

July 14, 2005 **Comments by Jean Laherrere on the OAPEC-IFP seminar** on 28-30 June 2005
«**Hydrocarbons reserves: Abundance or scarcity**»

Thanks to a free invitation (the subscription was 250 €) I attended the OAPEC-IFP seminar in Rueil-Malmaison. The seminar has gathered less than 150 people (38 from OAPEC) with few medias (no TV), which is quite a change compared to ASPO conference in Lisbon!

No participation from Saudi Arabia, maybe because afraid to be questioned on Matt Simmons's book!

An almost complete proceeding of the seminar was given and a CD will be sent. Two good dinner receptions were offered by OAPEC and Total.

The technical level was low, because, most of the times, data were political and terms were not defined. Most of comparisons were made between different undefined objects (as conventional confused with unconventional, proved reserves confused with 2P reserves).

The obvious fact that there are two contradictory sources being the published political and the confidential technical sources is completely ignored. It was neither mentioned during the seminar that the demand is for liquids (83 Mb/d in 2004) when all of papers speak about oil, mainly oil excluding NGL. In brief it was mainly comparing apples and oranges! Many do not want to accept that the world is several and cannot be reduced to a single global entity. Many do not want to accept that there are several practices of different values.

US symbols (as MM) are often used by IFP authors in contrary to metric system, which is against the French law! The SI (System International) of units is the law in all countries except the US industry (but not the US federal agencies), Liberia and Bangladesh. The losses of Mars climate orbiter and Frigg DP1 were due to confusion between SI and non-SI units

From my notes and the proceedings (without waiting to get the CD of the presentations), I have selected the following papers:

--Al-Lababidi OAPEC-Kuwait: «**Hydrocarbons reserves in OAPEC member's countries: current and future**»

The unit was the billion of barrels (Gb) written as bbls: *first b* for billion when usually bbls is used only for barrels as *bb* is assumed to be *blue barrel* to distinguish the blue (crude) to the red (refined). The OAPEC data (11 countries) as end 2004 are in Gb

Current reserves 649.790, in fact the total is 649.760 (but it is wrong to add proved reserves, the aggregation underestimates the real proved value of the organization), OGJ reports 648.84 and BP 648.1

Cumulated production 254.340

Discoveries 904.130

Undiscovered 170.856

Ultimate 1074.986

Giving seven significant digits for the ultimate shows that the speaker has a very poor understanding of the accuracy of this estimate!

On the OAPEC site, OAPEC reserves as end of 2003 were given as 639.9 Gb unchanged in every country from 2002, meaning that they do not represent the truth, as it is unlikely that new discoveries have replaced exactly the production in 2003 for every country.

Undiscovered comes from USGS 2000 but is considered as conservative!

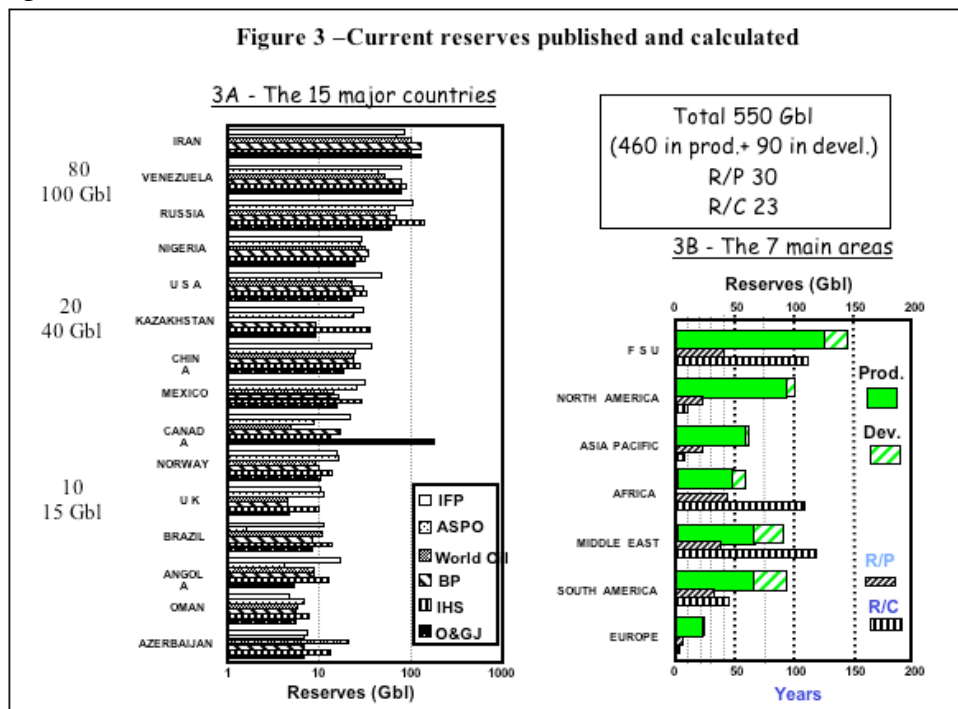
Adding EOR will bring the **OAPEC oil excluding NGL ultimate to 1432 Gb**, for the speaker, the abundance is there

-Yves Mathieu IFP«Non OAPEC liquid reserves and production forecasts»

The reported reserves by IHS, BP, OGJ and WO are treated as being independent estimates for the same product, when there are not, because the last three sources use the political data for proved reserves provided by the countries. Considering that the average of these four sources give the mean is wrong, first because there are not independent and second because the first source is for 2P when the last three is only for 1P.

Even if the estimates were independent, it is wrong to say that the minimum value is the sum of the minimum (in the four sources) of each countries, because it is well known, in a probabilistic approach, that a simulation has to be run to get the minimum value of the world, which is not the sum of the minimum value of each country. It is done for the proved reserves in almost all publications, but it is wrong. The sum of country (or field) proved reserves is underestimating the proved value of the world (or the country). It is why there is reserve growth for such aggregation of bad practices. Only the sum of mean country values represents the mean value of the world and statistically such sum does not grow, if properly estimated.

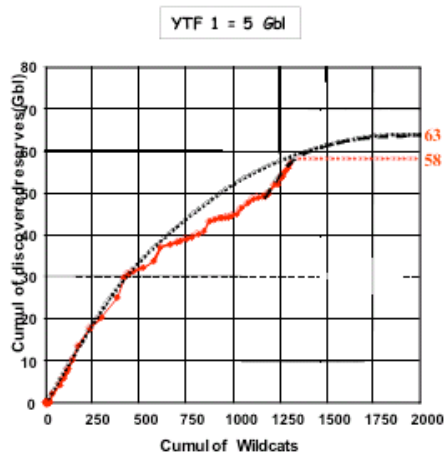
The comparison of current reserves is given for 15 major countries from IFP, ASPO, WO, BP, IHS and OGJ, without mentioning these current (end 2004) reserves can be remaining discovered 2P (IHS) or 1P (BP, WO and OGJ) or even remaining ultimate (ASPO). It is difficult to read data on a logarithmic scale!



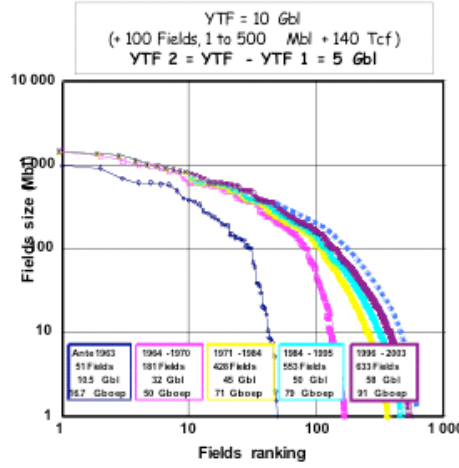
Evaluating the ultimate from the creaming curve is a good thing but it should be used properly.

Figure 4 : Future reserves evaluation at country scale

4A-Extrapolation from Creaming Curve

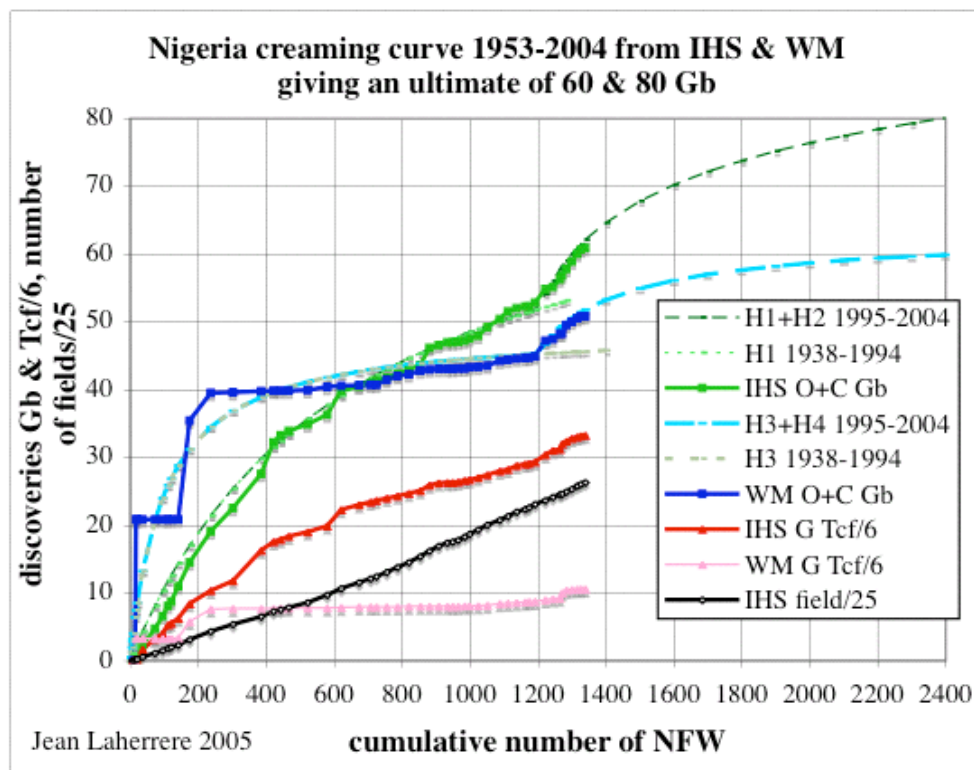


4B-Extrapolation from Field Rank analysis



On figure 4A, fitting the creaming curve with an exponential model is wrong, as the amount of recoverable oil is limited when exponential has no limit. Hyperbola, limited by its asymptote, should be used. It is wrong also to use only one cycle, fitting only the start of the curve and the end but badly in the between. It is obvious from all the creaming curves that I have studied that there are several cycles of exploration and everytime several hyperbolas fit well the data. The anonymous (obviously Nigeria) example shown is a good example of two cycles and the second cycle is rising more than the first one, meaning that the ultimate (usually taken as the value of the model for an amount of wildcats double of the present cumulated value) is higher than indicated by Mathieu.

My creaming curve for Nigeria oil +condensate (condensate is often forgotten) shows a cumulative discovery up to 2004 (first NFW 1938, first discovery 1953) reported as 61 Gb from IHS (against 58 Gb up to 2003 by Mathieu), but 51 Gb from Wood Mackenzie, which can be easily fitted with two hyperbolas, the second cycle starts in 1995 and represents the deepwater. With these 2 cycles model, the ultimate (for 2400 NFW) is about 80 Gb from IHS (instead of 63 Gb estimated by Mathieu) and 60 Gb from WM. It should be noticed that the number of fields (divided by 25) show also two cycles but the break in for 800 NFW or 1979.

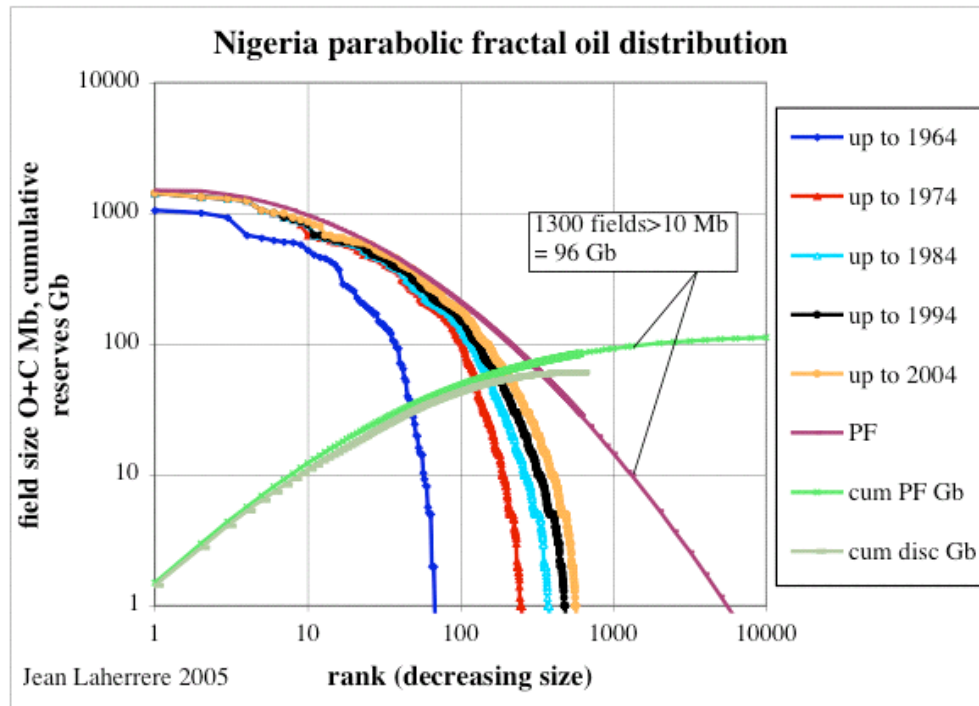


If YTF1 is from the creaming curve, I do not see really what is YTF2, except in the creaming curve a third cycle could be missing if another unexplored new Petroleum System exists or can be guessed. But unknown new Petroleum Systems has to be dealt on a worldwide base and statistically.

The claim that these undiscovered are based on underestimated estimates is not justified by any proof, it is just a statement! In fact it is the contrary when comparing IHS (used by Mathieu) and WM. It is the model which is underestimated the ultimate by using only one cycle!

I do not see how the YTF2 is estimated in the fractal distribution of figure 4B. Being the discoverer of the parabolic fractal I have to admit that I do not use it anymore because it is too imprecise as the parabola represents what is in the ground and not what will be produced and is only a help to the creaming curve.

The parabolic curve for Nigeria (in fact the data should be taken for the Petroleum System of the Niger delta involving the fields from Cameroon and Equatorial Guinea) shows that the largest fields were found very early (already in 1974).



Presently out of the 610 discovered oilfields, only 408 are larger than 10 Mb. The parabola fitting best the past discoveries and representing the potential of this country involves 1300 field above 10 Mb representing 96 Gb and 5500 fields over 1 Mb representing 110 Gb. The creaming curve indicates that 657 fields (the smallest is 0,05 Mb) were discovered with 1340 NFW giving a success ratio of 50 % (almost constant during all exploration with a small increase since 1979). In our creaming curve we assume that exploration will stop at the double of present activities or 2500 NFW to reach the 80 Gb, but the asymptote of the second hyperbola is about 100 Gb. To find almost all the fields indicated by the parabolic model above 1 Mb at least 6000 fields have to be discovered and 12 000 NFW would be drilled! It is obvious that all these possible 1300 fields above 10 Mb will not be discovered and it means that the parabolic fractal model is in line with our model of creaming curve. It is a good check but it does not add anymore potential.

I do not agree with the concept of two different YTF, the YTF has to be estimated as a mean from the creaming curve in association of the geological potential of the unexplored area. It is wrong to add YTF1 and YTF2 if they are not the mean value of two independent phenomena. The problem with Nigeria is not what could be YTF2, but what is the real estimate of present discoveries: do we trust IHS with 61 Gb or WM with 51 Gb? The Shell reserves problem more than a year ago has revealed that Shell had some incentive from the Nigerian government to report overestimated proved reserves in order to increase the OPEC quota. The best way is to check the estimate on the largest oilfield being Forcados-Yokri in production since 1970 and in decline. IHS value is 1430 Gb when the sharp decline 2000-2003 gives a much lower value of 1000 Gb. So WM data seem more reliable despite that they do not report the detail by fields but by company.

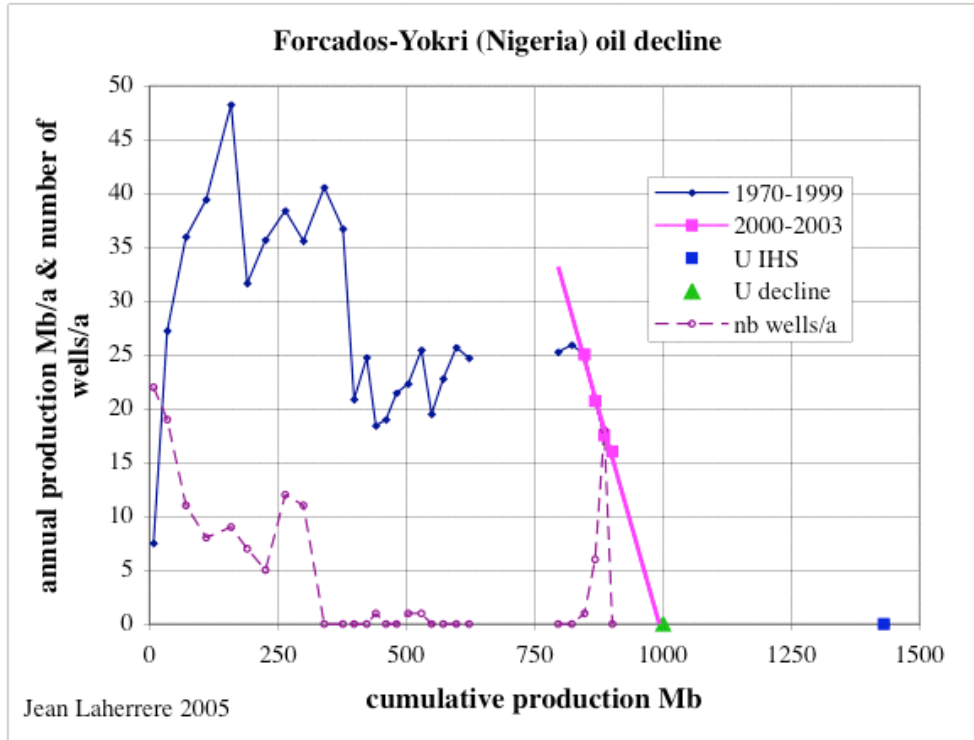
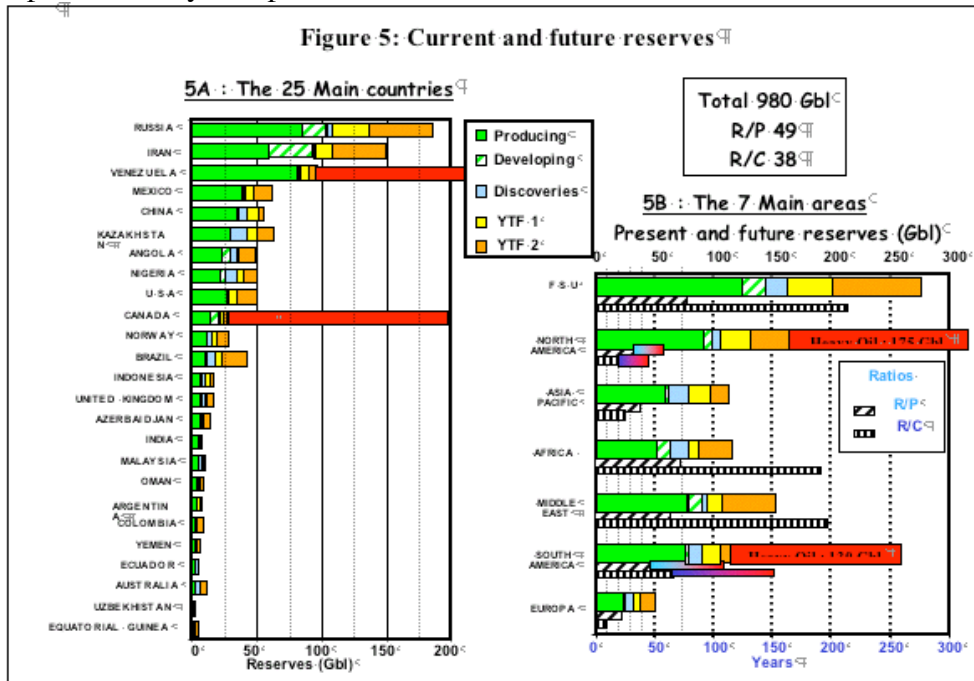


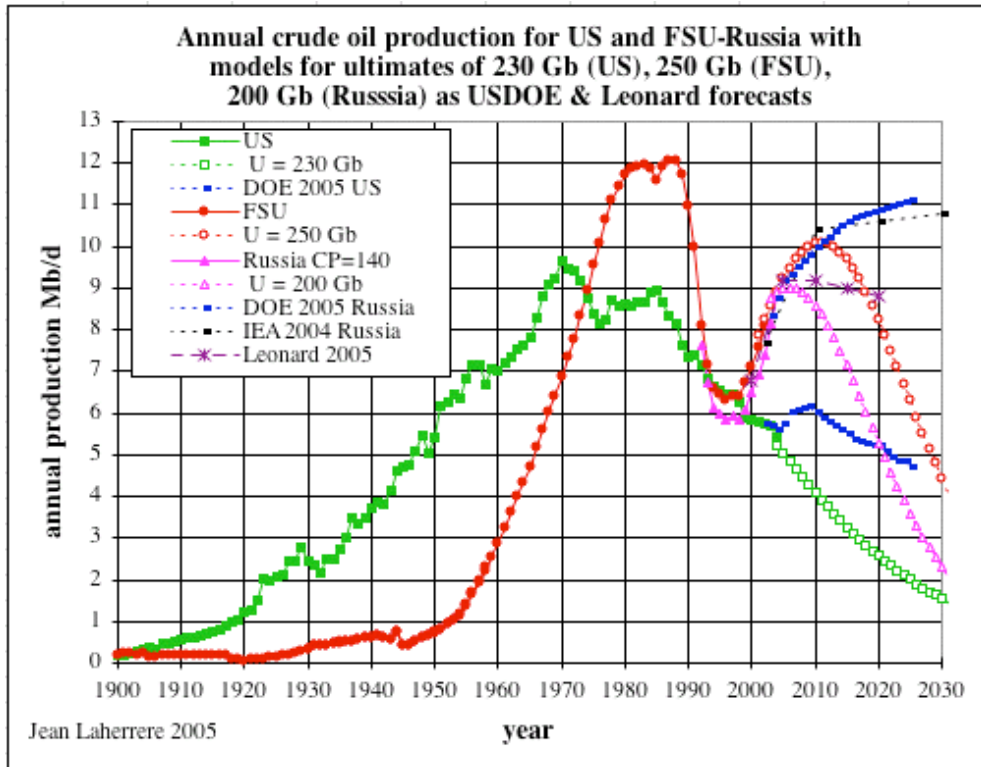
Figure 5 reporting the current reserves (the date should be given = end 2004?) does not report the cumulated past production and does not represent the ultimate, current reserves and future production represents the yet to produce = YTP



Russia is assumed to have about 170 Gb of YTP giving a 310 Gb ultimate, but my guess is about 60 Gb YTP (ultimate of 200 Gb with CP 2004= 140 Gb) and Colin Campbell's guess is 90 Gb YTP (U=220 Gb with CP=130 Gb). Russian estimates are based on a theoretical maximum recovery

following the Russian classification (presented in 1979 by Khalimov and stated by the same in 1992 as grossly exaggerated). I correct Russia reserve estimate by 30% after a complete study of the decline of the main fields. Chabrelie (below) stated that Gazprom gas estimates were reduced by 35 % (from 28 to 18 T.m3) by De Golyer & Mac Naughton.

Ray Leonard former VP E&P Yukos reported in ASPO Lisbon that Russian oil production will peak now to 2010 at 9,2 Mb/d to decline to 8,8 Mb/d in 2020, below his 2002 forecasts and very much below USDoE forecast.

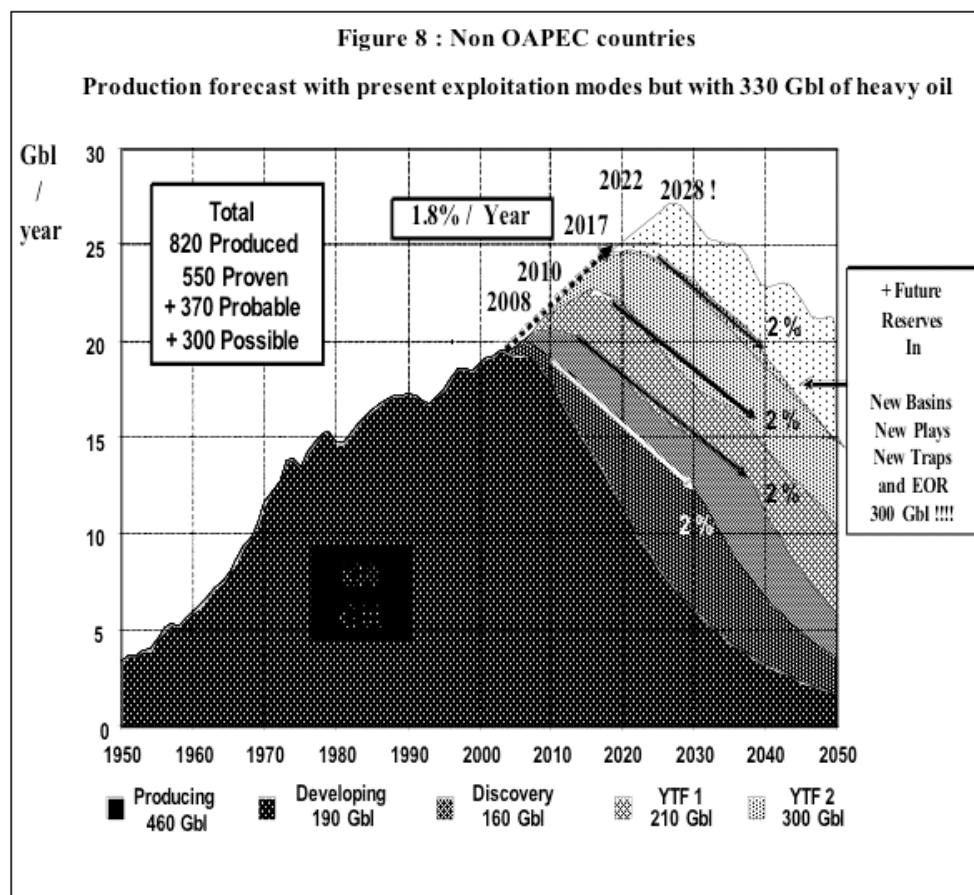


The forecast peak oil is stated as being 2006-2008 for ASPO (Laherrere and Campbell) but the range of forecasts between ASPO members is larger, as my forecast (for liquids supply in the referenced HEC MBA article) is within the next decade (outside any demand constraint, which is likely).

Mathieu's production forecast with 10 Gb of heavy oil (confused with extra-heavy oil!) assumes an ultimate of 820 Gb already produced and 990 Gb yet to produce)

The production forecast with 330 Gb of heavy oil (extra!) assumes an ultimate of 2140 Gb. But it is incorrect to add possible reserves without putting a probability factor.

Forecasting a peak oil (forgetting the NGL) in 2028 seems very optimistic.



Adding the OAPEC oil excluding NGL ultimate of 1430, the world oil ultimate should be over 3500 Gb when my estimate is 2000 Gb for crude less extra-heavy oil, 500 Gb for extra-heavy (Mathieu takes only 330 Gb), 250 for NGL and 250 for synthetic and refinery gain giving a total of 3 Tb for liquids. The cumulative world oil production up to 2004 is $254 + 820 = 1074$ Gb, in line with the data from USDOE for liquids including synthetic oil (BTL and CTL) and refinery gains (1076 Gb), but not with crude oil (987 Gb).

So IFP-OAPEC oil ultimate is 40 % higher than my estimate (3,5 Tb against 2.5 Tb). It is obvious than it could be the difference between abundance and scarcity!

-Tom Ahlbrandt USGS “**A global view of petroleum resources opportunities with a Middle east focus**”

Ahlbrandt still wants to justify the 2000 report, which is as end of 1995, almost 10 years old and claims that the data up to 2002 demonstrates that growth of existing field has added three times more reserves (which one? political or technical) than new discovery. He claimed that Iraq has 45 Gb of undiscovered (only 156 prospects have been drilled out of 526 inventory) plus 50-70 Gb in EOR. At the question from Cochet on Simmons’s book he replied that Aramco does not agree, forgetting to mention that it was Aramco management which objects, but that Simmons conclusions are based on 235 articles written by Aramco technicians with the approval of Aramco management. Simmons mentions in his book pages 322-324 that Saleri (Aramco reservoir manager) in a SPE Dec 2003 paper was describing problems in Shaybah field as a technician (requiring more time to asset the

performances of MCR wells), but in Feb 2004 as a representative of Aramco he claimed that there is no production problem and that the country could produce twice more for the next 50 years.

-Ken Chew IHS “**World oil and gas resources and production outlook**”

Good graphs on discovery outside US and Canada: peak of oil and gas volumes on 1965-1975, peak of NFW as of number of fields in 80-90, but success ratio has grown from 20 % in 1950 to 40 % in 2004. Field size was around 75 Mboe from 1900 to 1925, 600 Mboe from 1930 to 1955, 250 Mboe from 1955 to 1975 and 50 Mboe from 1980 to now.

On the 2000 USGS undiscovered study, he mentions that in the period 1996-2004 only 17 % of the predicted volumes of oil and gas have been found when 30% of the forecast period had elapsed.

IHS forecast for 2010 oil production is an addition of 13 Mb/d when its subsidiary CERA forecasts 16 Mb/d.

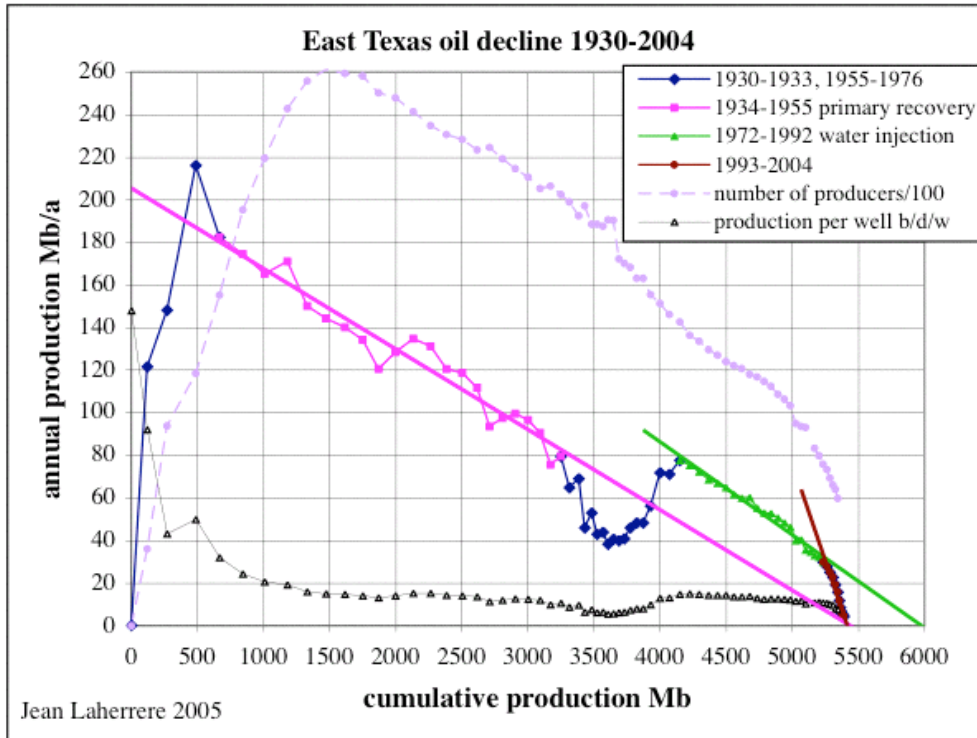
IHS forecasts an liquids ultimate at 4 Tb and a gas ultimate of 14 000 Tcf, accepting that oceanic hydrate will likely be never produced

-Debate chaired by Claude Mandil with speakers of the day

To answer some speakers praising the abundance coming from new technology (as the Barnett gas shale = unconventional), C. de Margerie (VP E&P Total) stated that his geologists are complaining about the difficulties of finding new reserves. Scarcity is what geologists are finding.

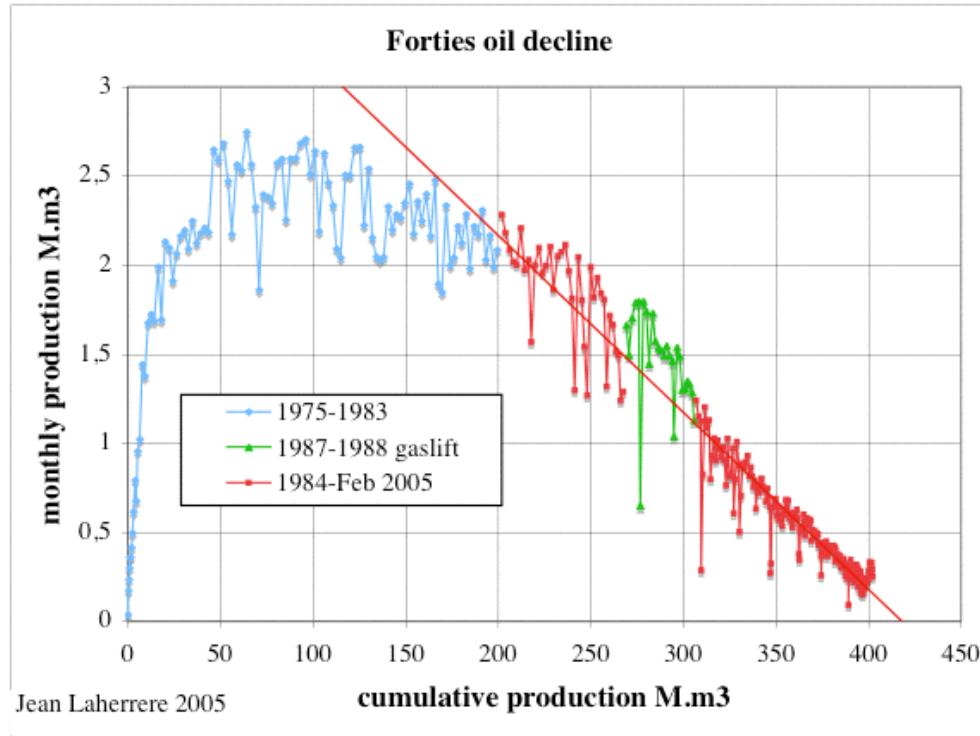
-Don Gautier & T.Ahlbrandt USGS “**Future reserve additions and the significance of peak oil and gas production**”

Gautier relies mainly on proved reserves to provide growth which is normal as proved reserves have for goal to provide growth being the minimum, but it is not the case of the mean value (expected value) which is reported as proven+probable in the world except the US. Growth can be found in 2P oil reserve estimates as in the North Sea but it comes from conservative value. Reserve growth from technological progress has to be seen in the oil decline and most field declines (East Texas oilfield in the US or Forties in North Sea) do not display any decline improvement at the end.

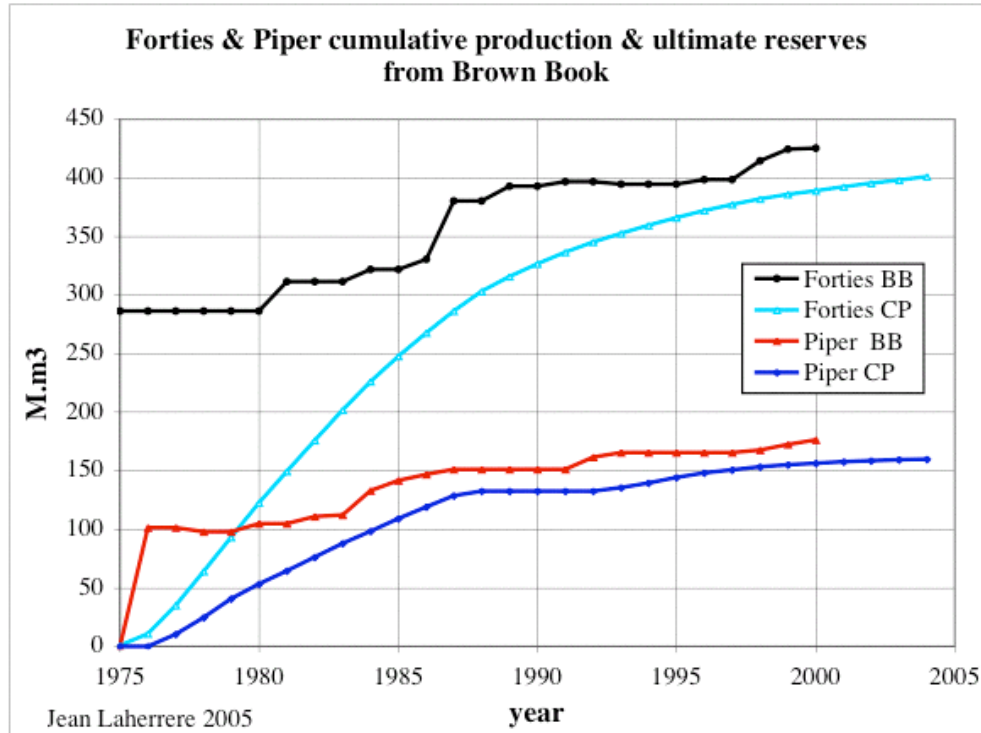


East Texas oilfield primary recovery from 1934 to 1955 leads to an ultimate of 5.5 Gb, but after unitization and water injection the decline from 1972 to 1992 leads to an ultimate of 6 Gb allowing a significant reserves growth due to technology, but unfortunately the decline from 1993 to 2004 leads now to an ultimate of 5.5 Gb (again as the primary recovery), meaning that in the end there was no reserve growth at all. The recovery factor of East Texas is estimated about 85%.

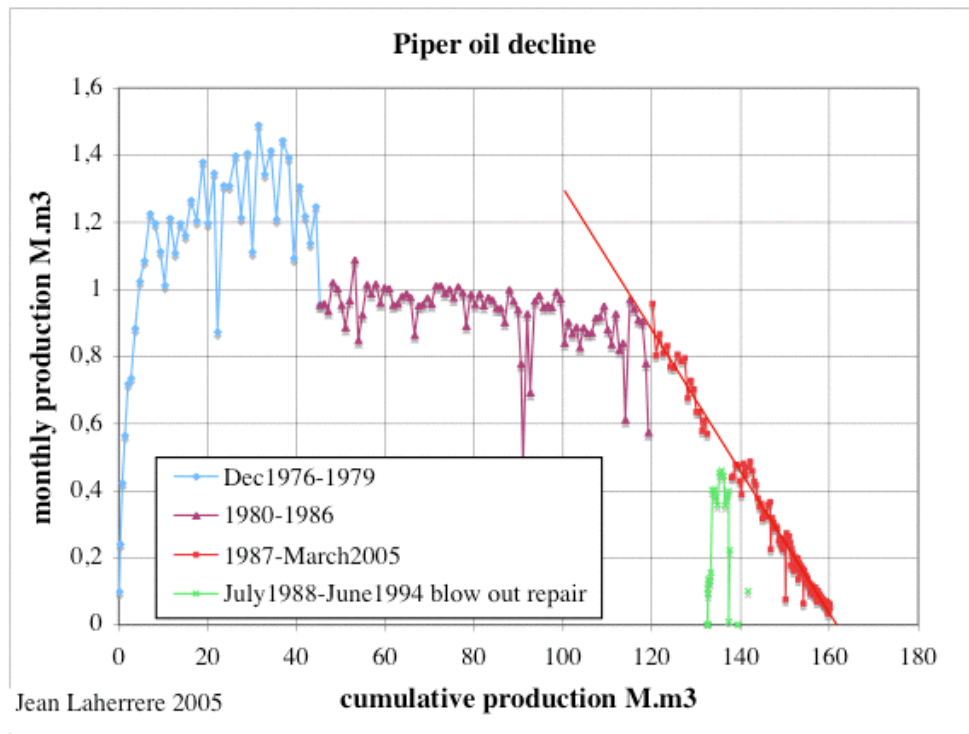
Forties was sold by BP two years ago to Apache because BP did not rely anymore in technological improvement, only in cost decrease, there was a short improvement in production with the new operator, but it seems to decline again, it is necessary to wait to see if there is any real increase but it is going to be very small, less than few percent. The oil decline after the installation of the gaslift (with a fifth platform) displays for 1987 a temporary increase in annual production but quickly the decline returns towards the same slope, which means the same ultimate.



Since 1984 the decline indicates an ultimate of about 420 M.m3. However the report from the operator in the Brown Book displays a slow increase in the ultimate together with the cumulative production, meaning that the operator is very conservative with the goal to provide reserve growth despite the constant decline graph. In 1986 where the estimate from the oil decline was more than 400 M.m3, BP was reporting only 330 M.m3 and it is only in 2002 before selling that BP reported the real value of 420 M.m3.

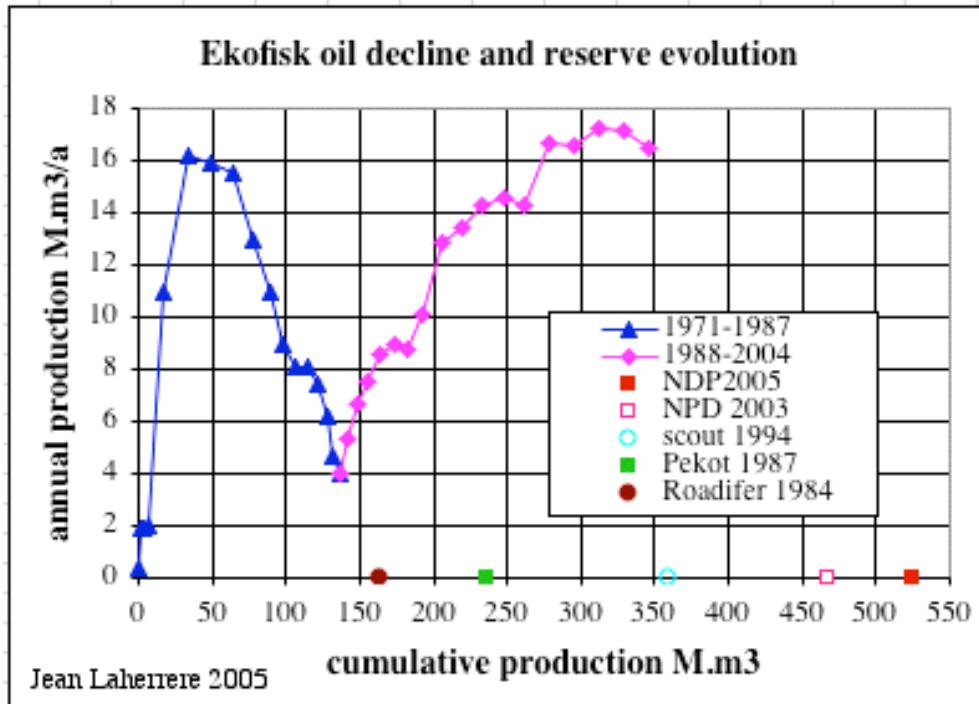


It is interesting to compare BP as a good operator on Forties with Occidental on Piper where the reported ultimate recovery grew about the same ratio of cumulative production when the decline curve tells a different story. Forties decline is a slow harmonious decline when Piper displays a two-steps. The extrapolation of the decline from 1980 to 1986 allows a much higher estimate than the decline from 1987 to the blow out (July 1988). But the last Piper decline 1987-2004 (with a 4.5 years stop) is twice steeper than Forties decline 1984-2004.



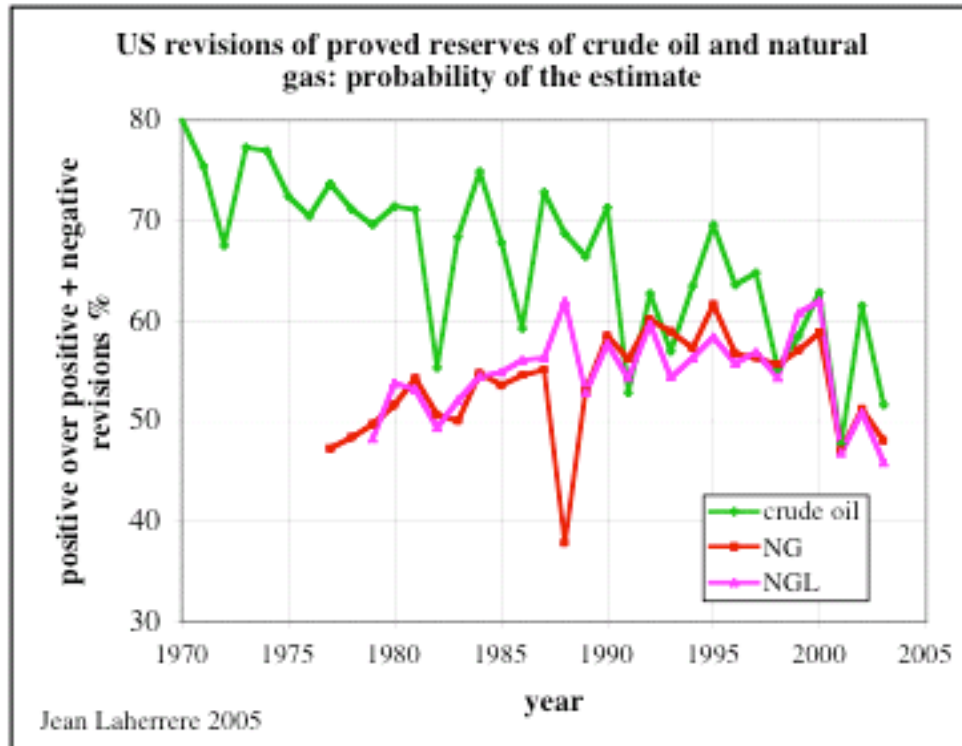
When the goal is the maximum of profit and not the maximum of oil the pattern is different. The aggressive way of producing an oilfield seems more important in the production pattern than the addition of technological means.

There are many examples of zero or negative growth fields, but few fields as Ekofisk displays a strong positive reserve growth because an exceptional chalk reservoir, which was compacted by the removal of oil, leading to a 7 m seafloor subsidence: it is the only case of subsidence in the North Sea and this example cannot be extrapolated to the rest of the basin.



A complete inventory of the global growth of world major oilfields has to be carried out, to decide if the global growth is positive, negative or more likely close to zero. And, as indicated by Gautier, reserve estimate is a dynamic process and the real result is known only at the end!

Present reserve estimates are now closer to the mean value (probability around 40% or P40) for the proven+probable (assumed to be P50), but even for proved US values (assumed to be the minimum and for SPE/WPC/AAPG rules to represent P90). At my question of how to explain why, in the 1970s the annual USDOE reports were showing much larger positive revisions than negative revisions, but now positive revisions are about equal to negative revisions, meaning that the probability of the estimate is about 50% (in 2001 it was below!), Gautier answered that he does not know.



It is obvious that now US oil operators do not report anymore the minimum value, as their discoveries are much smaller than in the past. Furthermore everybody now requests that the SEC change their rules to include probable reserves, as the rest of the world with Canada joining in 2003.

-G. Fries IFP “Additional reserves: the role of new technologies. A global perspective on EOR-IOR”

Fries defined secondary recovery as only water injecting, which usually covers also gas injection when to maintain pressure. He reports for EOR only 1.8 Mb/d (67% thermal, 19% miscible gas, 12% CO₂, nitrogen and chemical less than 1%), when Robein reports 2.5 Mb/d (plus 50%). It should be compared to the world refinery gain, which is 1.9 Mb/d and neglected by most in the oil production. There are 307 active EOR projects with 125 with steam and 16 with in situ combustion. His map was showing US, Venezuela, Canada, Indonesia, China and Libya. But he mentions later Hassi Messaoud (Algeria) as a gas miscible starting in 1980 when I thought that it was sooner.

-F. Rogero et al IFP & Reis Petrobras “Updating reservoir models with dynamic data and uncertainty quantification: an integral approach”

A real field in Brazil with 34 oilwells and 13 water injection wells has been in production since 1979. All seismic, geological and production data are used in the model and the initial model is compared to the final one. The change is drastic in particular for the porosity. The uncertainty is obtained by using five different equiprobable matched models. The range mini, mean, maxi seems small: is it the real range? It is a solution but it can be others. The approach is possible for a limited number of cells but hardly for large model as the Ghawar model with 10 million cells!

-P. Canal CGG “Seismic technology for the OAPEC countries”

3D technology in deserts displays now high technology productivity with 24 hours/day operations, 1000 km² per month and up to 960 fold. Processing through clusters of PC can reach 55 teraflops now compared to 0.3 in 2000.

-E.Robein Total “Technology for optimized EOR investments and benefits”

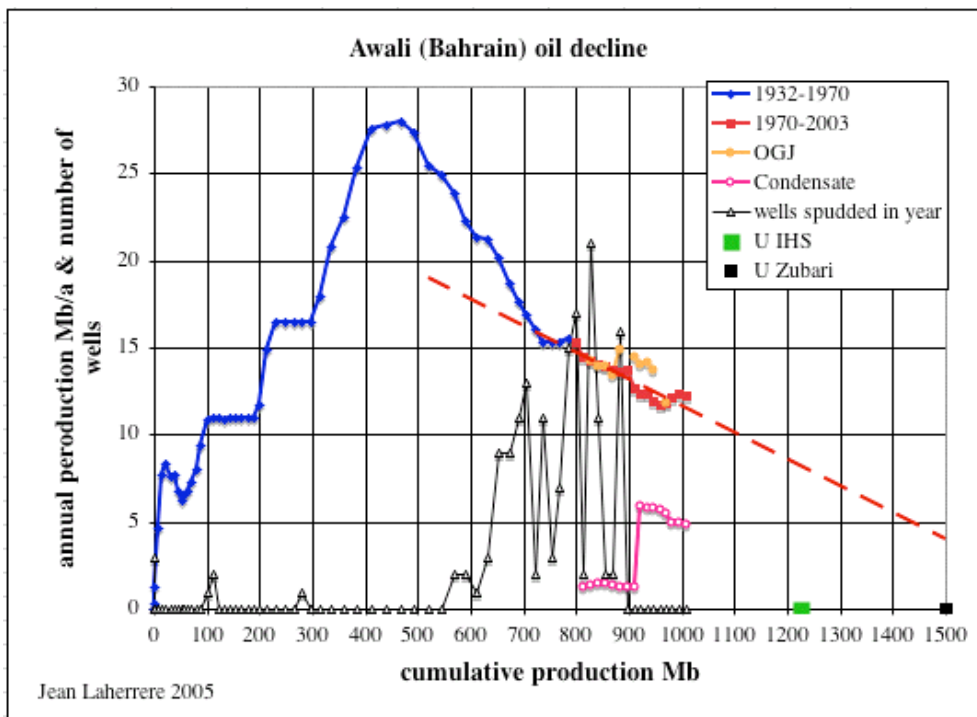
EOR in 2005 produce 2.5 Mb/d (60% thermal, 30% gas and 10% chemicals) compared to 1 Mb/d in 1980 (70% thermal and 30% gas)

-H.K.Zubari Bahrain Pet Co “Challenges faced in estimating oil reserves in a mature field”

Bahrain field (Awali in IHS file) has been on production since 1932 and Zubari did a good description of the geology and the history of production of this field. The field is 87% oil wet 14% intermediate wet and 3% water wet. He said that the reserves were 1 Gb in 1975, 1.2 Gb in 1990 and 1.5 Gb in 2003. IHS reports 1.2 Gb (+0.15 Gb condensate). Awali is a good example of present positive reserve growth.

The oil decline from IHS file shows a peak in 1970 at 28 Mb/a (77 000 b/d), a steep decline from 1971 to 1983 and a slow decline from 1984 to 2003 (the number of wells drilled raised sharply, from 1974 to 1994. It is unfortunate that Zubari did not indicate what is the cause of this drastic change in decline in 1984.

The condensate production displays a queer jump in 1996. OGJ data on oil production do not agree with IHS data.



The decline from 1970 to 2003 is linear and can be extrapolated beyond 1.5 Gb. It means either that the 1.5 Gb estimate is too low or that the decline will increase steeper in the coming years, as for East Texas or Piper.

-J.L.Rudkiewicz IFP «Modelling hydrocarbon migration as a tool for reserve estimation»

One of the best successes of IFP in exploration was the worldwide use of geochemical equipments as Rock-Eval and the geochemical evaluation of Petroleum System. It is strange to read an IFP article

on geochemistry which forgets to remind that any quantitative evaluation of HC generation needs to have measures with Rock-Eval. I asked Rudkiewicz why he did not quote the need of Rock-Eval measures and he replied that it is obvious and not necessary to say so. It is not obvious for all, as seen in the Libyan following paper.

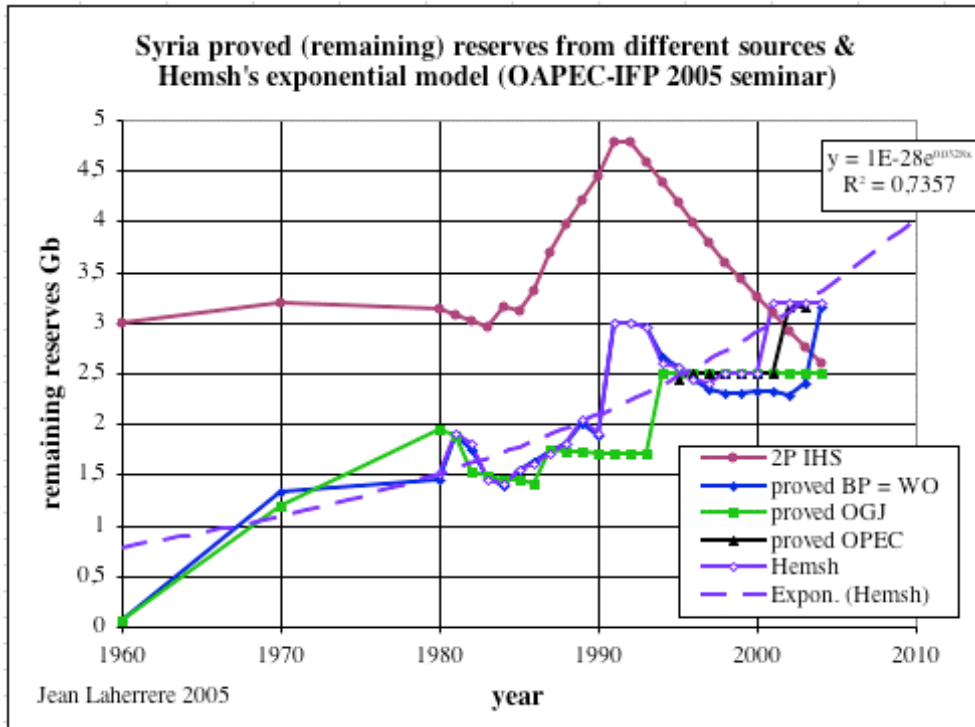
-M.I.Abuhajar & A.El Sogher Sirte oil Co «**Hydrocarbon potential of Libya**»

They have estimated that 1468 Gb of oil were generated in Libya, 927 Gb (63%) were expelled and only 122 Gb were found in place in present discoveries, representing only 13% of the oil expelled, *far less than 30-50% discovered in well explored mature sedimentary basins worldwide*. In our 1994 report J.H.Laherrere, A.Perrodon, G.Demaison “Undiscovered Petroleum Potential” Petroconsultants report, 383p, using Rock-Eval measurements, we have studied the generation of the main Petroleum Systems of the world and found that the ultimate oil reserves represent only about 1% of the oil generated (1% for the North Sea grabens and the Saharan Triassic, 1.4 % for the Arabo-Iranian megapetroleum system,). For the Sirte basin we were unable to estimate this efficiency ratio by lack of Rock-Eval measures at the time. With Rock-Eval measures giving the SPI index applied to the volumes of the source rocks, it is possible to estimate the amount generated (but not with four significant digits), but the amount expelled is a wild guess. Being mainly an oil explorer and not a geochemist, I checked the next day with the best geochemist who was the first to quantify the generation and got an AAPG award for that: Gerard Demaison. Believing that 15% of the generated oil (with 60% expelled) can represent the oil ultimate (with a 50% recovery factor) is a wild guess, being over one order of magnitude! But the estimate of oil generation needs maybe better Rock-Eval measurements and IFP can help!

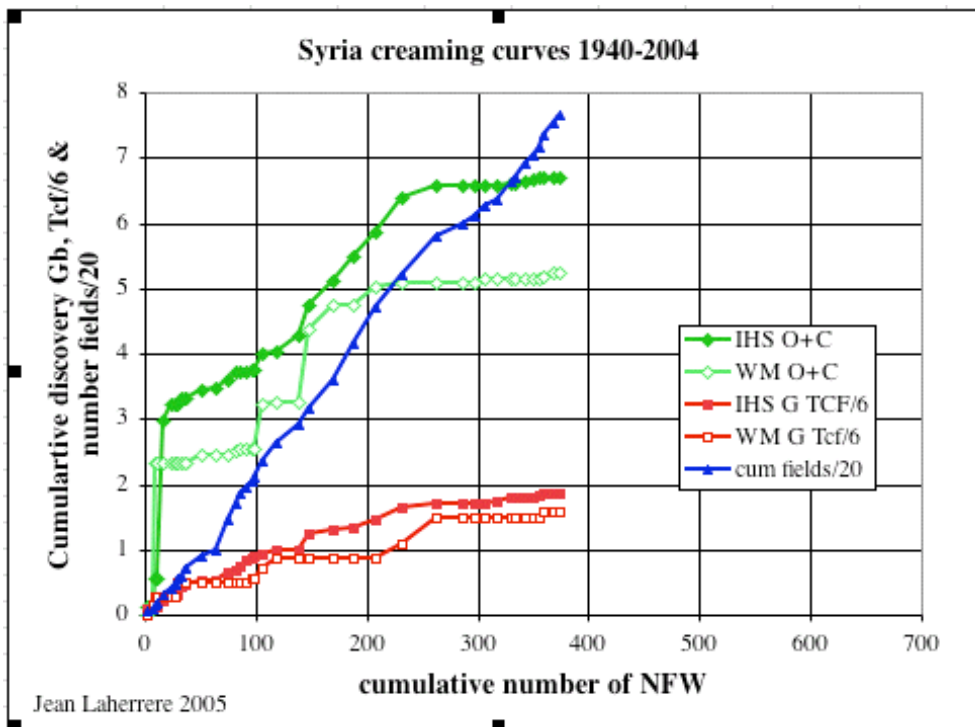
-T.Hemsh SPC Syria «**Future of hydrocarbons in Syria**»

Hemsh in figure 5 extrapolates from 1980 to now the proved oil reserves using an exponential curve to predict that remaining reserves will be 4 Gb in 2010 rising from 3,2 Gb in 2004. It is queer to believe that an exponential curve rising towards infinite can model remaining reserves, which one-day will decline towards zero. The best way to estimate the final total discovery is to use a creaming curve, which displays the cumulative “*mean backdated*” discoveries versus the cumulative number of New Field Wildcats.

Remaining reserves vary between different sources even on current proved reserves, but on backdated proven+probable (IHS) the trend is completely different going towards less than 2 Gb in 2010

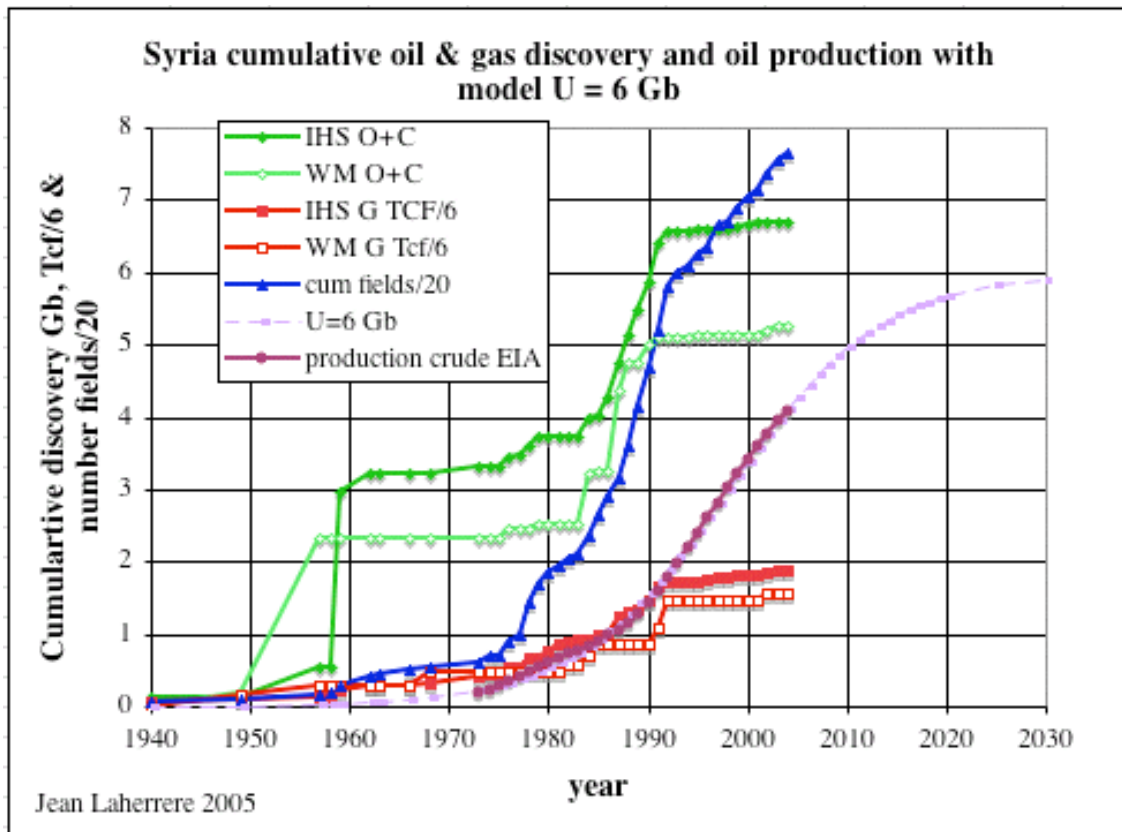


I plotted IHS and Wood Mackenzie data into a creaming curve and found a large discrepancy between them, but it is obvious that the last 10 years trend of discoveries is increasing in number but negligible addition in volume

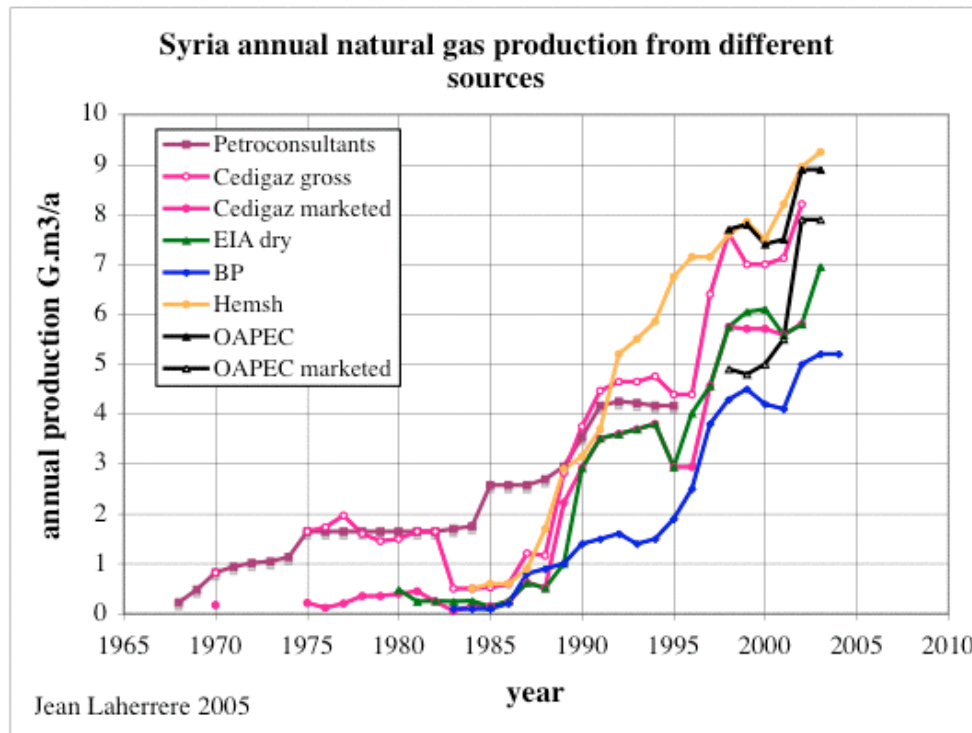


The cumulative discoveries versus time shows very well the increase in number of discoveries since

1991 but hardly any increase in volume compared to the discrepancy between the two technical sources. I am chosen a rounded 6 Gb as ultimate for oil because it fits fairly well the past production (4 Gb up to now) despite that Hemsh stated that the cumulative production up to 2002 was 2 Gb and 35 G.m3.

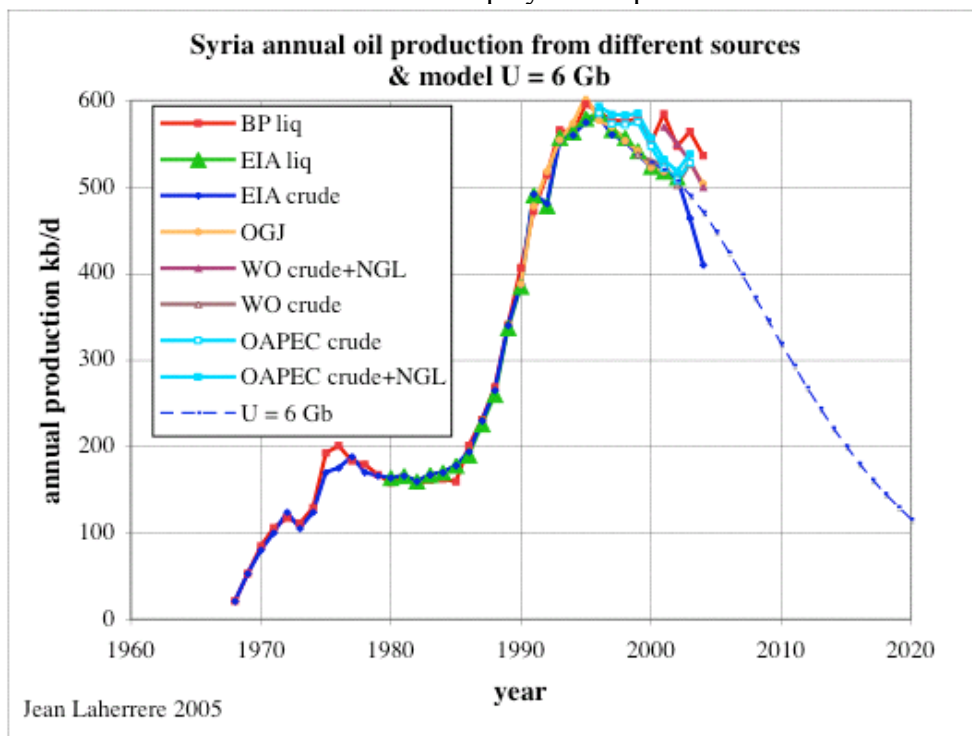


It is amazing to see the large range of production data mainly for natural gas. It is beyond inaccuracy: it is plain incompetence or manipulation! The gas production is reported in 1995 as 7 G.m3 by Hemsh, but as 2 G.m3 by BP and as 3 G.m3 as marketed and 4.3 G.m3 as gross by the more reliable Cedigaz. At end 2002 the cumulative gas production is given by Cedigaz as 100 G.m3 for gross and 64 G.m3 as marketed against 35 G.m3 by Hemsh!



The past oil production data displays a smaller discrepancy except for the last few years as for 2004 USDOE reports 410 000 b/d for crude (but no much difference for liquids previously) when BP reports 536 000 b/d for liquids

The model for an ultimate of 6 Gb displays a step decline in future in line with the peak oil of 1996.



-MF Chabrelie Cedigaz «Natural gas, the fuel of choice for decades to come»

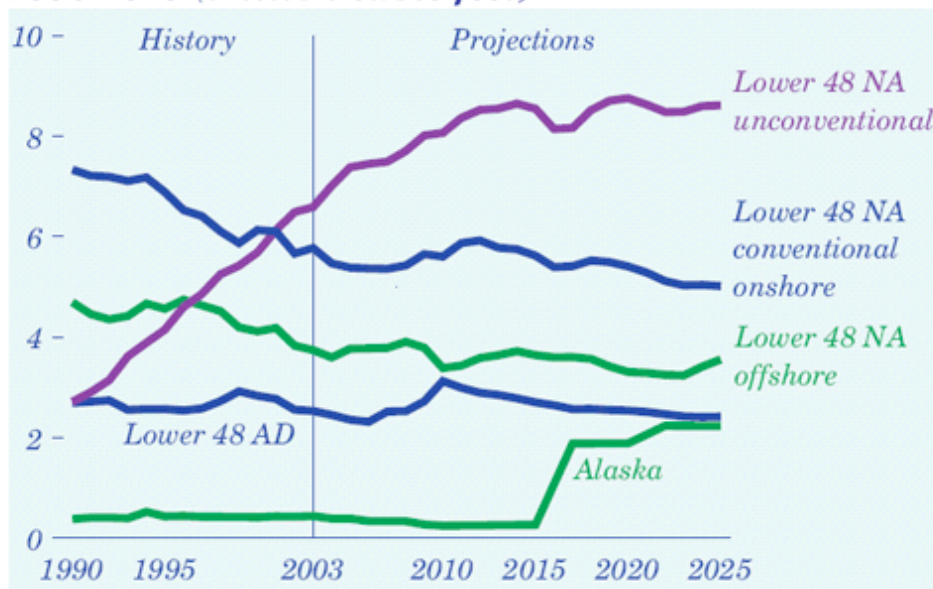
Very good presentation with clear graphs with a complete text in the proceedings.

Chabrelie states that the real world proven reserves must be 15% lower than the reported value if international definitions were used (but against the wrong rule of adding proved data). As indicated above Gazprom reserves were lowered by De Golyer from 28 to 18 T.m3.

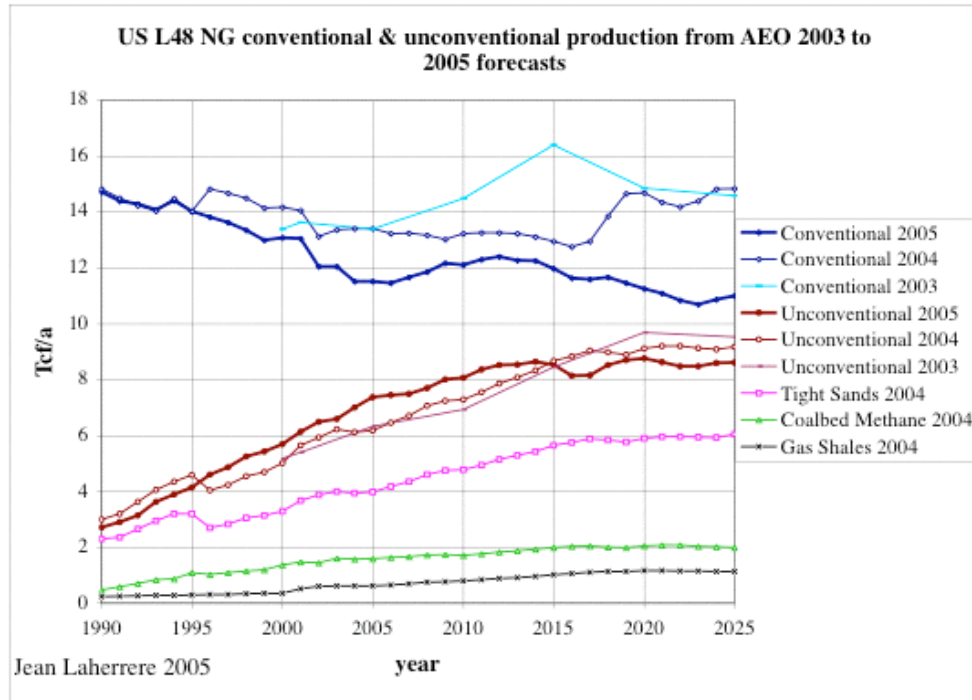
Chabrelie estimates the world conventional gas ultimate at 350-400 T.m3 (12 000 -14 000 Tcf) higher than my estimate of 10 000 Tcf unchanged since 1995 and now having WM data I am inclined to lower it. But I keep this rounded value of 10 Pcf until I got better data. She reports CBM (coalbed methane) resources at 250 T.m3 (9000 Tcf) but how much of these resources are recoverable? The US has about half of the world coal resources and USDOE AEO 2005 forecasts that US unconventional gas (mainly tight sands) will peak in 2012 despite the shortage of conventional gas. In my ASPO 2004 Berlin paper I estimate the US CBM ultimate at 100 Tcf and world CBM at 300 Tcf.

Annual Energy Outlook 2005 with Projections to 2025

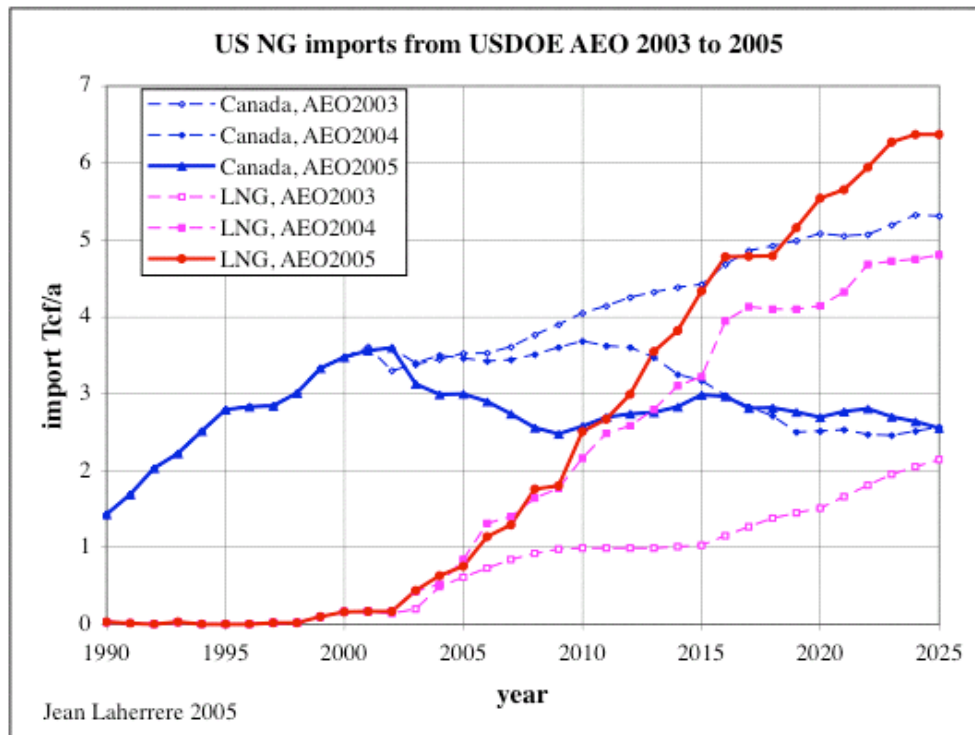
Figure 83. Natural gas production by source, 1990-2025 (trillion cubic feet)



The difference for US Lower 48 natural gas production between the past data and forecasts of the last three USDOE AEO 2003 to 2005 is striking. First the conventional past production from 1996 to 2003 was reduced (likely because a confusion with tight gas) and the unconventional corrected to eliminate the step of 1996. Then the conventional future production is in a chaotic way and lead to doubt on the last forecast.



It is obvious that in the last two years USDOE has lowered its forecasts and advanced the peak of its domestic NG production. But also it has also lowered the Canadian import and increased sharply the LNG import.



Chabrelie asked the question of the future of the Qatar LNG projects if LNG demand in the US does not occur (the LNG USDOE forecast for 2025 has raised from 2 to 6.5 Tcf/a in the last two years!). Paul Volcker forecasts with a 75% probability a depression in the next five years.

She mentions the poor efficiency of LNG with about 55-63%.

It seems now that the potential of producing oceanic hydrates is vanishing in the medias, as did vanish 30 years ago the potential of producing the huge volume of methane dissolved in pressured aquifers in particular in the Gulf of Mexico. It is what I said for about 10 years.

Most of the papers presented during the three days want to show that there is abundance of oil and gas, but the presented data are mainly political. The large discrepancy between sources or subsequent data for reserves but also production (even in the US) shows that all the declarations of every country to favour transparency is just wishful thinking or political talk. The first goal to better forecast should be to change most of the rules in particular of reporting only proven reserves being the minimum in favour of the proven + probable being the expected value.

As long as the SEC rules will stay the same and the OPEC quotas are based on reserves it is no hope to improve the data.

Before the seminar on 31 May IFP release several papers in a press conference “Comment accroître et renouveler les réserves de pétrole et de gaz? Avancées de la technologie et stratégie de la recherche IFP”. It is a pity to find some significant mistakes as in the paper “**Reserves de pétrole: des données évolutives en fonction de la technique et de l’économie**” (unknown author) where it is written *P50 ou 2P ce sont les” réserves probables”*: It is wrong: 2P are proven+probable.

Also *les réserves possibles dites encore P10 ou 3P* shows that the author did not bother to find what 3P means and has a poor understanding of the problem!

It is stated that ASPO forecasts peak oil before 2010 but ASPO is an association gathering several members and entities with different views. ASPO newsletter represents just one view and other views have to be found in the ASPO annual conferences. Furthermore my forecast in peak oil is stated to assume to be without any constraint from the demand, which is unlikely. I may forecast the supply but not the demand!

It is also stated that ASPO does not take into account the technological progress. It is false as I am a technician with 50 years experience and in all my studies I study the impact of technology as for example in the Forties field. I have been involved in most of the progress in oil and gas exploration techniques during these 50 years, in particular what is called new techniques, which are more than 30 years old as 3D and horizontal drilling. I challenge any IFP technician to prove that I ignore what have been done in past techniques and the potential in the future. My main quality is now to be free to speak as being unpaid, to have access to almost all technical data and I do not promote any techniques. IFP in contrary could be accused to ignore that technological progress leads to the new good practices of getting the maximum of profits (short-term goal against long-term goal) against getting the maximum of oil, which was the target in the past of good practices. The example of Shell in Oman (Yibal) or New Zealand (Maui) shows that maximizing the profit leads a barrel to day is better than two barrels to morrow.

In the potential of increasing reserves, the example of Duri in Indonesia is given where the recovery factor was increased from 16% to 55% using steam injection. But it is misleading to give the impression that improvement in unconventional fields can be extrapolated to conventional fields. Furthermore in the paper on «Comment augmenter du pétrole dans les gisements» it is rightly stated that steam injection does not work beyond 100 m because of net energy (this word was not mentioned in the seminar!).

Saying that oil will be produced until the end of the century does not mean anything, the main question is when oil will decline and when supply will not match the demand.

In conclusion this seminar was designed to speak about what people wants to hear and not about the truth!