investing \$50 billion to increase its production capacity by 2 M b/d, where does Cera expect the additional 24 M b/d of production capacity to come from, let alone the replacement for the 51 M b/d of declines?

Dr. Moujahed Al-Husseini, Editor-in-Chief, GeoArabia

Dr. Sadad Al-Husseini, Former Saudi Aramco Vice-President, Exploration and Producing

1010. Lax Accounting

It seems rather obvious that producing the oil in a country reduces what is left, namely *Reserves*, by like amount. For the reported *Reserves* of a country to stay the same from one year to the next implies that new discovery exactly matched production, which is clearly implausible. We are therefore justified in doubting unchanged reserves estimates, yet it is remarkable how many such cases are to be found in the public databases. For example, OPEC lists the reserves of 34 countries of which 19 (or 56%) are unchanged from 2005 to 2006. The Oil & Gas Journal reports 106 countries, of which 75 are unchanged (72%) from 2006 to 2007. The most blatant case is Abu Dhabi which has been reporting 92 Gb since 1987 despite having produced 13.5 Gb in the meantime.

Of course it is not as simple as it seems because the term *Reserves* is variously defined. *Proved Reserves* should comprise *Developed Reserves* (namely the estimated future production of current wells), plus *Undeveloped Reserves* (namely the amount to be drained from as yet undrilled infill wells). So-called *Proved & Probable Reserves* (also termed *P50* or *Mean Probability*) should be the best estimate of what is actually there, such that revisions are statistically neutral. Of course, if a country under-reports, as was the normal industry practice as tacitly permitted by the Stock Exchange rules, production might match discovery plus revision to leave an unchanged *Reserve* estimate.

It seems prudent for starters to subtract the production of any period of unchanged reports from the reported reserves of a country. In addition is the confusion over the boundary between *Conventional* and *Unconventional*, which for example has led to an extreme range of estimates for Canada (5.2 Gb for OPEC versus 176 Gb for the O&GJ). Given the importance of oil supply to the World economy, it is indeed remarkable to find such lax accounting.

1011. Shell Confesses

The Chief Executive of Shell has informed his staff that he does not expect what he calls *easy-to-access oil and gas* will no longer keep up with demand. This is close to an admission of Peak only five years later than the date estimated here. He is also to address the Davos Meeting of world leaders, presumably in the same vein. This is normally a fairly flat-earth occasion despite the mountainous setting, but perhaps it too begins to awake to reality. He follows in the footsteps of the Chief Executive of the French oil company Total, who has expressed doubt that production can reach 100 Mb/d.

See : <http://business.timesonline.co.uk/tol/business/economics/wef/article3248484.ece>

(References furnished by David Strahan and Basil Gelpke)

Shell subsequently announced record profits, evidently having adopted a strategy comparable to that outlined in Item 1006 above. Its production fell by 4% in 2007 and is expected to continue to do so. It is significant that the company bought back \$4.4 billion worth of its own shares, or 2% of its market valuation, a strategy that evidently supports the market value of the shares better than drilling dry holes but speaks of overall contraction. Certainly the company faces downstream overcapacity in the years ahead and is wisely disposing of secondary refineries and marketing chains before world supply shortfalls bite in earnest.

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.

2008

Feb 14th – Conference : Clingendael Institute, **The Hague** [Campbell]

April 15th – Peak Oil Debate : Geological Society, **London** [Campbell]

May 24th – Meeting : ASPO Switzerland, **Basel**.

NOTE

This newsletter is produced and distributed for perusal primarily by ASPO members.
Permission to reproduce items from the Newsletter, subject to acknowledgement, is expressly granted.

Compiled by C.J.Campbell, Staball Hill, Ballydehob, Co. Cork, Ireland.

-oOo-

Multi-Science Publishing Co. (Sciencem@hotmail.com) wishes to advise that copies of the book *Oil Crisis* by C.J.Campbell, providing background reading, are still available for purchase.