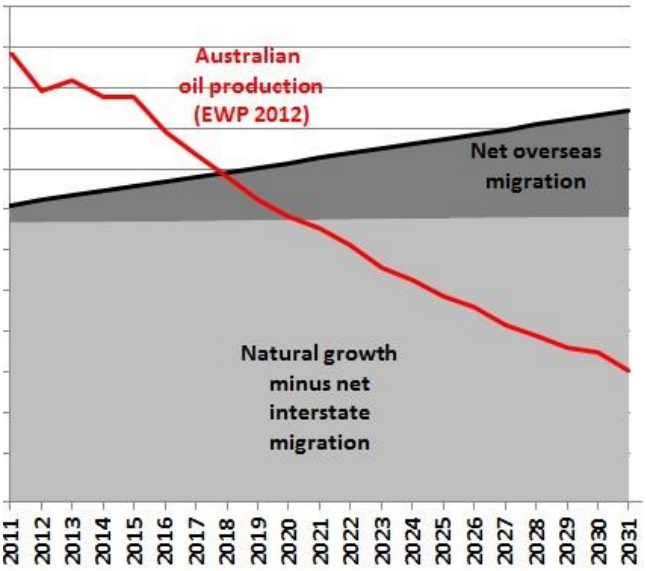
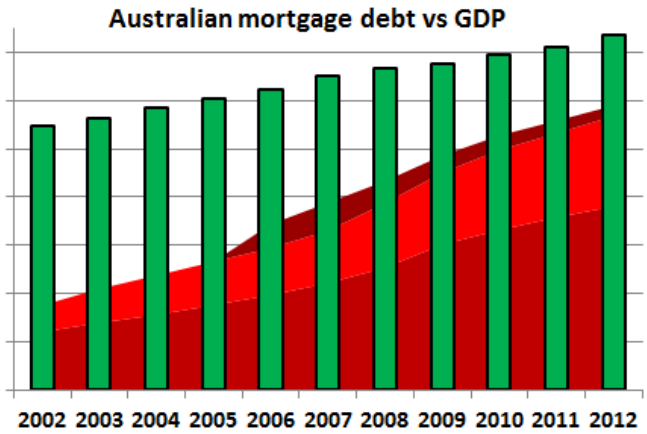
Submission on Sydney Metropolitan Strategy

The Clash between Overseas Migration, Mortgage Debt and Energy Supplies





http://crudeoilpeak.info
Crude Oil Peak
#1 in Monitoring the Global Crude Oil Peak

Prepared by Matt Mushalik
June 2013
mushalik@tpg.com.au

Contents

Executive Summary

The Metropolitan Strategy is a Sydney-centric, politically inspired, wishful thinking exercise for perpetual growth, not a professional planning document with the physical objective to make the existing city genuinely sustainable.

The State government acts like a city-state doing town planning although its role should be State planning which would develop all urban centres in NSW.

Instead of calculating the sustainable size of Sydney in a carbon constrained world, it postulates an arbitrary population target of 5.7 million by the end of the projection period. The State government sells this as a positive vision to the public which has practically internalised this growth paradigm as being good. Only at a local level, where residential high rise developments destroy the character of existing suburbs is there some resistance but this has not yet translated into questioning the whole underlying growth policy.

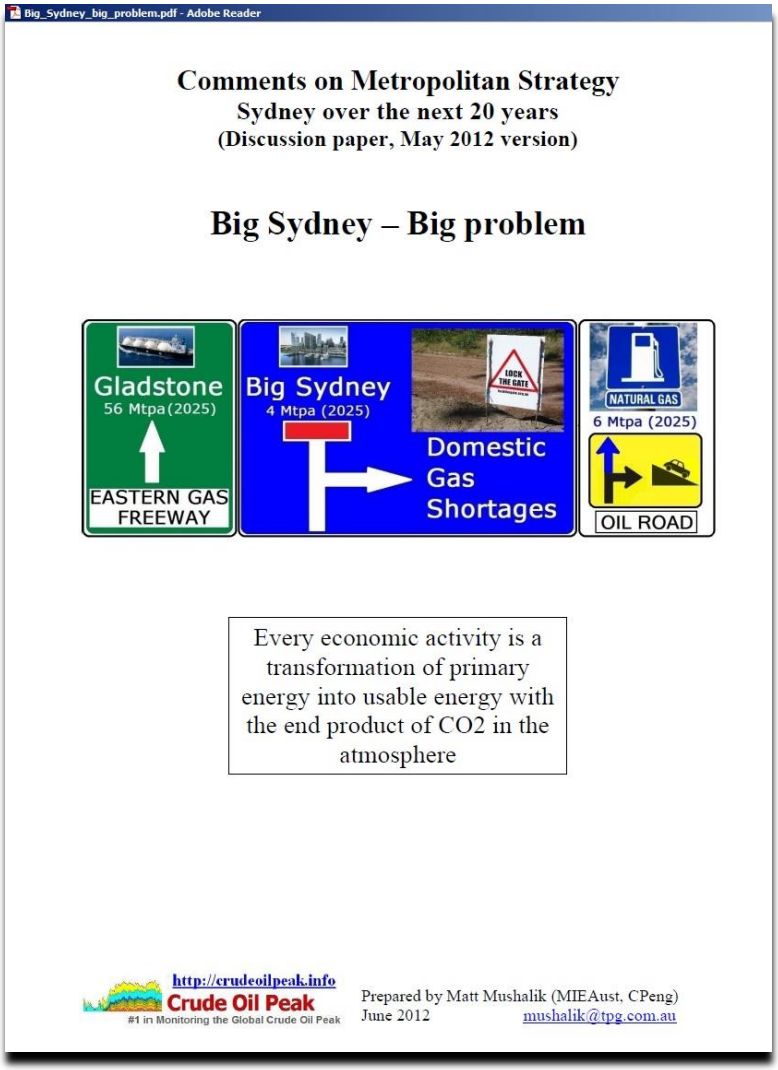
A proper demographic study at State level would start by analysing how the ageing problem can be solved. While a statistically measurable fertility rate is the result of individual decisions over which the government has no control, it can create a favourable environment for young families with children. Historically, this was provided in new subdivisions at Sydney's fringe. But due to both land shortages in the Sydney basin and oil vulnerability as identified in the VAMPIRE index, this classical solution has already hit its limits. The Metropolitan Strategy now tries to accommodate population in high density developments which are designed for (temporary?) empty nesters. This is not an appropriate approach. The only solution is decentralisation to towns in the State where land is cheap and per-capita infrastructure cost lower. The State government would need to develop a jobs strategy for these towns, preferably built around renewable energies. The Chinese have started with developing solar cities.

A demographic study would then continue to analyse the factors of internal migration, in which Sydney is losing population to other capitals and regional areas. In all likelihood the reason for this declining part of the population trend is Sydney's congestion and increasing cost of living.

ABS statistics show that net overseas migration (NOM) is the main driver of population growth and much of this is actually from temporary migration. Given the stuttering world economy due to the convergence of accumulated debt and high oil prices, it is not clear at all what future NOM will be. The State government would need to calculate per-capita cost of NOM and present this to COAG. Entrepreneur Dick Smith proposed a reduction of NOM to 70K.

The Metropolitan Strategy also fails to calculate energy requirements for the projection period. How many million barrels of oil, million m3 of gas and million tons of coal would be needed? What is the CO2 absorption capacity of the atmosphere when burning these fossil fuels? These are fundamental questions which should first be answered before even starting with planning. It is an untested assumption that a compact Sydney as presented by the Planning Department in the Urban Conversations event at Angel Place in June 2013 will consume less resources. Where are the numbers on this?

In fact the Metropolitan Strategy should focus on how to rescue existing Sydney in an evolving period of oil and gas shortages. Current inaction on replacing coal fired power plants will lead to a situation of climate emergency which will force us to reduce the use of coal and that means load shedding. None of this is part of the foresight and prudency of planners.



My submission of 1 year ago. Since then, The NSW government has not learnt how to do energy calculations. Every economic activity is a transformation of primary energy to useable energy. The driver of the economy is the productivity with which we use energy. Sydney's current use of energy, in particular oil, is not efficient.

(1) What the Metropolitan Strategy should do

The Metropolitan Strategy puts planning on its head. It postulates that population growth has to be 1.3 million by 2031 (a serious mission critical job by all measures) and then tries to do the planning for that. A cleverly designed PR campaign has already indoctrinated Sydney's population to accept this "target" as a given. However, a properly sequenced planning process would involve going through following planning steps:

Analysis of the current situation, definition of problems

(a) Calculate housing shortage and infrastructure deficiencies for the current population. Put dollar amounts on the associated costs, estimate mortgage debt and infrastructure financing. Determine whether these can be funded from the current and expected GDP growth, from super annuation savings and from the State budget
(b) Calculate energy requirements (oil, gas, coal) for the current population and compare this to available, projected supplies over the next 20 years. Consider the severe CO2 limits given by our carbon budget, the cost to replace oil dependent car traffic by public transport, the cost to replace coal fired power plants by renewable energies and potential gas shortages due to depletion in the Cooper basin. Do not count on CSG as farming is more important than anything else.
(c) Determine how climate change will impact on Sydney. Sea level rises up to 2 m by 2100 (Darling Harbour, Homebush, airport!) and coastal erosion will destroy land now being used. There will be super storms which will make life in high-rises uncomfortable if not dangerous.

This analysis is likely to produce the sobering realisation that even with the current population Sydney's problems will increase and not improve. The objective to increase population will be in doubt at this stage.

Natural population growth and internal migration

(d) Do a cohort survival analysis for the existing population without any migration whether internal or overseas. Assume certain parameters for fertility, death and birth rates. Fertility will depend i.a. on the density of housing provided (flats are unsuitable for families) and the economic development (GDP, employment, cost of housing etc.). This means there will be population ranges for natural growth. The ABS 2006 projection suggests that natural population will peak in the next decade.
(e) Study internal migration (interregional and inter-capital) and also calculate min and max ranges. The ABS 2006 projection has internal migration negative, just about cancelling out natural growth.
(f) If there is any growth from (d) and (e) calculate how much of that population can be accommodated in Sydney at which cost in terms of housing and infrastructure. The cheapest solution to accommodate natural growth is to allow and promote double story extensions of single story housing stock. Infrastructure must be budgeted for.
(g) Do an industry analysis to find out where the additional working age population can find employment in which sectors and in which parts of the city.

(h) If there is not enough affordable space in the Sydney area, or if infrastructure costs are too high, development must be decentralised to areas outside the commuting distance of Sydney.
(i) Calculate costs of a greenfield 200K model city on cheap land acquired by government (and leased back) and compare that with the marginal costs calculated under (f). An employment strategy must be developed for such decentralised cities. The future is with renewable energies and public transport so this must be about manufacturing of components for these industries (solar city)

Overseas migration

(j) Only if all the boxes (a) – (f) are ticked (unlikely) should any pro-active population growth strategy based on overseas migration be adopted and even then only in a decentralised scenario

Ageing population

(k) Overseas migration feeds sideways into the population pyramid, leading to a premature ageing of the population further down the track. Therefore, this is not a solution. If Australia's population structure is to be improved then by creating an affordable housing environment for young families with children and that can no longer be done in Sydney due to shortage of land near rail lines and long commuting distances by car in a city which has grown too big.

Solutions

(l) It is thought that higher densities (compact city) are a solution. At present this is pursued by building high-rise flats around existing rail stations (e.g. Rhodes) and proposed rail stations e.g. on the NRWL for future overseas immigrants yet-to-arrive. But this will not solve the car dependency problem of current residents in existing low density suburbs. The Metropolitan Strategy must deal with these transport issues by providing a network of electric trolley buses or light rail on existing road corridors (thereby replacing car lanes), not expensive rail tunnels.

Infrastructure implementation

(m) At present, it is thought that a modified PPP is the best solution. But tendering, paying for consultants, engaging financial advisors and employing head contractors who set up their own hierarchy of suppliers and subcontractors may in the end not be the cheapest way to do things.

System dynamics

(n) The Metropolitan Strategy must go through various scenarios and simulate them for the projection period (like in the Sim City game) using different parameters. This must include higher oil prices (macro-economic impact), higher petrol prices (impact on behaviour of

motorists) and higher diesel prices (cost of transportation). Similarly, the impact of global warming must be modelled. Not only storms and sea level rises but also assuming that revenue from coal exports will go down because extreme weather events will force the world to reduce use of coal

Here are some useful links on what is done in Port Oregon
http://www-03.ibm.com/press/us/en/pressrelease/35206.wss
http://www.youtube.com/watch?v=uBYsSFbBeR4
http://forio.com/

Monitoring

(o) The context of planning is changing constantly and rapidly. Whether it's the end of the mining boom, an evolving financial crash in China, an oil war in the Middle East or more climate disasters all these events have to be taken into account and the strategy has to be adapted accordingly.

Public consultation

(p) The public feels that decisions have already been made by the government especially as the proposed planning legislation will take away layers of public involvement when project proposals mature into a concrete shape which is understandable by the average layperson. Participation can be improved when alternatives are being presented and opinion is sought. Sleek business-type presentations as shown in the Urban Conversations event in Recital Hall are rather seen as what they are: "spin" according to an activist in Q&A at this function. However, the more local a planning issue is, the higher the participation in forums, seminars and workshops. The government also needs to truthfully tell the public facts about peak oil, the debt crisis and global warming.

(2) The immigration population bomb

Quote: *We know that by 2031: Our population will grow by an expected 1.3 million more people, taking our total population from 4.3 million to 5.6 million people (p 6)*

Comment: That is an untested assumption. Normally a report for such a period has to calculate various scenarios as it is inherently difficult to do population projections, in particular on migration which i.a. depends on socio-economic factors. Where is a detailed migration analysis?

So where does this number of 1.3 million come from? No reference is given in the Metropolitan Strategy.

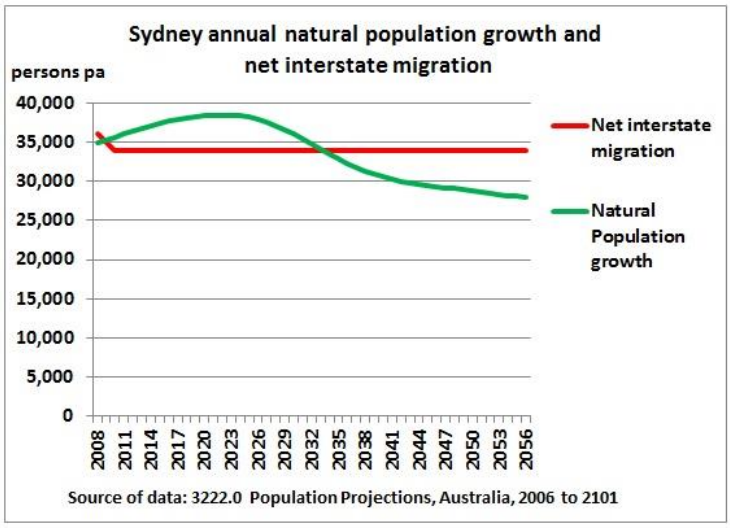
From the ABS Cat 3222.0, Population Projections, Australia, 2006-2101
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3222.0Main+Features12006%20to%202101?OpenDocument

we find for series B: 2007: 4.334 million and 2026: 5.426 million. In the XLS table under "past and future releases" (sheet Sydney, column AB) the population for 2031 is estimated at 5.71. That would be an increase of 1.38 million. In series B, following assumptions are being made:

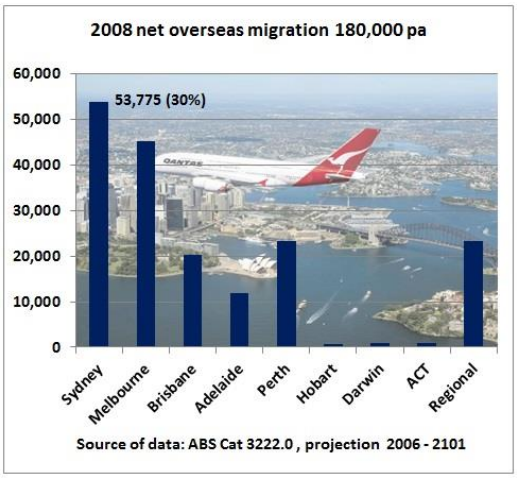
www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3222.0Main+Features12006%20to%202101?OpenDocument

ASSUMPTIONS

	Total fertility rate(b) babies per woman	Net overseas migration(c) persons	Life expectancy at birth(a) Males years	Females years
Series A	2.0	220 000	93.9	96.1
Series B	1.8	180 000	85.0	88.0
Series C	1.6	140 000	85.0	88.0

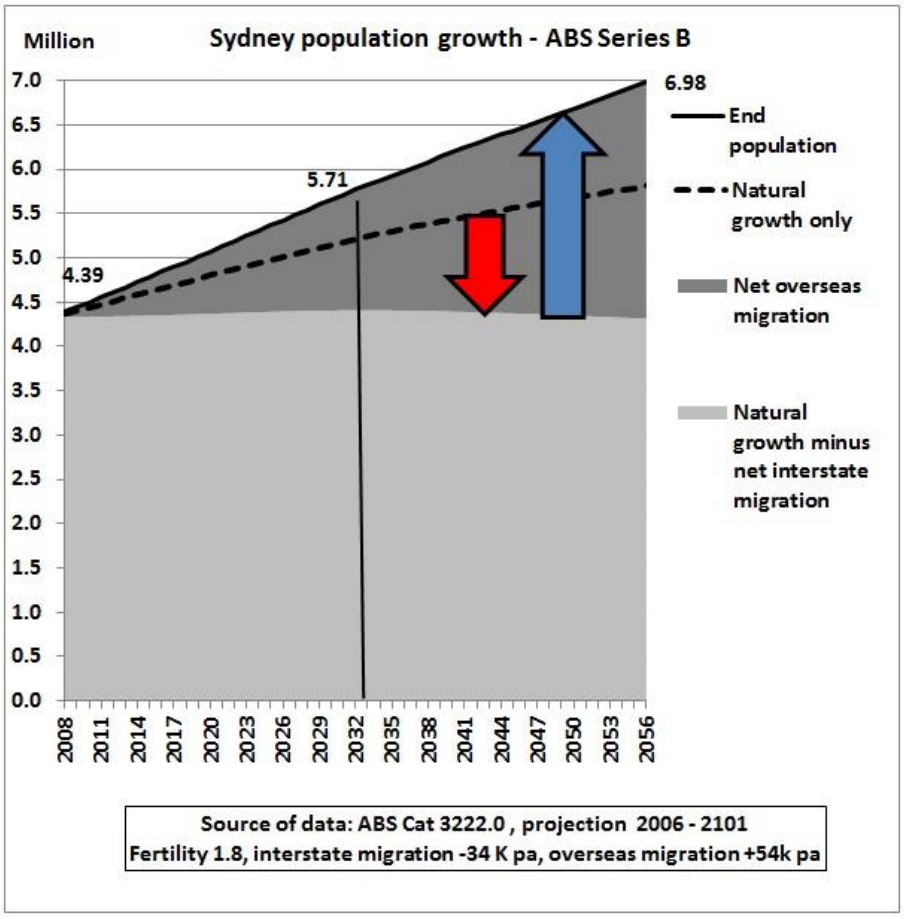


<< Fertilities and life expectancy result in annual natural growth in Sydney peaking in the early 2020s and then declining. In 2031, it will be back to current levels. Net interstate migration (34,000 departures) is practically as high as natural population growth. This means that population without net overseas migration does not grow at all.



<<< The national 180,000 net overseas migration is distributed as shown in this graph, with Sydney getting 30%

Bringing it all together:



From the natural population growth (dashed curve) we deduct interstate migration (red arrow). This gives a slightly declining population (light grey area). Adding net overseas migration results in a continuously growing end population. In other words, Sydney's growth is entirely driven by overseas migration.

This is being confirmed in a 2011 study of the Federal Department of Immigration entitled "Population Distribution Effects of Migration in Australia"
http://www.immi.gov.au/media/publications/research/migration-in-australia/

From chapter 2:

"The fact that Sydney, and several other capital cities, are recording net losses due to internal migration is little recognised in public discourse in Australia where the common opinion is that the largest cities are draining population from the rest of states. In fact this pattern of net internal migration loss in the capitals is a longstanding one, especially in Sydney. It needs to be stressed that in Sydney, and to a lesser extent in the other capitals, the primary drivers of population growth is not net internal migration but net international migration.."

http://www.immi.gov.au/media/publications/research/migration-in-australia/chapter-two-pages15-37.pdf

When these losses occur a detailed analysis has to be done to understand the reasons. How many are retirees, how many can no longer afford to live in Sydney, how many depart for mining jobs and how many leave for lifestyle changes?

What seems to be happening is that overseas migrants drive out the existing population. This creates conflicts. It is not good to base the Metropolitan Strategy on such a demographic change. Definitely this problem must be discussed in COAG.

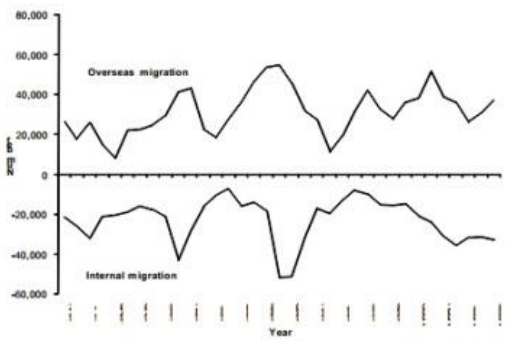
From chapter 5:

"The apparent relationship between substantial net gains from international migration and net losses from internal migration in Sydney has frequently been remarked upon (McKay and Whitelaw, 1978; NSW Department of Urban Affairs and Planning, 1995; Hugo, 1992; Bell, 1995).

www.immi.gov.au/media/publications/research/migration-in-australia/chapter-five.p

Figure 5.1: Sydney Statistical Division: Net Internal and International Migration, 1972 to 2006

Source: NSW Department of Planning

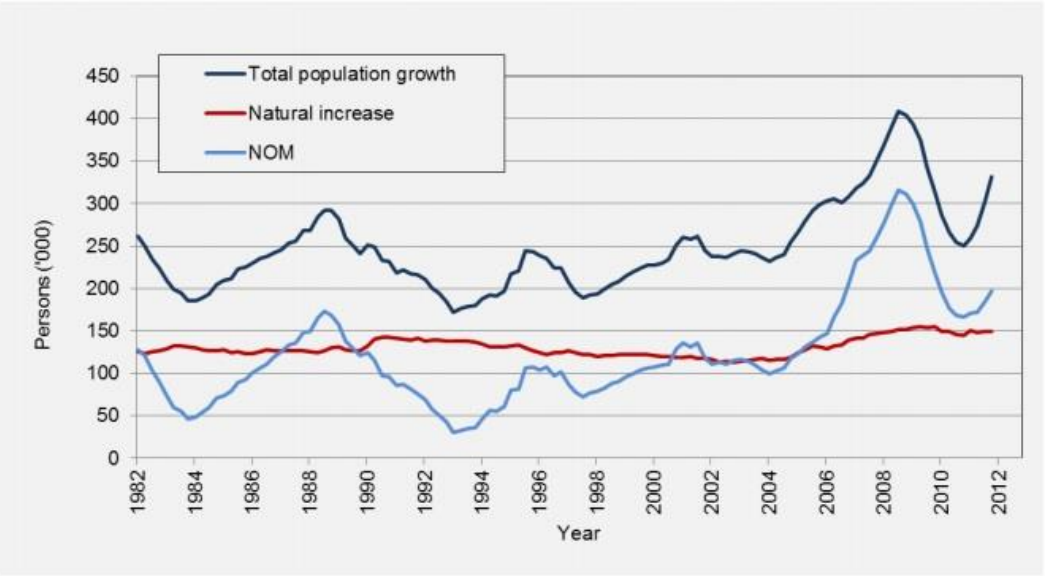


<< Indeed, if one graphs the annual levels of net internal and international migration for Sydney as in Figure 5.1, one profile presents a mirror image of the other suggesting a strongly negative association and this has been demonstrated statistically (e.g. see Flood et al., 1991, p. 7; Bell and Cooper, 1995, p. 102)."

http://www.immi.gov.au/media/publications/research/migration-in-australia/chapter-five.pdf

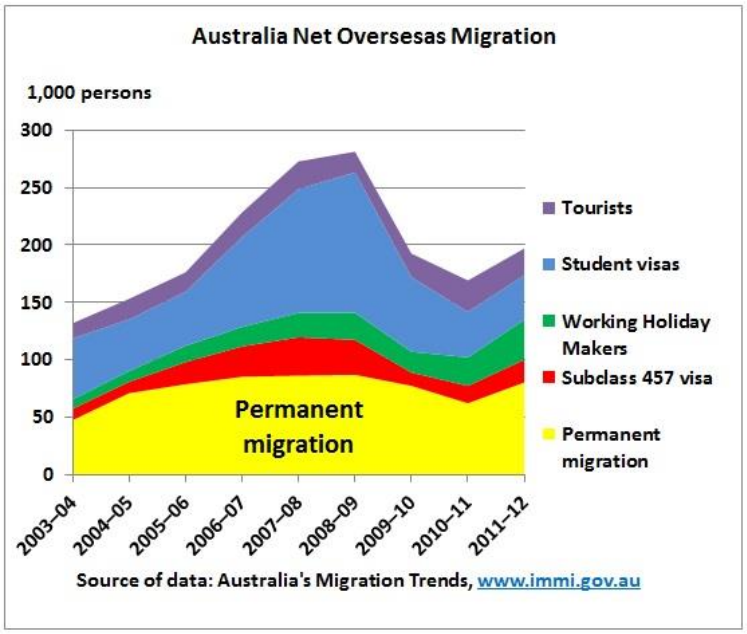
www.immi.gov.au/media/publications/statistics/immigration-update/australian-migration-trends-2011-12.pdf

Figure 6-1: Components of Australia's population growth, 1982 to 2012



Source data: ABS Australian Demographic Statistics (3101.0)
1. NOM estimates contain a break in series. Estimates for September 2006 quarter onwards use an improved methodology and are not comparable with NOM estimates from earlier periods.

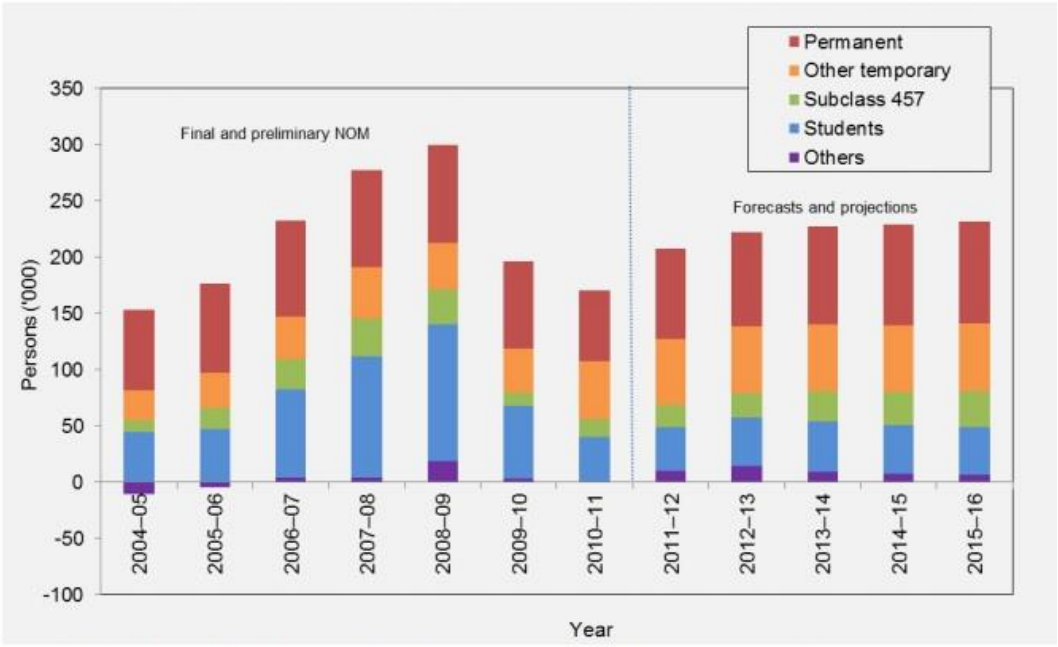
Natural population growth has a huge inertia and doesn't change much and quickly. While NOM depends on the economy and the financial system which can have a dramatic impact on migration numbers. The 1989 migration peak was followed by a decline in Keating's recession we had to have. A rapid increase of NOM after 2006 came to an end – with a delay of one year – with the arrival of the GFC.



The GFC mainly reduced temporary migration, in particular the student visa group. This is not a reliable demographic development as a basis for a Metropolitan Strategy which will cost 100s of billions of dollars to implement.

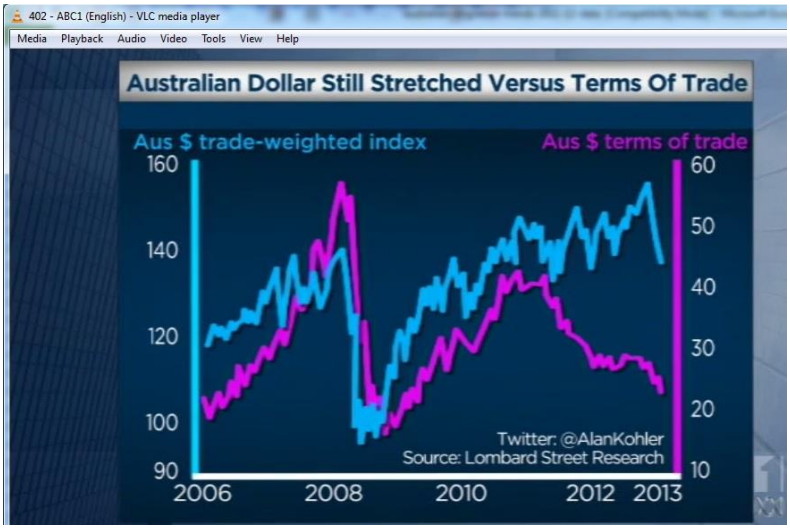
www.immi.gov.au/media/publications/statistics/immigration-update/australian-migration-trends-2011-12.pdf

Figure 6-4: Contribution of temporary and permanent migrants to NOM, 2004–05 to 2015–16



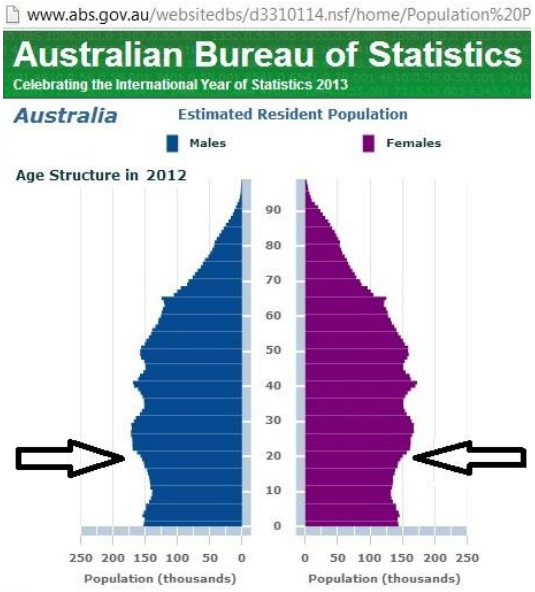
Source data: Travellers' Characteristics Database, ABS, and *The Outlook for Net Overseas Migration*, DIAC

Is this projection to 2016 correct? The economy and the financial system depend on a reasonable price of oil. The mining boom is over and China will not continue to grow as in the past. So the number of temporary NOM will go down just like it did in previous crises.



Graph from Alan Kohler as shown on the 7pm news on 25/6/2013
http://1.static.australianindependentbusinessmedia.com.au/sites/default/files/styles/ak_graph/public/kohlersgraphs/2013/Jun/australian-dolalr-still-stretched-versus-terms-trade.png?itok=lDMWfGHy

A gap has opened between the TWI and the terms of trade. If the AUD were to fall to realign itself with the terms of trade, oil import prices would skyrocket, probably leading to a recession. The high AUD has protected Australia from the impact of peak oil but now this period seems to come to an end. The Metropolitan Strategy has done no scenario planning whatsoever for this case.



<< Australian population pyramid showing a thinning at the base. Overseas migrants, although much younger than the average Australian population, are fed into the population pyramid sideways (arrows), leading to a premature ageing further down the track.

It would be better to have more Australians born from the existing population. But for this to happen we need a children friendly environment which cannot be provided in high rise flats in Sydney. Decentralisation to new cities outside the commuting distance of Sydney is a solution.

http://www.abs.gov.au/websitedbs/d3310114.nsf/home/Population%20Pyramid%20-%20Australia

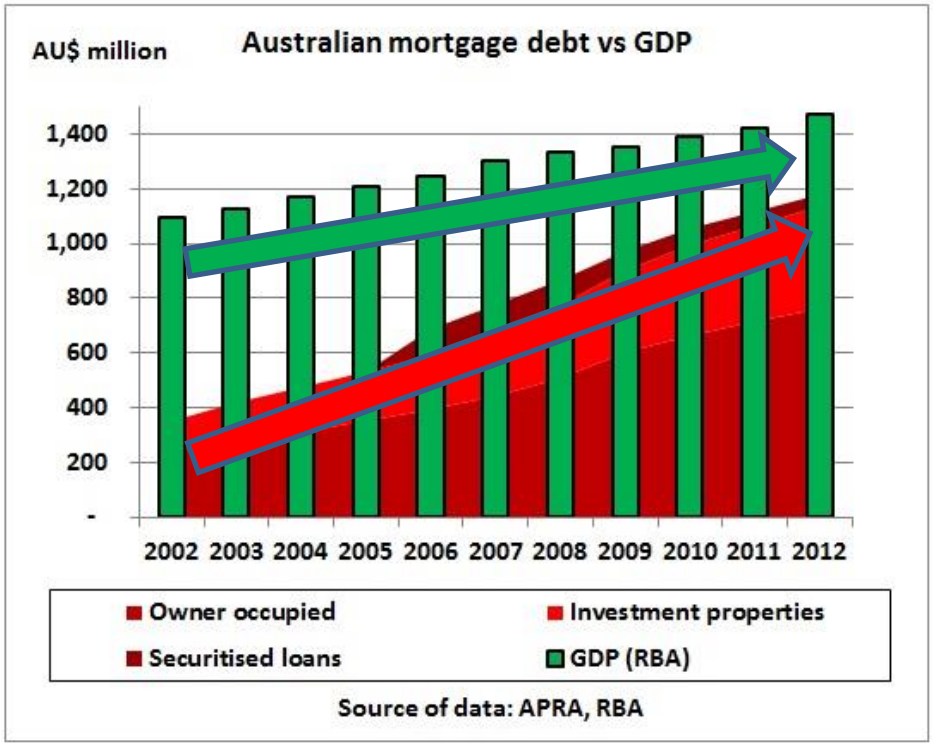
Decentralisation is mentioned in the following Parliamentary paper, but not in the Metropolitan Strategy.

Population Issues for Sydney and NSW: policy frameworks and responses
Briefing Paper No 5/2011

"At this early stage, the O'Farrell Government has focused on pursuing decentralisation and regional development as a means to alleviate pressures exerted by population growth in Sydney. This policy direction finds an echo in the strong focus on regional development in the Federal Sustainable Population Strategy"
http://www.parliament.nsw.gov.au/Prod/parlment/publications.nsf/0/E619AB5558C4A5A9CA2578DF001D062D/$File/Population%20Issues%20Briefing%20Paper%205-2011.pdf

Entrepreneur Dick Smith argues for a reduction of overseas migration to 70 K pa.
http://dicksmithpopulation.com/

(3) The mortgage legacy



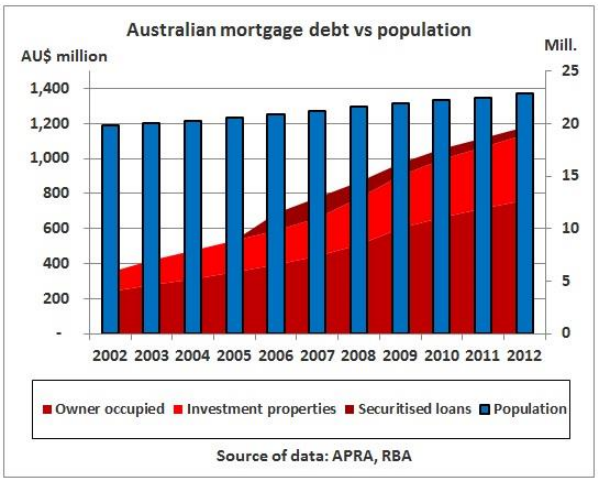
http://www.apra.gov.au/adi/Publications/Pages/monthly-banking-statistics.aspx
http://www.rba.gov.au/statistics/tables/xls/g10hist.xls

Australian residential mortgage debt and GDP

AU$ million	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2003-2012
Owner occupied	240,998	278,057	311,655	351,913	393,745	442,874	507,810	602,894	663,400	715,797	761,882	
Investment properties	110,008	141,372	163,192	179,953	195,122	217,976	267,513	299,028	331,971	349,625	375,040	
Securitised loans					99,044	116,082	91,642	70,936	60,582	51,910	43,233	
Total mortgage	351,006	419,429	474,847	531,866	687,911	776,932	866,965	972,859	1,055,954	1,117,333	1,180,156	
Annual increase		**68,422**	**55,418**	**57,019**	**156,045**	**89,021**	**90,033**	**105,894**	**83,095**	**61,379**	**62,823**	**829,150**
Mortgage debt growth in %		19.5%	13.2%	12.0%	29.3%	12.9%	11.6%	12.2%	8.5%	5.8%	**5.6%**	
GDP (RBA)	1,093,870	1,127,285	1,173,376	1,209,863	1,242,809	1,300,386	1,335,100	1,354,046	1,389,485	1,423,338	1,474,274	
GDP inccrease		**33,415**	**46,091**	**36,487**	**32,946**	**57,577**	**34,714**	**18,946**	**35,439**	**33,853**	**50,936**	**380,404**
GDP growth in %		3.1%	4.1%	3.1%	2.7%	4.6%	2.7%	1.4%	2.6%	2.4%	3.6%	
Mortgage debt % of GDP	32%	37%	40%	44%	55%	60%	65%	72%	76%	79%	80%	

http://www.apra.gov.au/adi/Publications/Pages/monthly-banking-statistics.aspx
www.**rba**.gov.au/statistics/tables/xls/g10hist.xls

Over the last 10 years, mortgage debt has increased twice as fast as GDP.



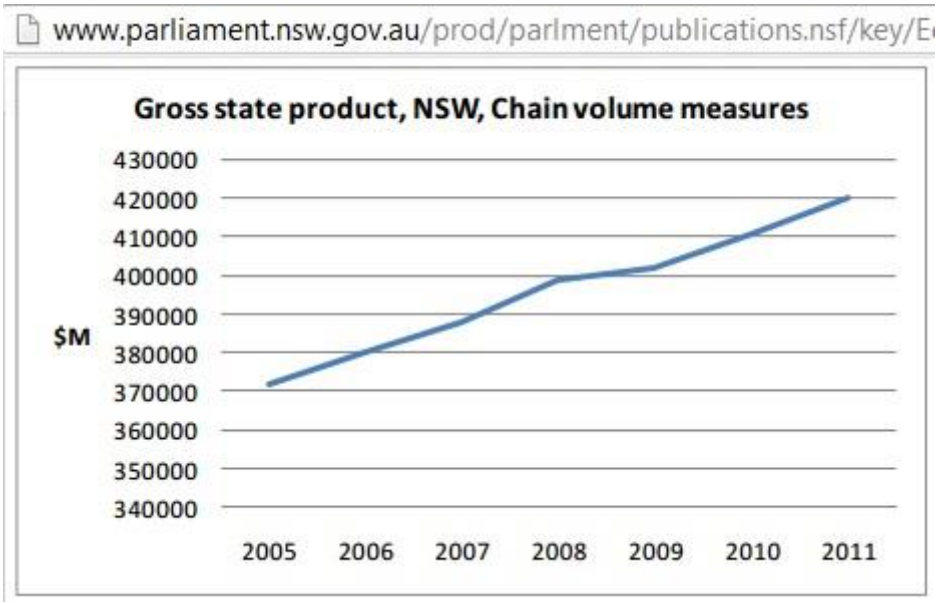
<< The difference between mortgage debt growth and population growth is even starker. While population grew by 16% over 10 years, mortgage debt tripled. For every additional 1,000 population, 266 million AUD debt was created.

As most of the housing is in capital cities it is clear that these cities have become too expensive.

From this document:

NSW Parliamentary Library
Economic Indicators NSW
(January 2012)
Statistical Indicators 2/12

we get the NSW GSP:



http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/key/EconomicIndicatorsNSW(January2012)/$File/Economic+Indicators+NSW+January+2012.pdf

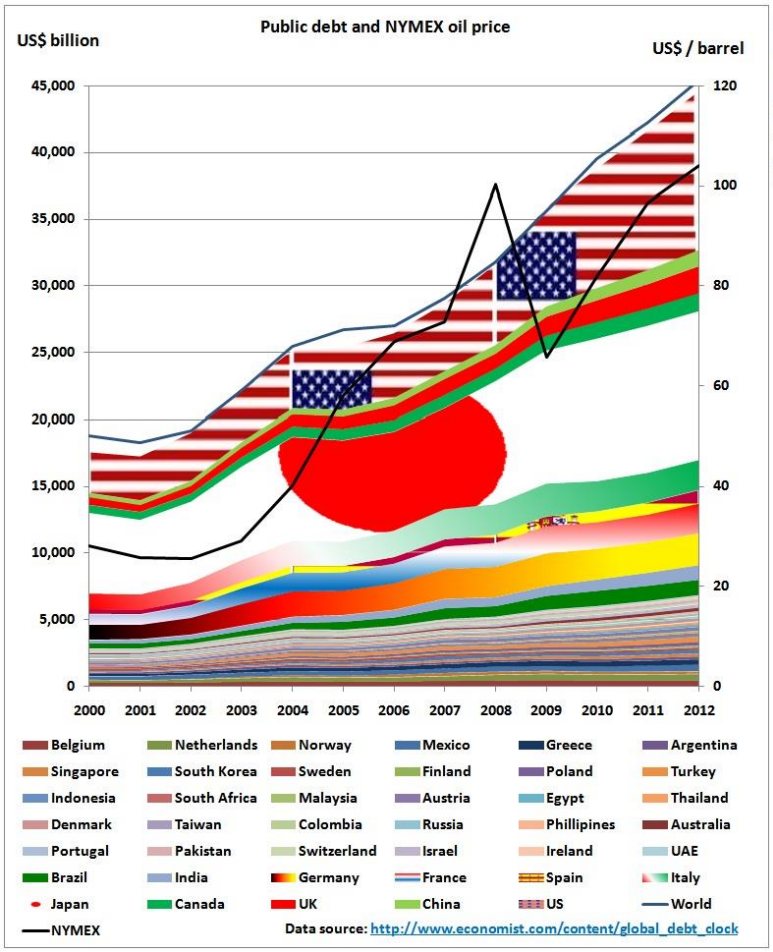
Note the graph is not zero scaled which makes the growth look larger than it is. The NSW GSP growth was 2.2% pa while national mortgage debt grew between 29% (2006) and 5.6% (2012). Therefore the NSW GSP growth was insufficient to support the past debt growth (assuming that mortgage debt in Sydney grew at national rates). Thus, the existing situation is already unsustainable, not to mention a continuation of current trends which underlie the Metropolitan Strategy.

Assuming current mortgage debt levels for future population growth a back-of-the-envelope calculation would give 1.3 million additional population x 266,000 $ new debt per person = $ 350 bn which would be an **additional 83% of current GSP**, lifting current debt levels into out-of-chart territory.

Peak oil of course means that GSP growth rates will be difficult to maintain. Already now, the State government has to sell assets (ports, electricity generators) to balance the State budget which includes financing of transport and other infrastructure to alleviate current bottlenecks (not to mention congestion problems created by future population growth).

The Metropolitan Strategy does not do any economic and debt calculations. In fact, before even thinking about a totally unrealistic “target” of 1.3 million, the State government should first estimate when the current system will crash.

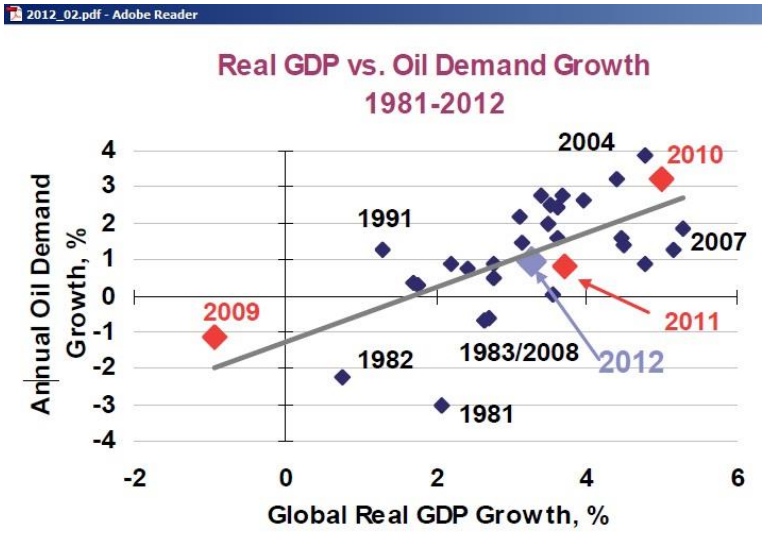
(4) Convergence of accumulated debt and high oil prices



The Quantitative Easing objective is to pay for high oil prices caused by the beginning of peak oil in 2005.

http://crudeoilpeak.info/global-debt-and-oil-prices

The link between GDP growth and oil demand growth is shown in this graph from the IEA Monthly Oil Market Report (Feb 2012, p7)

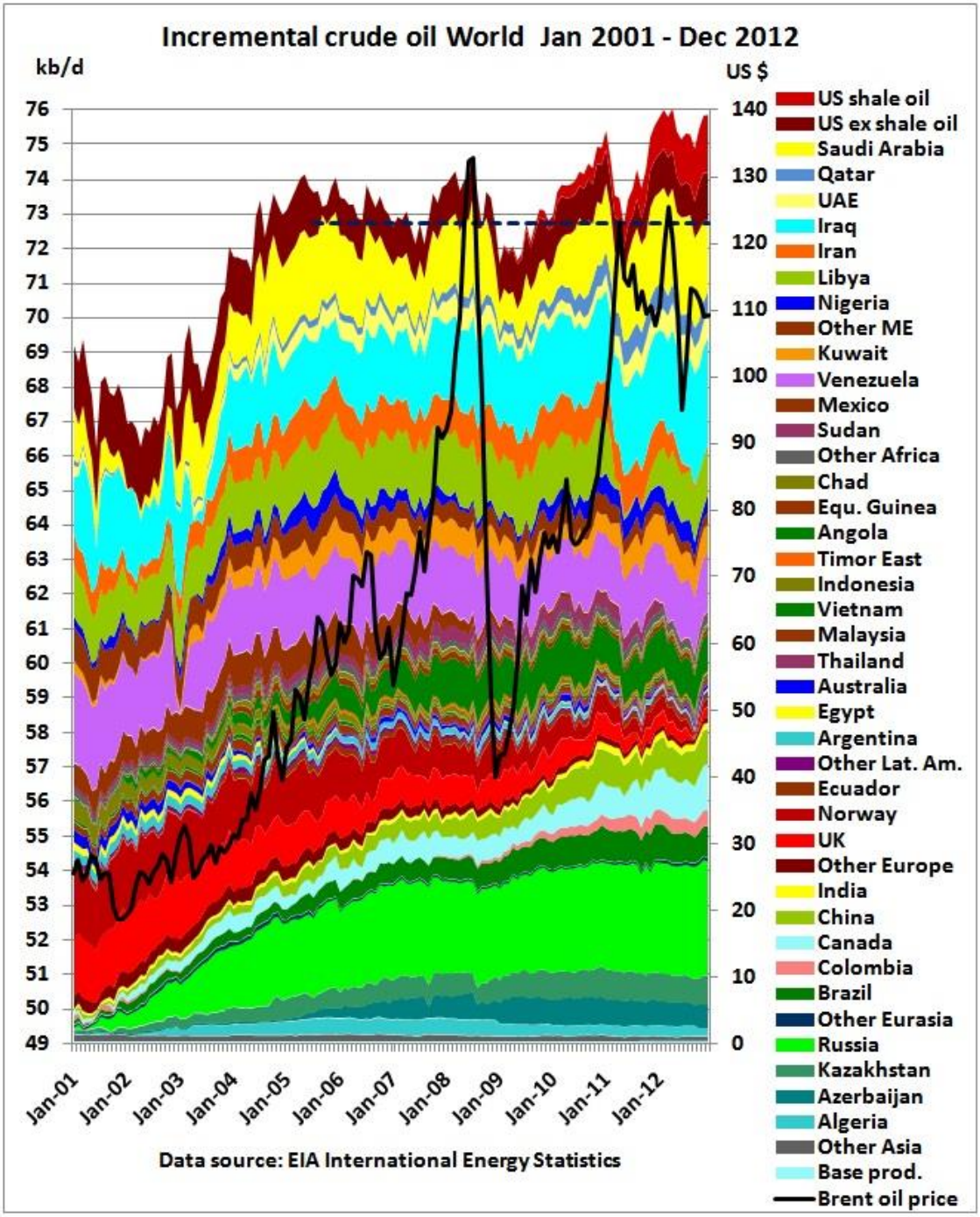


<< for a zero oil demand growth GDP can grow only below 2%. That will limit the ability to finance infrastructure and to pay back debt.

This is an average for the global economy. Detailed calculations would have to be done for the Australian economy.

http://omrpublic.iea.org/omrarchive/10feb12full.pdf

(5) Peak oil

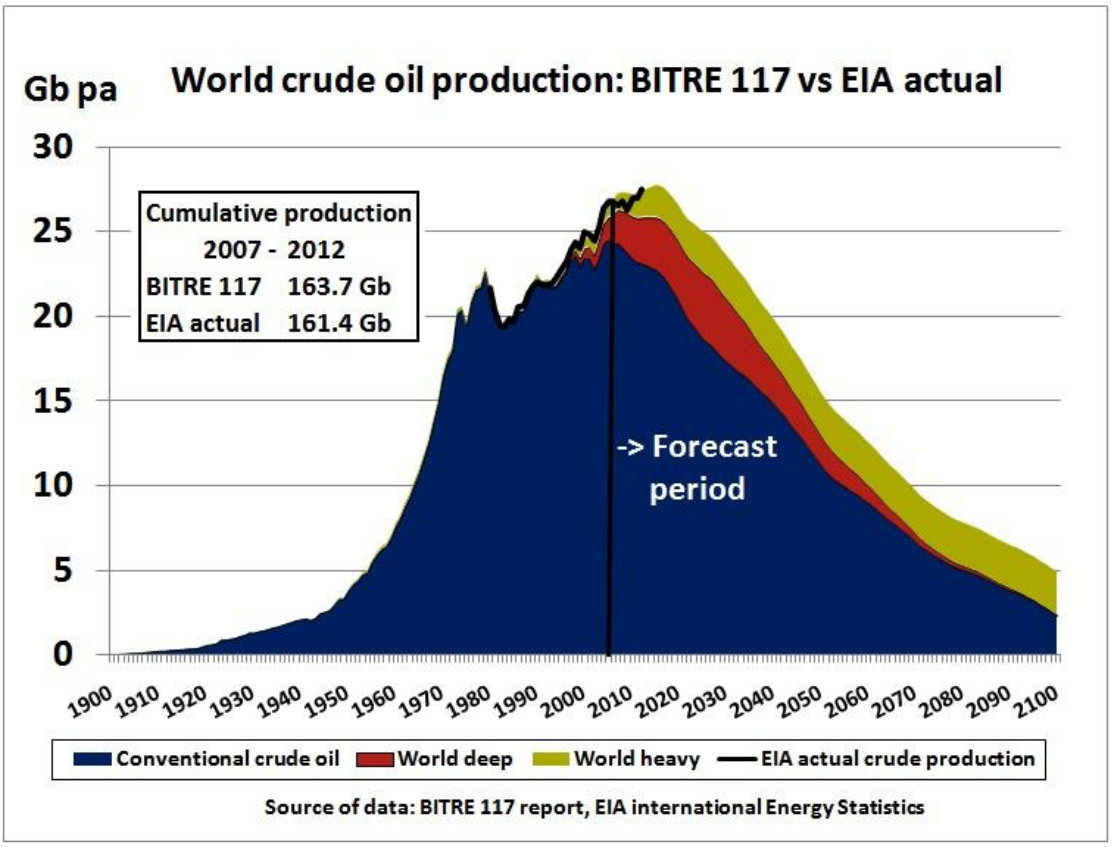


http://crudeoilpeak.info/global-debt-and-oil-prices

29/4/2013 Excluding the US, rest-of-world crude production in 2H2012 was not higher than in 2005
http://crudeoilpeak.info/excluding-the-us-rest-of-world-crude-production-in-2h2012-was-not-higher-than-in-2005

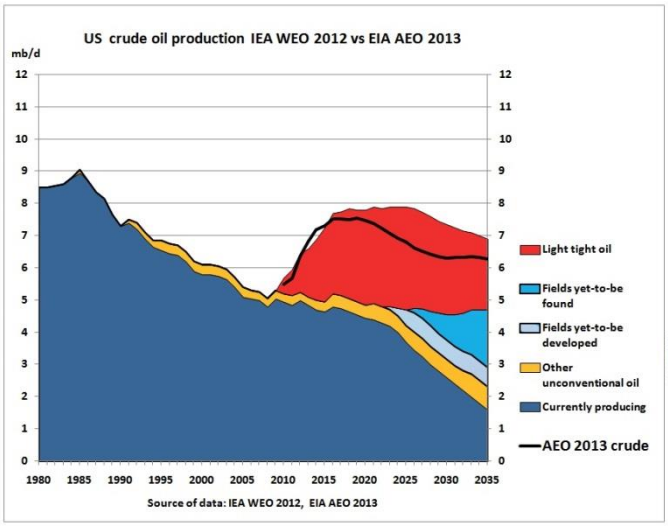
The famous peak oiler Matt Simmons from Texas (book: "The coming Saudi oil shock and the world economy") brought my incremental graphs to the attention of the Pentagon. From the above graph we can see the dip in Saudi oil production in 2006/07. That, together with China's additional oil demand for the Olympic games, brought oil prices to $147 a barrel in 2008.

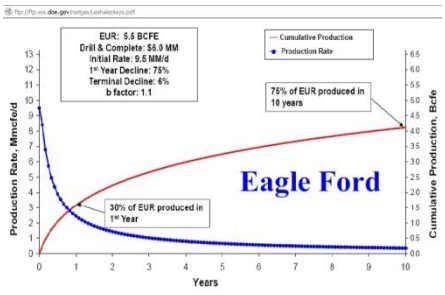
BITRE 117 and shale oil hype



25/2/2013 How good was the Australian peak oil report BITRE 117? (peaky leaks part 4)
http://crudeoilpeak.info/how-good-was-the-australian-peak-oil-report-bitre-117

This report did not include US shale oil, which will peak before 2020.

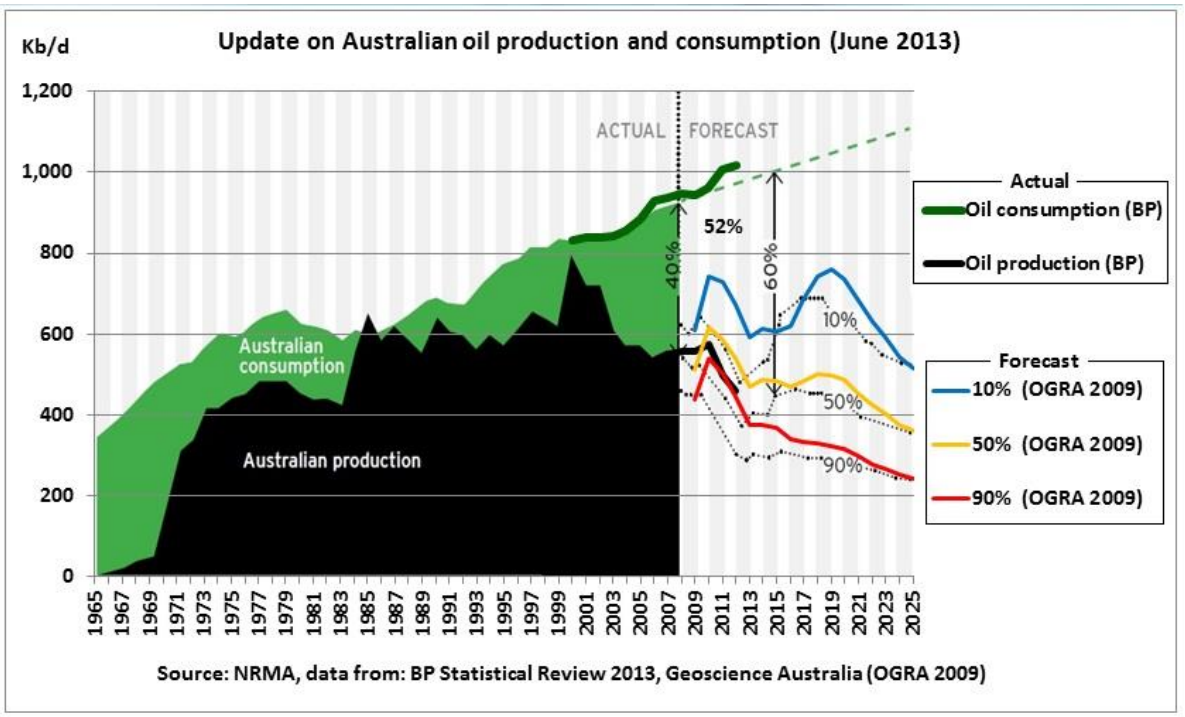




This is because a shale oil well depletes by 80-90% within 2-3 years. More than 200 K wells need to be drilled to get at oil equivalent to 10 months global oil demand.

13/12/2012 US still needs to import 50% of its crude oil requirements despite increasing shale oil production
http://crudeoilpeak.info/us-still-needs-to-import-50-percent-of-its-crude-oil-requirements-despite-increasing-shale-oil-production

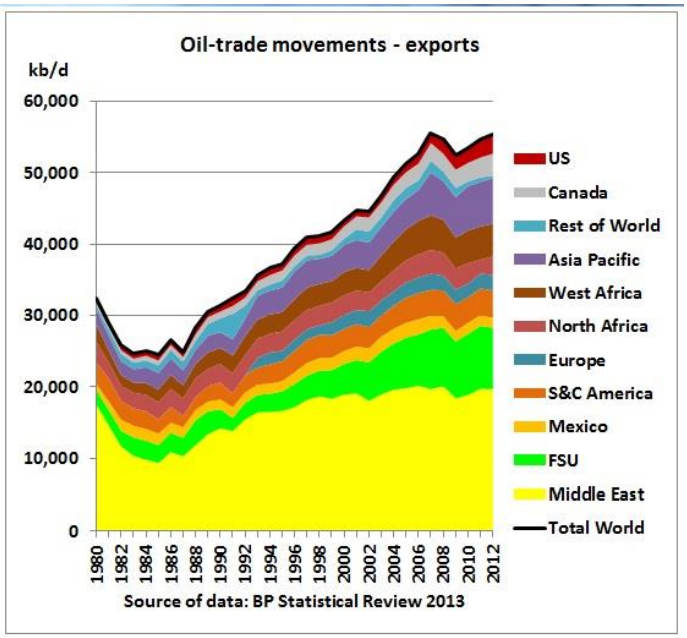
(6) Australian peak oil



In February 2013, the NRMA published a paper on Australia's Liquid Fuel Security
http://www.mynrma.com.au/media/Fuel_Security_Report.pdf

The above graph from this report is updated with latest production and consumption data from the BP Statistical Review 2013.

Australian oil demand growth in the last 10 years was +2% pa on average. That alone is incompatible with stagnating global oil exports (graph below). The NSW State government has no experience and no intention to reduce oil demand by e.g. a fast roll-out of light rail solutions all over the city and rail electrification of interstate rail freight. Therefore, the oil based transport sector will be forced to reduce demand either by higher petrol/diesel prices or later physical shortages.

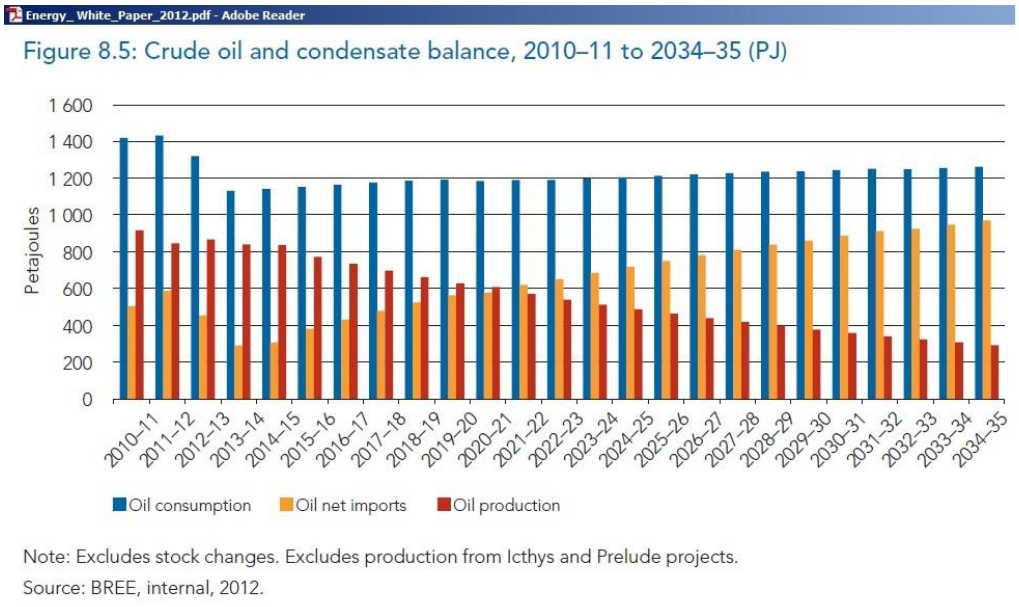


<< We can see that the so-called US energy revolution of shale oil has played only a marginal role in bringing up 2012 exports to a level which was still lower than in 2007.

Middle East exports are basically flat since 2006 and FSU exports peaked in 2011.

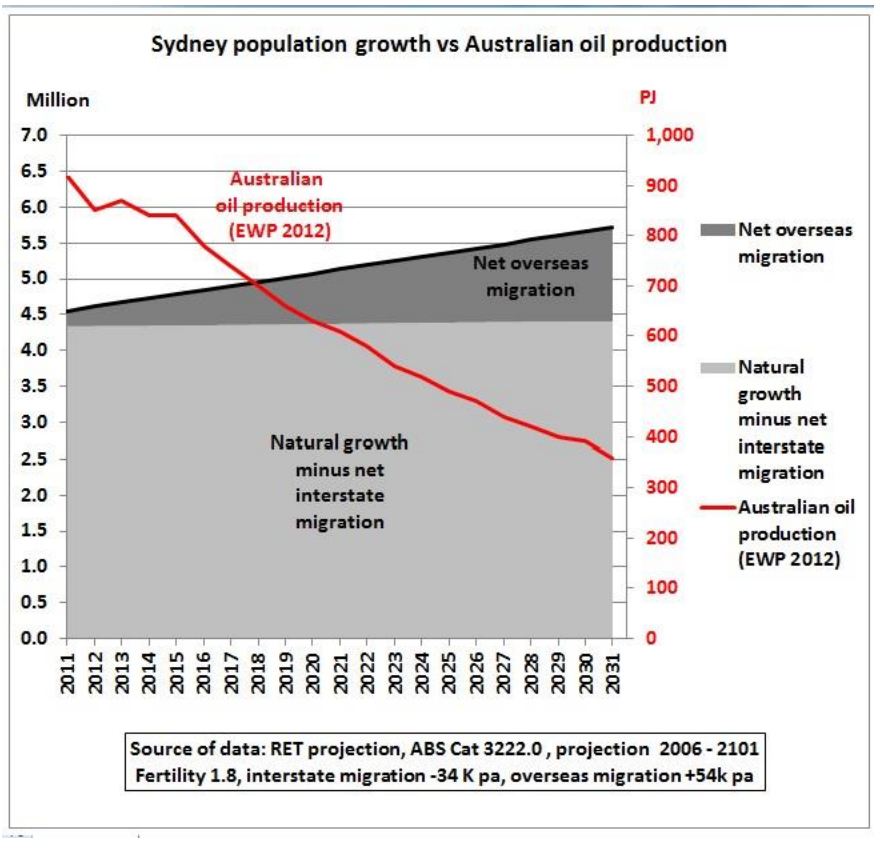
The above NRMA graph shows OGRA 2009 projections updated in 2011
http://www.ga.gov.au/products-services/publications/oil-gas-resources-australia/2009.html

The 2012 Energy White Paper included a political projection in this graph with declining oil production:



Note: Excludes stock changes. Excludes production from Icthys and Prelude projects.
Source: BREE, internal, 2012.

Let's superimpose this with assumed population growth from the ABS Series B scenario used in the Metropolitan Strategy:

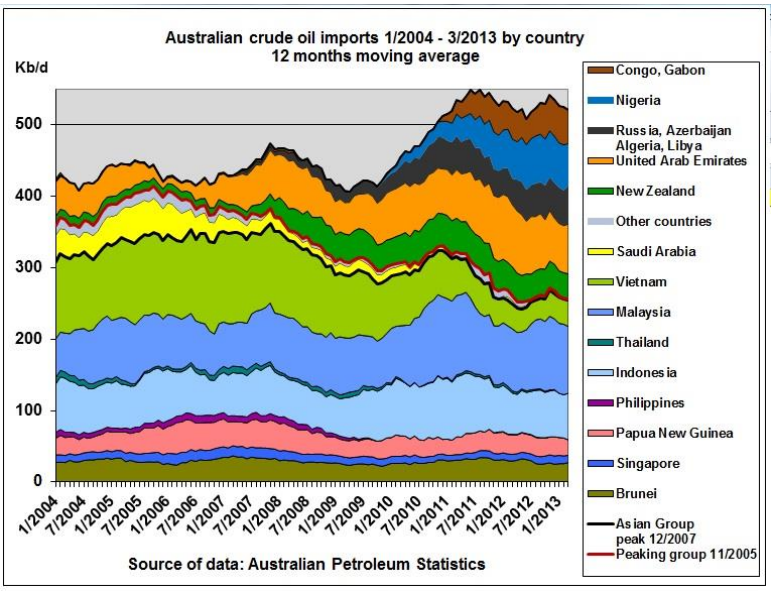


<< An unbridgeable gap widens between Australian oil production and demographic development, even in the case of zero overseas migration.

This should be crystal clear:

The higher the population, the longer the petrol lines at the filling stations

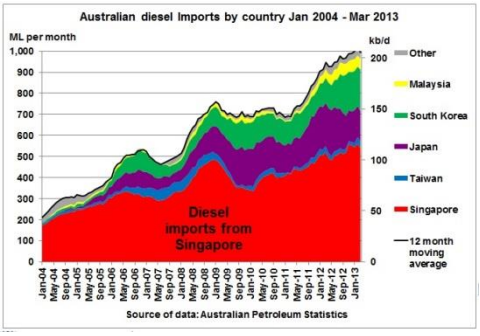
(7) Australian oil and fuel dependency on the Middle East is 37%

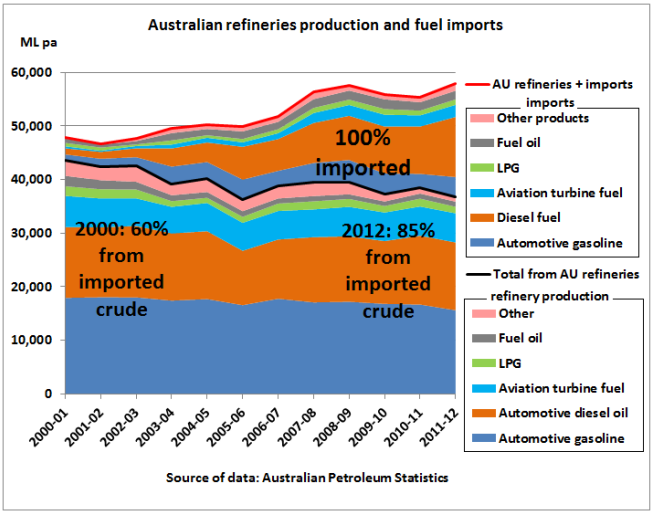


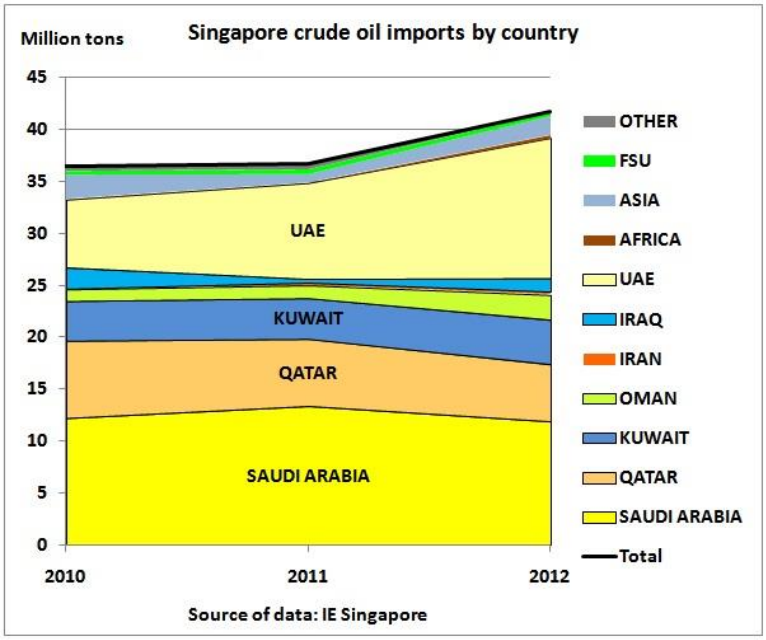
<< Australian crude oil imports

Imports from South East Asian neighbours (black line) peaked in 2007. Since then, Australian refineries did a good job to import crude from far-away places including Russia and were able to actually increase imports which was necessary due to declining quantities of indigenous oil suitable for Australian refineries. The Middle East dependency of imported crude is only around 14%.

Composition of fuels from AU refineries and directly imported products. >> (down) Growing diesel imports from Singapore, South Korea and Japan.



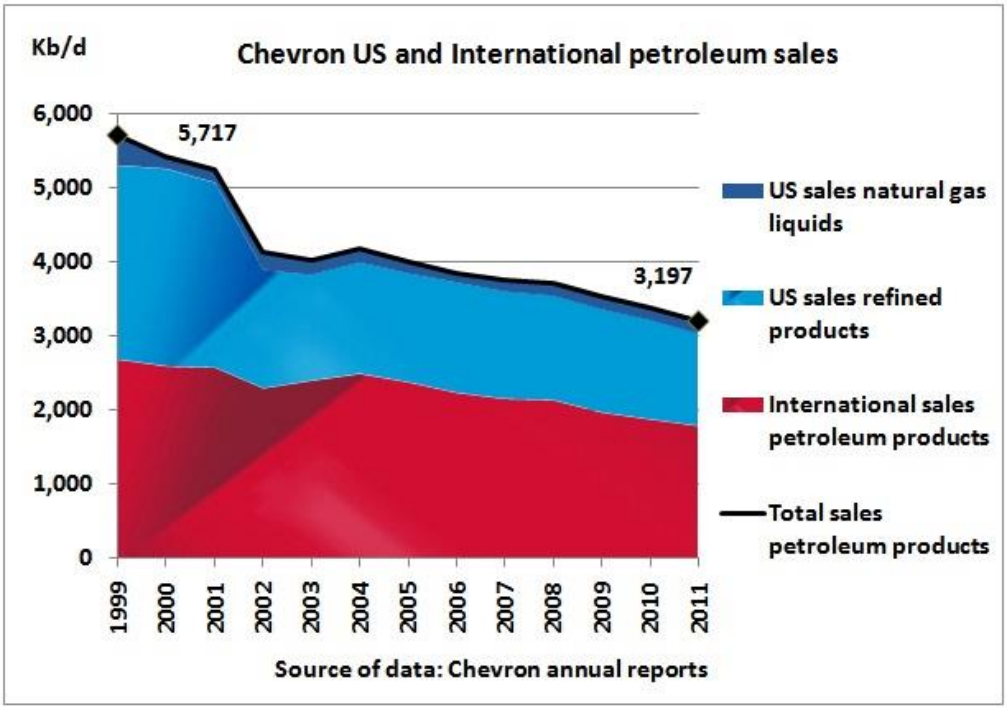




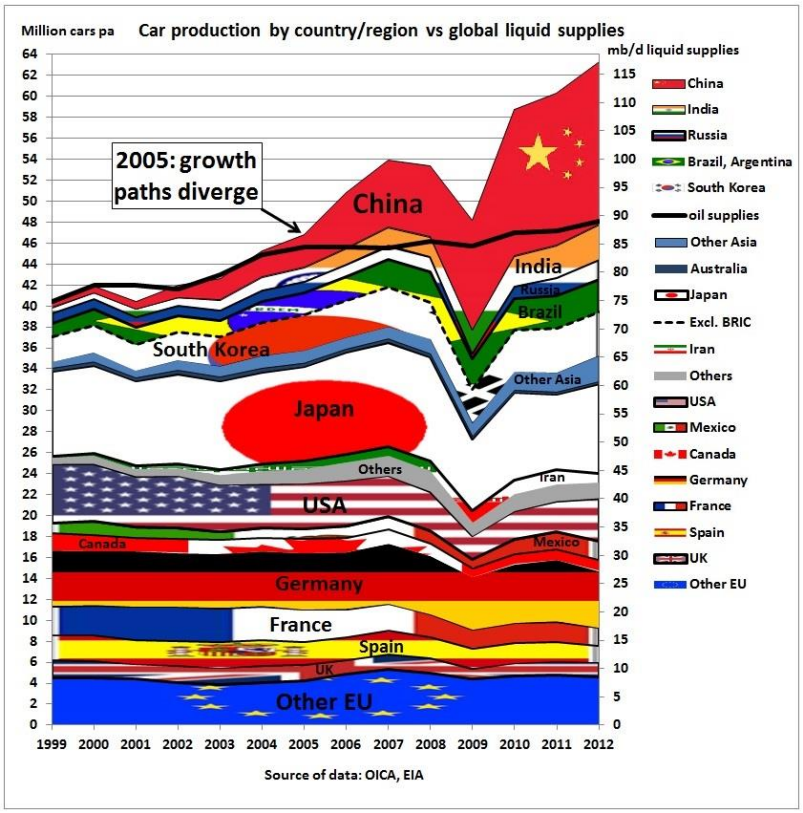
<< Singapore is 94 % dependent on Middle East oil. Japan and South Korea are around 80% dependent on the ME.

24/6/2013
Australian oil and fuel dependency on the Middle East is 37%
http://crudeoilpeak.info/australian-oil-and-fuel-dependency-on-the-middle-east-is-37

(8) Closing of Australian refineries



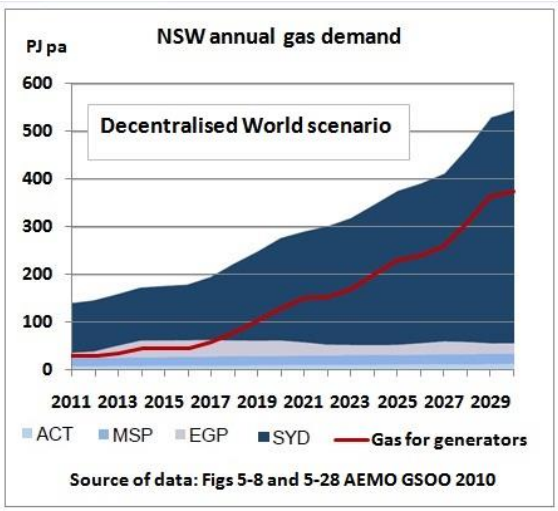
27/7/2012 After Sydney's refinery closure: Caltex to import fuel from Chevron's shrinking sales
http://crudeoilpeak.info/after-sydney-refinery-closure-caltex-to-import-fuel-from-chevrons-shrinking-sales



How will Australian motorists and truckies compete for petrol and diesel from Asian refineries?

27 May 2013 World car production grows 3 times faster than global oil supplies
http://crudeoilpeak.info/world-car-production-grows-3-times-faster-than-global-oil-supplies

(9) NSW gas supplies and use

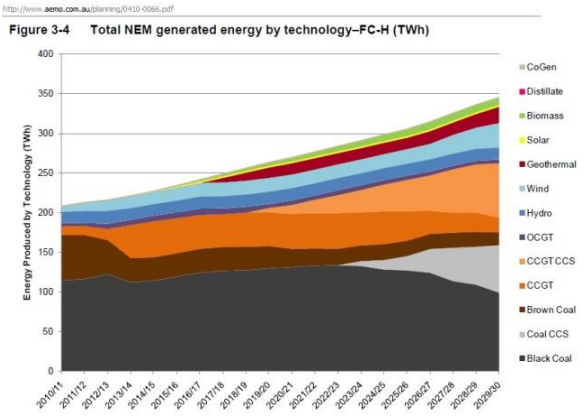


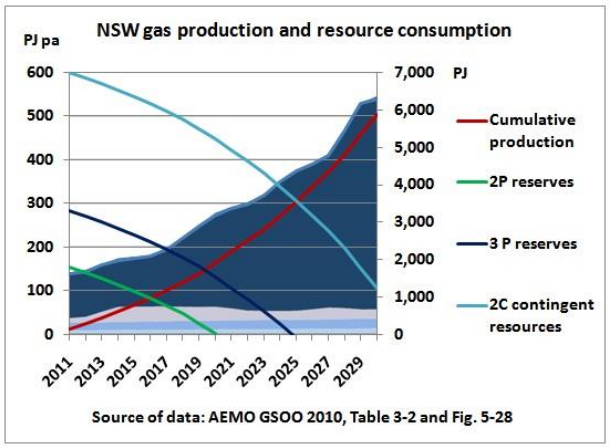
Brown coal is phased out in Victoria but black coal is continued (later CCS – carbon capture and storage – is assumed). Clearly, the NSW government has not understood the phasing out of coal.

While some of the gas powered capacity is needed to even out fluctuations in renewable energies, this has not been quantified in the NSW submission.

Most of the CSG gas is proposed to be used for power generation and in Sydney. From Fig 5-8 and Fig 5-28

The growth in the non-generating sector is around 2.2 % pa. No gas has been included for use as transport fuel. What's worse, this gas is mainly used for growth of capacities, not for replacing coal fired power. The NSW submission quotes the "National Transmission Network Development Plan 2010" by AEMO, which contains following graph:

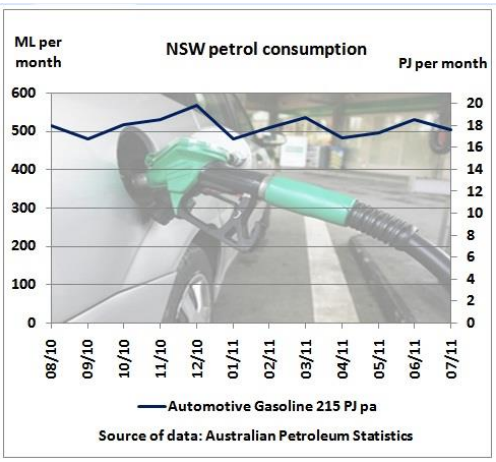




How fast are current gas reserves depleted? Based on the reserve and resource data in AEMO's table 3-2 we can compare cumulative production with declining 2P and 3P reserves (RHS) which would be depleted by 2025. 2C contingent resources would have to be proved up to continue until 2030.

And nothing has been set aside for gas being used as transport fuel

So how much gas would we need to replace all diesel and petrol by compressed natural gas (CNG) or liquefied natural gas (LNG)?



160 PJ pa for diesel and 215 PJ pa for petrol, in total the equivalent of 1.7 LNG export trains @ 4 mt pa. The problem is of course that Queensland is building these export facilities right now in Gladstone, instead of using and distributing this gas along the East coast as transport fuel. In other words, NSW now damages its landscape because Queensland is exporting its CSG to foreign countries and not to other States along the East coast. More details are here:

9/5/2012 Queensland plans to export more than 10 times the gas NSW needs (part 3)
http://crudeoilpeak.info/queensland-plans-to-export-more-than-10-times-the-gas-nsw-needs-part-3

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

(10) Tollway debt

www.transurban.com/1134584.pdf

transurban

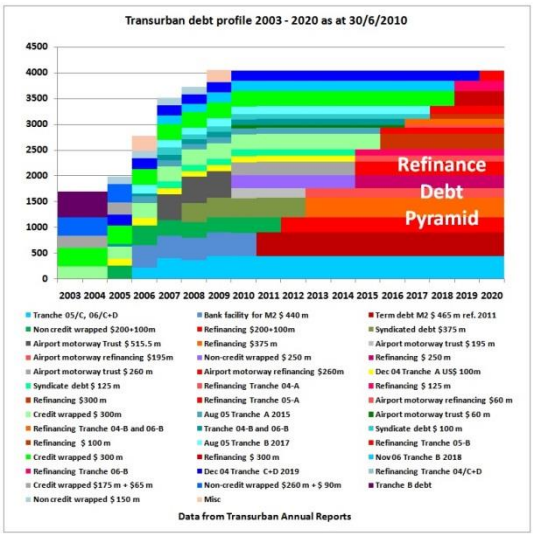
GROUP DRAWN DEBT AT 30 JUNE 2012

TRANSURBAN CORPORATE DEBT	AUD ($M)	USD ($M)
Working capital lines[1]	-	61
Term bank debt	600	-
US Private Placements	1,336	162
Domestic AUD bonds	1,050	-
Canadian MTN (CAD Notes)	233	-
Total	3,219	223

Non recourse (AUD $ million)	Asset Debt	Ownership	Proportional
Lane Cove Tunnel	260	100.0%	260
M1 – Eastern Distributor	520	75.1%	391
Hills M2 – Hills Motorway[2]	645	100.0%	645
M5 Interlinks Roads[3]	531	50.0%	265
M7 Westlink	1,255	50.0%	628
Total	3,211		2,189
Non recourse (USD $ million)	**Asset Debt**	**Ownership**	**Proportional**
Pocahontas – Senior	306	75.0%	229
Pocahontas – TIFIA[4]	179	75.0%	134
495 Express Lanes – Senior	589	67.5%	398
495 Express Lanes – TIFIA[5]	576	67.5%	389
Total	1,650		1,150

1. $450m facilities, $380m available undrawn assuming drawn USD is converted at the spot exchange rate ($1.0191 at 30 June 2012). Separate Letters of Credit are issued to the value of $42m in relation to Capital Beltway and CityLink.
2. $95m available in undrawn capital facility.
3. $204m available in undrawn facility.
4. Undrawn but restricted TIFIA facility of US$4m. Debt balance includes US$33m of accreted interest.
5. Undrawn TIFIA facility of US$53m. Debt balance includes US$40m of accreted interest.

43



14/8/2012 Transurban does not pay back its debt
http://crudeoilpeak.info/transurban-does-not-pay-back-its-debt

12/2/2013 No debt repayment plan for Sydney's toll-ways
http://crudeoilpeak.info/no-debt-repayment-plan-for-sydney%e2%80%99s-toll-ways

15/11/2010
Transurban's M7 traffic 38% less than expected
http://crudeoilpeak.info/transurban%e2%80%99s-m7-traffic-38-less-than-expected

Let's have a look at the definition of borrowers:

"Minsky argued that a key mechanism that pushes an economy towards a crisis is the accumulation of debt by the non-government sector. He identified three types of borrowers that contribute to the accumulation of insolvent debt: hedge borrowers, speculative borrowers, and Ponzi borrowers.

The "hedge borrower" can make debt payments (covering interest and principal) from current cash flows from investments. For the "speculative borrower", the cash flow from investments can service the debt, i.e., cover the interest due, but the borrower must regularly roll over, or re-borrow, the principal. The "Ponzi borrower" borrows based on the belief that the appreciation of the value of the asset will be sufficient to refinance the debt but could not make sufficient payments on interest or

principal with the cash flow from investments; only the appreciating asset value can keep the Ponzi borrower afloat. "
http://en.wikipedia.org/wiki/Hyman_Minsky

So where are toll-way operators like Transurban in this classification? Not among the hedge borrowers because capital is not paid back. It would be "speculative borrower" because debt is being rolled over. However, there were already problems with the M2:

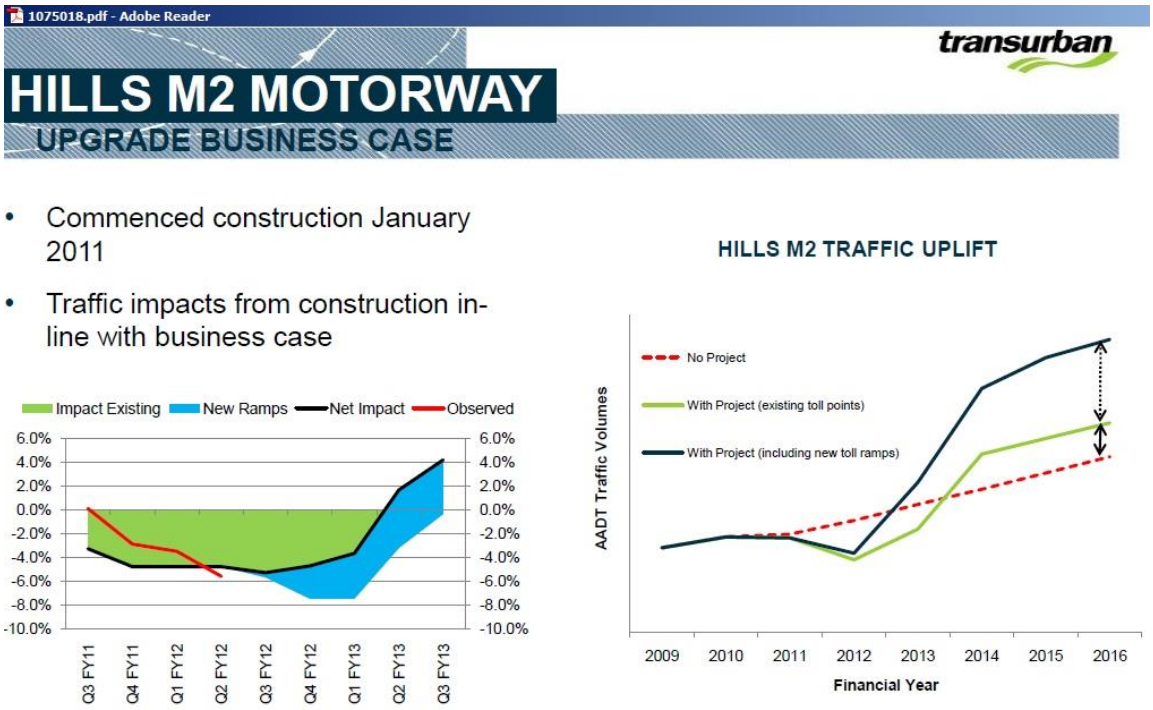
11/2/2011 Money in Transurban's cash box not enough to complete M2 widening
http://crudeoilpeak.info/money-in-transurban%e2%80%99s-cashbox-not-enough-to-complete-m2-widening

19/4/2013 $50 m blow out for Transurban M2 upgrade
http://www.smh.com.au/business/50m-blowout--for-transurban-m2-upgrade-20130419-2i4uh.html

So the question is: how much money for the M5 was taken to finance the completion of the M2?

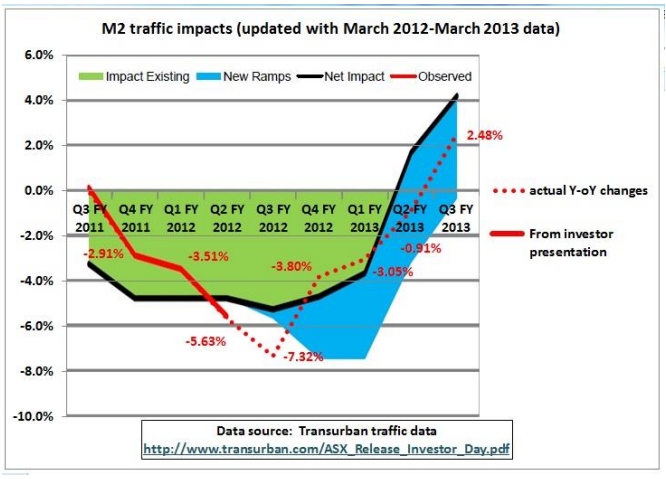
In any case, as soon as traffic softens and is not in line with projections, valuations will go down and roll-over of debt will be in doubt. That would mean a re-classification into at least a partial Ponzi scheme.

Let's have a look at M2 traffic estimates and actual data. In February 2012 Transurban predicted traffic to decline due to construction and then to increase.



http://www.transurban.com/1075018.pdf

Updating the left side of the above Transurban graph with actual traffic data shows that traffic is well within the estimated range (dotted line. But how about the traffic increase after opening the 3rd lane?

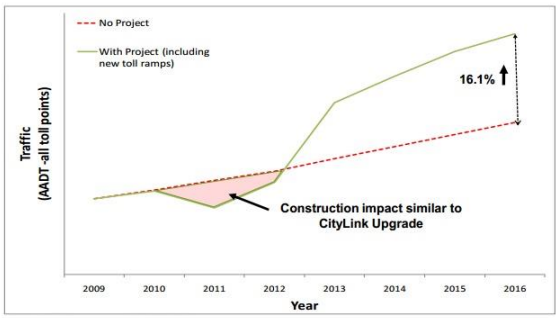


In this March 2011 presentation, this was supposed to be 16% on top of some unspecified underlying growth trend by 2016:

http://www.transurban.com/20110328_Investor_Presentation.pdf

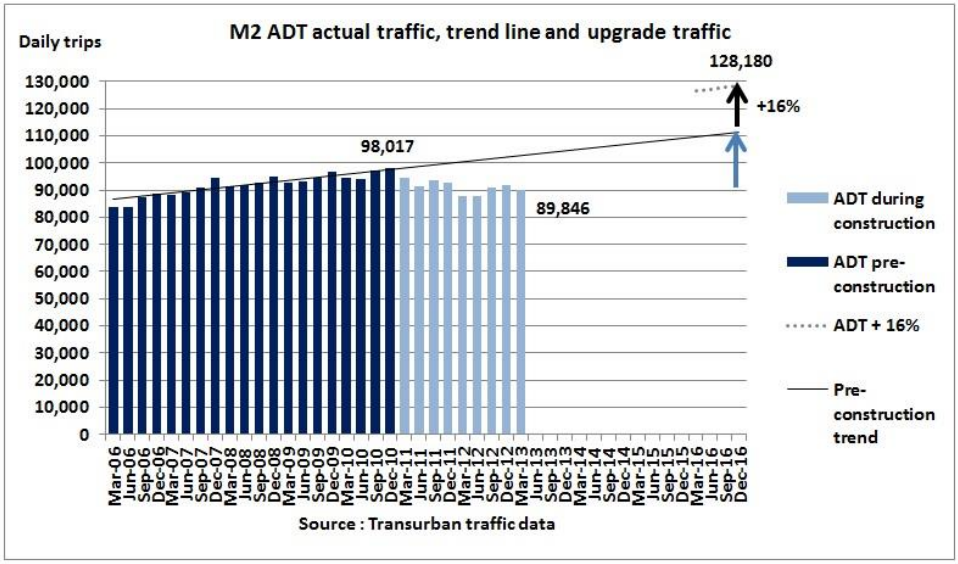
www.transurban.com/20110328_Investor_Presentation.pdf

- M2 Upgrade – commenced construction January 2011
- Disruption to revenue during construction allowed for in business case and partially offset by additional revenue from early opening of new ramps
- Contractor incentives to minimise disruption



- Traffic uplift (AADT) of 16.1% by 2016

Note the word "indicative" in an investor presentation where investors want to know exactly how much money they are going to earn. Let's put that into a graph with actual traffic data:



The dark blue columns represent the ADT before construction started, the light blue columns traffic during construction. The pre-construction trend-line would have brought traffic to around 100,000 in March 2013 when actual traffic was around 90,000. So where did that traffic go? Did it disappear?

Mode shift to PT? Rat race on Carlingford Rd? Up to the end of 2016 the trend line continues to around 110,000. If Transurban's graph is right the 3rd lane would create an additional 16% which would lift traffic to around 128,000. That's 38,000 more than now.

That would fill 38 NWRL daily trains @ 1,000 pax each

Of course the question is whether the expected M2 traffic increase will actually materialise. The toll will be lifted to $6 all the while petrol prices are rising as the AUD drops. A miracle would have to happen for both the NWRL and the M2 widening being commercially successful at the same time.

F3-M2 tunnel

Transurban investor presentation on F3-M2 tunnel
http://www.transurban.com.au/20130419_Investor_Day.pdf

Transurban's investor presentation dated 19/4/2013 is not calculating what will be the paying capacity of motorists for a trip from e.g. Hornsby - Chatswood.

On Tuesday 14 May 2013, the Federal Government announced it would contribute $400 million to help deliver this project in partnership with the NSW Government in the 2013-14 Budget.
http://www.rta.nsw.gov.au/roadprojects/projects/building_sydney_motorways/m2_f3/

This means the project is not commercially viable without a subsidy.

Main_Report_Complete.pdf - Adobe Reader

	Purple	Blue	Yellow	Red
Strategic Capital Costs Estimates (in 2003 dollars)(1)				
Dual 3 lane ($million)	1,960	2,150	1,990	2,000
Dual 2 lane ($million)	1,670	1,820	1,650	1,600
Benefit Cost Ratio (BCR)(2) – No Toll(3)				
Dual 3 lane	1.1	1.0	1.0	1.0
Dual 2 lane	1.2	1.1	1.1	1.2
Benefit Cost Ratio (BCR)(4) – $3.50 Toll				
Dual 3 lane	0.8	0.8	0.7	0.5
Dual 2 lane	1.0	0.9	0.8	0.7

This table is from the 2004 SKM study. The BCRs are very low, possibly embellished. Construction costs are much higher now so BCRs will be lower still.

Productive cities use oil efficiently

My letter to the AFR on the destiny of toll-ways was published on 20/6/2013, p47

THE AUSTRALIAN FINANCIAL REVIEW

www.afr.com | Thursday 20 June 2013 $3.30 INCLUDES GST

Energy costs take a toll on roading charges

Treasurer Baird wants to fund the first stage of WestConnex from asset sales (equals taxpayer money) and then wait for traffic counts so that a publicly owned toll road company can issue bonds against toll revenue. Which toll revenue?

Estimates after stage one would be as risky because no one knows what the traffic would be in stage two, not to mention stage three.

Granted, the risk is spread over many years but there is a rub. As we are burning our finite oil reserves, the remaining oil is less productive to produce. A recent energy outlook of the US Department of Energy estimated that US shale oil until 2040 – the timelines for a tollway – is the equivalent of just 10 months of global oil demand but require more than 200,000 wells. Syncrude from tar sands, oil from deep or even ultra-deep water and oil from maturing giant fields with horizontal wells and enhanced oil recovery, all cost a lot in input energy and money.

High oil prices reflect this situation. For an economy just to stay even, productivity in the use of oil would have to compensate for the loss in productivity to produce this oil.

Tollways dependent on a slow transition from gas-guzzlers to fuel-efficient cars cannot neutralise the impact of a three to four-fold increase in oil prices. Only car-pooling can do that. But that would kill all tollway operators unless tolls are charged per passenger. Good luck.

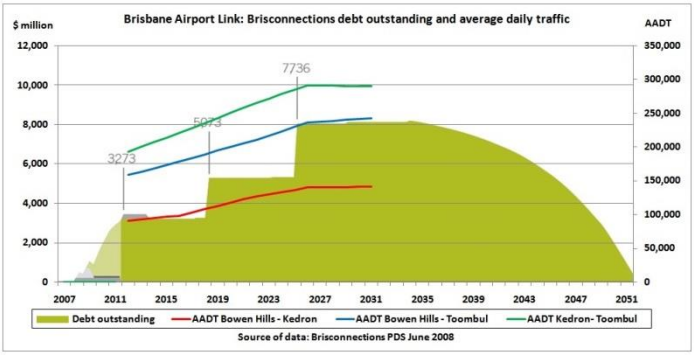
Traffic projections of four road tunnels were embellished because planners did not do the above productivity calculations.

Instead, their models calculated that higher oil prices would be absorbed by a growing, general inflation and purchasing power index.

This has turned out to be an untested assumption. So there is no future for tollways.

Matt Mushalik
Epping, NSW

Track record of failed road tunnels



<< growing debt

20/2/2013 Brisbane Airport Link: At the end of the road tunnel, investor money flies away (part 2)
http://crudeoilpeak.info/brisbane-airport-link-at-the-end-of-the-road-tunnel-investor-money-flies-away-part-2

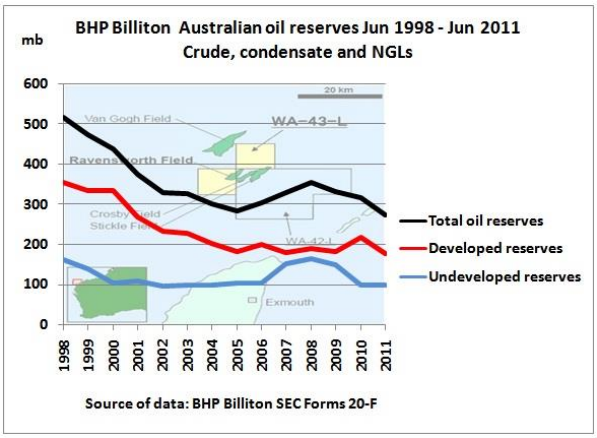
28/2/2011 Brisbane's Clem7 tunnel in receivership
http://crudeoilpeak.info/brisbanes-clem7-road-tunnel-in-receivership

27/1/2010 Peak oil brought forward moment of truth for Lane Cove Tunnel
http://crudeoilpeak.info/peak-oil-brought-forward-moment-of-truth-for-lane-cove-tunnel

8/1/2006 How Cross City Tunnel Planners ignored peak oil
http://www.crudeoilpeak.com/?p=219

Many billions of dollars could have been saved if my advice had been taken seriously.

(11) End of mining boom



<< BHP's declining oil reserves

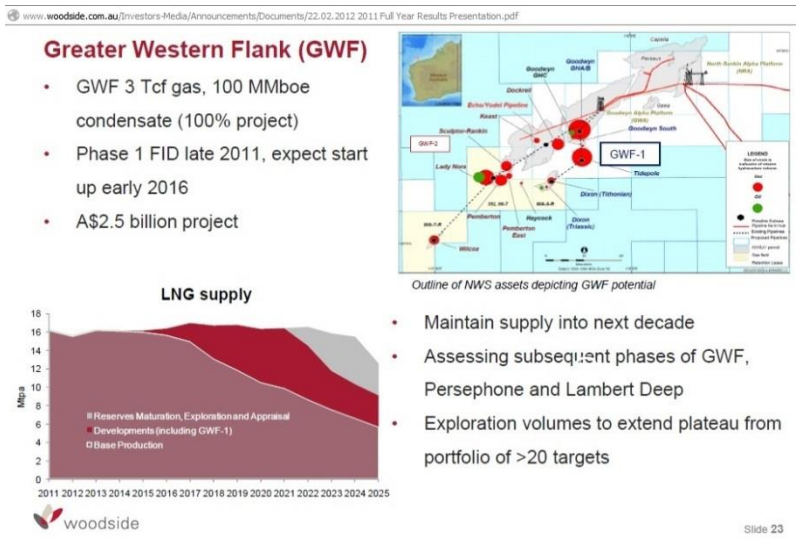
Diesel consumption for Olympic Dam mine would have gone up 16-fold.

odxEisChapter5DescriptionOfTheProposedExpansion51To57.pdf (SECURED) - Adobe Reader

Table 5.2 Indicative major infrastructure demands

Expansion requirement	Current operation	Proposed expansion	Combined operations
Water demand (average GL per annum/ML per day)	13/37[1]	70/183[1]	83/220[1]
Electricity consumption (MWh per annum)	870,000	4,400,000	5,270,000
Diesel usage (ML per annum)	26	403	429
Peak construction/shutdown workforce	1,400	6,000	1,400
Ongoing operational workforce	4,150	4,000	8,000
Sulphur usage (tpa)	80,000	1,720,000	1,800,000

[1] Excludes additional water demand from off-site infrastructure.



<<< North West Shelf gas approaching depletion in next decade.

Browse contingent gas resources dropped by 40% since 2007! So we have not only a cost problem but a depletion problem and optimistic resource projections.

The easy gas is going while actually we need it as transport fuel.
The equivalent of 5.5 LNG trains would be needed to REPLACE Australia's oil based fuel use.

9/5/2012 Queensland plans to export more than 10 times the gas NSW needs (part 3)
http://crudeoilpeak.info/queensland-plans-to-export-more-than-10-times-the-gas-nsw-needs-part-3

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

(12) Global warming

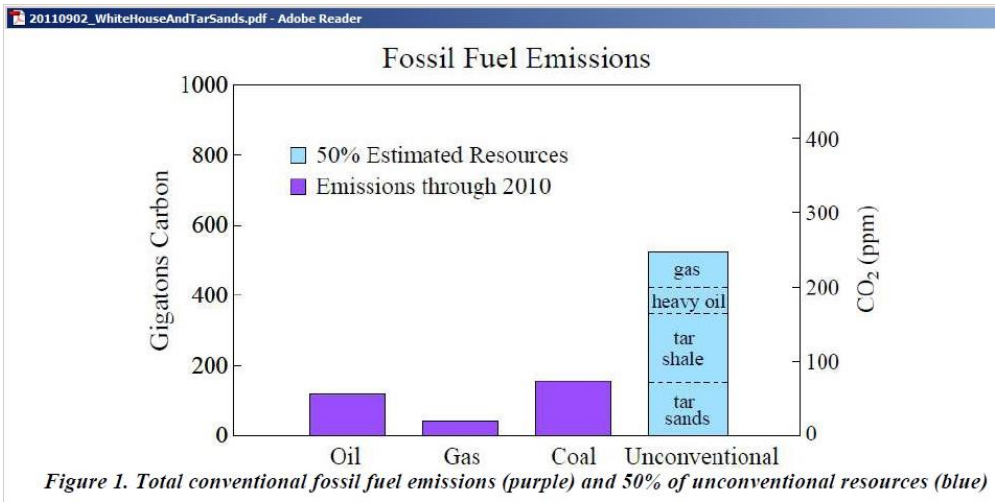
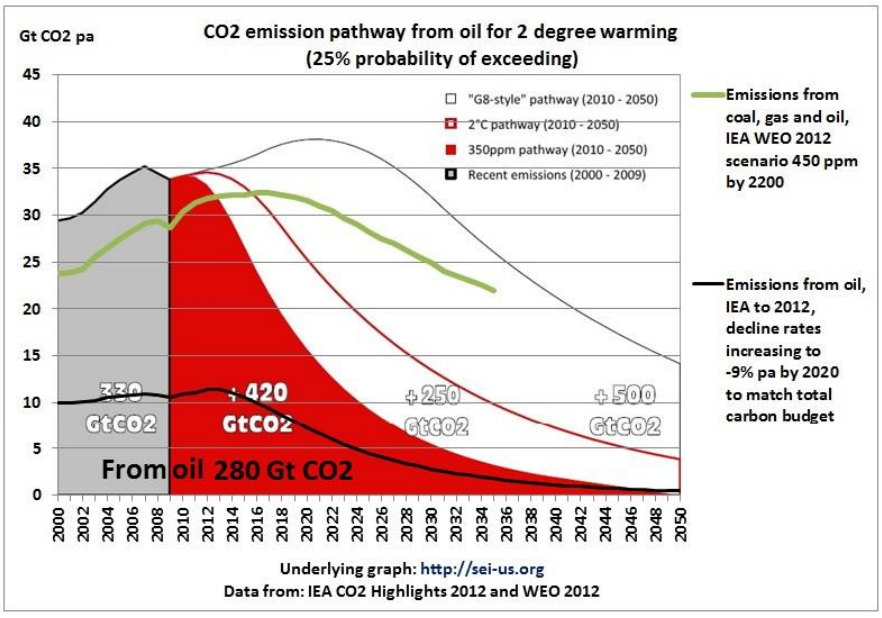


Figure 1. Total conventional fossil fuel emissions (purple) and 50% of unconventional resources (blue)

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

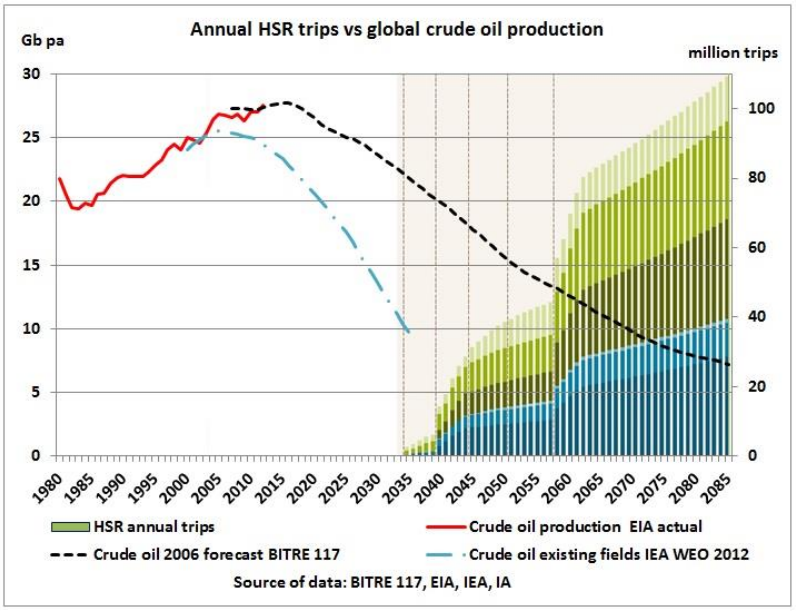
Amount of fossil fuels which can be burnt is limited.

8/3/2010 **NASA climatologist James Hansen at Sydney Uni: "Australia doesn't agree now that they got to stop their coal, but they are going to agree. I can guarantee you that within a decade or so because the climate change will become so strongly apparent that's going to become imperative"**
http://www.usyd.edu.au/sydney_ideas/lectures/2010/professor_james_hansen.shtml



16/5/2013 Half of oil burnable in 2000-2050 to keep us within 2 degrees warming has been used up as we hit 400 ppm
http://crudeoilpeak.info/half-of-oil-burnable-in-2000-2050-to-keep-us-within-2-degrees-warming-has-been-used-up-as-we-hit-400-ppm

(13) High Speed Rail



First high speed trains are proposed to run between Sydney - Canberra - Melbourne ($ 50 bn) between 2035 and 2040 and Sydney – Newcastle - Gold Coast - Brisbane ($ 64 bn) between 2040 and 2060 with 110 million passengers pa. By that time, global oil production will be in decline, resulting in a permanent recession, if not worse

The function of electric rail will NOT be to capture a growing travel market but to REPLACE unreliable, petroleum based air and car traffic.

The currently used diesel XPTs are now 30 years in service and need replacement. In year #9 of peak oil, should they be replaced again by diesel sets? It is unlikely that there will be easy diesel supplies for another 30 years. Can we introduce LNG locos? Can electrification be done in time to buy electric train sets to replace the XPTs? With every month of indecision and endless debates time is lost for realistic solutions. All the while Sydney wants to waste superannuation and tax money for more urban road tunnels.

<< Melbourne-bound passengers dumped at Goulburn station when XPT broke down

5/12/2011
Australian intercity rail run-down and unprepared to replace domestic flights after peak oil
http://crudeoilpeak.info/australian-intercity-rail-run-down-and-unprepared-to-replace-domestic-flights-after-peak-oil

MPs should go by train to Canberra to get some experience! Branch line feeling.

5/2/2012 Australian peak oil report ignored for urgent Sydney Canberra rail upgrade (Peaky Leaks Part 2)
http://crudeoilpeak.info/australian-peak-oil-report-ignored-for-urgent-sydney-canberra-rail-upgrade-peaky-leaks-part2

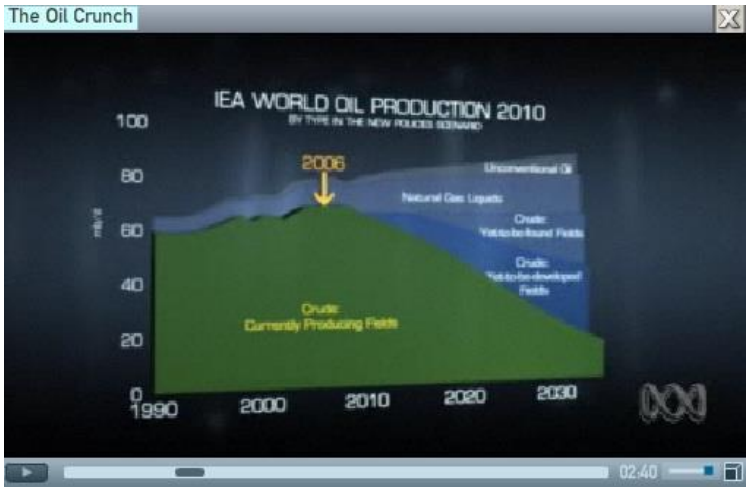
14 The future

Peak oil will turn into a physical problem before 2020 as US shale oil is likely to peak before that year. This is the best case scenario. OPEC is reporting total reserves (not remaining reserves) so cumulative production has to be deducted from these reserves. This problem will also come to light in this decade. Developments in Egypt and Iran are critical and could move the moment of the truth forward. The scenarios are changing rapidly and include now sectarian violence spreading through the **Middle East**, ultimately impacting on oil supplies. If there is another oil war in the Persian Gulf, the problem will come within 3 tanker weeks.

When John Howard won the election in October 2004, I wrote a letter to him warning that peak oil may happen in his next term. I received a reply from him with a letter attached from Ian MacFarlane who conveniently picked a scenario from the EIA, decades down the track.
http://www.eia.gov/pub/oil_gas/petroleum/feature_articles/2004/worldoilsupply/oilsupply04.html

I continued having an exchange of letters with Howard on peak oil for the next 3 years.

Conventional oil peaked indeed in 2006, as made public in the ABC TV Catalyst's Oil Crunch story broadcast in April 2011 including an interview with the IEA Chief Economist Fatih Birol.



http://www.abc.net.au/catalyst/oilcrunch/
This peaking of cheap, conventional oil has caused oil prices to go up 3-4 fold.

According to the Hirsch report, commissioned by the US government,
http://www.netl.doe.gov/publications/others/pdf/oil_peaking_netl.pdf
it takes 10-20 years to prepare for peak oil which means this should have started 1996 at the latest, the year Howard come to power. It was also the year in which Irish geologist Colin Campbell warned about peak oil. http://www.hubbertpeak.com/campbell/

The latest year Howard should have known about peak oil was in 1999 when Colin did a presentation to a committee of the House of Commons, something ASIO should have picked up.

The Rudd/Gillard government was not better by 1 barrel. In a 2010 meeting, Resource Minister Martin Ferguson told me "we can always buy oil".
http://www.dpmc.gov.au/community_cabinet/meetings/epping.cfm

In the meantime, not only are we not preparing for peak oil, we are actually doing the opposite, namely building more oil dependent infrastructure like road tunnels, highways and airports

The **debt crisis** will continue because of high oil prices which our economy cannot actually afford.

Global warming is worse than peak oil. CO2 is a physical debt which is extremely difficult to remove. Extreme weather events in this decade will become so bad and damaging to the economy that governments will be forced to reduce CO2. This will involve load shedding because existing coal fired power plants are not being REPLACED by renewable energies

> TONY JONES: …. why worry about carbon dioxide when water vapour is a stronger greenhouse gas and actually occurs naturally?
>
> JAMES HANSEN: Yeah, that's the screwiest argument which keeps being made again and again and again. The amount of water vapour in the atmosphere is determined by the atmosphere's temperature, everyone should know that. Look at the difference between winter and summer.
>
> As you go to a warmer climate the atmosphere holds more water vapour because at the places where the humidity reaches 100 per cent the water vapour falls out as water or snow. And therefore, as the planet becomes warmer, the atmosphere holds more water vapour.
>
> That's why we get heavier rain falls as the planet gets warmer. So this water vapour is an amplifying feedback. It makes the greenhouse effect much stronger. But it's not something that just changes on its own accord; it changes in response to the temperature changes.
> http://www.abc.net.au/lateline/content/2008/s2764523.htm

Increasing Climate Extremes and the New Climate Dice

10 August 2012 James Hansen, Makiko Sato, and Reto Ruedy

We show that the 2012 summer heat wave in the United States (June-July data) exceeds any that occurred in the 1930s. We reconfirm our conclusion that the increasing extremity of heat waves and the area covered by extreme events is caused by global warming. The location and timing of weather extremes depends on many factors and to a large degree is a matter of chance. Changing climate can be described, usefully and realistically, by the combination of "climate dice" and a shifting, broadening "bell curve", an approach that we believe can be appreciated by the general public.
http://www.columbia.edu/~jeh1/mailings/2012/20120811_DiceDataDiscussion.pdf

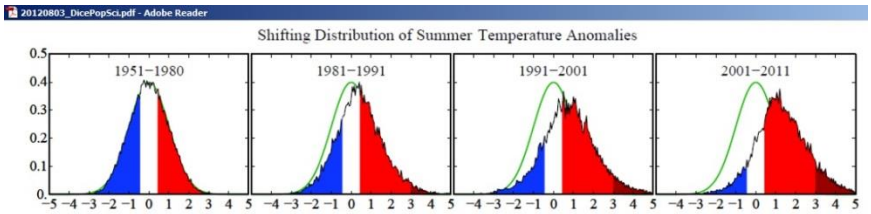


Figure 3. Frequency of occurrence (vertical axis) of local June-July-August temperature anomalies (relative to 1951-1980 mean) for Northern Hemisphere land in units of local standard deviation (horizontal axis). Temperature anomalies in the period 1951-1980 match closely the normal distribution ("bell curve", shown in green), which is used to define cold (blue), typical (white) and hot (red) seasons, each with probability 33.3%. The distribution of anomalies has shifted to the right as a consequence of the global warming of the past three decades such that cool summers now cover only half of one side of a six-sided die, white covers one side, red covers four sides, and an extremely hot (red-brown) anomaly covers half of one side..

(15) Recommendations

General objective: Away from oil and fossil fuels in general. Reduce mortgage debt.

(1) Reduce immigration because housing debt will continue to skyrocket and related infrastructure will be unaffordable in tight budgets. Dick Smith proposed an immigration intake of 70 k pa

(2) Decentralise to cities OUTSIDE the commuting distance of Capital cities

(3) NSW Energy Department to do serious peak oil research and regular monitoring of global, regional and domestic oil supplies and **exports**

(4) Reserve natural gas as transport fuel

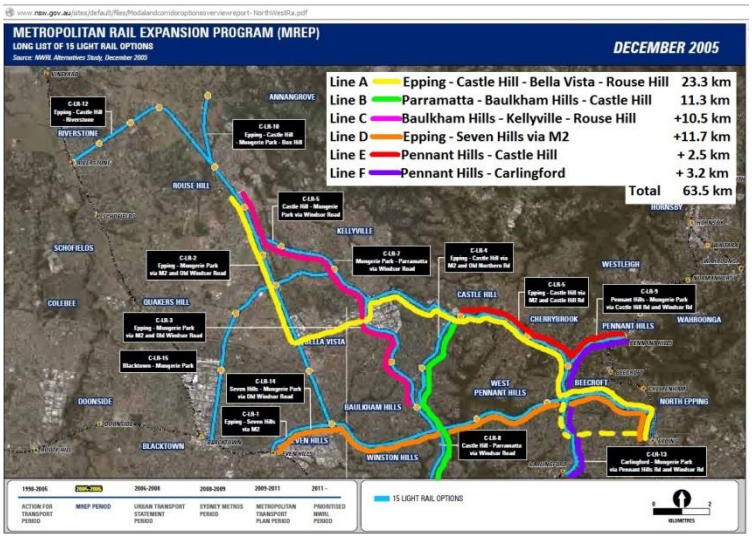
(5) Replace coal fired power plants with renewable energies. If this is not done voluntarily and speedily, nature will force us to do it – which will be an extremely painful experience

(6) Do not build new road tunnels like F3-M2 and Westconnex, other motorways, highways and airport expansions

(7) Do not build any other new, energy hungry facilities like skyscrapers and high-rises (Darling Harbour) unless absolutely necessary (like electric rail)

(8) Duplicate and electrify trunk rail lines Sydney-Melbourne and Sydney-Brisbane. **Do not wait for high speed rail**. Start with Sydney-Goulbourn-Canberra. Replacement for XPT train sets is needed immediately

(9) Light rail (not just trams) in road corridors is the solution for urban areas. In Sydney, Central – UNSW is more urgent than trams in the CBD.

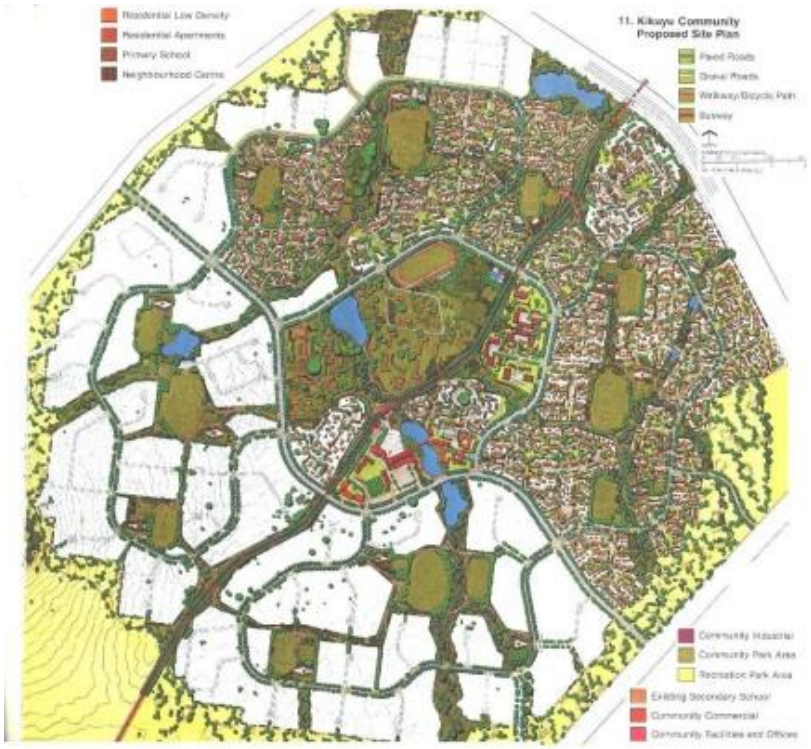


<< Light rail plan for the North West of Sydney.
The North West Rail Link costing $ 9bn will require at least $10 billion in residential high rises around proposed stations to fill trains with 6,000 passengers per hr. It is doubtful whether the NWRL will pay its way, given the mortgage debt problem. The job is to REPLACE EXISTING car traffic which is on the M2. Adopt Transperth solution (rail on motorways). My submission: http://crudeoilpeak.info/wp-content/uploads/2011/02/Submission-on-NWRL.pdf

NWRL contracts have now been signed. One wrong decision after the other.

Appendix: Hierarchy of Urban Rail System in Frankfurt	
Heavy rail	
	
Double deckers are used as city or regional express only; limited stops every 15 mins or so	Single deckers for all stopper services. Average distance between stations: 2.5 kms
Metro	
	
Stops every 800-1000 m, runs every 5 mins	Also above ground on dedicated track.
Light rail – surface metro	
	
8 car trains - high platforms - frequent stops	Simple stations can be built fast
Trams – low floor	
	
Sharing road way	On dedicated track; car lanes gone

Appendix: Decentralisation and sustainable cities



Communities 40 K population with commercial and business centre where 50% of population can work

Communities grouped around common city centre where rest of population works.

1 orbital and 2 radial bus or tram lines would be needed.

This plan could be modified to have 5 communities.

Rail line needs to go through centre of city.

Sustainable (=energy frugal) cities will not have more than 200 K population (also required for a good sized hospital and University) http://crudeoilpeak.info/sustainable-cities-master-plan