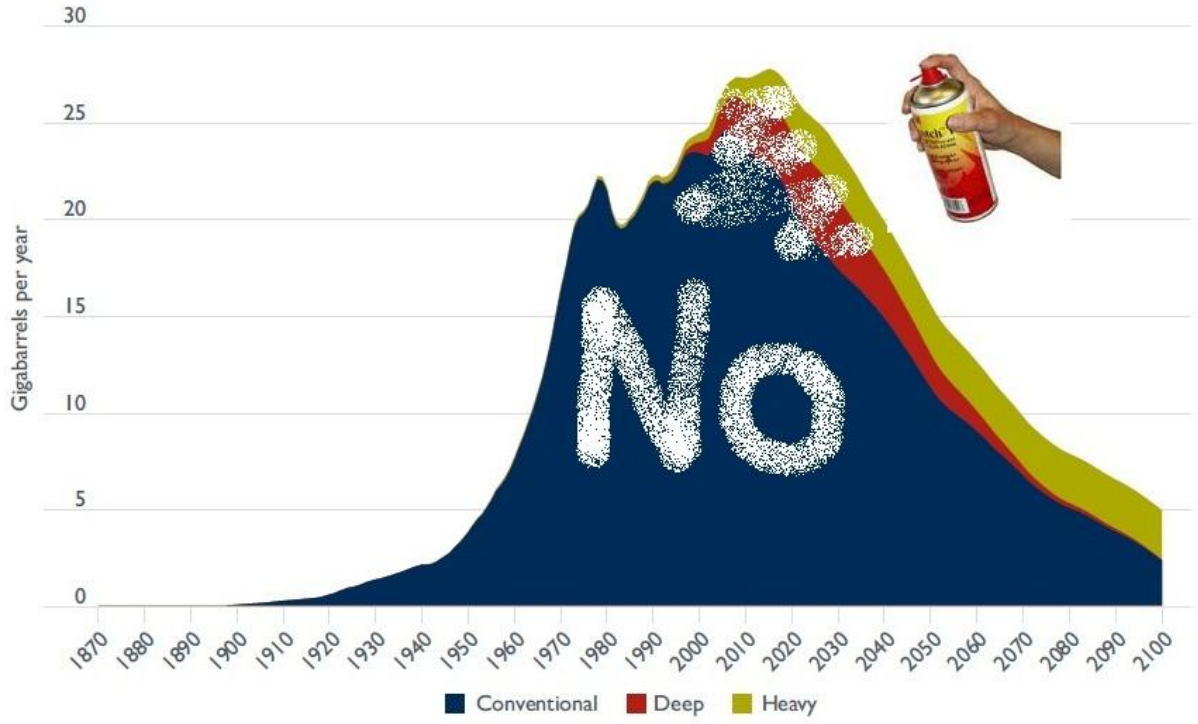
Submission on 2011 Energy White (Wash) Paper
or
Peak oil denial not yet peaked



> **Senator LUDLAM:** You can table it, Minister.
> **Senator [Kim] Carr:** The answer is no.

Prepared by Matt Mushalik (MIEAust, CPEng) March 2012 mushalik@tpg.com.au

Contents

Executive summary

The focus of this submission is the peaking of crude oil supplies, a crucial part in every energy mix. Global peak oil is not an easily identifiable event like 9/11. Rather, it is a process which started in 2005 and now extends over a number of years with many positive and negative feed-back loops. Peak oil brought the world from $20 a barrel to a $100 level at which all economies are suffering. The decline after the peaking will come when oil depletion in maturing, conventional fields can no longer be offset by other liquids.

But while the end of the bumpy production plateau is endlessly debated until judgment day what is more critical right now is the peaking of oil production in key countries like Iran, Yemen, Egypt, Sudan, Libya and Nigeria which triggers social unrest and creates new, dangerous geo-strategic constellations.

The EWP does not do any calculations on peak oil nor does it analyse any of the above problems, a fatal flaw. Some of this analysis has been conveniently tucked away in the

"updated" 2011 oil vulnerability report of ACIL Tasman (with commercial interests) and the NESA report, but both these reports are not a proper assessment of the current situation.

One of the main failures of the EWP is that it did not update the internal BITRE 117 report which calculated an optimistic peak around 2016/17, arrived at by using a modified Hubbert linearization. The proper procedure would have been to take BITRE 117 as an envelope of theoretical maximum scenarios. Then, country by country, it should have used the decline rate analysis of the IEAWEO 2008 (with amendments in WEO 2010 and updates in all IEA OMRs). On top of these declining production profiles it should have stacked all new oil field projects from Chris Skrebowski's Megaprojects database. Such a fine tuning would have helped to come up with a more accurate timing of the end of the production plateau. **This essential research was not done, but number crunching work on this should start immediately so that this can be included in the final version of the EWP.**

The EWP is also cherry-picking from the IEA ("not peaking before 2030") instead of applying the principles of prudent governance by accepting the warning of the IEA chief economist Fatih Birol in the ABC TV oil crunch show that governments should have prepared for peak oil already 10 years ago.

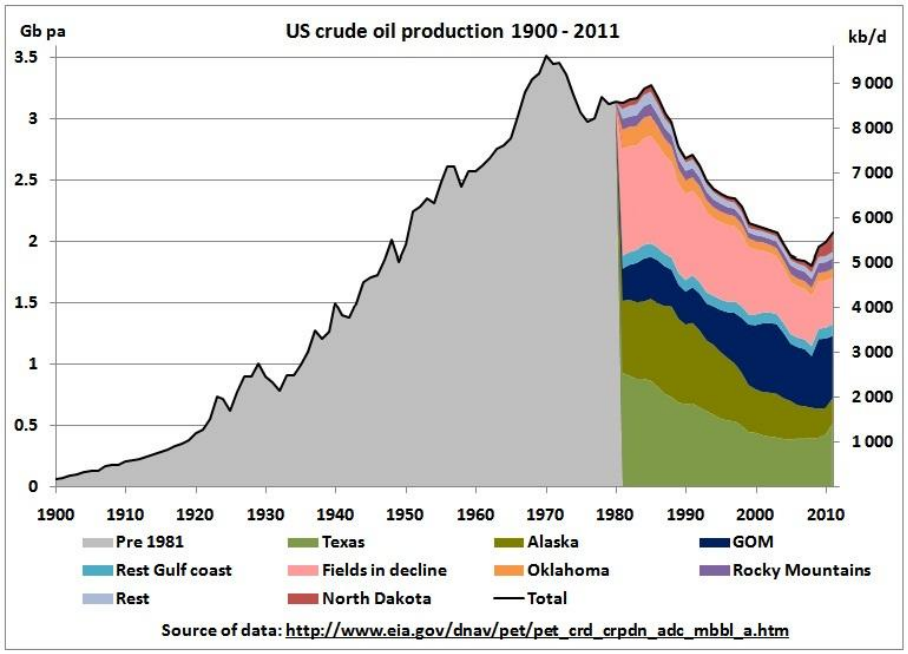
There are many consequences flowing from the failure to calculate future oil supplies. First, the physical infrastructure (electric rail) which is needed in a constrained oil supply environment is not being built in a timely manner. Alternative fuels like natural gas as transport fuel are not introduced into the car and truck fleet at a speed commensurate with the coming oil decline. A forward preparation of at least 10-20 years would have been needed for a smooth transition. A lot of irreversible economic damage has already occurred. With a continuing peak oil denial economic damage will be astronomical, worsening the ongoing financial crisis as a result of accumulated debt (which in itself could have been avoided or at least mitigated if governments had warned banks to be prudent with their investments).

There will also be legal consequences of peak oil denial as investors will seek compensation for moneys lost in oil dependent infrastructure like toll-ways, airport extensions etc. Who will be responsible is difficult to say. No doubt politicians and bureaucrats will blame each other. Courts will decide. It will be like after a train accident. They will ask why that was not foreseeable?

(1) Historical peak oil events which changed the world

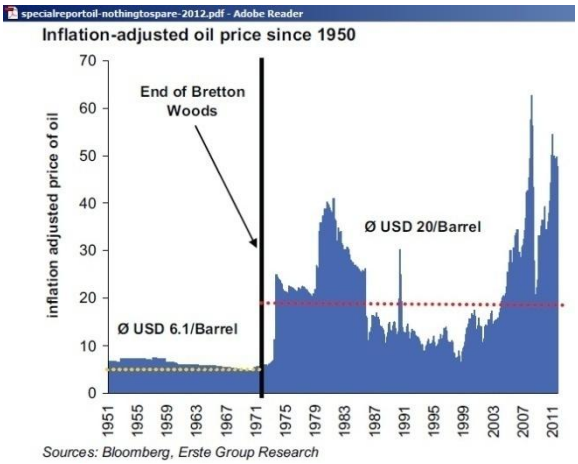
These 4 subchapters will show how peak oil in key oil producing countries has triggered events which changed the world forever and continue to shape geo-politics until the present

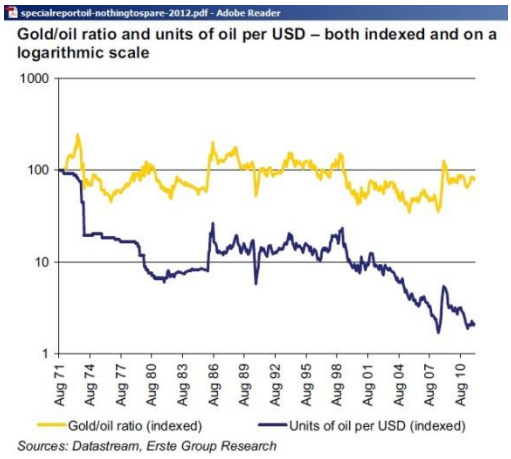
(1.1) US peak in 1970



The US peak in 1970

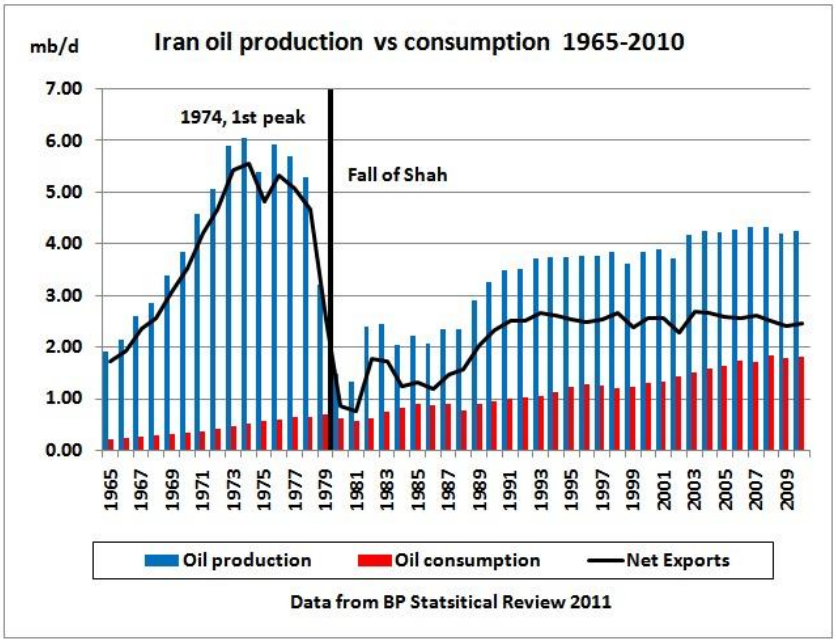
(a) allowed OPEC to impose a successful embargo in 1973, causing the 1st oil crisis
http://crudeoilpeak.info/oil-crisis-1973
(b) forced the US to import more oil, paid for in petro-dollars. For that to happen, President Nixon had to lift the gold standard of the US dollar otherwise oil imports would have been limited by gold production. http://en.wikipedia.org/wiki/Nixon_Shock





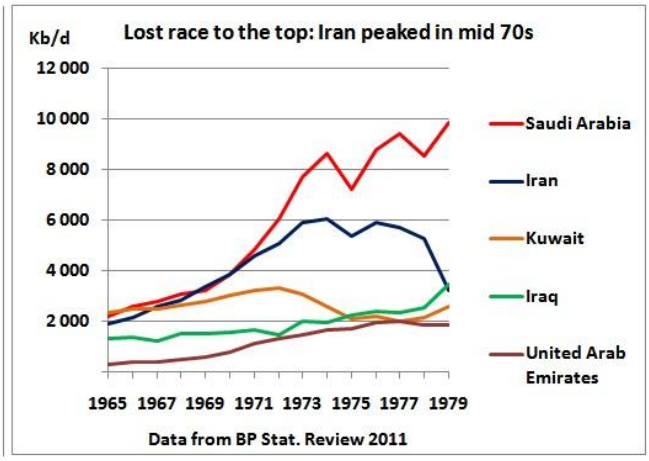
These graphs are from the oil report 2012 by the Erste Group (Austrian Savings Bank)
Left: We see the jumps in adjusted oil prices as a result of the 1st and 2nd oil crisis and then again when the global oil peak started. Right: while the gold/oil ratio was fairly constant over the decades, the units of oil one USD could buy has plummeted dramatically.
http://treo.typepad.com/files/specialreportoil-nothingtospare-2012.pdf

(1.2) Peak oil under the Shah in 1974



<< Iranian oil production peaked in 1974, years before the Iranian revolution brought production to a collapse. This peak was created by starting one giant oil field after the other in quick succession in the late 60s (post WW2 boom) and early 70s (during 1st oil crisis). These fields were: Agha Jari, Gachsaran, Ahwaz, Parsi, Marun and Bibi Hakimeh, producing at peak around 4.8 mb/d.

In the book "The Cambridge History of Iran", volume 7
http://en.wikipedia.org/wiki/The_Cambridge_History_of_Iran
the authors write: "When oil revenues began to decline in the middle of the 70s and when national expenditure was at its greatest and the pressure on national resources unprecedented, it was not just the demurrage charges at Iranian ports or the bottlenecks in transportation which affected the economy and dispelled the myth of continuous progress. It also involved the failure of power supplies in the capital, which stopped lifts and ruined the contents of deep freezers, spoiling the lifestyle of the privileged. ….The question posed by the Shah in October 1976 remains a problem for Iran: "what, then is going to take the place of our oil? What is going to replace our oil income, which now enables us to give so many services to the nation?"



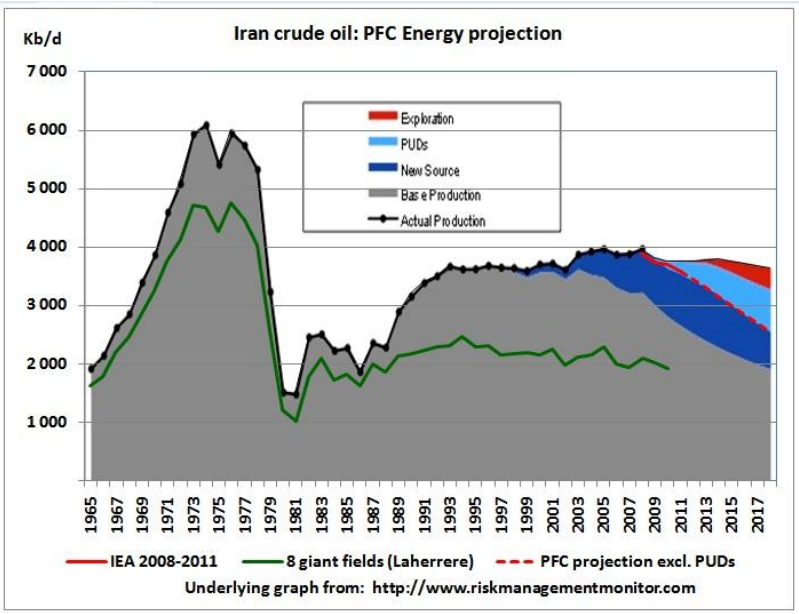
The peaking and the revolution brought about the 2nd oil crisis. At that time I was working in Lilongwe, Malawi. The petrol line in the picture is about 5 hrs long. >>

This will happen again as governments do not prepare for oil decline.

More details:
http://crudeoilpeak.info/my-experience-oil-crisis-1979

Even after the revolution and the Iran/Iraq war production from Iran's giants did not exceed 2.5 mb/d. They are now down to 1.7 mb/d or around 35% of their peak production.

It is very important to be aware of this historical context as this helps to understand what is happening right now.



http://www.riskmanagementmonitor.com/wp-content/uploads/2010/05/Picture-23.png

The above graph is from a March 2010 article of the Risk Management Monitor on a presentation by PFC Energy. I have added: a green curve showing the production from 8 giant oil fields (data kindly provided by Jean Laherrere), a red curve showing actual production (IEA OMR, the 2010 projection for 2011 was spot on) and a red dotted projection line. Sanctions imposed on Iran will guarantee that PUDs (proven undeveloped) will not be produced and exploration will also be hampered. Iran is now sliding down the upper edge of the dark blue area.

Therefore, Iran is on its 2nd and last peak and we see this country again under peak oil stress, a highly dangerous situation, especially as the nuclear weapons program is intractably connected to the issue of oil supplies.

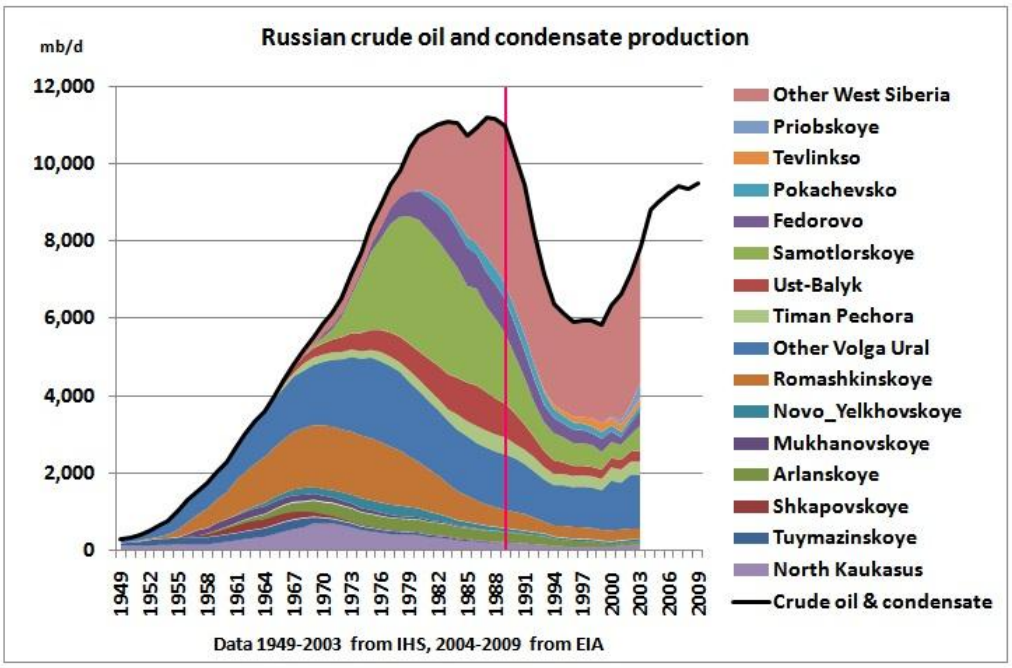
TONY JONES: *Let's go briefly through some of the possibilities that are in your mind…..*

MARTIN INDYK: ..... they [Iranians] might try to close the Straits of Hormuz. They could disrupt shipping for a short time, but I don't think they'll succeed over time in blocking the Straits, but they may try that. They may bomb the oil facilities in Saudi Arabia, just across the Persian Gulf and other Arab oil producers like Qatar and the United Arab Emirates, all of whom are strongly opposed to Iran and that could cause serious disruption in the flow of oil and of course a spike in the price of oil that could affect the global economy.
http://www.abc.net.au/lateline/content/2012/s3449250.htm

More details on the above graph can be found in the Iran Primer of the PBS website by Fareed Mohamedi from PFC Energy. The decline is -3.8 % pa)
http://www.pbs.org/wgbh/pages/frontline/tehranbureau/2010/10/iran-primer-oil-and-gas-charts.html

That the EWP did not do any detailed analysis on Iran is inexcusable. For that omission alone, the whole ACIL Tasman oil vulnerability assessment is useless.

(1.3) West Siberian peak in 1986 triggered fall of SU



It can be clearly seen that well before 1989 a steep decline in the giant oil fields Romashkinskoye and Samotlor could not be offset by production from other oil fields which caused a serious oil crisis. It was one of the contributing factors to the collapse of the Soviet Union.

From the Spiegel article:

Gorbachev, as Genscher [the German Minister for Foreign Affairs participating in negotiations] *observed at the time, "is only interested in what is happening at the moment." And at that moment, there was turmoil throughout the Soviet Union, whose ethnic groups were striving for independence. "What can I do?" Gorbachev said at the time. "Azerbaijan and Lithuania, radical reformers on the one hand, social democrats on the other, and the blows are getting more and more painful, the economy is limping along,* ***and the people are running out of energy****."*
http://www.spiegel.de/international/germany/0,1518,719848-5,00.html

Soviet Economic Decline:

Did an Oil Crisis Cause the Transition in the Soviet Union?

In the 1970's and 1980's the Soviet Union was trying to get Eastern Europe to cut its reliance on oil especially from the Soviet Union so that it could export more oil for foreign hard currency (CIA, 1985). Before 1989, the Soviets provided as much oil as Eastern Europe needed using a bartering system (FBIS, 1989). In reality the oil was given away at well below world prices (Balabanov and Deitz 1991). The Soviet Union was practically giving away its oil to Eastern Europe, Cuba and North Korea in order to hold up their economies and Soviet influence. As oil production waned, those exports declined and the subsidy was cut causing those economies to fall one by one alongside the Soviet economy. Already the Soviets had a severe credit crunch due to lower oil prices on their oil exports in 1986. The Soviets compensated by cutting foreign imports that year. Unfortunately exporting less lead to greater foreign currency problems, and so the Soviets started borrowing money to pay for

imports. Eventually the Soviet and Eastern European economies were forced to cut oil consumption in order for the Soviet Union to be able to export oil for needed revenue to pay interest on foreign debts and buy essential Western technology.

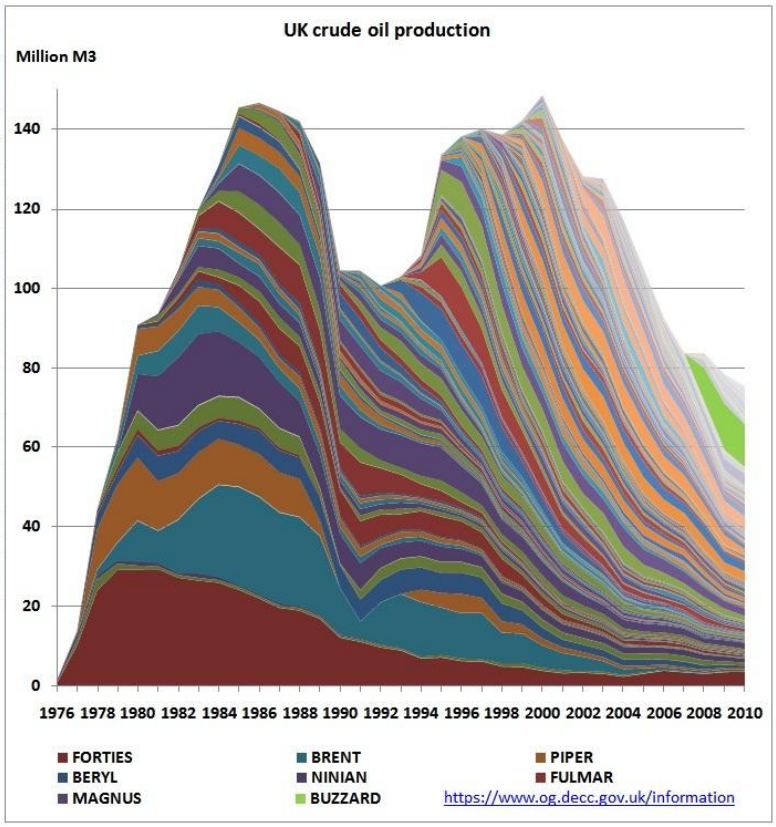
Finally in 1989, the Soviets announced that trade to Eastern European Countries in CMEA (the Council for Mutual Economic Assistance) would be conducted in hard currencies and that oil exports to CEMA would be cut by 10% in 1990 (Balabanov and Deitz 1991). During that year and after, the Soviet Union undoubtedly cut oil exports, although exact figures are hard to come by. The Soviets probably went more quickly to selling their oil for hard currency than official accounts and undoubtedly cut exports to those who could not pay. Thus from 1989 to 1990, Eastern Europe was going through an oil crisis. With less virtually free oil from the Soviet Union, Eastern European countries had to adapt their economies to the new market. They had to become more oil efficient overnight. The only way was with freer markets. The Soviet Union could see that the only way to cut exports of free oil to Eastern Europe was by simply cutting off from the established trading system and let Eastern Europe sink or swim. In 1989 then, Gorbechev initiated total glasnost in Eastern Europe and stood back hoping it would simply stay in the Soviet sphere.

http://www.hubbertpeak.com/reynolds/SovietDecline.htm

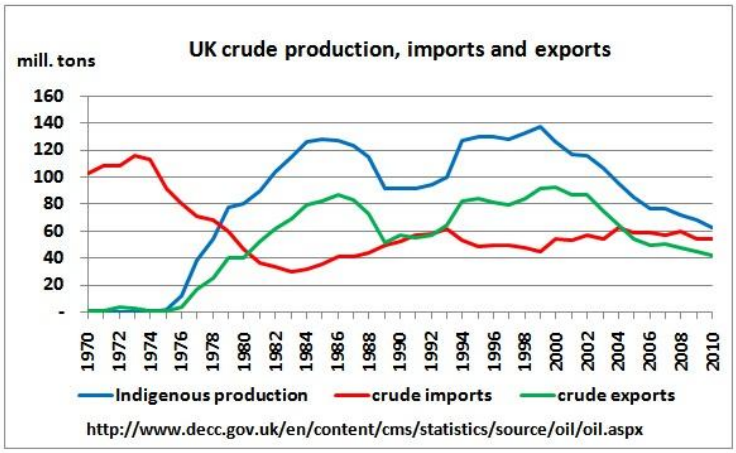
We should also not forget that the Chernobyl nuclear accident in 1986 sharpened the energy crisis. http://en.wikipedia.org/wiki/Chernobyl_disaster

More details are here:
Russia's oil peak and the German reunification
http://www.crudeoilpeak.com/?p=1912

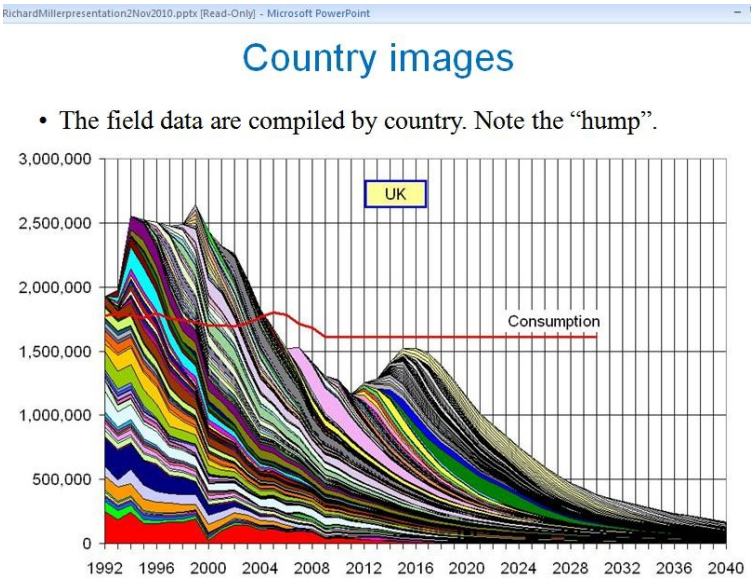
(1.4) North Sea peak



<< UK oil peaks. Like in other countries, peaks are created by peaking of giant oil fields. Instead of using new fields to offset their expected decline these smaller fields are stacked on top of the giants, driving total production up to unsustainable levels. In 1988, the Piper Alpha accident lead to steeper declines as all oil and gas platforms had to be re-engineered. During that period, more, but much smaller fields were found, leading to the 2nd and final peak.
The problem with these peaks is of course that the economy is being built for and around these high production levels which cannot be maintained.



<< UK is now a net importer of oil



<< Projection by Richard Miller. A hump is possible from developing fallow fields.

http://www.energyinst.org/filegrab/?ref=798&f=RichardMillerpresentation2Nov2010.pptx

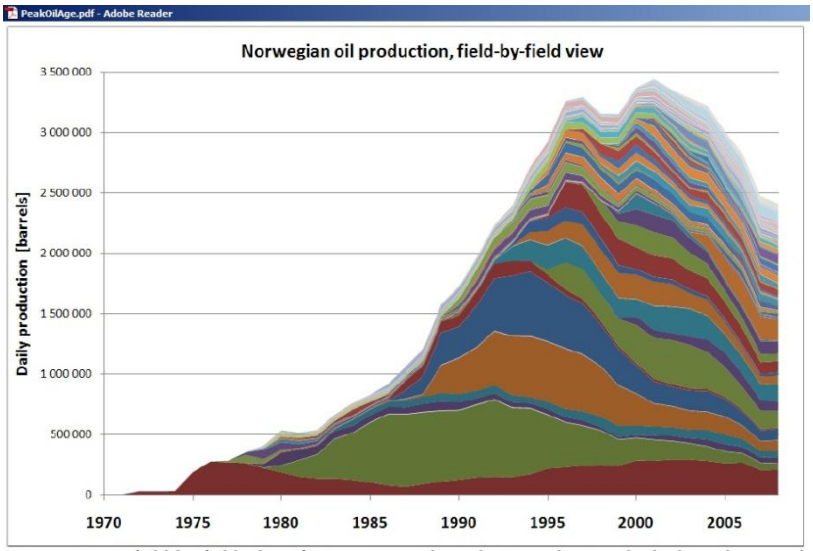
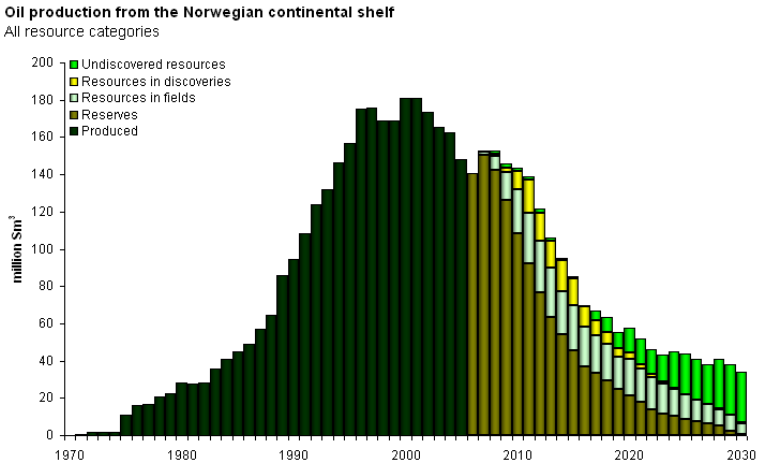


Figure 10: *A field-by-field plot of Norwegian oil production, showing both the volume and temporal distribution of production for each field. Most of the giant fields peaked prior to 2000. Initially, their decline was offset by a massive expansion of development of smaller fields before the overall decline became unstoppable.*

<< Norwegian oil peaks. A similar picture to UK

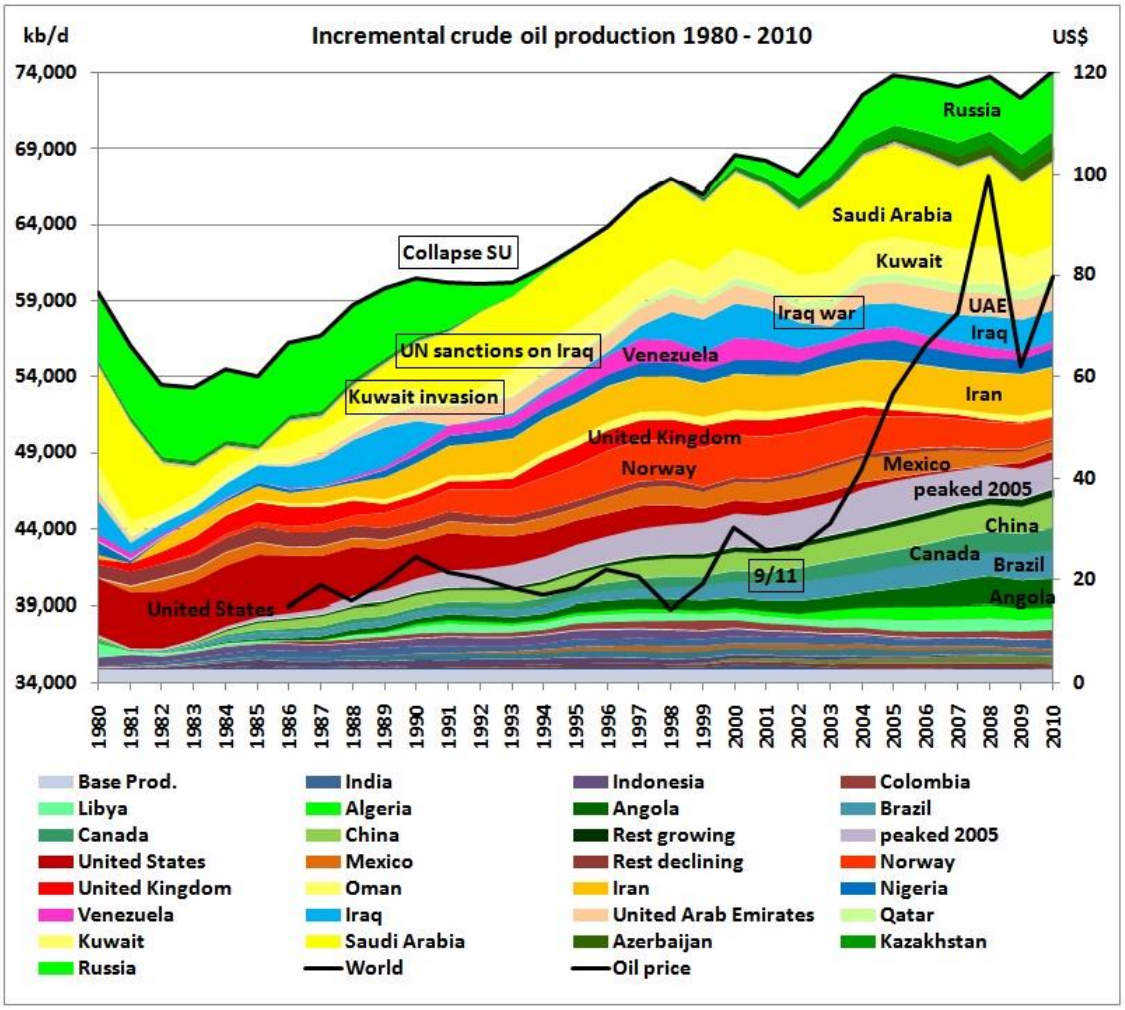
http://www.tsl.uu.se/uhdsg/publications/peakoilage.pdf



<< Projection from the Norwegian Petroleum Directorate

https://norwayportal.mfa.no//NR/rdonlyres/3AE52C92D215419D81319A5A13FB1ACA/49868/productionncs1.gif

The North Sea oil peak (including Denmark) started in 1996 and lasted until 2001, at around 5.9 mb/d. This marked another turning point in global oil markets as can be seen on this graph:



Incremental production in each country is the production exceeding the minimum production in the period under consideration (1980-2010). The sum of all minimum production is called the base production. The stacking order is as follows:
(a) minor suppliers with a very flat peak around 2000,

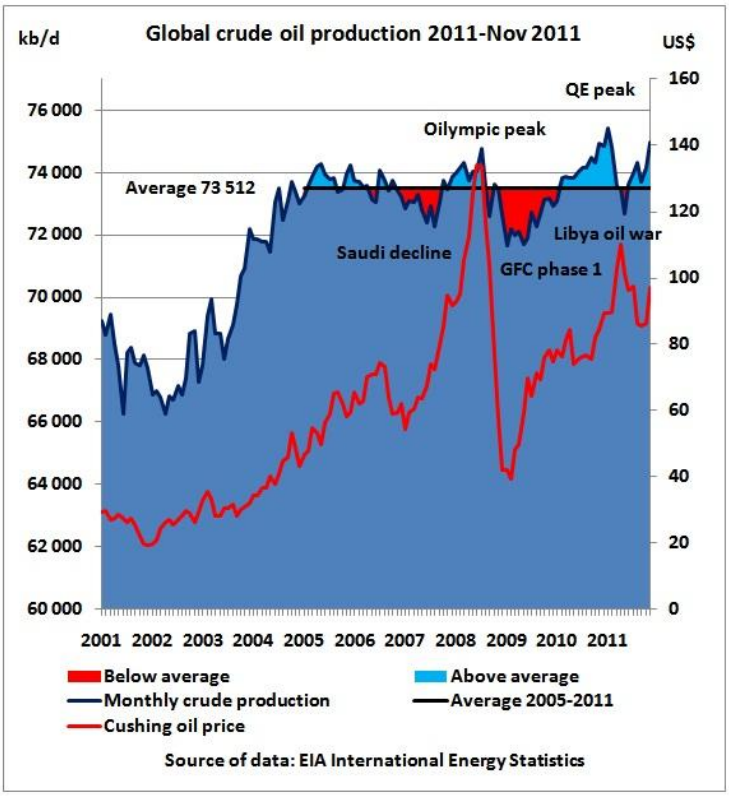
(b) growing suppliers (green color),
(c.) a group of minor suppliers which peaked in 2005,
(d) declining countries (in red), including the North Sea and the US
(e) OPEC countries
(f) Russia and FSU countries

We can see that when the North Sea stopped growing at the end of the 90s the whole group below UK on the graph stayed practically flat, thereby giving OPEC more market power. It always takes time until markets realize what is happening and we had a dip in demand after 9/11 in 2001. When the Iraq war started in March 2003, no one could quickly increase production except Saudi Arabia and oil prices went North. However, OPEC did not perform well (the Saudis had problems with their oil fields in 2007) and the single most important country to have rescued the world from a deep oil crisis was actually Russia.

It is very clear that the world is at peak (crude oil) since 2005, at around 73.5 mb/d

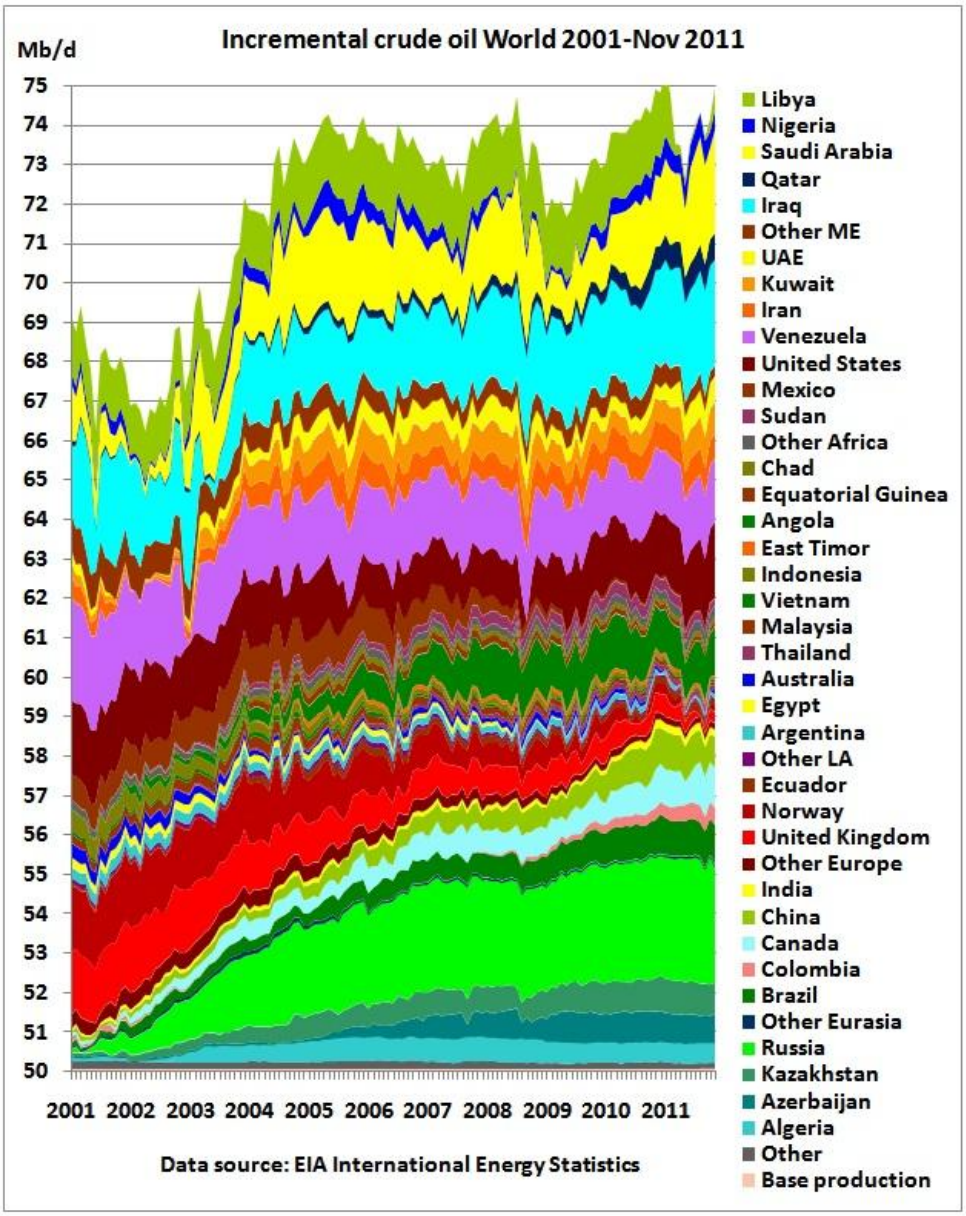
Conclusion this chapter: Peaking of oil production in key countries or important oil provinces can have a profound impact not only on the flow of oil but also on financial systems, the social cohesion in oil producing countries, the stability of whole empires and of course the oil price itself. An that leads us to the next chapter

(2) Peak oil is NOW – what you see is what you get



This graph shows the bumpy production "plateau" since 2005. The average was around 73.5 Mb/d. We can see there are periods with above average and below average production. The 1st problem was the Saudi decline in 2007, followed by a demand spike in the Olympic boom year where China's extra demand drove oil prices to highest levels. The 1st phase of the Global financial crisis, which in itself was triggered by high oil prices above the 1990's level of $20 a barrel, caused a recession which lowered oil demand. Oil prices went dangerously low because there is a lot of oil which costs more to produce than $40 a barrel. Subsequently,

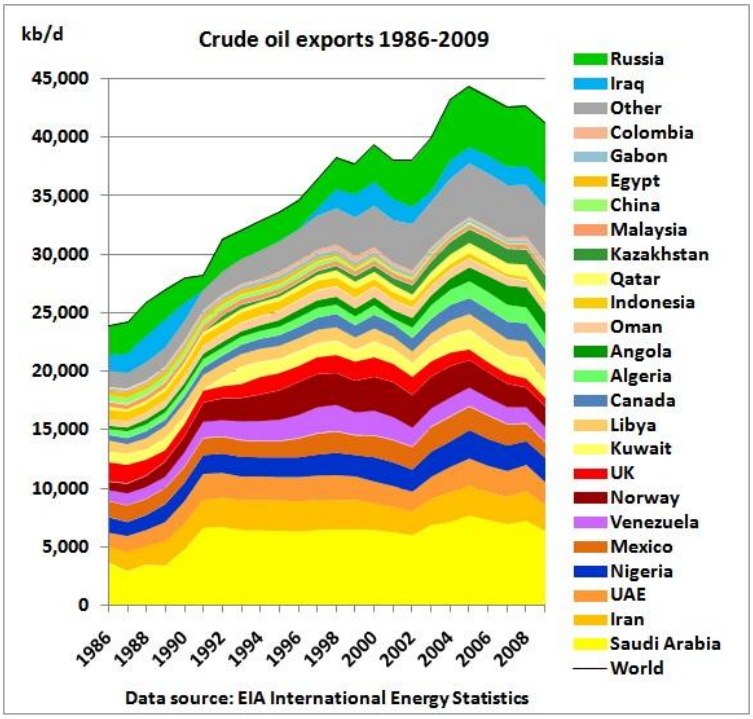
quantitative easing flooded the market with easy, cheap money, brought the world out of recession and increased demand for oil, but also brought oil prices up again, suggesting production cannot keep up with demand growth. No sooner had crude production reached historic heights of 75.4 Mb/d did the Libya oil war start, a proxy war over oil between Europe and China. Libyan production losses during that war are recovering but the next problems are around the corner: reduction of production in Syria, Yemen, Sudan and, most importantly, Iran. This gives us a foretaste of what is to come. Dr. Bakhtiari explained during his visit in Australia in 2006 that the end of what he called transition phase T1 will come when the periods of declining (below average) production exceed the periods of growing (above average) production.



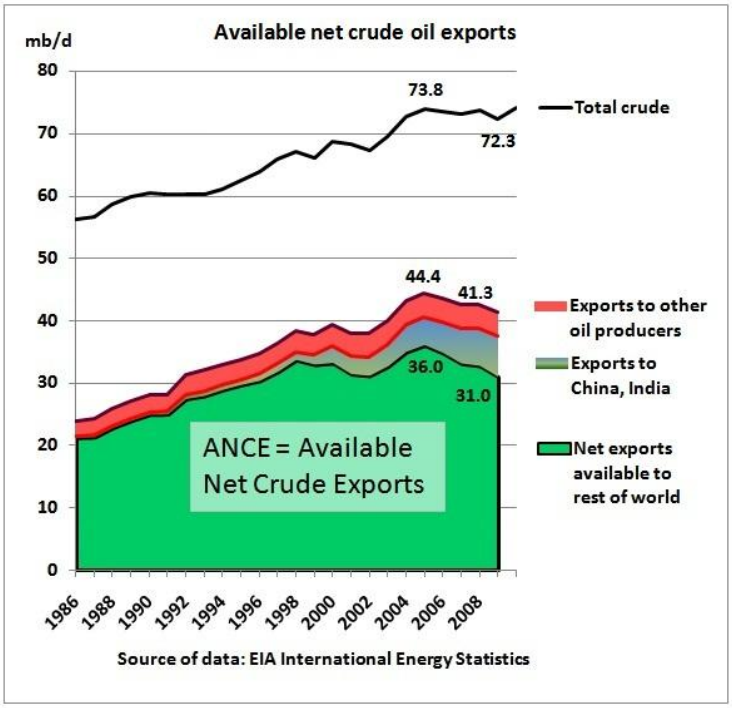
This graph shows incremental crude oil production (production exceeding the minimum achieved by each country in the period January 2001 to Nov 2011 – the minima are then summed up in "base production", now 50 Mb/d). The countries are stacked in following order: Growing, then declining, then peaking , the US and on top OPEC and ME countries. The larger the area, the larger the variation in oil production. Russia – with a quite reliable production pattern - increased production by 3 Mb/d but now seems to have reached a plateau. An equal amount was lost in the North Sea (UK and Norway), so there was no growth from these 3 countries together. Brazil, Angola, Canada and China contributed to

growth and recently Colombia, too. US production had an uptick from deep water and unconventional oil but remains vulnerable to hurricanes. Venezuela (strike), Iraq (war) and Libya (war) were the countries with the highest variations in oil production. As can be seen from the Saudi production drop in 2007, they are no longer a reliable swing producer although they can still afford to reduce production (GFC). The response to Libyan production outages was slow and delayed.

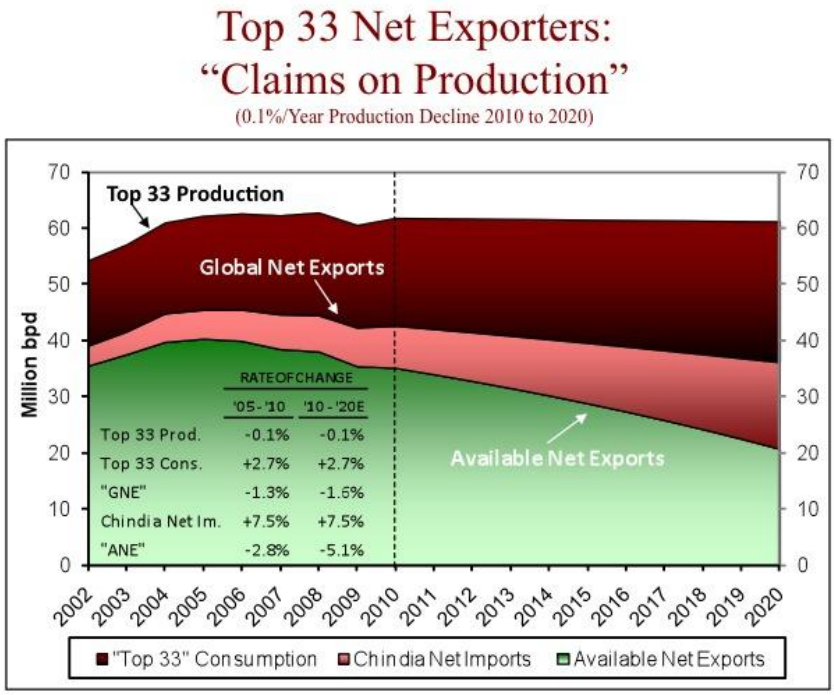
(3) Export peak



Global crude oil exports have definitely peaked in 2005. This is the main reason for higher oil prices.



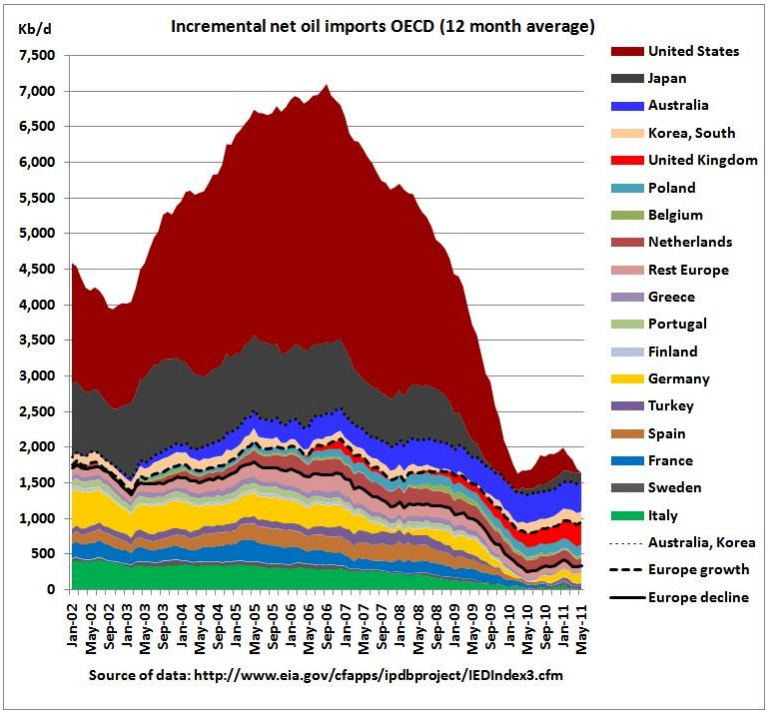
What has declined even more are the net crude oil exports available for import by countries other than India and China.



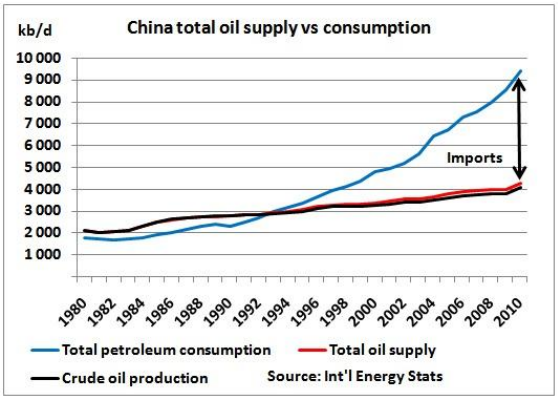
http://www.aspousa.org/conference/2011/presentations/110311%201400%20ASPO%20China%20and%20Middle%20East%20Brown.pdf

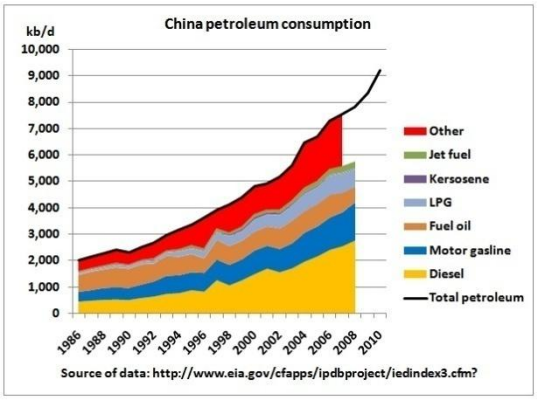
This graph is from Jeff Brown's presentation to the ASPO 2011 conference. Even if production stays flat, and while demand in oil producing countries and in Chindia grows the net available exports for the rest of the world will decline

(4) OECD demand peak and zero sum game



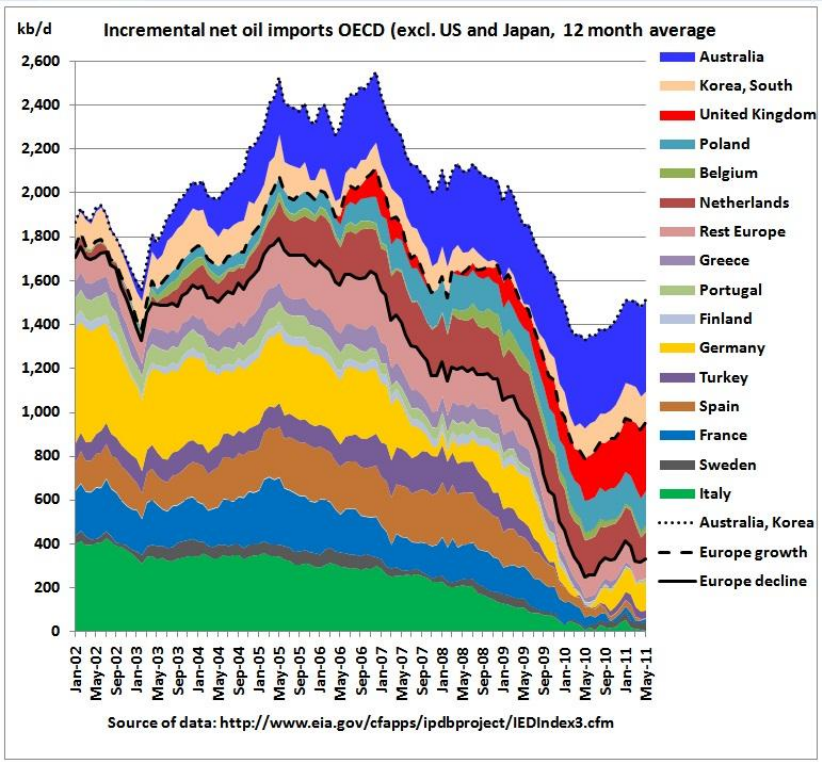
Hardest hit was the US, but also Japan. These reductions in oil imports were of course NOT voluntary but caused by high oil prices after peak oil hit in 2005. What was "saved", was gobbled up by China and other non-OECD countries. A perfect zero sum game.





top,left: increasing oil imports
bottom, left: diesel shortages

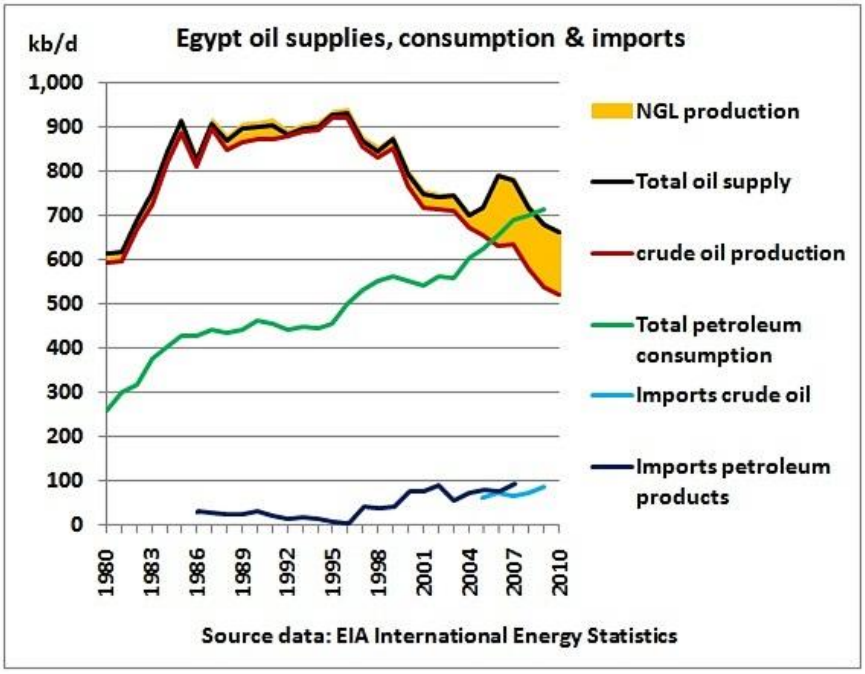
top,right: petroleum consumption by fuel type
bottom, right: taxis lining up at filling station



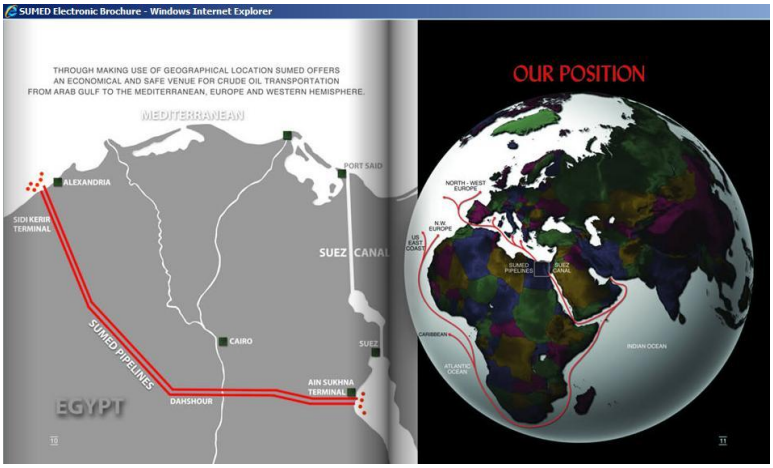
Australia's imports increased but that cannot last long and will ultimately back-fire because a trend of growing oil imports is unsustainable vis-à-vis declining global oil exports.

(5) Current peaking in key countries and impact

(5.1) Egypt



Egyptian oil production peaked already in the mid 1990s. Egypt is now a net oil importer with dramatic consequences for the budget and social stability. This country is very important because of the Suez canal and the Sumed pipeline. If there is unrest in Egypt, this might impact on oil flows through this chokepoint.



This are excerpts from a newspaper article:

February 20, 2012
"The current government has reversed the liberalizing reforms that the prior regime had instituted… potentially to replace them with trade restrictions, price controls and maintaining subsidies… [Such policies are] a recipe for economic inefficiency and stagnation.
"They will not produce the 6 and 7 percent rates of growth that Egypt needs to meet the job demand of new entrants to the labor force and to make a dent in high youth unemployment," she said.
Egypt faces potentially incendiary inflation if the central bank reserves fully deplete in the next several months, as expected, which could trigger further political unrest, she added.
Foreign reserves have been declining at an average of $2 billion monthly since the uprising, reaching around $16 billion at the end of January.
Although Egypt's petroleum reserves will reportedly deplete within the next 20 years, South Sudan represents a new frontier for petroleum investors.

"We have to change our mindset. We are no longer living in a $20 per barrel world, it is now a $100 per barrel world. We will not be able to find cheap oil and gas anymore," he said.
He reiterated the necessity of reducing petroleum subsidies, given that it is both economically unsustainable and encourages smuggling.
http://thedailynewsegypt.com/energy/egypt-expects-8-bln-in-petroleum-investments-says-minister.html

So what will happen when Egypt is on the way of running out of oil? Allow oil to flow easily through their country when farmers don't get enough diesel for irrigation? Where is that in the oil vulnerability assessment of ACIL Tasman? These consultants seem to live on a different planet, without Egypt. While they have seen with their own TV eyes how explosive the situation can get there and how fast.

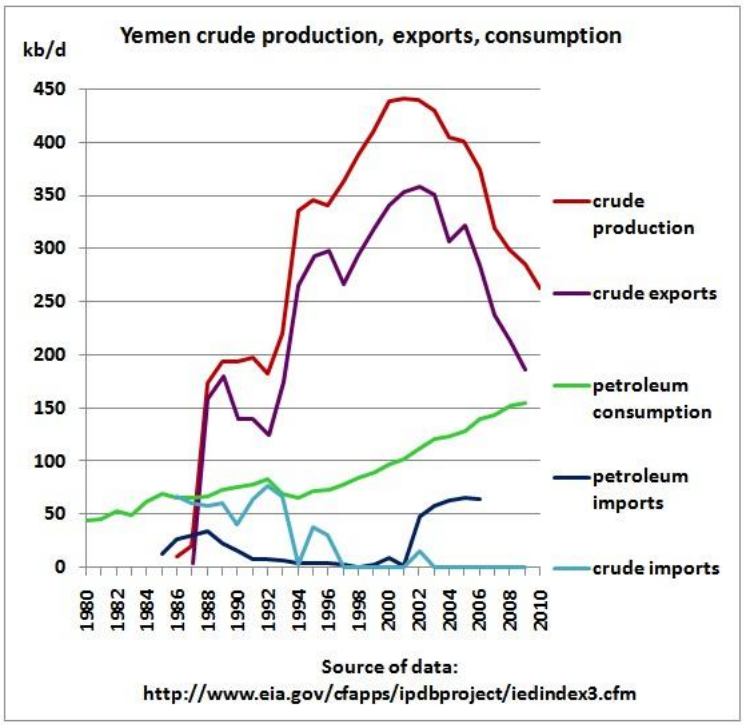
Egypt's diesel crisis is back

19/5/2011

The diesel shortages in Egypt's governorates this week crippled the activity of many vital sectors. The diesel fuel crisis is an annually recurring problem caused by an increase in the local consumption due to the agricultural harvest season

http://www.almasryalyoum.com/en/node/446409 Read more on my website:
31/1/2011 Egypt - the convergence of oil decline, political and socio-economic crisis
http://crudeoilpeak.info/egypt-the-convergence-of-oil-decline-political-and-socio-economic-crisis

(5.2) Yemen



Yemen oil production peaked around 2002. This is a failed state.

Saudi Arabia to donate fuel to troubled Yemen

Dec 2011

DUBAI: Saudi Arabia will donate fuel to Yemen, throwing a second lifeline in six months to its impoverished southern neighbour to prevent a shortage there from escalating into chaos, industry sources said on Thursday.

State oil giant Saudi Aramco will buy oil products from the market but will ask the supplier to discharge the cargo in Yemen instead of in Saudi ports, industry

sources familiar with the matter told Reuters. The amount Yemen will receive from Saudi in January will be around 500,000 tonnes.

"There is a government to government agreement between Yemen and Saudi Arabia where Aramco is buying the gasoline and gasoil and paying for it," one source familiar with the deal said.

Although a small oil producer, Yemen's location on the strategically important Bab al-Mandab strait, through which millions of barrels of oil are shipped between Asia, Europe and the Americas, makes instability there a risk to global trade

http://www.dailystar.com.lb/Business/Middle-East/2011/Dec-29/158304-saudi-arabia-to-donate-fuel-to-troubled-yemen.ashx#axzz1nYksxVvx

Well, fuel which goes to Yemen cannot be consumed elsewhere. The cost of that oil gift is of course put on Saudi Aramco's oil price. It is interesting to note that Saudi Aramco buys the fuels somewhere else. The amount is small, 3.5 million barrels, but that shows us what will happen in future when Saudi Arabia has to help in order to stop collapse in neighbouring countries. Although not yet successful, other candidates from the Islamic world are already lining up:

Kuwait, Saudi Arabia <u>not</u> to supply oil to Pakistan on long term credit

Jan 2012

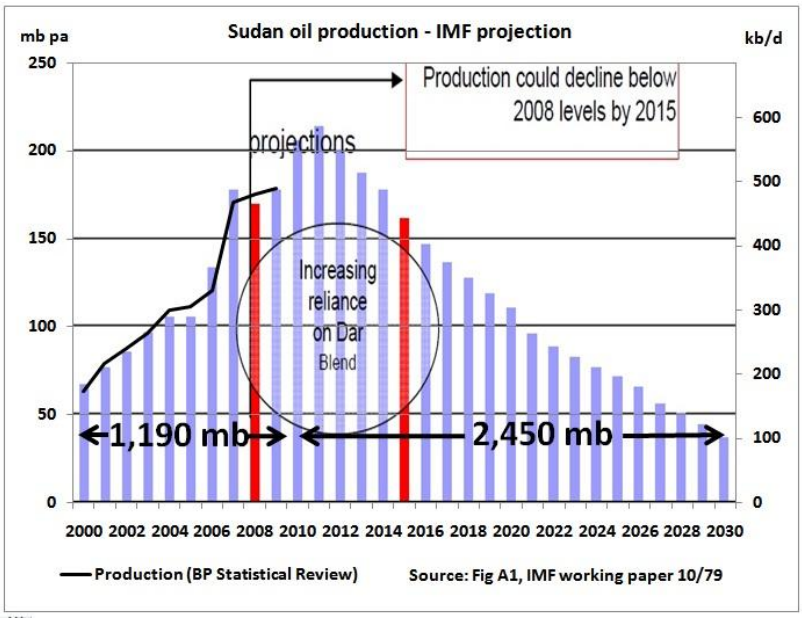
ISLAMABAD: Kuwait and Saudi Arabia have turned down Pakistan's request to supply oil on long-term credit despite the rhetoric of long-standing and brotherly ties between the countries, according to a media report today.
http://articles.economictimes.indiatimes.com/2012-01-09/news/30607691_1_iranian-oil-saudi-arabia-kuwait-petroleum-corporation

That may change quickly. If we get a nuclear arms race in the Middle East, one outcome may be "oil for nuclear"

(5.3) Sudan

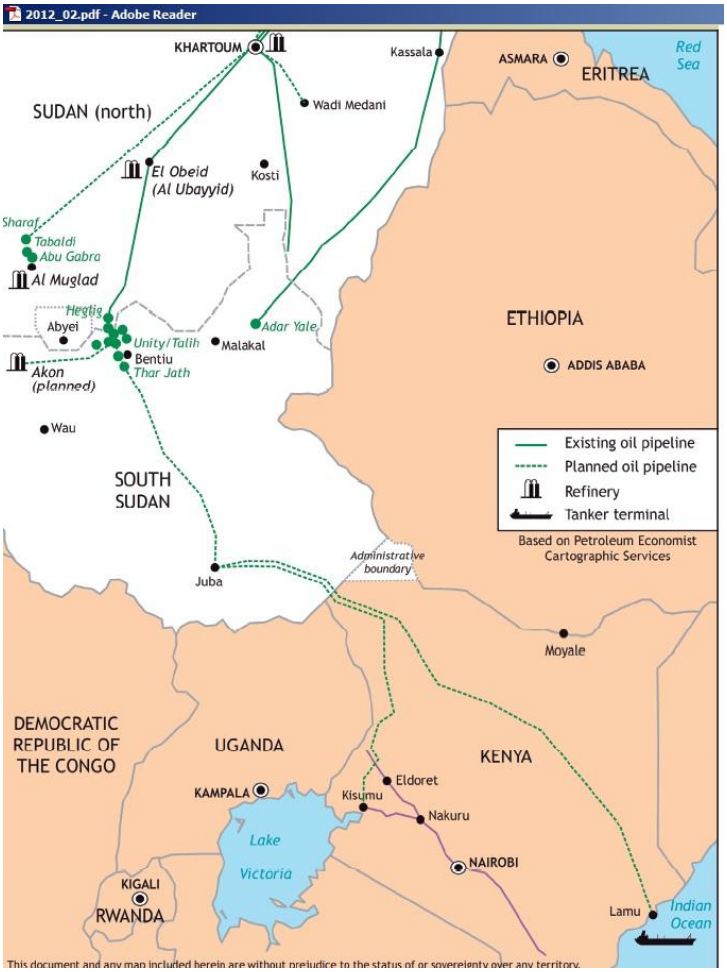
This graph from the IMF working paper 10/79 says it all.

80% of Sudan's oil is in South Sudan, but the pipelines all run to the North, to the refinery in Khartoum and to the export terminal in Port Sudan.



Revenue-sharing agreement breaks down. Since South Sudan declared independence, a tenuous revenue sharing scheme persisted in which Southern Sudan paid Sudan in kind for the use of its transit pipeline and the use of its port. Sudan lost around 75% of its preindependence revenues to the South. After the South's secession, the sharing agreement gave South

Sudan 60% of the revenues from the Unity field's output (located in South Sudan) and around 25% of the revenues from Block 2's output (located in Sudan). Initially, Khartoum in the north was asking



for a $32-$38/bbl transit fee. After a week of negotiations in Addis Ababa, Ethiopia, South Sudan had offered $1.7 billion to Sudan and transit fees of $0.63-0.69 a barrel for use of the two lines to Port Sudan. Khartoum then demanded $5.4 billion in cash and $3/bbl.

South Sudan's 260 kb/d could remain absent from world markets for the near future. The Unity field and other related fields in South Sudan are located within GNPOC's Block 1A and 1B. They are integrated with GNPOC's production system for the fields located in Block 2 in Sudan, which include the Grand Heglig field and its satellites. The Unity field produced around 80 kb/d during the first half of 2011, or around 60% of GNPOC's production. Cross-border gas lines for reinjection connect these fields, and GNPOC's Central

Processing Facility is located near Heglig. Therefore, any sustainable restart of production in the South will have to account for these fields' joint operation

Bad timing for a disruption.

China imported roughly 260 kb/d of Sudanese and South Sudanese crude oil in 2011, roughly 5.2% of total imports, and is likely to see the most acute effects of the disruption. The loss of over 200 kb/d of heavy and acidic Dar Blend and light, sweet, and waxy Nile Blend crude oils is coinciding with strong Asian demand for medium and heavy crude oil—not to mention the threat to Iranian supplies from heightened US and European sanctions.

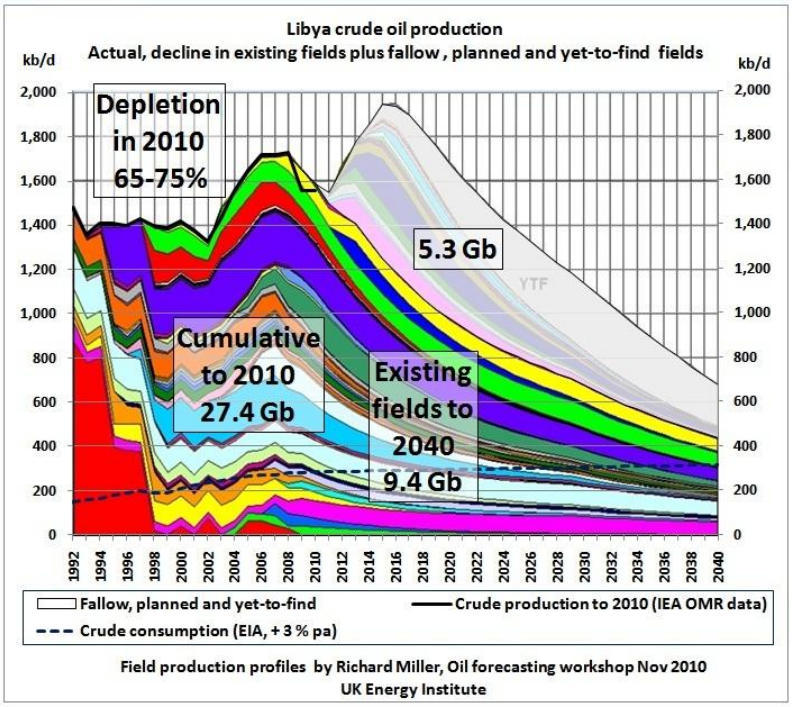
Outlook. On the one hand, both Sudan and South Sudan are almost entirely dependent on oil export revenues for their economy so a quick resolution would make economic sense and would avoid the need for new transport infrastructure. **Funding for an alternative pipeline to the Kenyan cities of Lamu or Mombasa (to the south) would require greater clarity on South Sudan's oil reserves** and security situation. Eventually, current and new

South Sudanese oil could flow via routes that are exporting new oil production from Tullow's fields in the Albert basin in Uganda , which will add around 150 kb/d post-2014.

This example is typical for peak oil. World oil markets worry about a mere 260 kb/d. More:

31/5/2011 Sudan's Nile blend in decline - why we should be concerned
http://crudeoilpeak.info/sudan-nile-blend-in-decline-why-we-should-be-concerned

(5.4) Libya

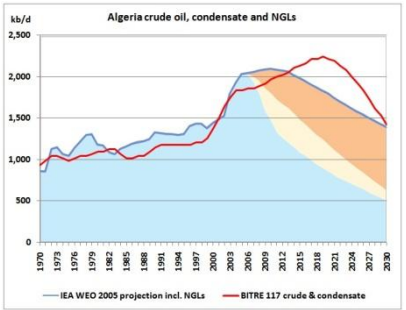


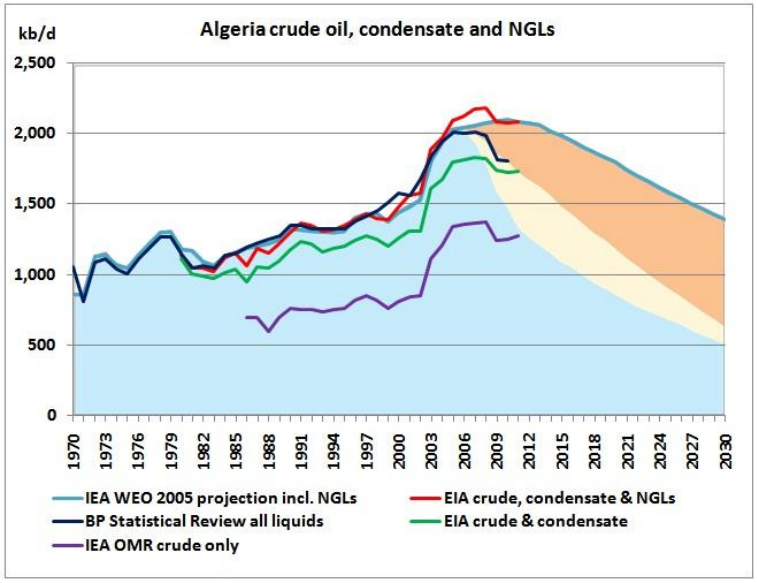
<< we see here why Gaddafi had to do his handshake in 2004 with Tony Blair: he was confronted with steep declines in his maturing oil fields and needed modern technology from international oil companies. In turn, the West needed a new frontier after the dash for Iraqi pre-peak oil had failed in 2003.

24/6/2011 War overshadows peak oil in Libya
http://crudeoilpeak.info/war-overshadows-peak-oil-in-libya

(5.5) Algeria

Actual production data superimposed on the WEO 2005 estimate of the IEA >>



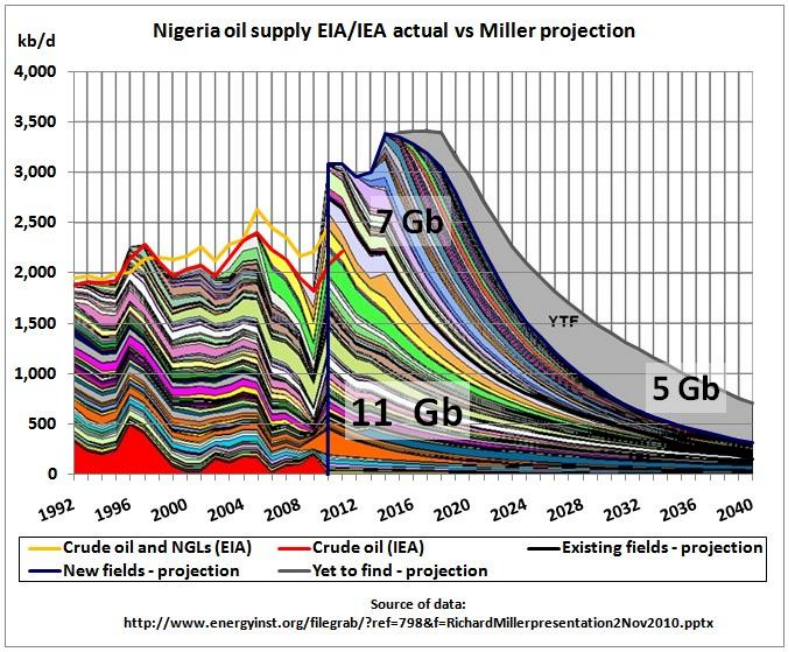


(left, the red curve is showing the BITRE 117 estimate high above the IEA WEO 2005, another example how a late peak was created)

More details are on my website, including discovery graphs from Laherrere who worked in Algeria as a geologist:

27/1/2012 Algeria crude oil peak http://crudeoilpeak.info/crude-oil-peak-in-algeria

(5.6) Nigeria



<< peak oil ahead in Nigeria

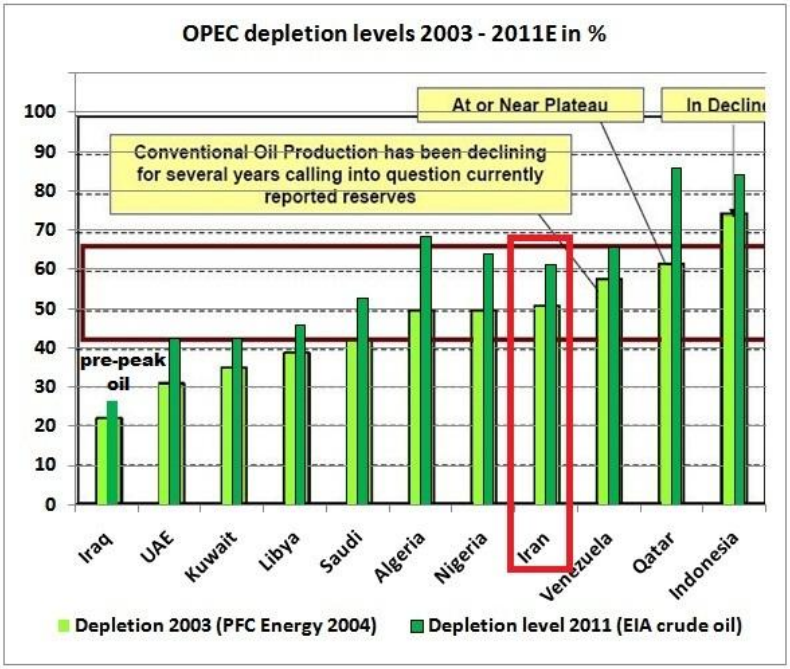
However, the most pressing problem is the mountain of subsidies the government has to pay for fuel imports.

This is another problem created by peak oil and internationally high fuel prices. Oil producing countries which traditionally had below market fuel prices domestically and which do not have enough local refining capacity now have to import petrol and diesel at international rates, subsidised by the government.

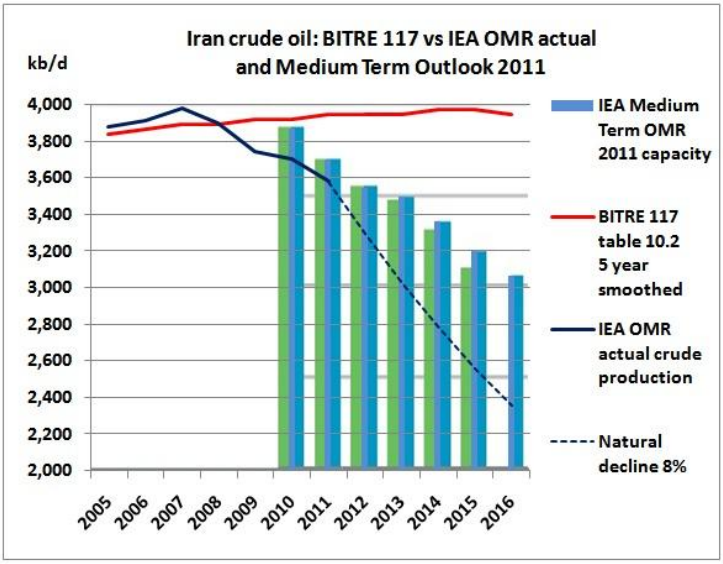
16/1/2012 Nigeria: oil producers try to reduce subsidies
http://crudeoilpeak.info/nigeria-oil-producers-try-to-reduce-fuel-subsidies

(5.7) Iran

Iran, like many other OPEC countries, reports original reserves, not remaining reserves or a mixture of both. This is one of the reasons why production in Iran is declining and not growing. If Iran had really 155 Gb of easy oil and would produce it at a modest 2% pa (i.e. over 50 years) production should be 155 * 0.02 /0.365 = 8.5 Mb/d, more than double of what it is now. Instead, Iran has a depletion level of around 60% >>



Original graph from:
http://www.ecolo.org/documents/documents_in_english/oil-forecasts-04.pdf



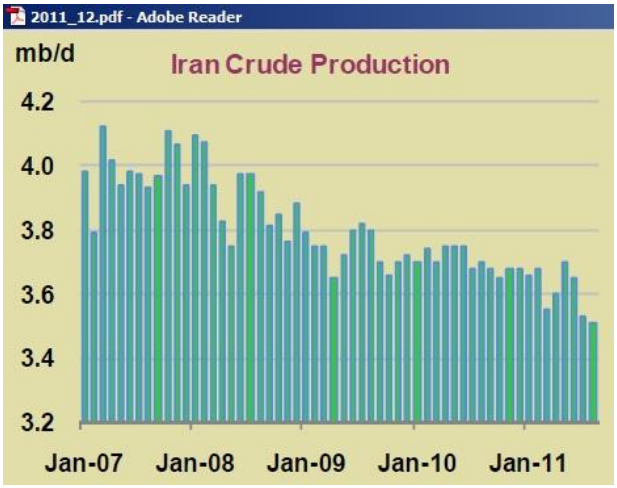
<< In the meantime, the main problem right now are the sanctions which impact on Iran's capacity to offset 8% natural decline in its maturing oil fields (graph from the IEA Medium Term Oil Market Report (July 2011).

The red line shows the estimate of the optimistic BITRE 117 report, much higher than the IEA.

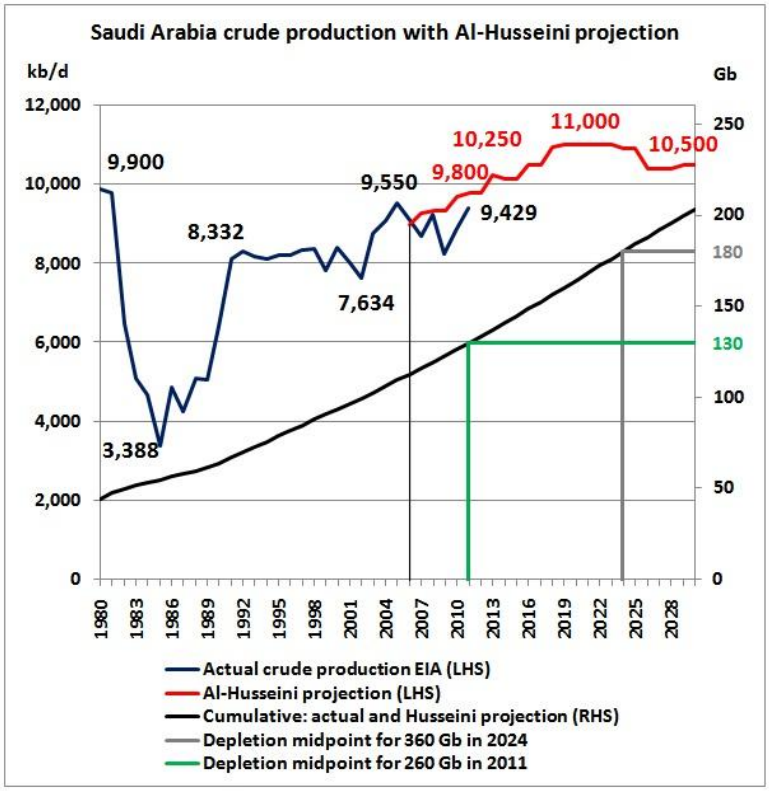
An updated graph from the Dec 2011 IEA oil market report tells the whole story >>

It's one of the reasons for high oil prices.

The historic context was explained in chapter 1.2

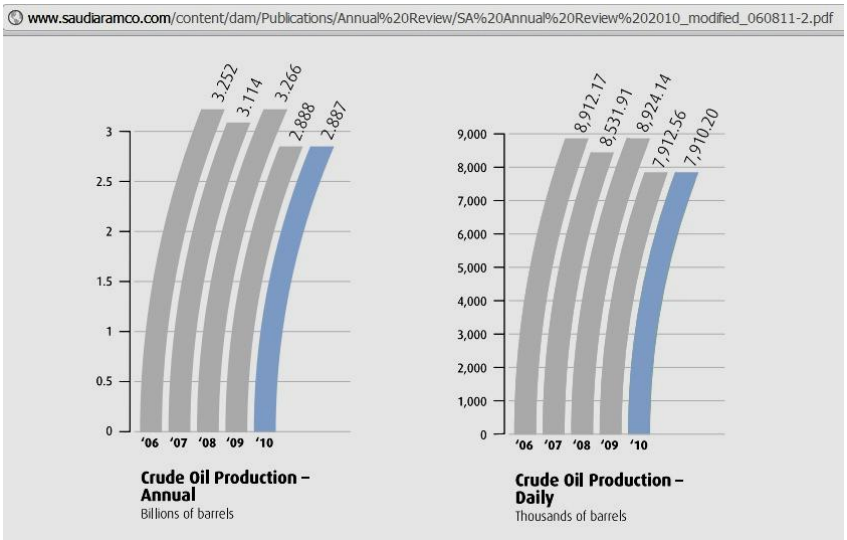


(6) Saudi Arabia



<< This updated graph with data up to November 2011 shows actual C&C production against Ex-Saudi Aramco's Husseini's projection from the 2007 Oil and Money conference in London.

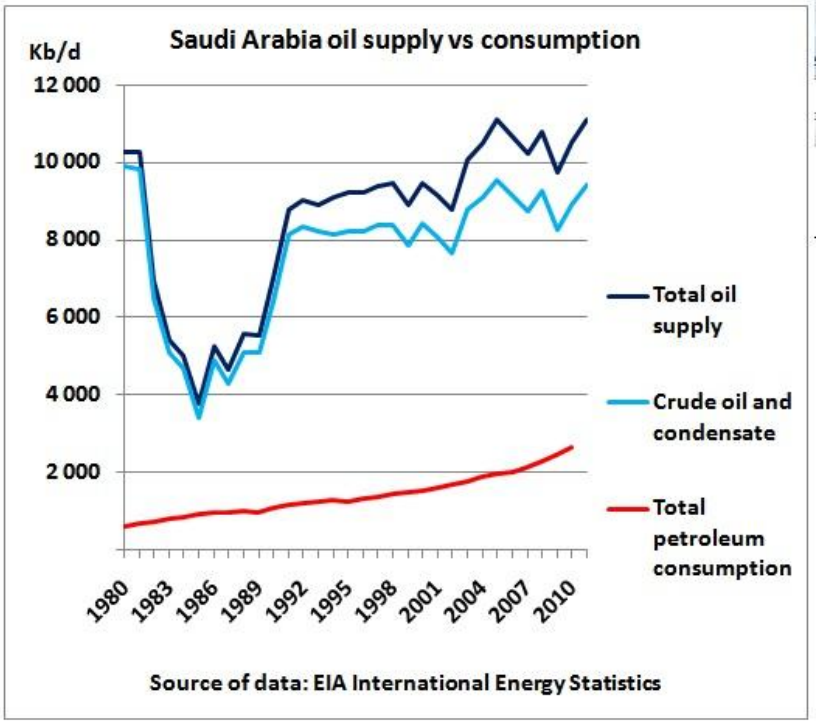
More details are here:
2/3/2011 WikiLeaks cable from Riyadh implied Saudis could pump only 9.8 mb/d in 2011
http://crudeoilpeak.info/wikileaks-cable-from-riyadh-implied-saudis-could-pump-only-9-8-mbd-in-2011



<< This graph is (crude oil only) from the Saudi Aramco Annual Review 2010

The 2011 report was not yet available.

http://www.saudiaramco.com/content/dam/Publications/Annual%20Review/AnnualReview2010/Annual%20Review_2010_modified_080611.pdf



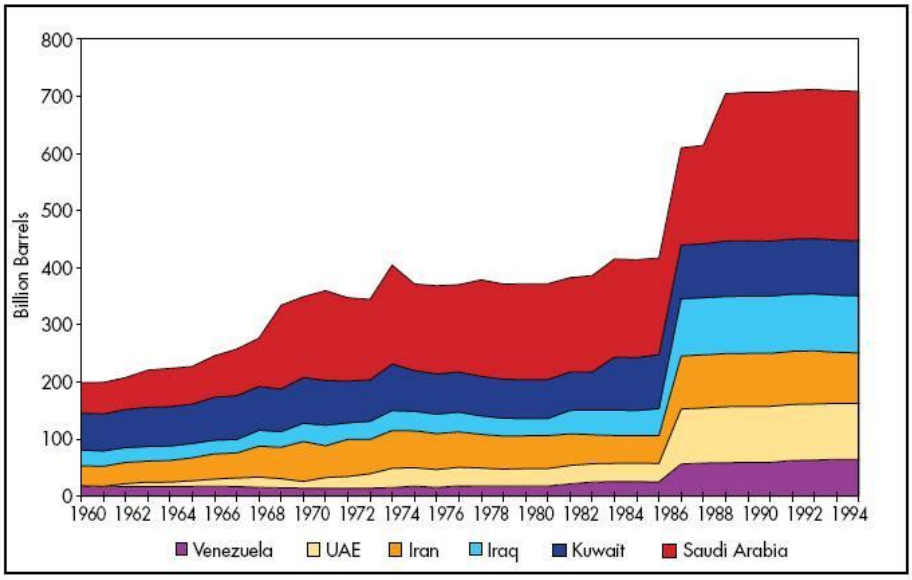
Increasing local consumption will reduce future Saudi exports

(7) OPEC's paper barrels

These are now imploding right in front of our TV eyes. It is an old hat but it has been largely forgotten. Already the WEO 1998 wrote:
"Because of this large, one-off increase in OPEC's oil reserves, many commentators have questioned the reliability of the reserves estimates data published in the BP Statistical Review of Energy and the Oil and Gas Journal. They have noted that, while the reserve estimates are described as proven (meaning a greater than 90% probability of

weo1998.pdf - Adobe Reader

Figure 7.4: **OPEC Official (proved) Oil Reserves**



Source: *BP Statistical Review of World Energy*, 1997.

being produced), a comparison with the Petroconsultants oil field database suggests that large quantities of probable and possible reserves may have been included in the OPEC estimates. Furthermore, large quantities of unconventional oil also appear to have been included in some OPEC member country estimates, possibly in order to obtain a larger oil production quota." www.iea.org/weo/docs/weo1998.pdf

10 years later, in the WEO 2008, the problem is still unresolved:

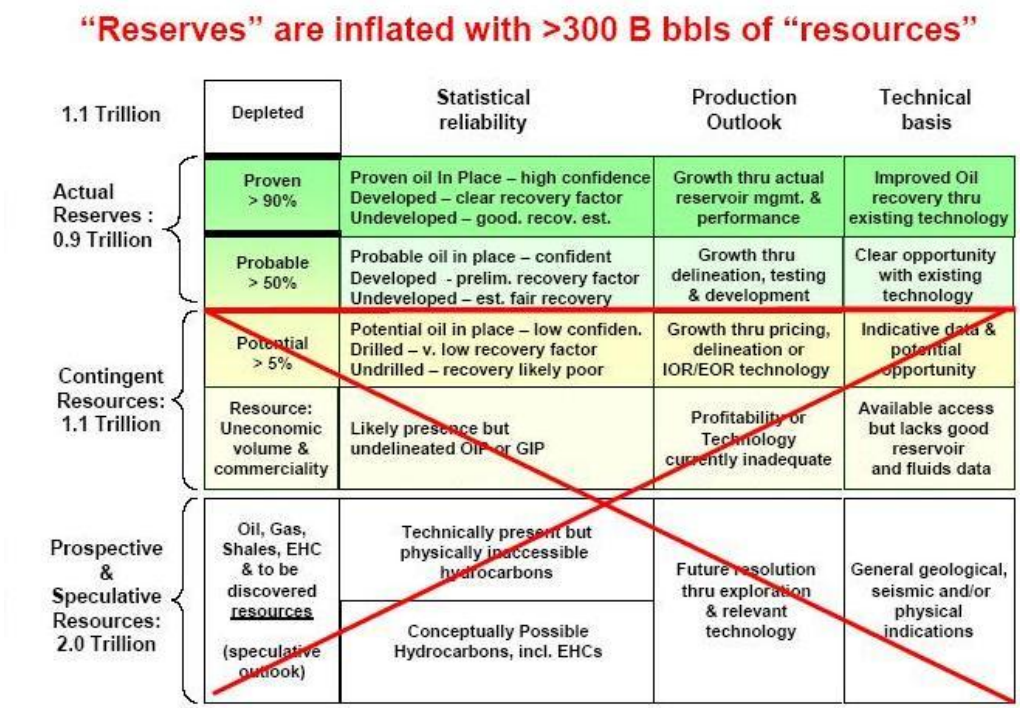
"According to BP, which compiles published official figures, proven reserves worldwide have almost doubled since 1980. Most of the changes result from increases in official figures from OPEC countries, mainly in the Middle East, as a result of large upward revisions in 1986-1987. They were driven by negotiations at the time over production quotas and have little to do with the discovery of new resources or physical appraisal work on discovered fields. The official reserves of OPEC countries have hardly changed since then, despite ongoing production" (p.202)
http://www.iea.org/textbase/nppdf/free/2008/weo2008.pdf

The same game still continues, within days these 2 announcements:

Oct 5th, 2010: Iraq lifts oil reserve estimates to 143 Gb, overtakes Iran
http://www.bloomberg.com/news/2010-10-04/iraq-lifts-oil-reserves-estimate-overtakes-iran-update1-.html

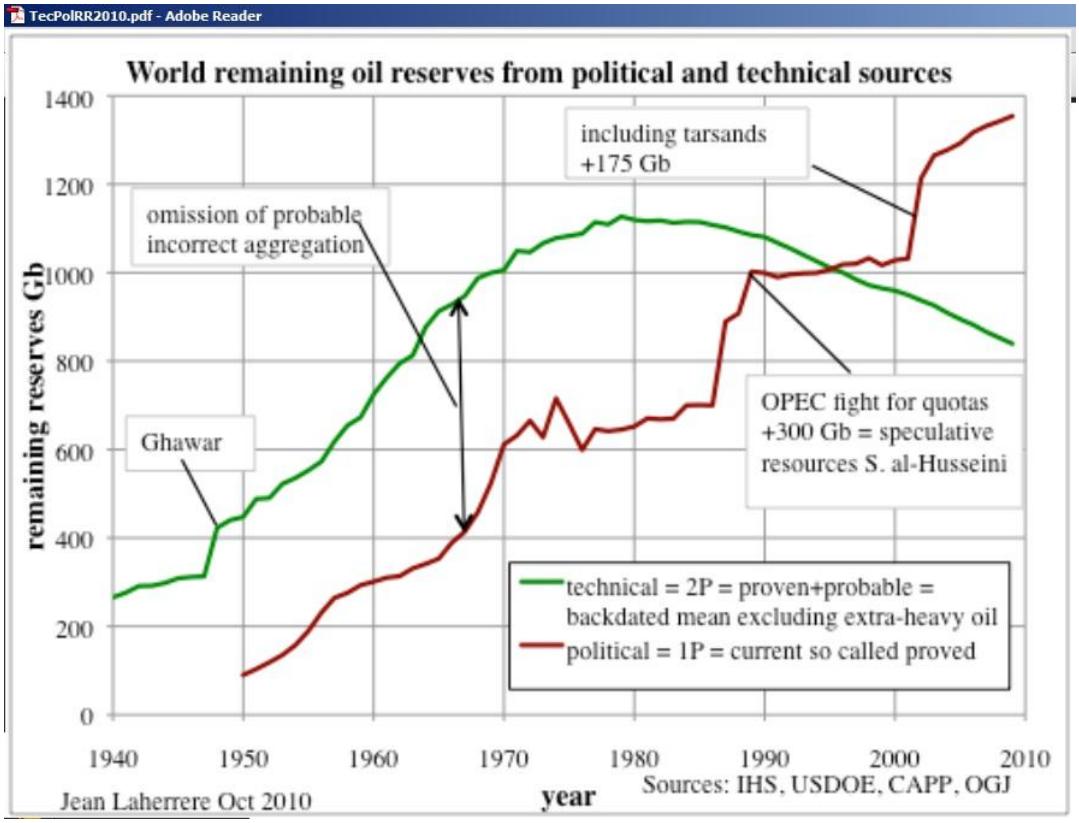
Oct 12th, 2010: Iran increases oil reserve estimate, passes Iraq
Coming ahead of an OPEC meeting on Thursday, one analyst said the two countries were in a "bidding war" over reserves, which is usually a consideration including other criteria such as production capacity when it comes to allocating quotas.

http://www.dailystar.com.lb/Business/Middle-East/Oct/12/Iran-increases-oil-reserves-estimate-passes-Iraq.ashx#axzz1msZvdQkf



http://www.energyintel.com/om/speakersNew.asp?Year=2007&filename=SadadIbrahimAlHusseini.pdf

Ex-Saudi Aramco chief Sadad-al-Husseini crossed out 300 GB of OPEC reserves = 30 years OPEC oil supplies. The assessment in his slide show (now no longer available on Energy Intelligence the link) was used to calculate Saudi crude production in the chapter on Saudi Arabia.



http://aspofrance.viabloga.com/texts/documents

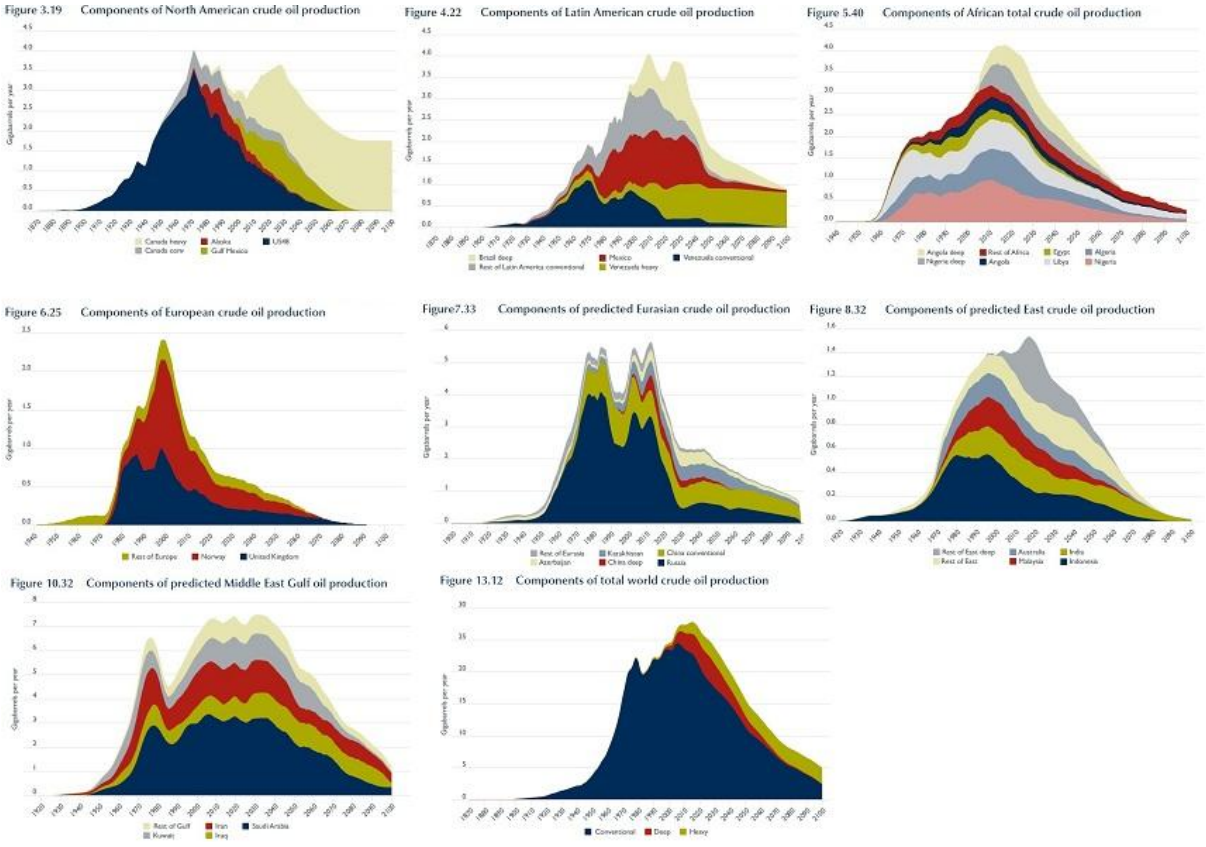
The above graph from Jean Laherrere shows this jump in OPEC reserves. Jean distinguishes political (red curve) and technical reserves (green curve) which are now around 800 Gb.

(8) Peaky leaks and the EWP draft – revelations in the Senate

We had to witness bizarre proceedings during the February 2012 budget estimate hearings in the Australian Senate. Capital Hill in Canberra seemed to be more remote than ever from the reality of oil related conflicts in the Middle East, just a couple of tanker weeks away. The revelations during the hearings shed light on how badly BITRE and RET research is coordinated.

Although a leaked government report BITRE 117 on peak oil – comfortably calculated for around 2017 - is freely available on the internet, Minister Kim Carr refused to officially table it before the upper House of Parliament because it was "not up to scratch". Top bureaucrats said that a peer review showed weaknesses in the methodology of the report, without being able to present readily available written details to the inquiring Senators and without explaining why the report was not re-submitted after considering the criticism in the peer review – which would have been the normal procedure. They also claimed that the report was fed into the Energy White Paper (EWP) process, although the draft of the EWP released in December 2011 neither mentions BITRE 117 nor presents a modified or improved version based on the results of the peer review. It was also argued that there are now a range of other departmental reports which "negate" BITRE 117 and make it even "irrelevant". It can be shown that - except for one report on fuel prices which uses peak oil scenarios - all other quoted reports neither know about peak oil nor calculate alternatives to BITRE 117. By desperately trying to defend their peak oil denial the government and its top bureaucrats shot a series of own goals.

The EWP team has seen this, so there is no need to fill pages with peaking graphs. Here is a summary:



Peaks and only peaks in BITRE 117: from top left to right bottom: North America, Latin America, Africa, Europe, Eurasia, East, Middle East and the global peak, around 2017

Here is a list of reports quoted by top bureaucrats and what they say about peak oil

(8.1) BITRE WP 73

December 2009
Greenhouse gas emissions from Australian transport: projections to 2020

Further scenarios (e.g. addressing different possible futures, especially depending on potential oil supply constraints or particular implementation of emission abatement policies), though important when considering longer term trends, are beyond the scope of this present study—and would have to be investigated by separate BITRE modelling/ projection studies." (page xx)
http://www.btre.gov.au/Info.aspx?ResourceId=744&NodeId=16

Hold it, that's sufficient. No peak oil analysis was done in this report. In fact it states – half year after BITRE 117 was complete - that detailed modelling on oil supply constraints would be required.

(8.2) BITRE Information Sheet 30

Fuel consumption by new passenger vehicles 1979-2008
August 2009. Extract

"BITRE has examined trends in the fuel consumption of new passenger vehicles sold in Australia. Up to 2001, technological advances in engine technology, which improved fuel efficiency, were offset by increases in power, weight and the popularity of 4WD vehicles. Since 2001 the overall trend in fuel consumption has continued to decrease with average new light vehicle fuel consumption down 8.4 per cent to 8.14 litres per 100 kilometres (L/100 km)."
http://www.bitre.gov.au/Info.aspx?ResourceId=730&NodeId=21&printable=true

The word "oil" does not even appear in this publication. The above graph shows how slowly average fuel consumption for the whole fleet is declining over the decades. If anything this suggests the problems motorists will face when e.g. petrol rationing is introduced.

(8.3) BITRE Research Report 124

August 2011
Road vehicle-kilometres travelled: estimation from state and territory fuel sales

Historically, Australian businesses and households have had access to inexpensive transport fuel as a result of relatively low global oil prices and low fuel taxes (by international standards). Inexpensive fuels combined with prevalent patterns of urban development have been key factors behind the high level of car ownership and extensive use of trucks for the national freight task.

http://www.btre.gov.au/Info.aspx?ResourceId=810&NodeId=23

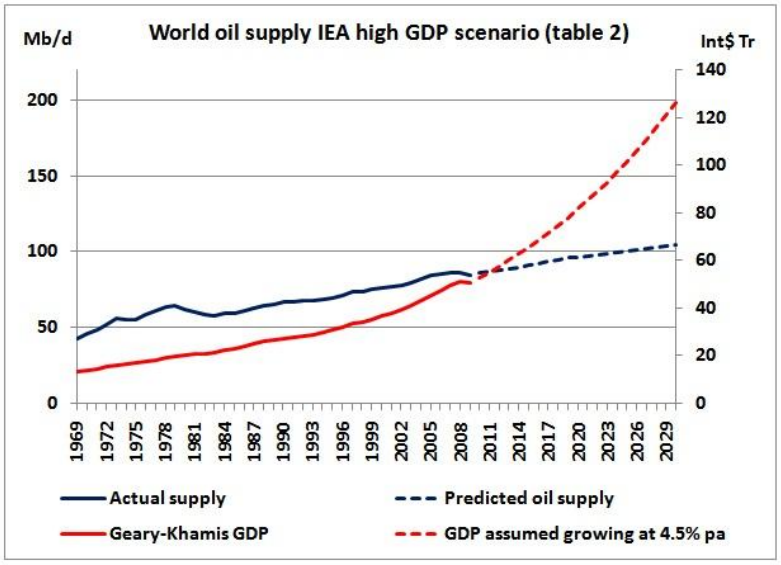
Although this report contains a lot of valuable information, there is no peak oil analysis in this report either.

(8.4) Petrol prices in Australia by Dr. David Garrett
ATRF September 2010 Proceedings

Dr. Garrett is the author of BITRE 117. So we are not surprised to read this:

"The objective of this paper is to model how Australian petrol prices are determined by movements in world oil prices, the Australian exchange rate, and numerous other components of the price chain. This paper examines five scenarios for the future of world oil prices and shows how they would translate into movements in Australian retail petrol prices. The findings suggest that petrol prices are likely to be restrained in this decade. However, in the 2020"s prices are likely to either rise **under peak oil scenarios** or continue constrained under the more optimistic world oil supply scenarios."

However, when putting table 2 into a graph we find that GDP is totally detached from oil supplies:

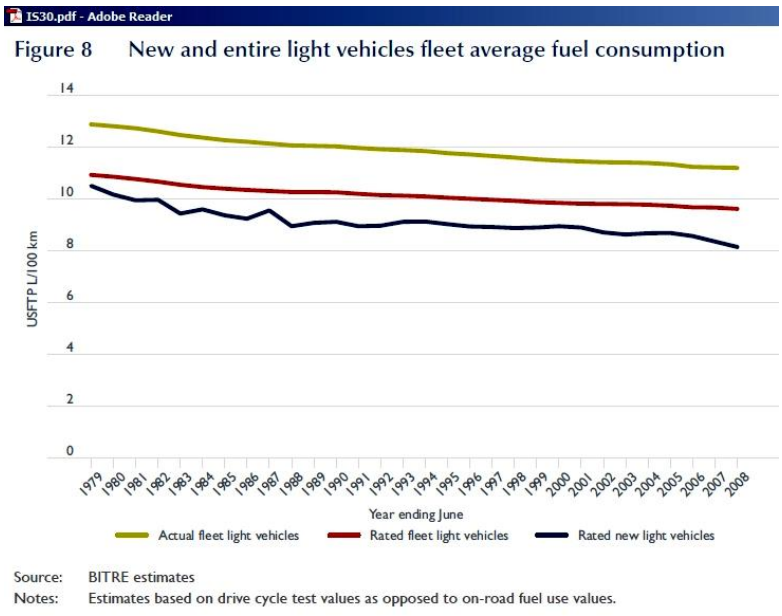


Surprisingly, this GDP growth at 4.5 % pa goes along with just a 30% increase in oil prices over the next 20 years. The author warns:

"The obvious conclusion: it all depends on what you assume!" and:

"Increases in the fuel efficiency of the vehicle fleet will be an important factor in mitigating the effects on consumers of any rise in petrol prices, but such increases are very slow given the longevity of the Australian fleet."

Well, let's look at those fuel efficiency improvements in the above mentioned BITRE information sheet, they can be measured only in decades >>



(8.5) BITRE Information sheet 34, road and rail freight

This report was written in the same year as the BITRE 117 report. The freight study does not mention peak oil but is concerned with long-term oil prices above $100, is sympathetic to rail freight development and is therefore one of the better BITRE reports. However, it does not calculate whether fuel efficiency improvements for trucks can offset oil decline, how future diesel prices will impact on the modal share and which rail investments are needed in which timeframe to replace truck based freight, in particular grain freight and food transport to the cities.

Obviously, the authors did not have the task to analyse which impact the BITRE 117 findings on peak oil would have on the freight sector. This example shows there is very little coordination between departments in relation to peak oil.

(8.6) Long term emissions study

Cosgrove, D.C., 2008, 'Long-term Emission Trends for Australian Transport', *Proceedings of the 31st Australasian Transport Research Forum*. Extracts:

Such possible oil shortages will have significant implications for future transport task levels, probably before 2050, unless the projected gap between energy supply and demand can be bridged before then; either by increased energy efficiency, or by the large-scale introduction of more-sustainable alternative fuels. **Until the form of future oil supply is more precisely known, energy use projections longer than about a 2030 timeframe should be considered as highly speculative – and where even the (conservative) oil price assumptions adopted here, for the years up till 2030, have a significant level of uncertainty attached to them**. (p11)"

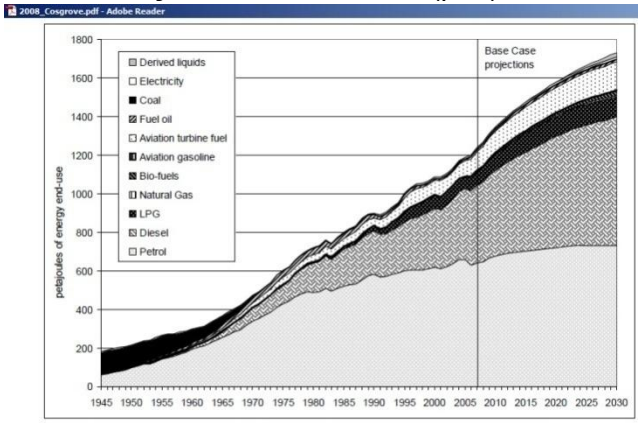


Figure 11 – Energy end-use by Australian domestic transport, long-term trends

Sources: RET (2008), ABS (2007), BTRE (2002a, 2006), Cosgrove (2003), BITRE (2008), BITRE estimates.

Obviously, the graph with increasing petrol and diesel consumption is in conflict with the "significant level of uncertainty" in oil prices until even 2030. But what is most important in the context of the Senate hearing is that this study calls for "more precisely known energy use projections". The Cosgrove study was presented at the 31st ATRF in October 2008, shortly after the oil price spike in July 2008 and just as the GFC was bringing oil prices down. The BITRE 117 report was in its final draft stages at that time before it was completed (or interrupted?) in March 2009. It did exactly what was asked for in the emissions study. **So to argue now, in February 2012, that the Cosgrove study invalidates BITRE 117 is in contradiction with the facts and not in line with the actual sequencing history of these reports.**

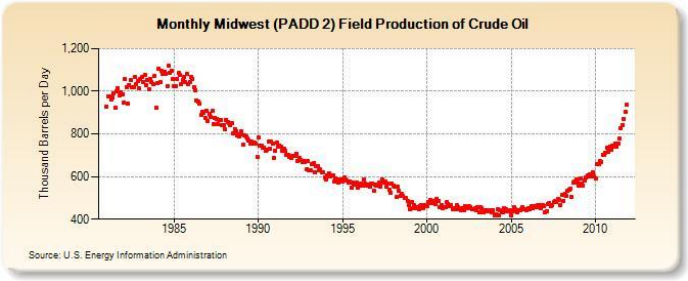
(8.7) Summary lack of integration BITRE – RET

So why this excursion into BITRE reports in this submission? Because It was claimed by top bureaucrats in the Senate hearings that BITRE 117 was invalidated by other research. Well it was not. More details are in this post:

24/2/2012
Australian Government kicks own goals in Senate peak oil debate (peaky leaks part 3) http://crudeoilpeak.info/australian-government-kicks-own-goals-in-senate-peak-oil-debate-peaky-leaks-part-3

(9) Tight oil to the rescue?

It was also claimed the BITRE 117 report underestimated non-conventional resources like tight oil in the Bakken formation. Let's have a look at the production profile

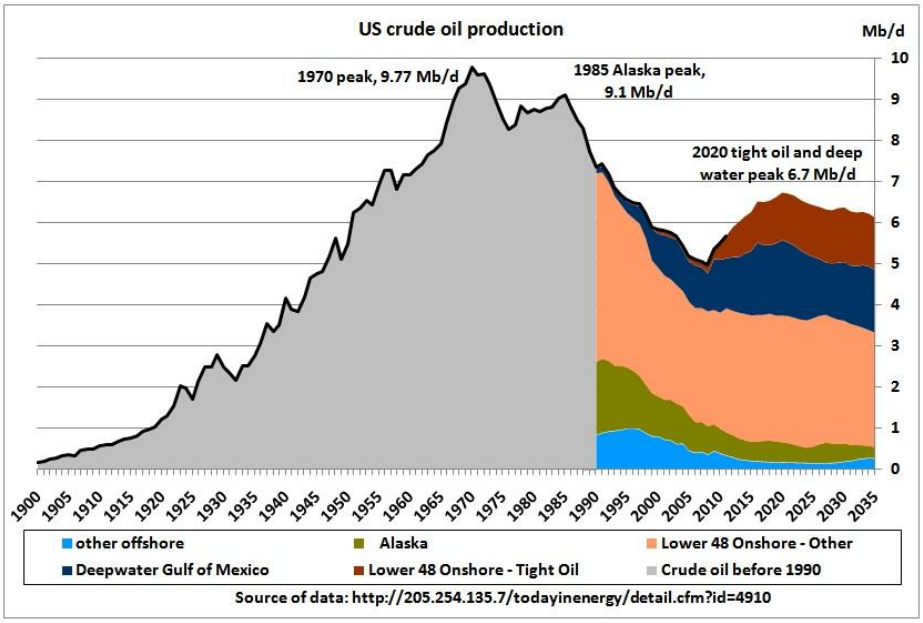


http://www.eia.gov/dnav/pet/hist_chart/MCRFPP22M.jpg

EIA projects that U.S. domestic crude oil production will increase from 5.5 million barrels per day in 2010 to 6.7 million barrels per day in 2020. Even with a projected decline after 2020, U.S. crude oil production projections remain above 6 million barrels per day through 2035.
The AEO2012 Early Release Reference case projects that onshore tight oil production will increase significantly, ***reaching 1.3 million barrels per day in 2030*** *and remaining above 1 million barrels per day for the remainder of the projection.*

http://205.254.135.7/todayinenergy/detail.cfm?id=4910

Using these projections we can see that tight oil can never bring the US back to the peak production of 1970.



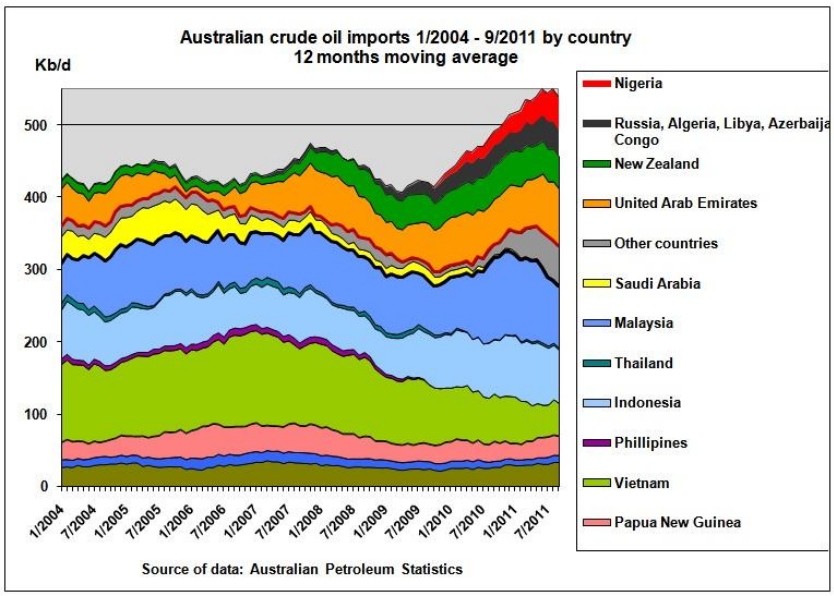
http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm

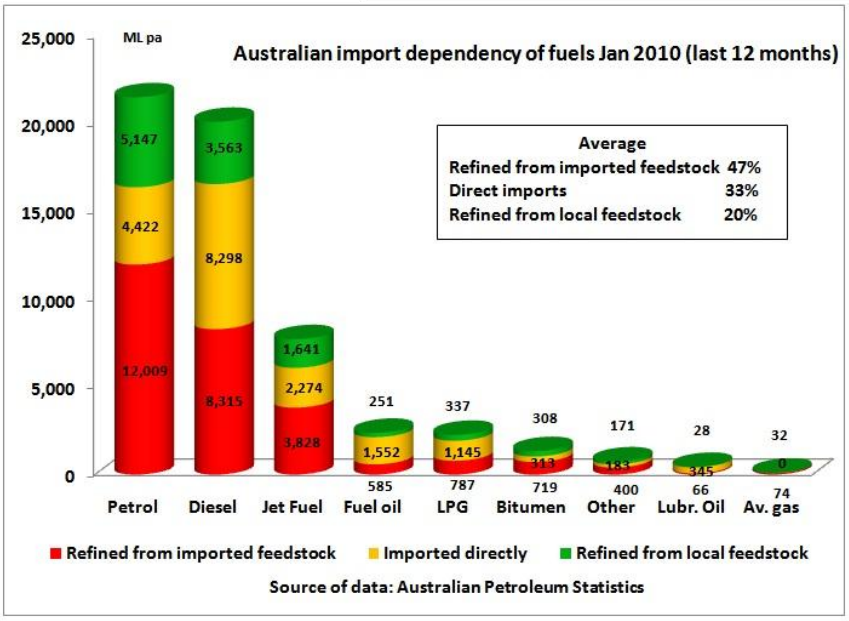
Environmental problems were presented on ABC TV: Meet the Frackers:
http://www.abc.net.au/foreign/content/2012/s3441606.htm

More details in this article:
No number crunching in Alan Kohler's opinion piece on a premature peak oil death
http://crudeoilpeak.info/no-number-crunching-in-alan-kohler-opinion-piece-on-premature-peak-oil-death

(9) Australian oil vulnerability

Crude imports from its neighbouring countries (Vietnam, Indonesia and Malaysia) are in decline. Saudi Arabia has been replaced by UAE. Australia was forced to get crude from far-away places like Russia, Algeria, Libya, Azerbaijan, Congo and Nigeria.





What's worse, the Clyde refinery will be closing and Caltex also announced a review. Australia will then have to import fuels from Asian refineries, in direct competition to China. Singapore gets around 75% of its crude from the Middle East. Australia' soil vulnerability will increase.

One solution would be to build a condensate splitter for harnessing liquids from Australia's increasing wet gas production. Around 25% diesel could be produced

Darwin Clean Fuels is proposing to design, build and operate a 60 000 bpd condensate processing facility to produce high quality transport fuels that will meet the new Australian Standards for clean fuels. http://www.darwincleanfuels.com.au/

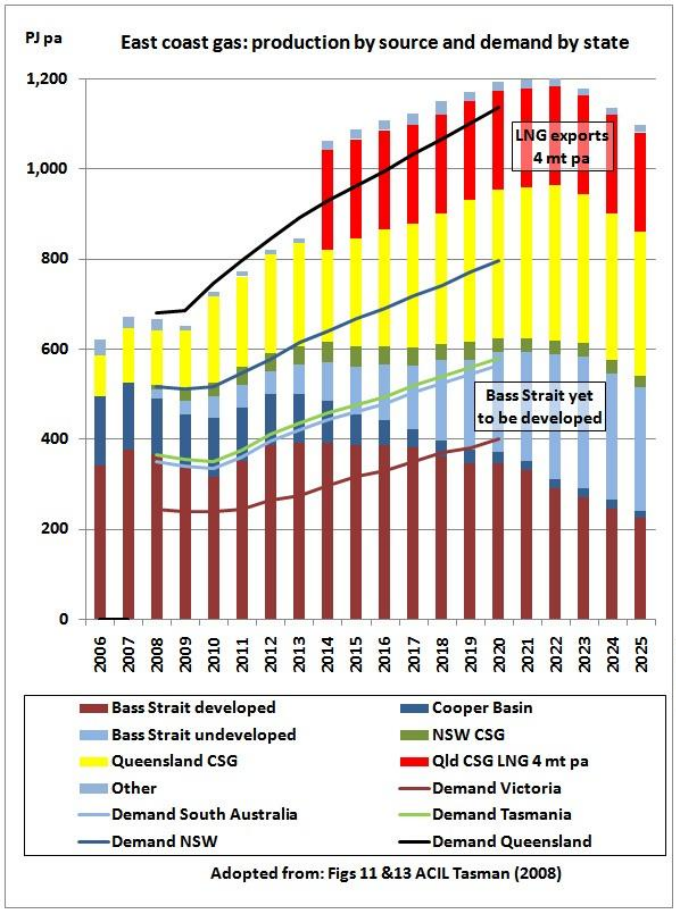
In April 2010 I proposed in a meeting with the Resource Minister to cancel the Hunter Feeeway, use the funds to establish a Strategic Oil Reserve and to build a condensate splitter under Federal control to have diesel available for emergency services and other essential transport like food to the cities. I was laughed at.

(10) Natural gas as transport fuel

No provision is made to use Australian gas as transport fuel. Total petrol and diesel use is the equivalent of 5.5 LNG trains. These are being built now for export. Huge gas export contracts were signed by the Howard government, which was also peak oil ignorant

8/7/2011 "Yes, Prime Minister", peak oil 2006 under your watch
http://crudeoilpeak.info/yes-prime-minister-peak-oil-2006-under-your-watch

This wrong policy has been accelerated with coal seam gas developments in Queensland. The lack of strategic vision and resource nationalism is mindboggling.



This graph shows that even without gas being used as transport fuel, gas demand will enter the area of LNG export capacities meaning there will be a shortage of gas for domestic use. More details are here:

13/10/2011 NSW gas as transport fuel. Where are the plans?
http://crudeoilpeak.info/nsw-gas-as-transport-fuel-where-are-the-plans

11/10/2011 Australia's natural gas squandered in LNG exports
http://crudeoilpeak.info/australias-natural-gas-squandered-in-lng-exports

<<< We can already visualize truckies arriving in Canberra

(11) Ethanol

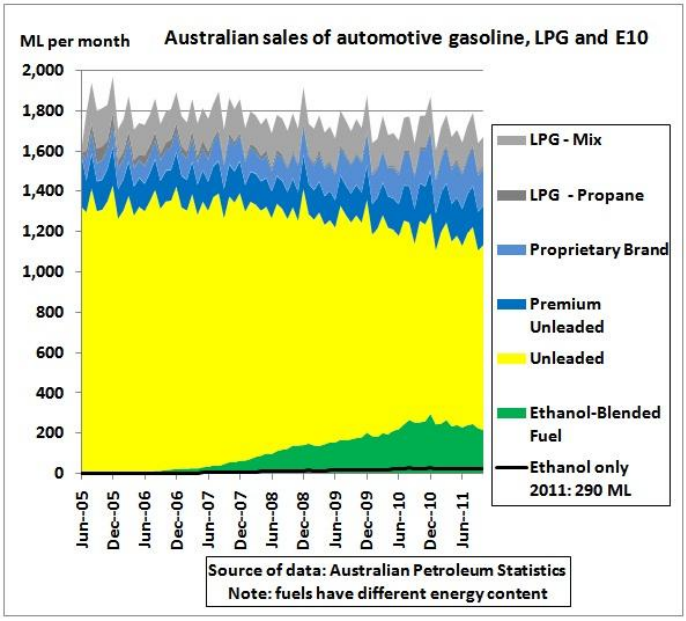
There is an endless debate about biofuels. The authority on this topic is Barney Foran with his research

Powerful choices: Transition to a bio fuel economy in Australia, June 2009
http://lwa.gov.au/products/pn30178

This has been updated by

Low carbon transition options for Australia, June 2011
In: Ecological Modelling 223 (2011) 72– 80

The core scenarios showed that a fully renewable (the renewables transition) or an advanced fossil and nuclear transition (the conventional wisdom transition), can reduce accumulated CO2 emissions from the Australian economy for the period 2006–2051 by 50%. Adding a low growth economy where GDP averages less than 1% annually extends this to a 60% reduction. Extensive reforestation of more than 50 million hectares extends the total reduction to 70% over the 45 year period and provides at 2051 a per capita emissions level of one to two tonnes which will be necessary if developed and developing countries are to converge on equal atmospheric impacts with reasonable lifestyle opportunities
http://www.journals.elsevier.com/ecological-modelling/#description



<< this graph shows the microscopic contribution (black line) of ethanol in the whole gasoline mix.

30/1/2012 Ethanol blended E10 would take 14 years to replace ULP in Australia
http://crudeoilpeak.info/ethanol-blended-e10-would-take-14-years-to-replace-ulp-in-australia

(12) Un-conventional fuels and global warming

NASA climatologist James Hansen has calculated that by burning just 50% of unconventional fuels, CO2 concentration in the atmosphere would increase by 250 ppm while the actual target is to decrease to 350 ppm, down from its current 390 ppm. For comparison: without human interference (Milankowitch cycles plus CO2 feed back) a warm period has around 300 ppm, an ice age around 200 ppm. We have kicked planet earth already out of its natural cycle.

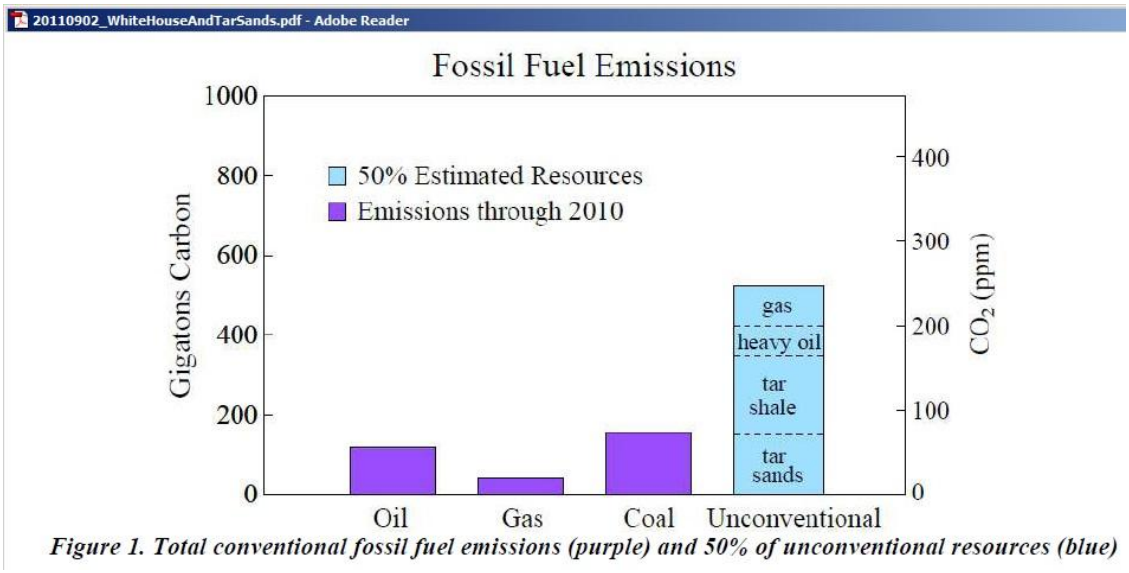
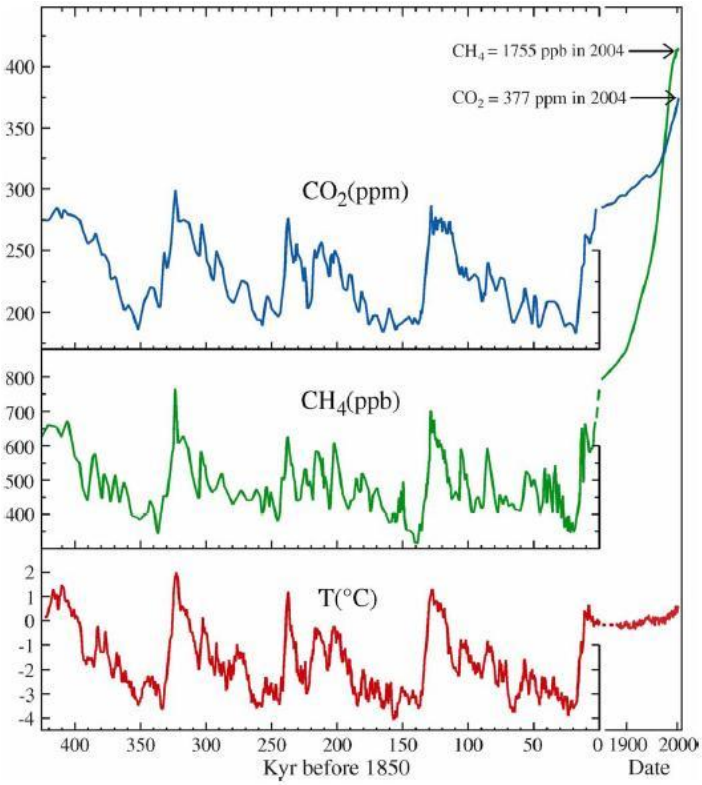


Figure 1. Total conventional fossil fuel emissions (purple) and 50% of unconventional resources (blue)

http://www.columbia.edu/~jeh1/mailings/2011/20110902_WhiteHouseAndTarSands.pdf

Global warming is now impacting on the lives of millions:

Oklahoma-Texas-Northern Mexico in 2011 and the Moscow region in 2010 provide examples of summer heat anomalies that exceeded 3σ relative to the 1951-1980 climatology. In the 1951-1980 period of climatology the area with temperature anomaly exceeding +3σ was only a few tenths of one percent. However, the area covered by such extreme anomalies has increased with global warming. +3σ anomalies covered 7% of the area with observations in Jun-Jul-Aug 2009, 13% in 2010, and 9% in 2011 (Hansen et al., 2012). Increased occurrence of such extreme anomalies as a result of global warming, by more than a factor of 10, implies that we can attribute such recent extreme anomalies, including that in Texas and Oklahoma, to global warming.
http://www.columbia.edu/~jeh1/mailings/2012/20120119_Temperature.pdf



Earth's energy imbalance and implications
22/12/2011
Improving observations of ocean heat content show that Earth is absorbing more energy from the Sun than it is radiating to space as heat, even during the recent solar minimum. The inferred planetary energy imbalance, 0.58±0.15 W/m^2 during the 6-yr period 2005-2010, confirms the dominant role of the human-made greenhouse effect in driving global climate change. Observed surface temperature change and ocean heat gain together constrain the net climate forcing and ocean mixing rates. We conclude that most climate models mix heat too efficiently into the

deep ocean and as a result underestimate the negative forcing by human-made aerosols. Aerosol climate forcing today is inferred to be -1.6±0.3 W/m^2, implying substantial aerosol indirect climate forcing via cloud changes. Continued failure to quantify the specific origins of this large forcing is untenable, as knowledge of changing aerosol effects is needed to understand future climate change. We conclude that recent slowdown of ocean heat uptake was caused by a delayed rebound effect from Mount Pinatubo aerosols and a deep prolonged solar minimum. Observed sea level rise during the Argo float era is readily accounted for by ice melt and ocean thermal expansion, but the ascendency of ice melt leads us to anticipate acceleration of the rate of sea level rise this decade.
http://pubs.giss.nasa.gov/docs/2011/2011_Hansen_etal.pdf

To think we can bypass the laws of nature by burning un-conventional fuels in the above mentioned quantities is therefore a big mistake.

(13) Peak oil = peak debt

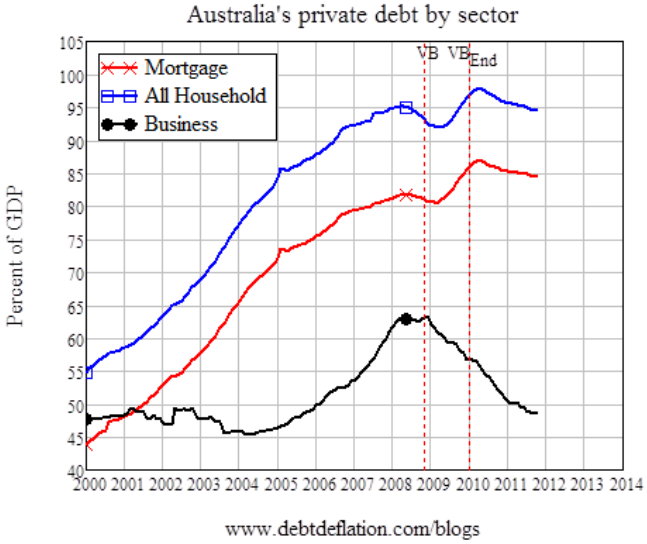
There can be no doubt that peak oil has already played havoc with the world economy.

Causes and Consequences of the Oil Shock of 2007–08
http://www.brookings.edu/~/media/Files/Programs/ES/BPEA/2009_spring_bpea_papers/2009_spring_bpea_hamilton.pdf

The convergence of peak oil with the problem of accumulated debt is deadly for the economy.

<< Australia is not immune from the debt crisis. Alan Kohler showed this graph on the 7 pm news 22/2/3012

We can see that government debt is low, but financial debt and household debt in % of GDP is comparable to the US

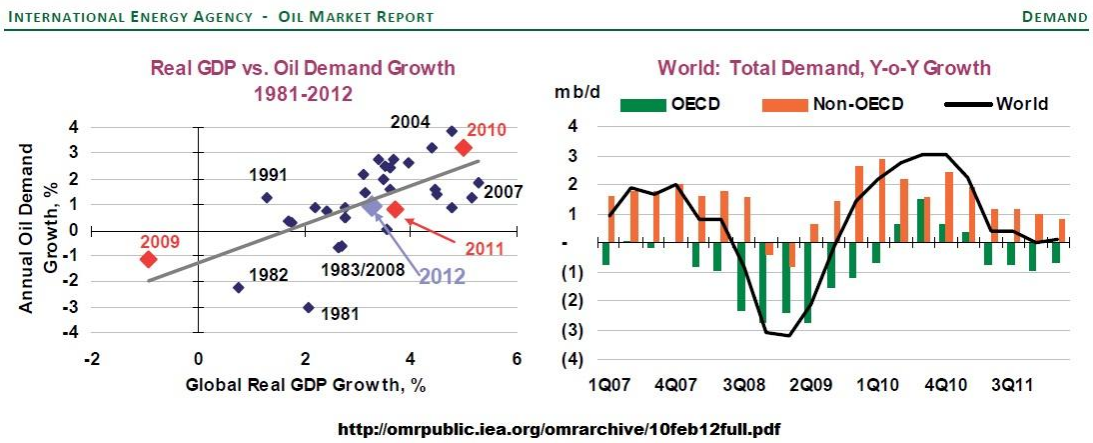


Steve Keen from the Uni of Western Sydney keeps track of Australian debt.

Household debt is almost 100% of GDP a level at which other countries become insolvent.

http://www.debtdeflation.com/blogs/2012/02/10/rba-rates-decision-roy-morgan-unemployment/

Debt can only be paid back in a growing economy, but a growing economy needs more oil.



This graph is from the IEA OMR February 2012 issue. It shows that, in 2012, for a 3.5% growth in GDP 1% more oil is needed. And are we getting more productive in the use of oil?

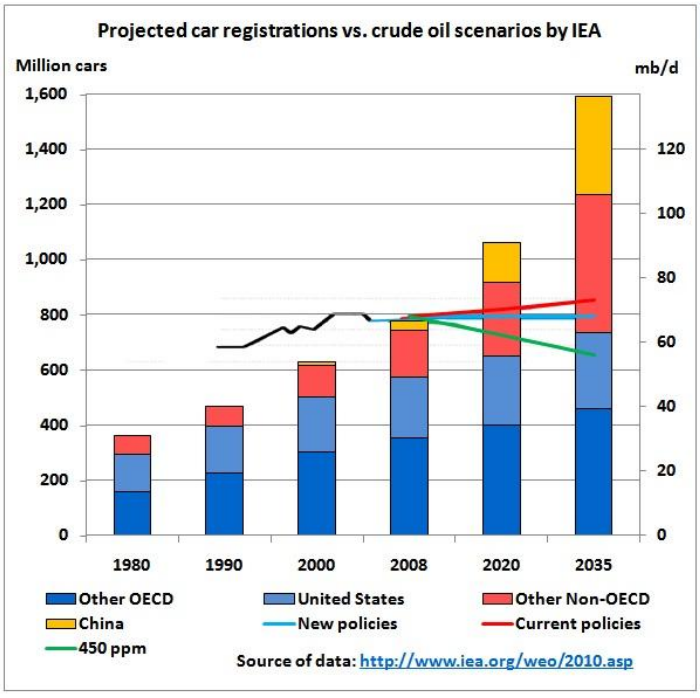
7/9/2011 NSW budget 2011/12 does not increase oil use productivity
http://crudeoilpeak.info/nsw-budget-2011_12-does-not-increase-oil-use-productivity

20/11/2011
APEC energy intensity reductions: what it means for Australian oil consumption
http://crudeoilpeak.info/apec-energy-intensity-reductions-what-it-means-for-australian-oil-consumption

From a US perspective: the link between peak oil and peak debt
http://ourfiniteworld.com/2011/07/11/the-link-between-peak-oil-and-peak-debt-part-1/

(14) Future of car culture

We are going to see the end of our car culture in this decade



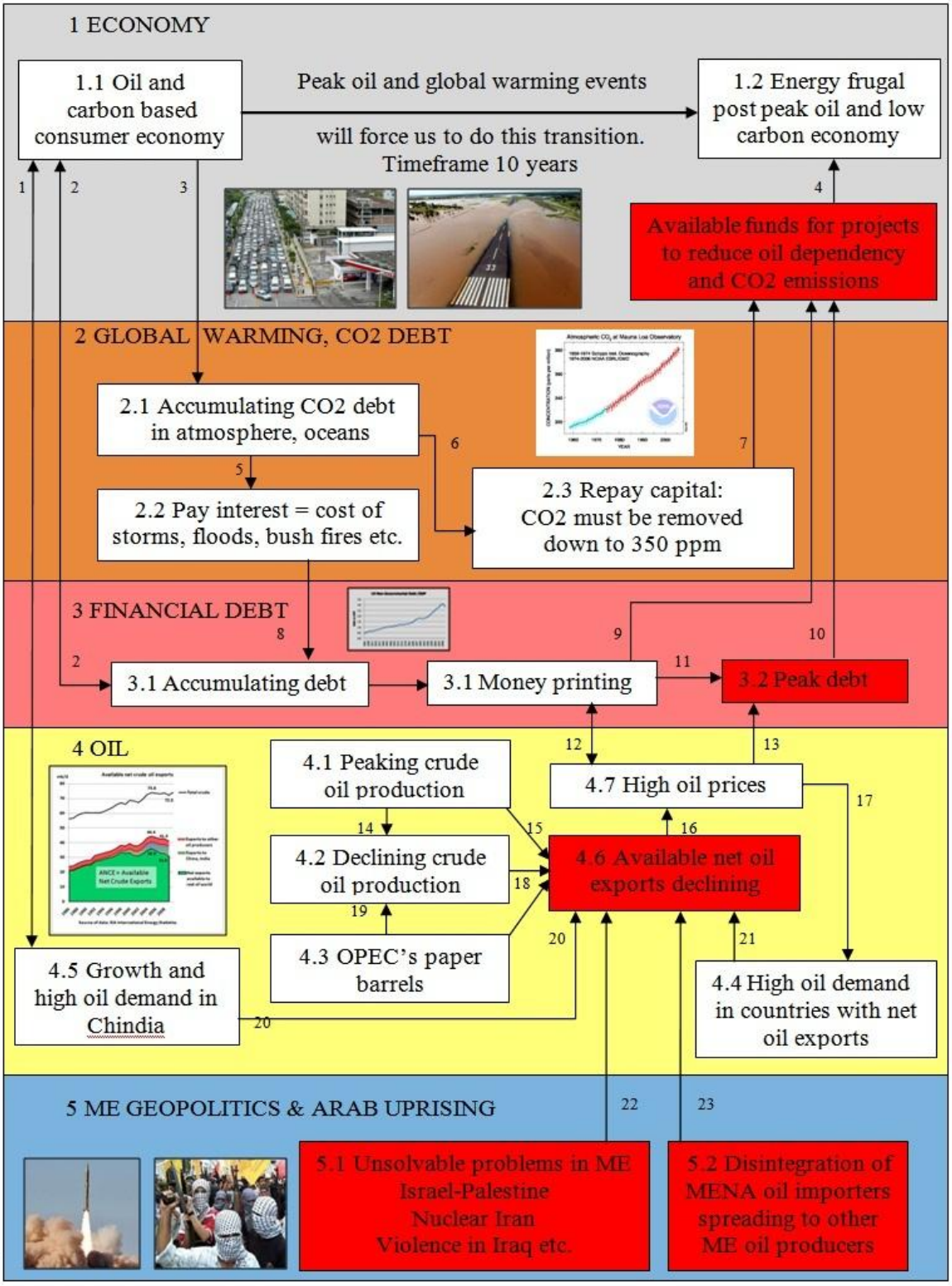
<< This graph superimposes projected global car registrations and IEA's WEO crude oil scenarios. We can see that the trends are incompatible. More details:

31/8/2011 1 billion vehicles in year #7 of peak oil
http://crudeoilpeak.info/1-billion-vehicles-in-year-7-of-peak-oil

It's not a technology problem, it's a primary energy problem

19/6/2010 M2 widening: Primary Energy Dilemma for cars
http://crudeoilpeak.info/m2-widening-primary-energy-dilemma-for-cars

(15) Bringing it all together



The above graph shows the interdependencies between 4 factors: peak oil, global warming, the accumulated debt crisis and Middle East politics. Note that CO2 is a debt because it has to be removed from the atmosphere, and very soon. Once the heat is in the oceans we are not going to get it out in timescales of interest to us. More details are here:

9/11/2011 System Dynamics peak oil, financial and CO2 debt, ME geopolitics
http://crudeoilpeak.info/system-dynamics-peak-oil-financial-and-co2-debt-me-geopolitics

(16) Consequences of peak oil denial

A continuing peak oil denial leads to further investments in oil-dependent infrastructure like toll-ways, airport extensions etc. which will trigger yet another financial crisis because the projects will not yield the expected returns.

A good example is the M2 widening by a toll-way operator which sits on a huge mountain of debt:

1075018.pdf - Adobe Reader

transurban

GROUP DRAWN DEBT AT 31 DECEMBER 2011

TRANSURBAN CORPORATE DEBT	AUD ($M)	USD ($M)
Working capital lines[1]	117	53
Term bank debt	600	-
US Private Placements	1,336	162
Domestic unwrapped bonds	450	-
Domestic wrapped bonds	600	-
Total	**3,103**	**215**

TRANSURBAN NON RECOURSE DEBT (AUD $ million)	Asset Debt	Ownership	Proportional
Lane Cove Tunnel	260	100.0%	260
M1 – Eastern Distributor	520	75.1%	391
M2 – Hills Motorway[2]	583	100.0%	583
M5 Interlinks Roads[3]	510	50.0%	255
M7 Westlink	1,255	50.0%	628
Total	**3,128**		**2,117**
TRANSURBAN NON RECOURSE DEBT (USD $ million)	**Asset Debt**	**Ownership**	**Proportional**
Pocahontas – Senior	306	75.0%	230
Pocahontas – TIFIA[4]	173	75.0%	130
Beltway – Senior	589	67.5%	398
Beltway TIFIA[5]	450	67.5%	304
Total	**1,518**		**1,062**

1. AUD $550m facilities, $381m available undrawn assuming drawn USD is converted at the spot exchange rate ($1.0156 at 31 December 2011). Separate Letters of Credit are issued to the value of AUD $43m in relation to Capital Beltway and CityLink.
2. AUD $157m available in undrawn capex facility.
3. AUD $13m available in undrawn working capital facility.
4. Undrawn TIFIA facility of USD $6m. Debt balance includes USD $29m of accreted interest.
5. Undrawn TIFIA facility of USD $167m. Debt balance includes USD $29m accreted interest.

53

More details are here:

12/2/2012
Car addicted Sindney destroys bus ramp near rail hub as tollway debt increases 60% at least
http://crudeoilpeak.info/car-addicted-sindney-destroys-bus-ramp-near-rail-hub-as-tollway-debt-increases-60-pct-at-least

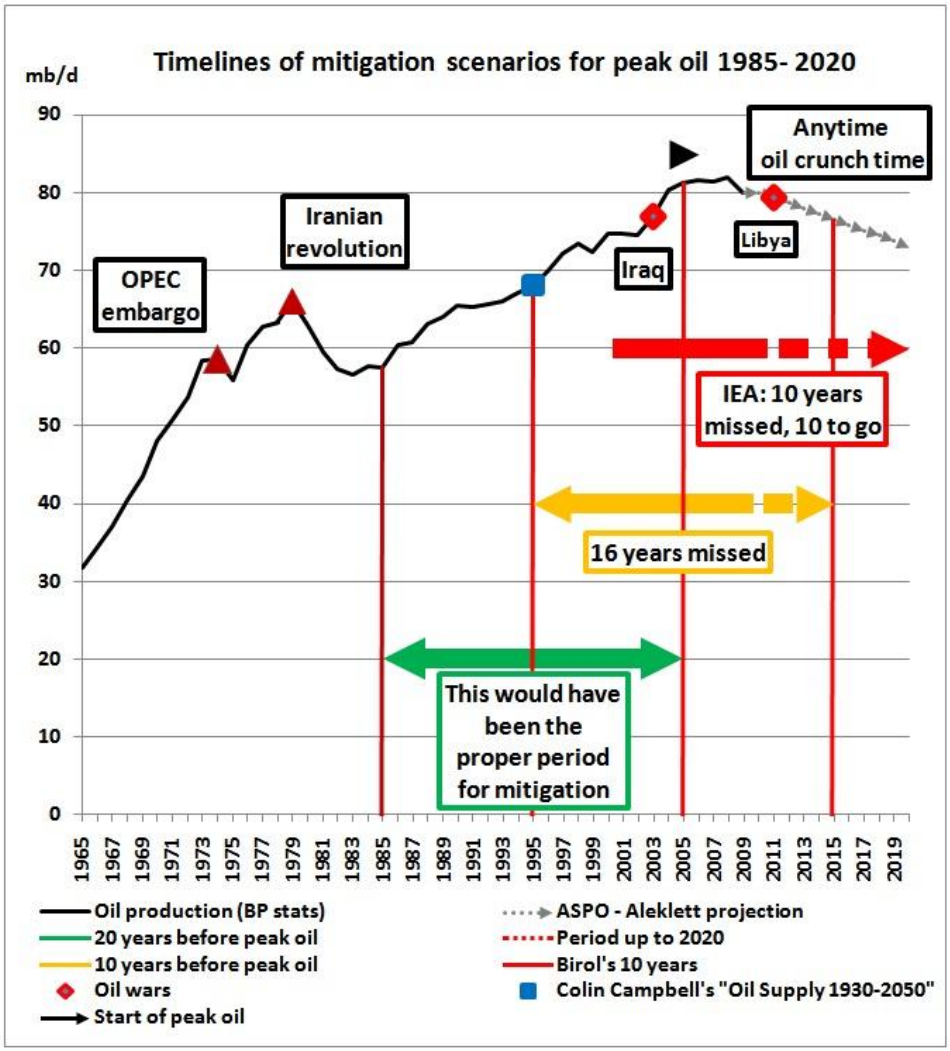
Once investors will lose money they will ask questions. By simply typing in “oil production” in Google they will come quickly to peak oil sites. Currently, the Wikipedia peak oil article is in #7 position on the first page.
http://en.wikipedia.org/wiki/Peak_oil

They will seek compensation claims from those who did not warn them about the risks of their investments. The problem will ultimately end up with financial institutions and governments who can be shown to have neglected their duty of care or who have acted against the principles of prudent governance.

Courts will decide. It will be like after a train accident. They will ask why that was not foreseeable?

(17) What to do

It is now too late to prepare for peak oil because critical milestones in the past have been missed:



My original 10 point program is here:
http://crudeoilpeak.info/solutions

But what can be done now is only part of this:

STEP 1: Rewrite the Energy White paper. Discard the ACIL Tasman oil vulnerability report and the NESA report and replace by proper assessments

STEP 2: Start a public awareness campaign on peak oil. Any continuing denial will backfire

STEP 3: Prepare emergency plans for car pooling, petrol rationing and diesel allocation. This is a plan from WA
http://www.energy.wa.gov.au/cproot/2917/2/Westplan%20-%20Liquid%20Fuels%20Supply%20Disruption.pdf
However, oil decline will mean a PERMANENT emergency, not just temporary

STEP 4: Set up Strategic oil reserve

STEP 5: Stop doing business as usual: No more highway duplications, only removal of black spots; advise banks and financial institutions of peak oil so that no more toll-ways are built or expanded; no more planning for new airports, runway extensions etc. Revise all Federal and State infrastructure plans

STEP 6: Convert that part of the truck fleet to CNG and LNG which supplies food to the cities. Build gas supply infrastructure for this fleet. Revive rural rail lines for grain and agricultural commodities export

STEP 7: Biofuels only to be used in the agricultural sector itself

STEP 8: There is no more time for very fast train (VFT) dreams. Therefore, immediate launch of rail projects on all trunk lines between capital cities to upgrade alignment and track. Duplication Maitland – Brisbane and a section at Junee. Ultimately, all rail lines will need to be electrified.

STEP 9: Re-tool car manufacturing capacities for the mass-production of rail cars, trams and buses

STEP 8: Stop planning for expensive rail tunnel projects e.g. in Sydney

STEP 10: In urban areas, rescue toll-way operators by re-negotiating contracts allowing them to put electric rail (like Transperth) or electric trolley buses on car lanes which will empty anyway

----------Further reading----------

Other points of critique can be found in the first post I wrote immediately after the EWP was published.

19/12/2011 Australian Energy White (Wash) Paper 2011: peak oil denial not yet peaked
http://crudeoilpeak.info/australian-energy-white-wash-paper-2011-peak-oil-denial-not-yet-peaked

Note: larger versions of the graphs contained in this submission can be downloaded from my website