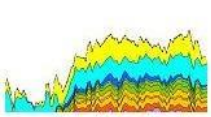


A Smart City is energy frugal

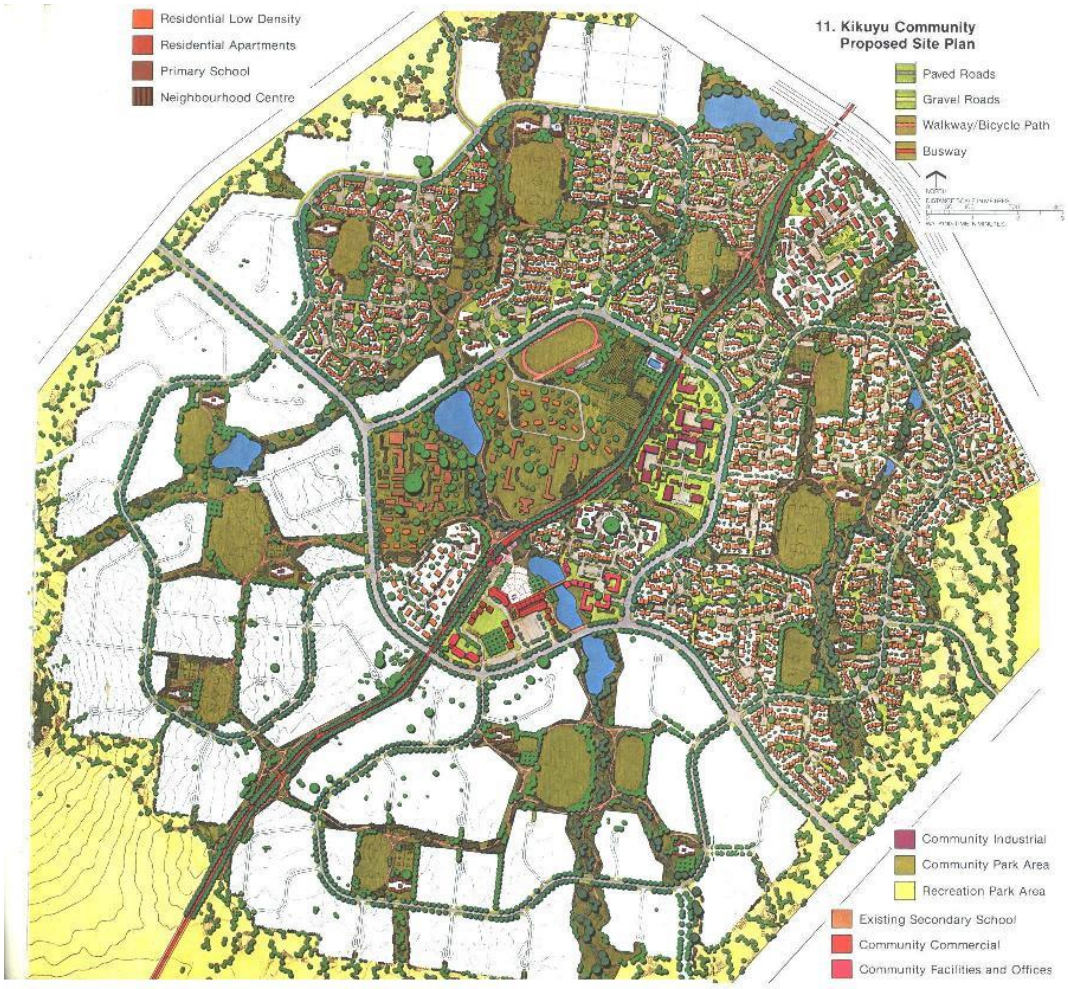
Prepared by Matt Mushalik 25/8/2016 mushalik@tpg.com.au twitter @crudeoilpeak

Contents

What is a sustainable city?

A sustainable city is foremost an energy frugal city in which energy consumption is rigorously limited. Commuting is minimised by the clever location of residential areas, business parks and light industrial areas. Power consumption in buildings is low. This means for example no highrises with the need for lifts etc.. No big shopping centres with the requirement for air conditioning. There would be no need for metros or motorways. Transport would be by trams (also cargo trams) or electric trolley buses. Such a city would have a population between 140 K = 4 communities x 35 K population each and 200 K = 5 communities x 40 K population each.

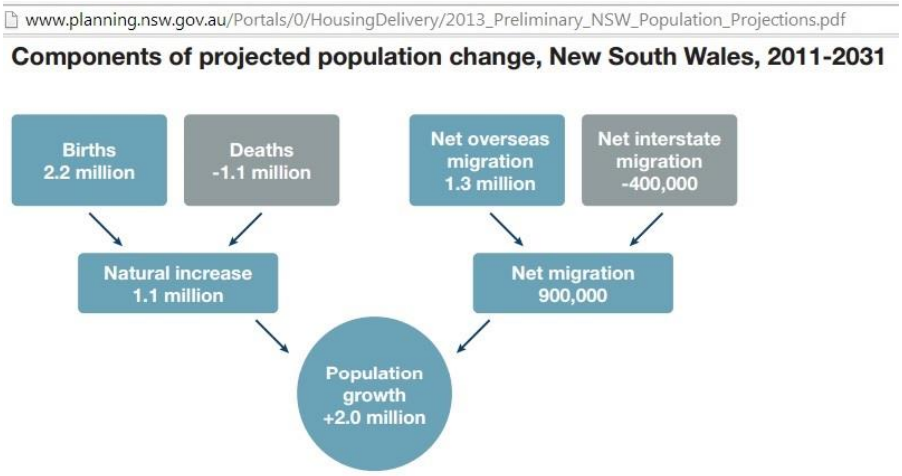
Such plans were done by Canadian townplanners for the new capital in Dodoma, Tanzania, were I worked as an advisor to the Principal Secretary of the Ministry of Capital Development in the 1970s.



Community with 35 K population on 400 ha, mostly terrace housing. No highrises. 50% of population would find work in their own community (mostly walking or biking distance),

4 communities grouped around a common city centre in which the other half of the population would find work. 1 circular and 2 radial tram or bus lines would be needed to connect to the city centre and main train station. Since the mid 80s Sydney's population growth could have been accommodated in 3 such cities, OUTSIDE the commuting distance. Instead, an unsustainable city has been made even more unsustainable.

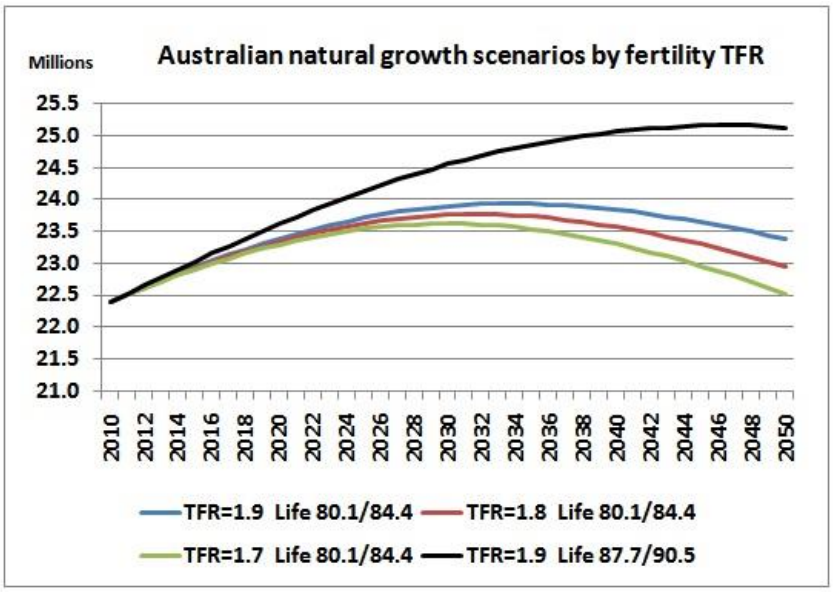
Population growth



65% (1.3 m / 2 m) of population growth comes from overseas migration. Therefore, 65% of all additional problems Sydney faces (unaffordable housing, traffic congestion on both road and rail, pollution, energy and water shortages) can be avoided simply by reducing immigration.

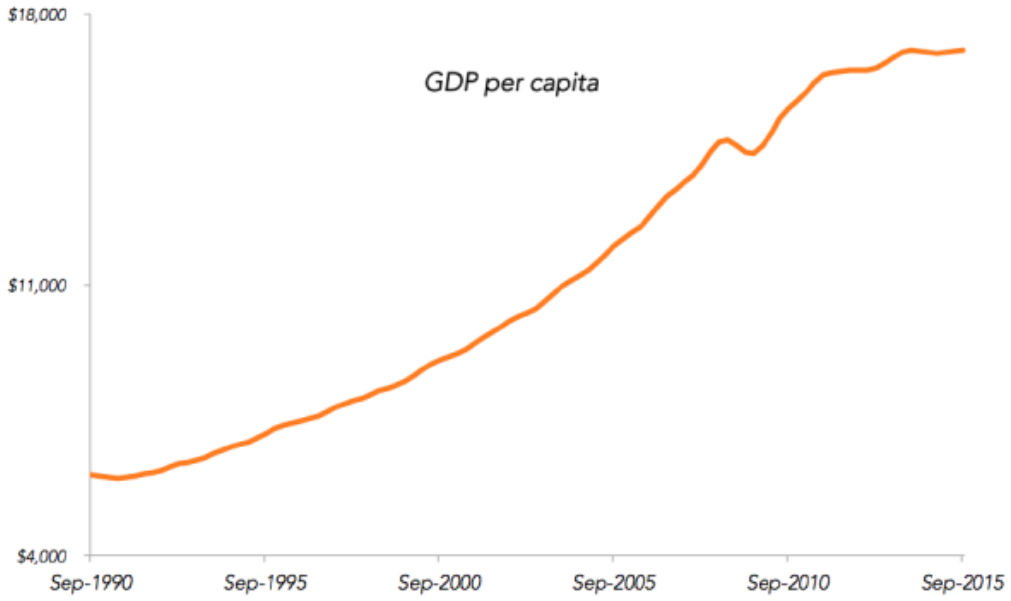
Natural population growth is mainly controlled by the fertility rate which is around 2, that is replacement level.

In 2010 I did a cohort survival analysis which shows that a population with natural growth would peak within 20 years with an accumulated total increase of 7% (depending on life expectancies and fertility rates).

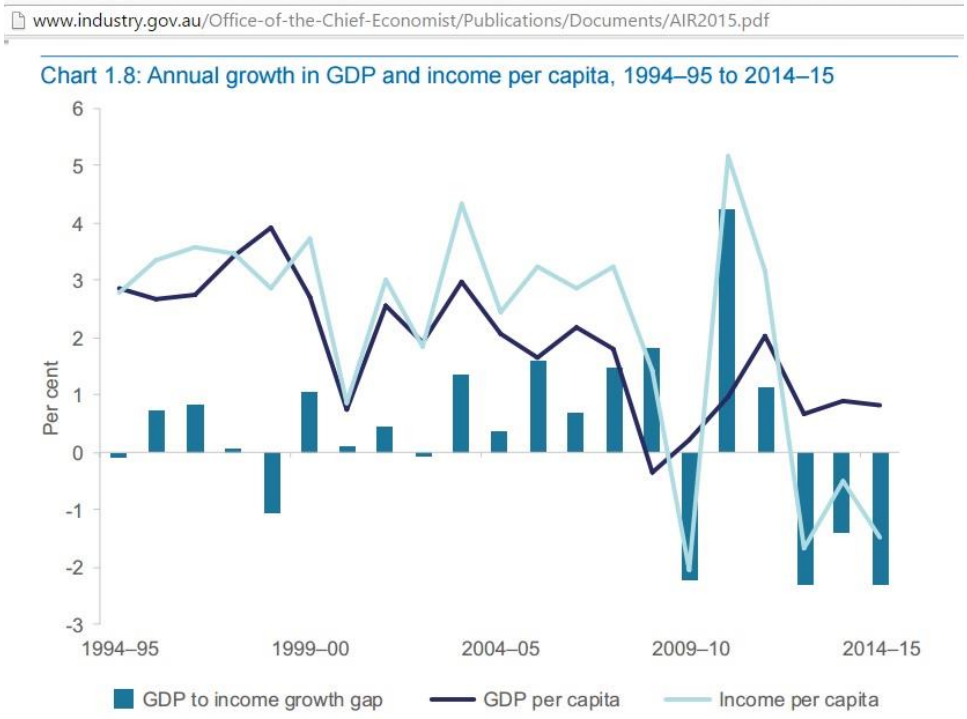


This would have to be applied to updated Sydney data. There will be no endless population growth which is thoughtlessly spruiked by governments for the electorate to be accepted as something good. I also predict that motorists will demand the Federal government to reduce

immigration as soon as fuel shortages arrive at filling stations. They will quickly understand that every new arrival is an unwanted competitor.
Governments have the naïve idea to grow the GDP by population growth at all cost.
However, GDP per capita is peaking, despite all efforts.



http://www.news.com.au/finance/economy/australian-economy/the-population-booms-hidden-secret/news-story/d2a892dcea0ab8e9967455880502f4c1



http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/AIR2015.pdf

In Chart 1.8 income growth per capita is already negative.

www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/AIR2015.pdf

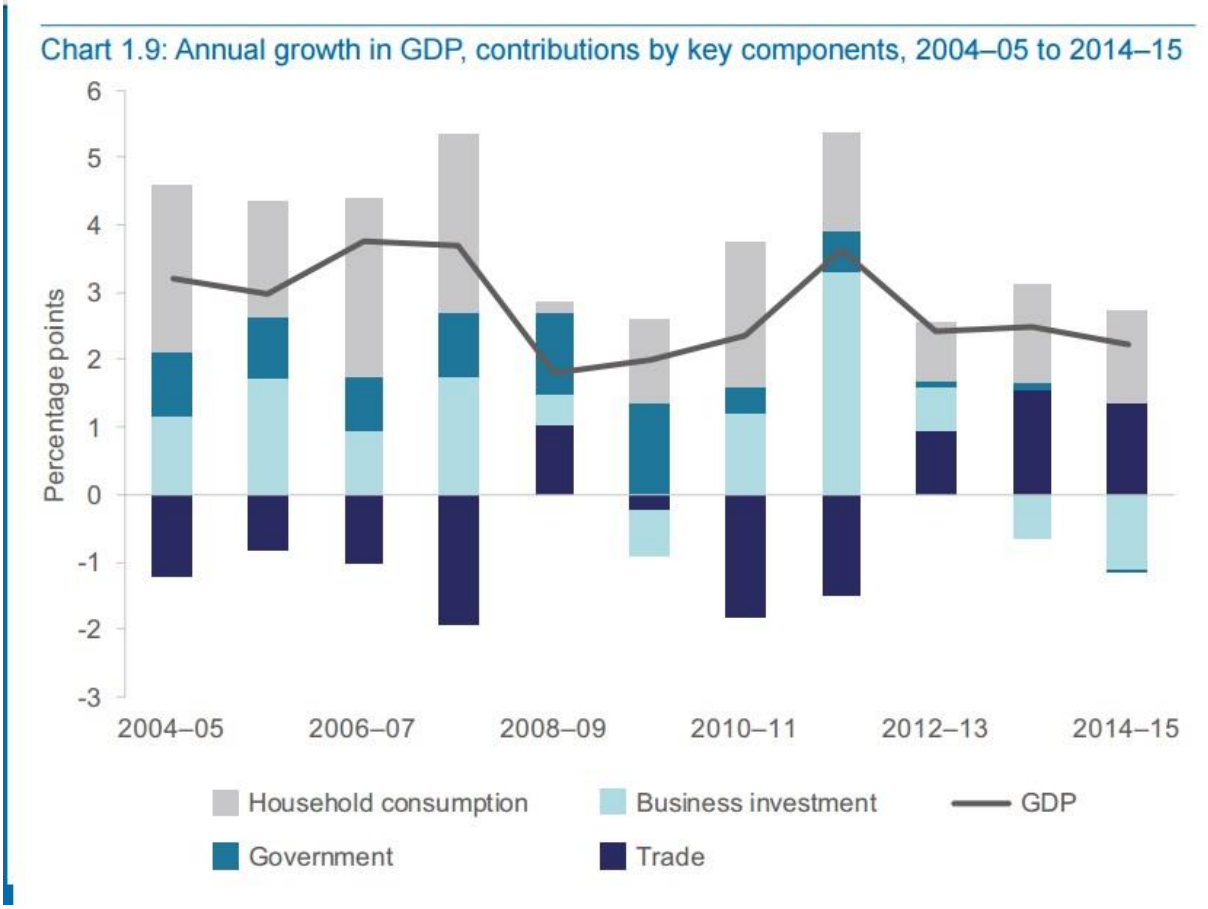
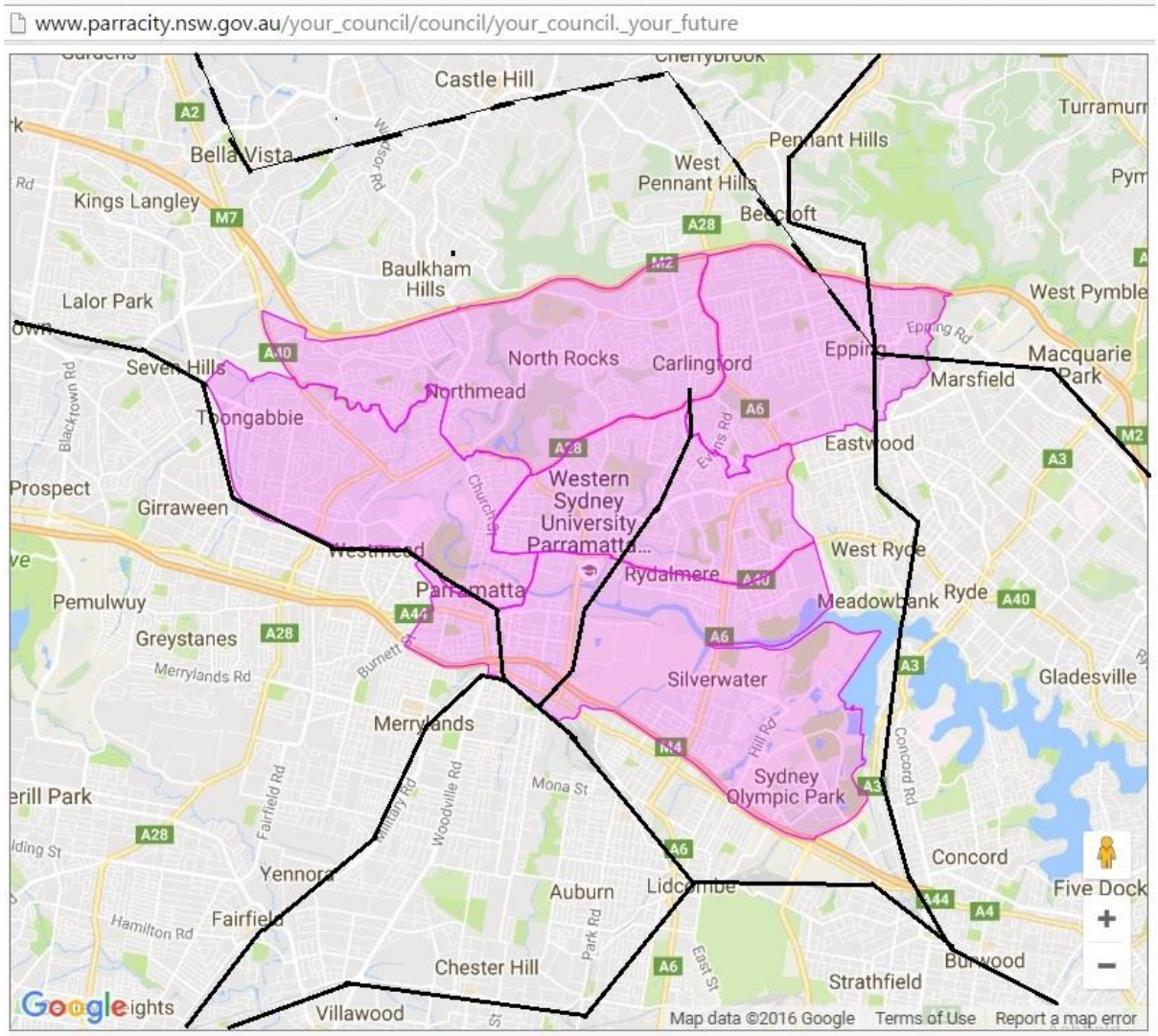


Chart 1.9 does not look good. Half of the GDP growth comes from unproductive consumption, possibly driven by population growth. That cannot continue for very long. The trade component will mainly come from export of commodities. The higher the population which has to share the same income from these exports, the worse it will get.

Why Epping does not belong to Parramatta

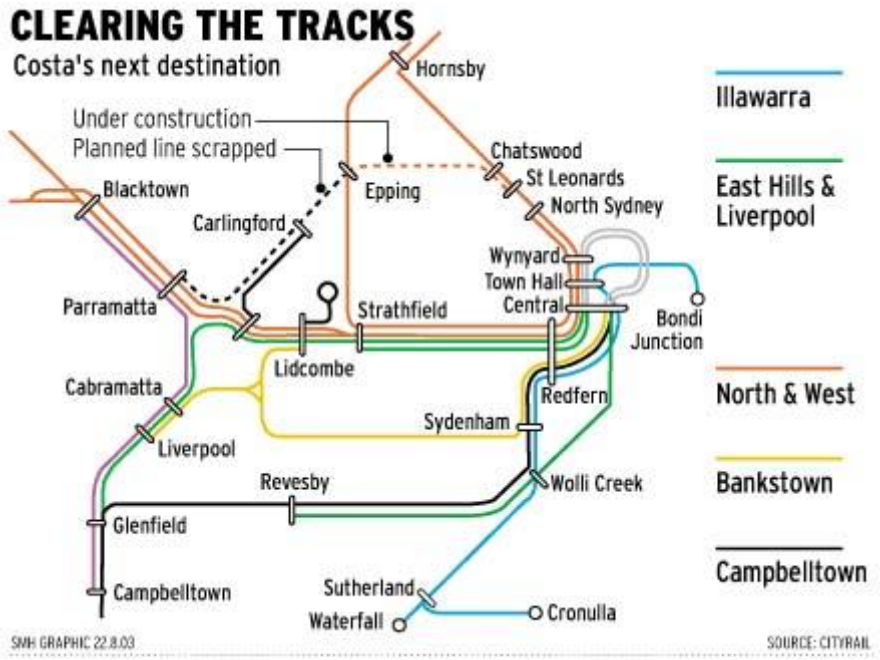


We can see that the Parramatta Council area is a miscarriage. The Parramatta CBD location is eccentric at the outer edge of the area, not in the centre, surrounded by a hodgepodge of suburbs not necessarily oriented towards the Parramatta CBD, often cut off by arterial roads or motorways. This is not a coherent city. It is a typical part of Sydney's unstructured settlement pie created by decades of ad-hoc land sales, uncontrolled motorisation and associated motorway construction, not by proper town planning. This has resulted in an unprecedented and unsustainable culture of long-distance commuting which has destroyed local identity. Only smaller areas like business parks or CBD blocks are well planned. But this is rather architecture than town planning.

The connection between the Parramatta CBD and its LGA is totally dependent on cars and buses. (In Europe, a city with a population of 215 K would have its own tram network connected with the main rail station). The Western and Northern rail lines run tangential. The Carlingford line with an hourly service is substandard and ends at a hostile goods yard station (Clyde) in the middle of warehouses.

Plans to link Parramatta with its Eastern parts by rail have been abandoned.

Parramatta – Epping Rail Link was cancelled by Costa in 2003



http://www.smh.com.au/articles/2003/08/21/1061434990699.html

According to files I inspected at the Parramatta Transport Office at the time of the Parramatta – Chatswood Rail Link EIS in 2000 the main reason was to divert Western trains away from the crowded Strathfield – Central corridor (capacity exhausted by 2016!), so that office workers on the North Shore (Milsons Point – Chatswood) would not have to go through the Sydney CBD. Take an evening rush hr train from Epping to Emu plains via the Sydney CBD and there is only standing in an 8-car double decker in North Sydney.

In Wynyard there is total chaos because Western commuters find trains already full up. Thank you Mr. Costa. Where is he now?

Now the Epping – Chatswood tunnel will be downgraded for single deckers only (and the 500 m stud North of Epping, too). This means that even if a Parramatta – Epping tunnel were built, the original concept as described above can never be implemented with double deckers.

It is this constant change of plans which has contributed to Sydney's total planning mess. It is unfortunately irreparable before oil shortages and global warming will determine the fate of Sydney, namely its disintegration into whatever subcentres can survive.

Even light rail plans for Parramatta – Macquarie Park have been abandoned and now shortened to just Parramatta-Carlingford, in favour of another corridor, presumably because in the Olympic Park area a higher amount of "value capture" is expected. This concept is in doubt as it worsens the affordability of housing. A housing crash will end the plans anyway. And the topography is also a big problem for light rail. Roads in the Carlingford – Epping area were never designed for trams (like in the Eastern suburbs). In all likelihood a short tunnel would be needed near the Carlingford Court shopping centre. By the way, the only location for a light rail terminus in Epping would be the Coles car park but no-one is planning for this.
In other words, there will never be a rail link between Epping and Parramatta. And that is why the Marsden Rd - Pennant Hills Rd should be the Eastern boundary of the Parramatta LGA. Epping's orientation will always be eastwards, not westwards. The pecking order of suburbs also dictates this. Take a train between Eastwood and Hornsby during school travel times and you will see 1,000s of students commuting between schools along the rail line. That is our orientation, not Parramatta.

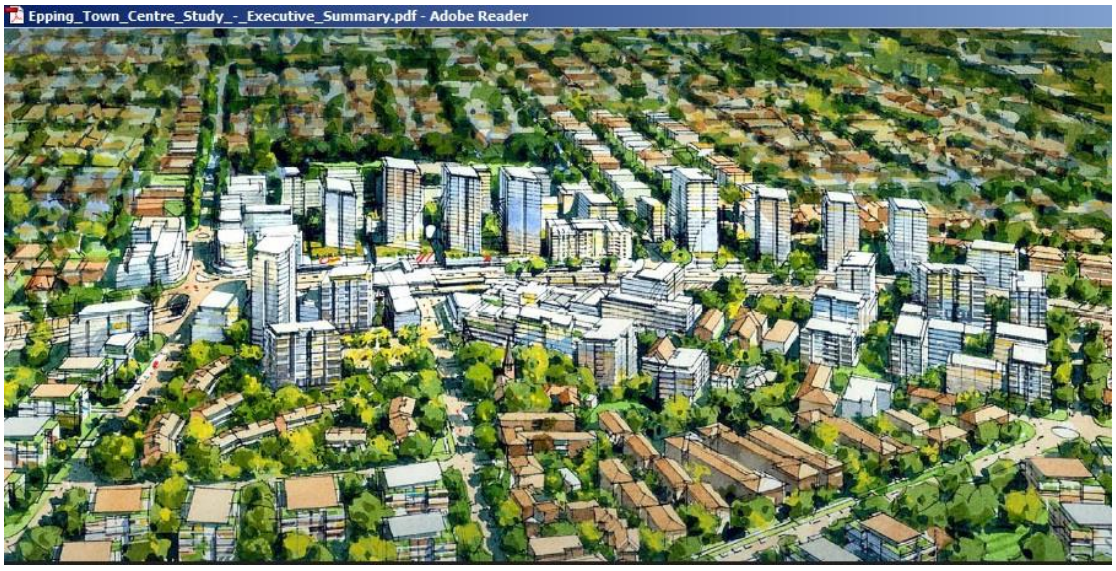
Nothing else than a sketch in a glossy brochure. Typical for Sydney
http://www.transport.nsw.gov.au/sites/default/files/b2b/projects/parramatta-light-rail-industry-briefing-march-2016.pdf

So what has Parramatta to offer Epping in terms of transport? Metrobus M54, an unreliable random service without timetable, stuck in Carlingford Rd traffic jams, zig-zagging through suburbs, impossible to coordinate with the train time table? And that is a replacement for a rail link? Ridiculous.

When Frankfurt did Council amalgamations in the 60s and 70s, the City Council included these areas in their CBD fare zone for trains, metro, light rail, trams and buses, making travel much cheaper (multimodal tickets). Can you imagine this happening in Sydney?

Epping Town Centre

What do we expect in Epping? Picture this:



Epping Town Centre study: a nightmare

An embellished view of Rawson St which is already completely congested now. This is how the public is mislead with architectural impressions.

The destruction of Epping has already started

A beautifully landscaped business park (above) in Cambridge St East of Epping station with 100s of jobs has been demolished to make room for a residential tower for Chinese speculators. This is EXACTLY THE OPPOSITE what must be done, i.e. more jobs into the suburbs. The NWRL site has also destroyed a business park

Shame on all levels of government who have approved this. Hornsby Council has rubber stamped what the State government forced on it.

The function of the government is to PROTECT the public from these excesses of developers. Instead government departments have degenerated into branch offices of large

companies, working in their interest. With an Administrator not answerable at elections it will only get worse.

And the media is supporting it with propaganda

http://www.dailytelegraph.com.au/newslocal/news/interactive-epping-development-sites-explained/news-story/6730a58f11f3c02da1dab3388f543aa4

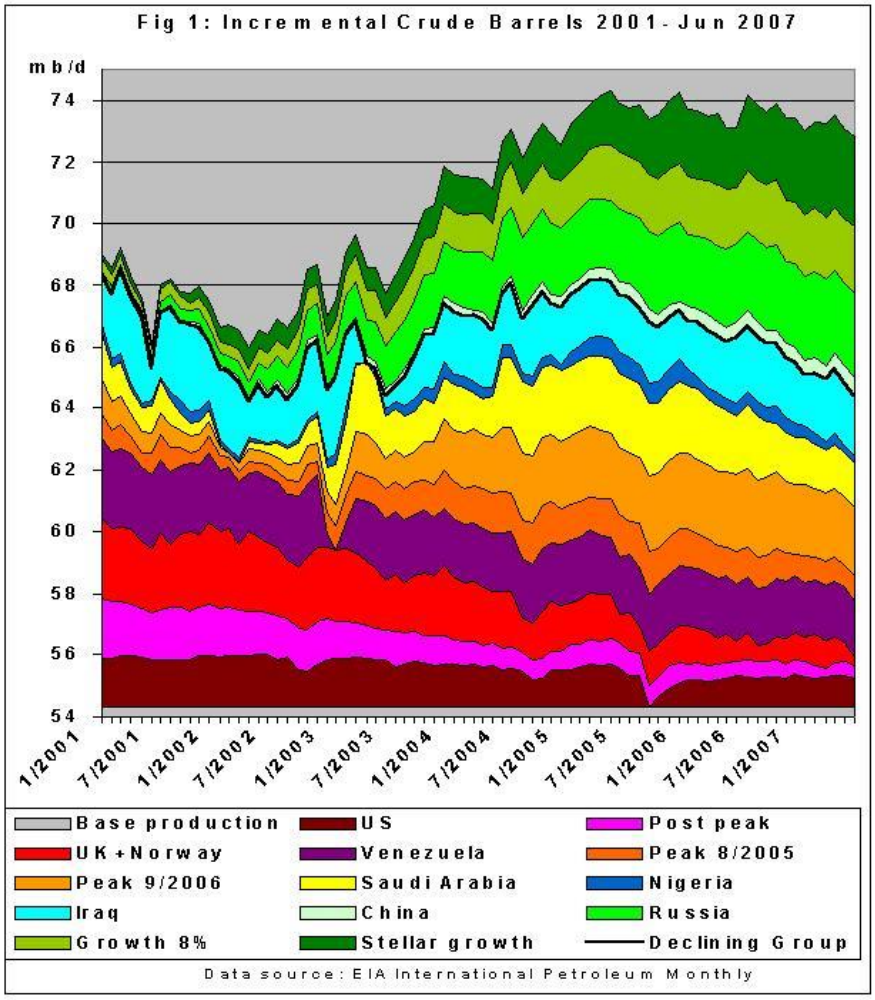
We can only hope that there will soon be a credit crunch to stop this madness. An oil crisis or a further downturn in the oil industry may trigger this. Look how the only place for a light rail terminus, the Coles car park is proposed to be overbuilt by a huge skyscraper.

Peak oil at an advanced stage

Crude oil started to peak in 2005. Production declined until 2007. At the time I wrote following article:

Did Katrina Hide the Real Peak in World Oil Production?

9/10/2007

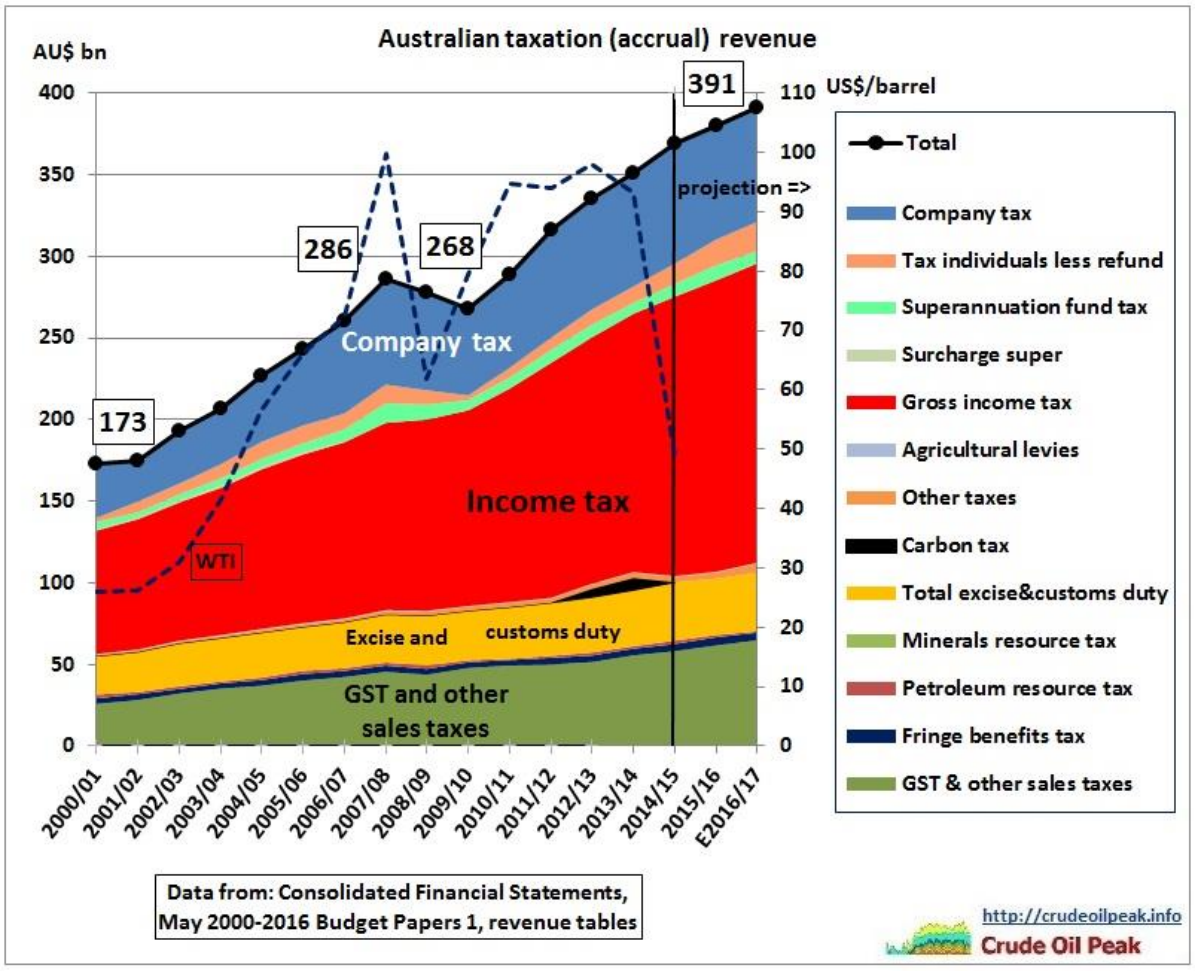


http://www.theoildrum.com/node/3052

High oil prices as a result of these insufficient oil flows (supply shock, note the Saudi decline!) caused the US recession end 2007. In 2008 China went on the oil market with 800 kb/d of extra demand for the Olympic Games. That pushed oil prices to over $140 a barrel and broke the camel's back. High petro dollar debt from ever increasing US oil imports had accumulated since the 1970s oil crisis (Nixon shock). In car dependent US suburbia $4 per gallon petrol prices in combination with an ill-timed mortgage reset triggered the financial crisis.

Causes and Consequences of the Oil Shock of 2007–08
https://www.brookings.edu/wp-content/uploads/2016/07/2009a_bpea_hamilton-1.pdf

The financial crisis caused companies to reduce their tax burden. Company closures also contributed. 80% of the Australian budget deficit is caused by lower company tax income after the GFC. It has nothing to do with the ALP. The same would have happened to Howard.



Read my article here:
28/6/2016
80% of Australian budget deficit comes from lower company tax revenue after GFC (part3)
http://crudeoilpeak.info/80-of-australian-budget-deficit-comes-from-lower-company-tax-after-gfc-part-3

The Australian public was warned about the 2006 conventional oil peak in this ABC TV Oil crunch story in April 2011:

Dr Fatih Birol
When we look at the oil markets the news is not very bright. We think that the crude oil production has already peaked in 2006

NARRATION
Hang on - did you get that? Crude oil production for the world peaked in 2006.
http://www.abc.net.au/catalyst/stories/3201781.htm

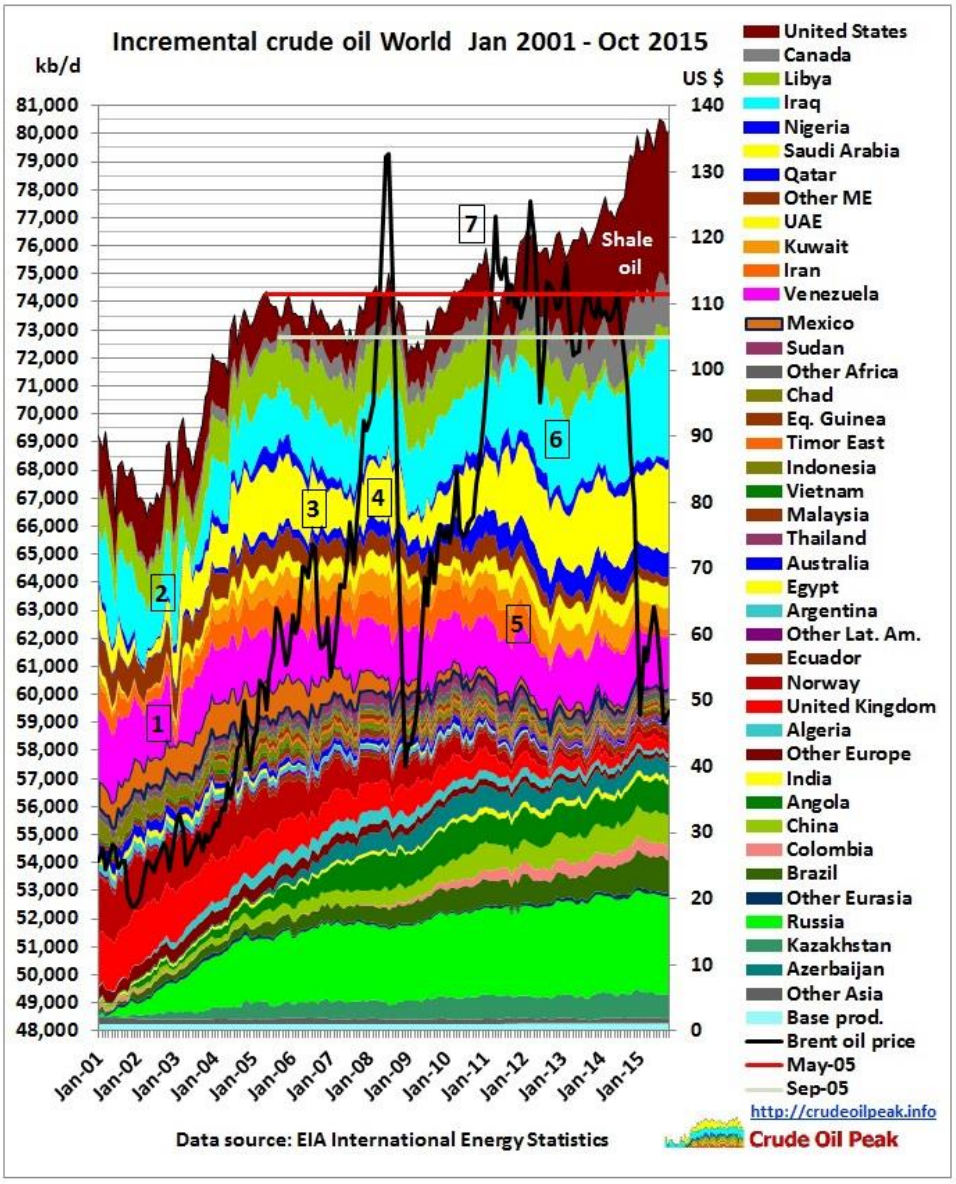
In the US, the response to the conventional oil peak was low interest rates, money printing (so that economy can afford high oil prices) and shale oil. But despite increases in shale oil

production, oil prices did not go down. The high oil price period 2007-2014 has damaged the financial system (more debt, budget deficits) and the economy (company closures and job losses) irreversibly (like a heart attack or stroke when blood does not flow freely).

In 2014 oil prices dropped for following reasons:

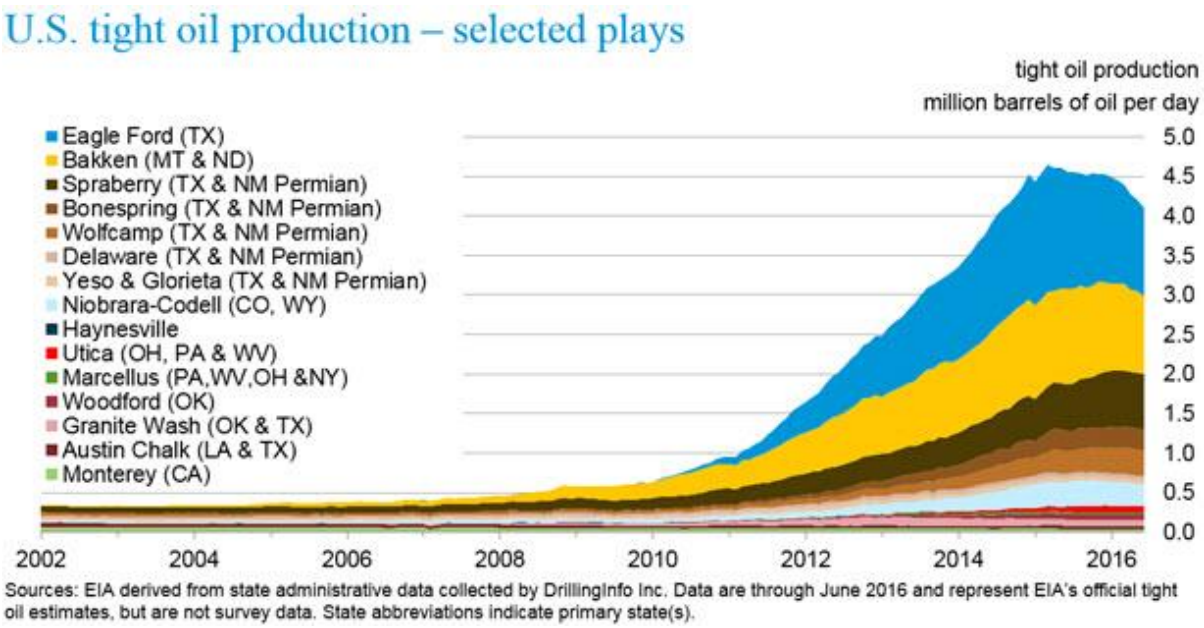
- End of QE announced by the Federal Reserve: higher US dollar – lower oil prices inverse relationship
- Oversupply of US shale oil
- Lower demand growth due to weakened economy as a result of previous high oil price period

The experiment with money printing, $100 oil prices and shale oil has ended in failure.

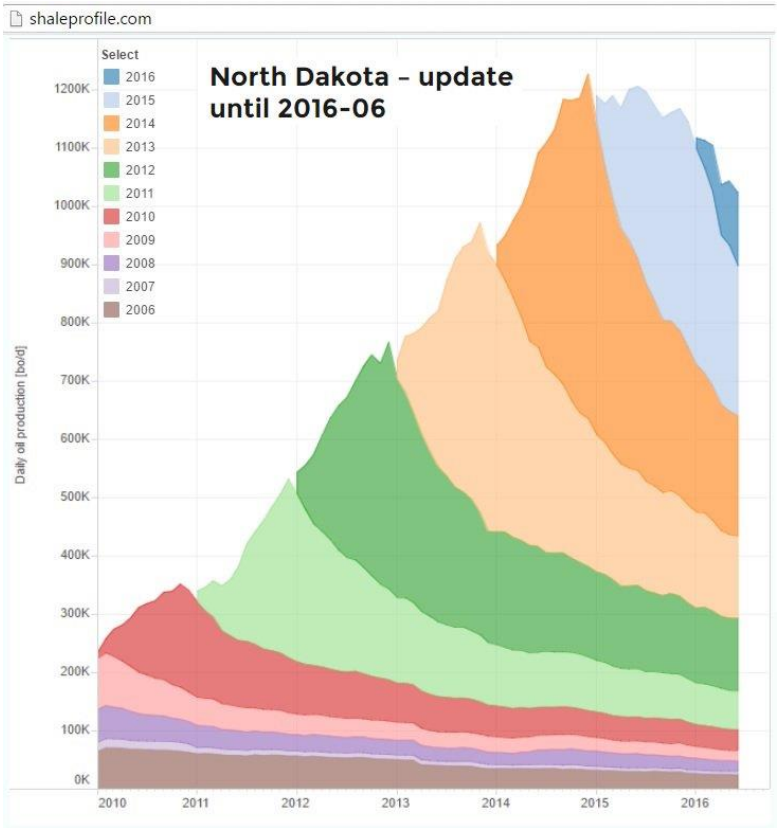


The grey horizontal line shows that the world outside the US and Canada did not produce more oil than in 2005. That is peak oil!

In the meantime it is clear that shale oil itself peaked in 2015



Shale oil is not your average crude oil. Decline rates are astronomical compared with conventional oil



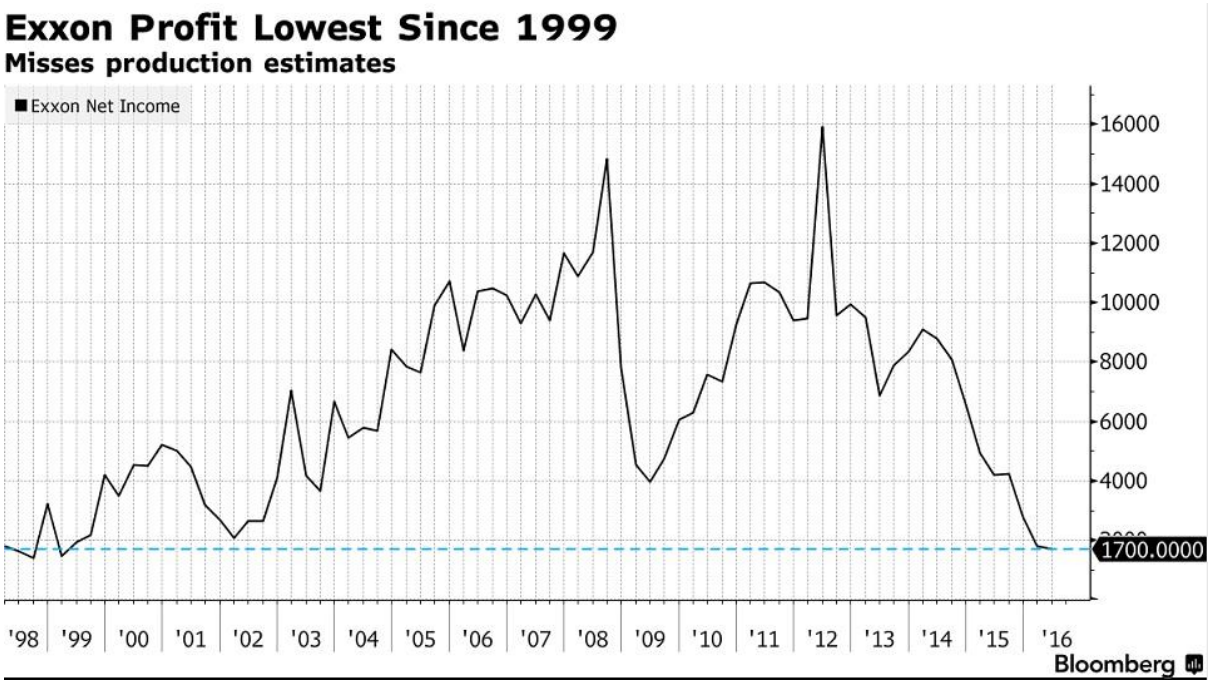
Graph from: http://shaleprofile.com/

For example, production from all wells drilled (and put to production) before 1/1/2015 has declined from 1,200 kb/d to 650 kb/d, almost half, in just 18 months!!

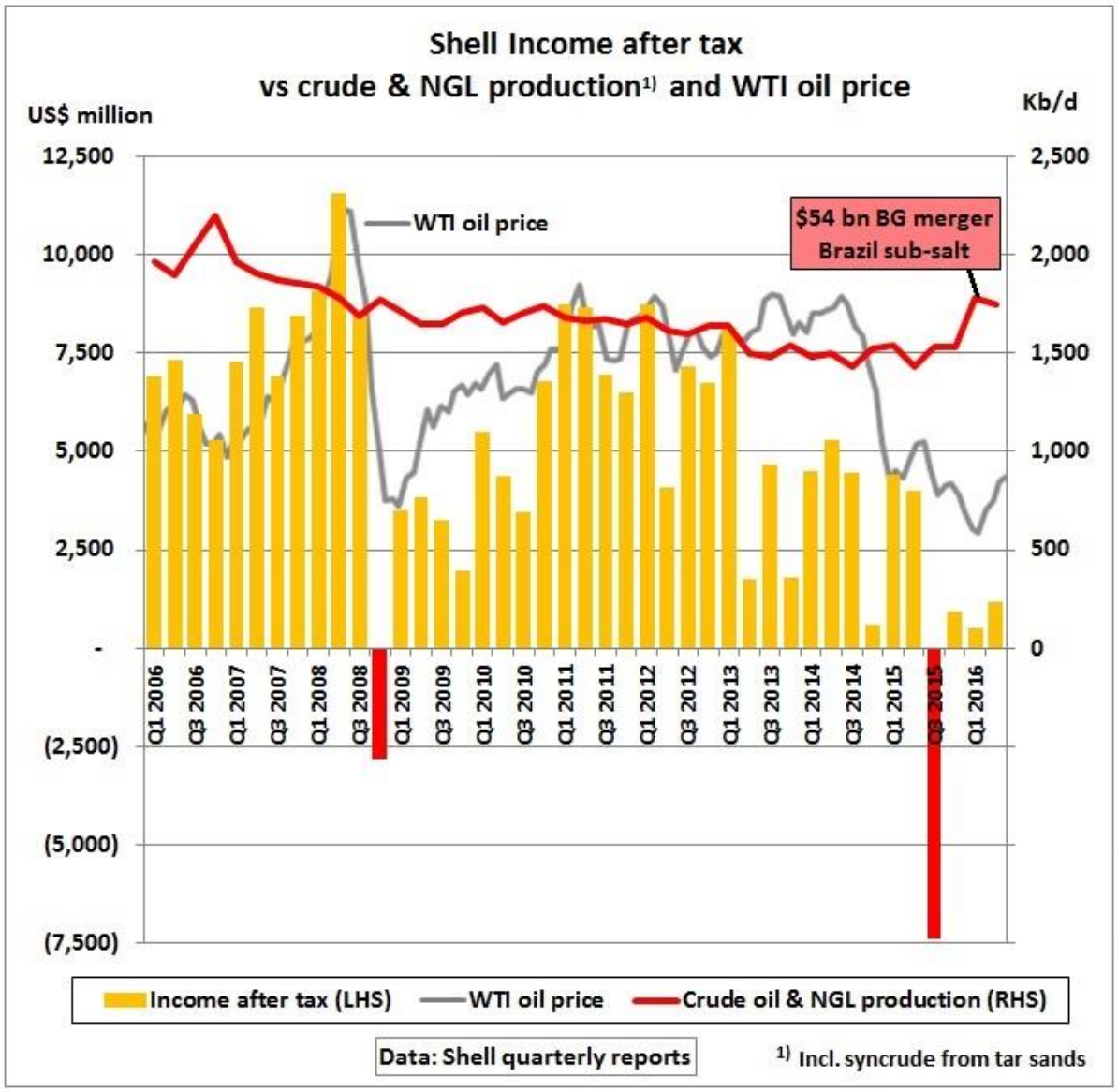
It is generally assumed that in case oil prices go up again, shale oil production will pick up as well. The North Dakota graph shows how difficult that will be. And shale oil is not your average crude oil which can be used in all refineries. It definitely does not directly compete with Saudi or Iranian oil, for example.

To quote Tim Olsen, 2015, Working with Tight Oil, Chemical Engineering Progress:
"Light oils typically pose unique challenges because they:
* are difficult to transport due to a lack of pipeline infrastructure
* contain entrained hydrogen sulfide
* require the addition of amine-based H2S scavengers in the pipeline, truck, or railcar prior to transport.
* are contaminated with paraffin waxes that cause fouling in piping, tank walls, and crude preheat exchangers
* contain large amounts of filterable solids
* can have a wide range of API gravity
* require crude blending to balance the atmospheric crude fractionator cut-point yields for best downstream utilization
* may be incompatible with other types of crudes used for blending
* require energy balancing across the crude preheat exchangers
* may experience cold flow property deficiencies that require modifications to catalysts… "
http://www2.emersonprocess.com/siteadmincenter/PM%20Articles/Olsen_CEP_April2015.pdf

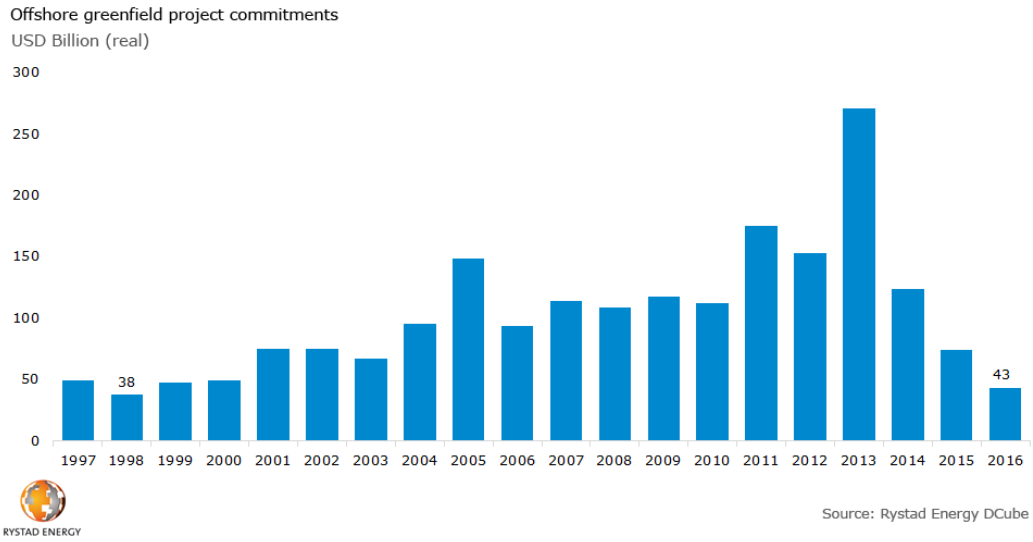
Low oil prices have led to a drop in oil company profits



This cannot continue for very long.



The trend is clear: Shell's income after tax is in long term decline. The problem started already before oil prices came down. Low oil prices also means a drop in investments.



This will negatively impact on future oil production. It will take 5 years until new oil can flow after investment decisions.

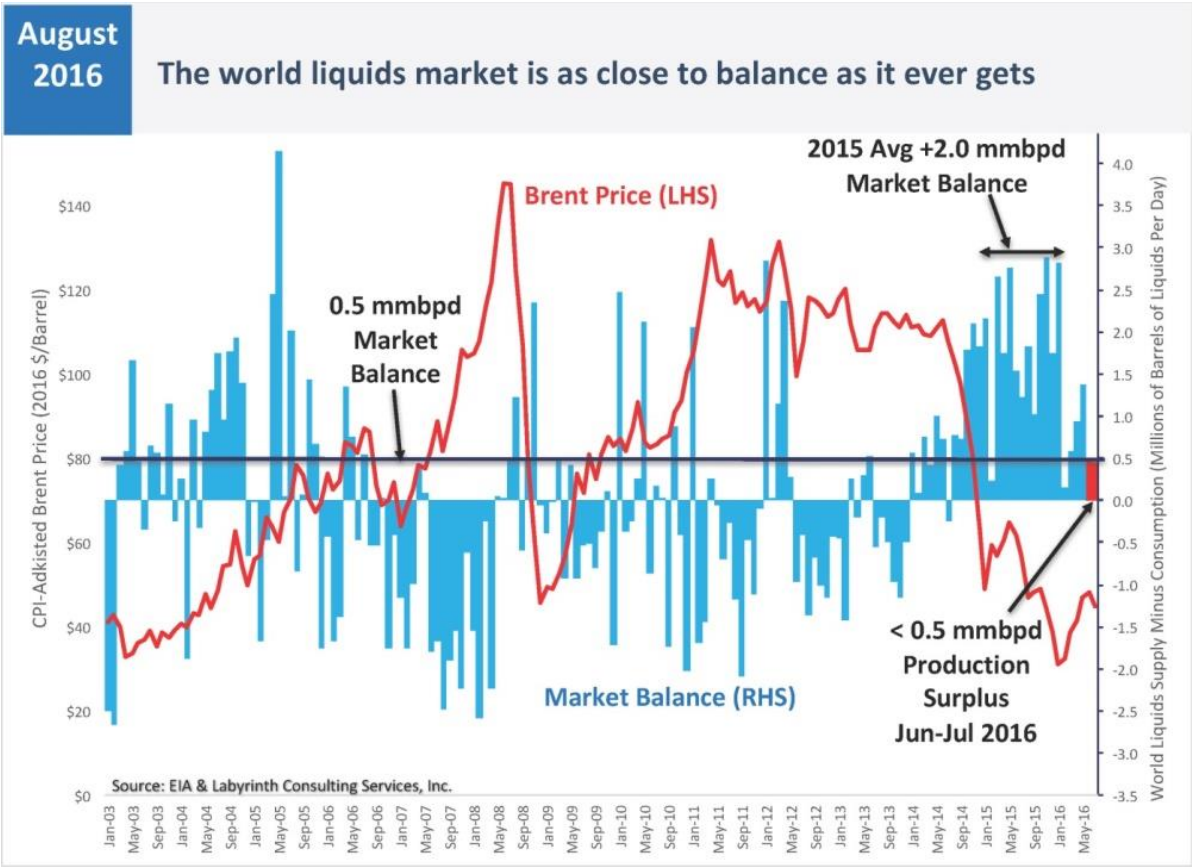
The longer oil prices are low, the deeper the next oil crisis

Warnings were given in Davos in January 2016

9/2/2016 IEA in Davos warns of higher oil prices in a few years' time
http://crudeoilpeak.info/iea-in-davos-2016-warns-of-higher-oil-prices-in-a-few-years-time

But governments don't want to listen.

Current oil market balance August 2016



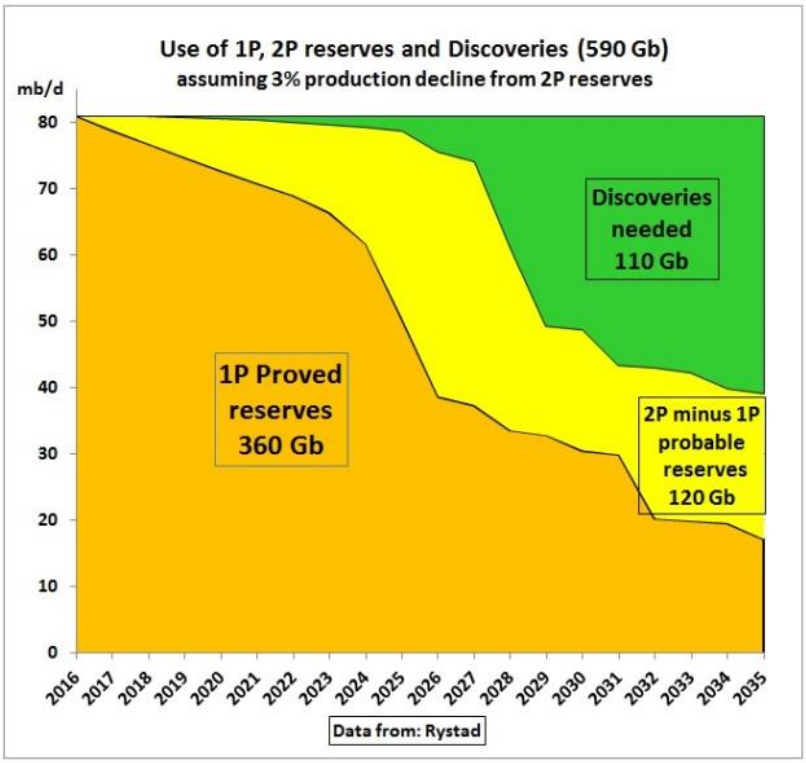
http://www.artberman.com/saudi-permian-a-race-to-the-bottom-for-tight-oil/

The production surplus has shrunk. Yet oil prices are still much lower than before 2014. This suggests something is dead wrong. Oil demand seems to be too weak because the global economy is ailing. China has tanked. Chinese investors are fleeing and think Australia is a safe place. Good luck.

80% of investors don't even look at what they are buying. Only a combined housing crash and currency devaluation can chase away these speculators for good.

How much oil is remaining?

BP Review's so-called proven oil reserves are overstated by more than 400% , according to Rystad.



< Lower oil prices mean less oil reserves. At current prices proven and probable oil reserves will not even last for 20 years.

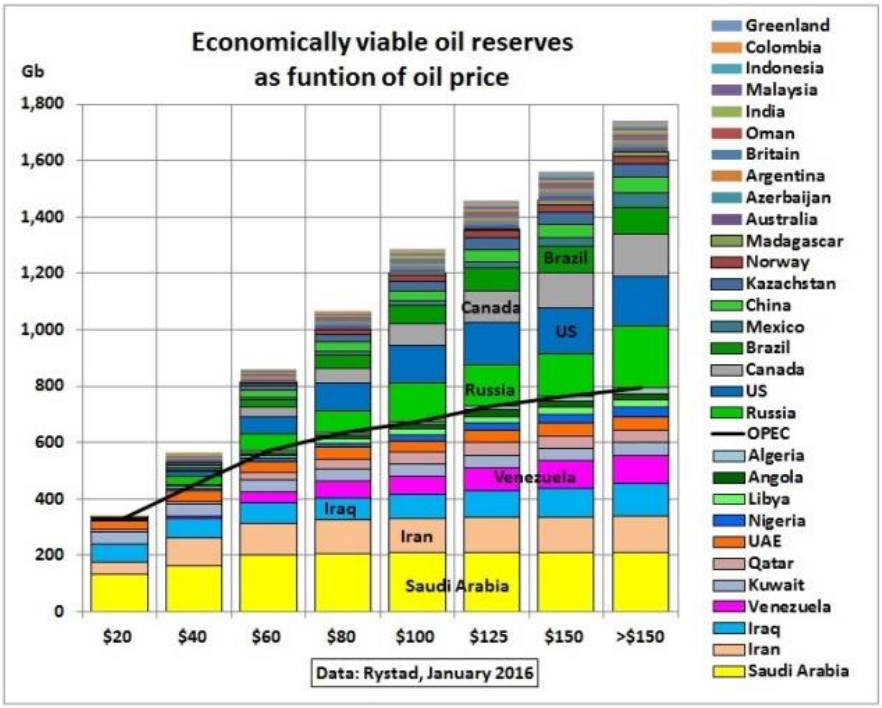
Of course oil production will not drop suddenly after x years. The problem will start much earlier. In this simplified model, if insufficient investments are made for discoveries, production from 2P reserves will decline already within 10 years. Price spikes are guaranteed, further damaging the financial system and the economy.

And governments still build and plan oil dependent infrastructure for decades to come. This research should actually be done by State and Federal departments. Where is it?

Oil above $100 will stay in the ground.>

More details are here:

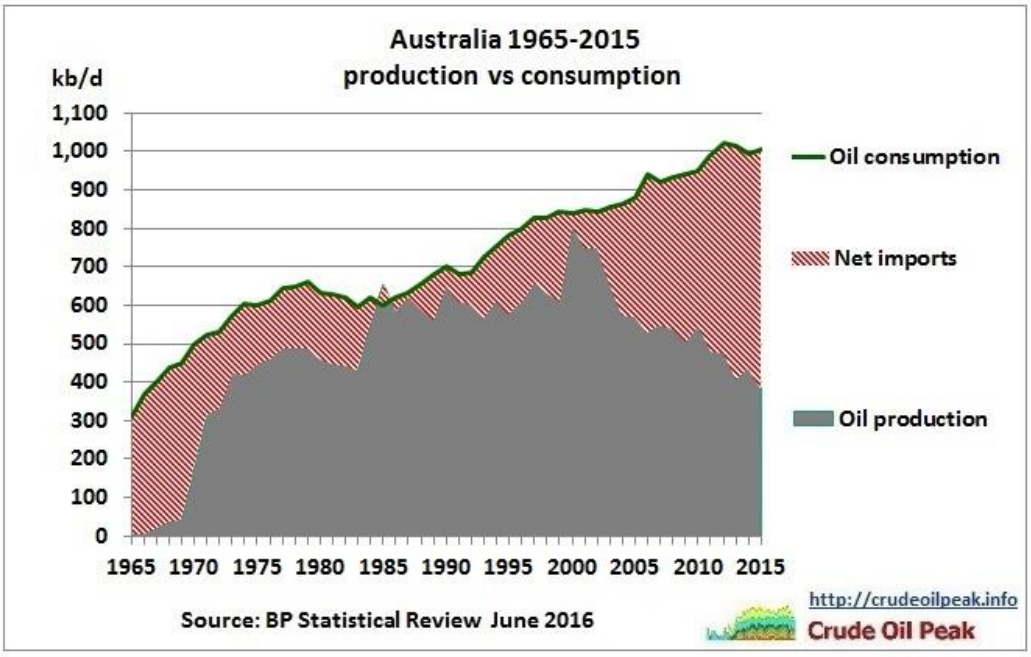
19/8/2016 Oil reserves and resources as function of oil price



http://crudeoilpeak.info/oil-reserves-and-resources-as-function-of-oil-price

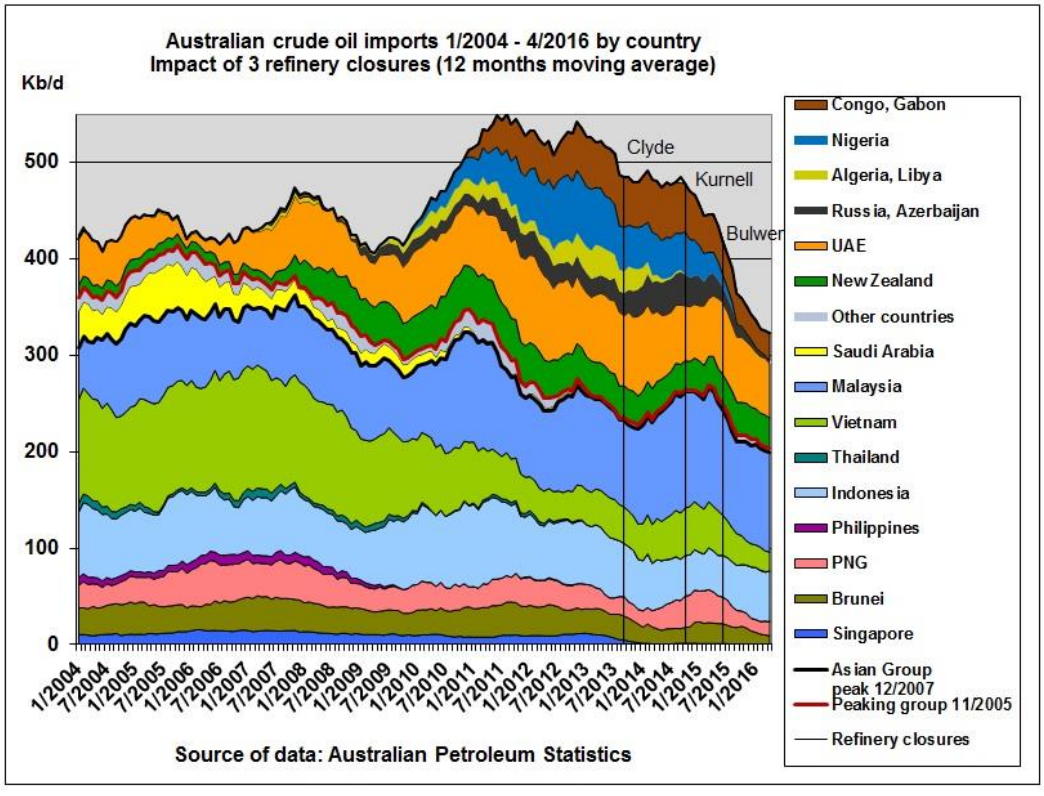
Australia's oil supply vulnerability

Australian crude oil production peaked in 2000



Increasing oil imports have made Australia vulnerable to oil supply shocks

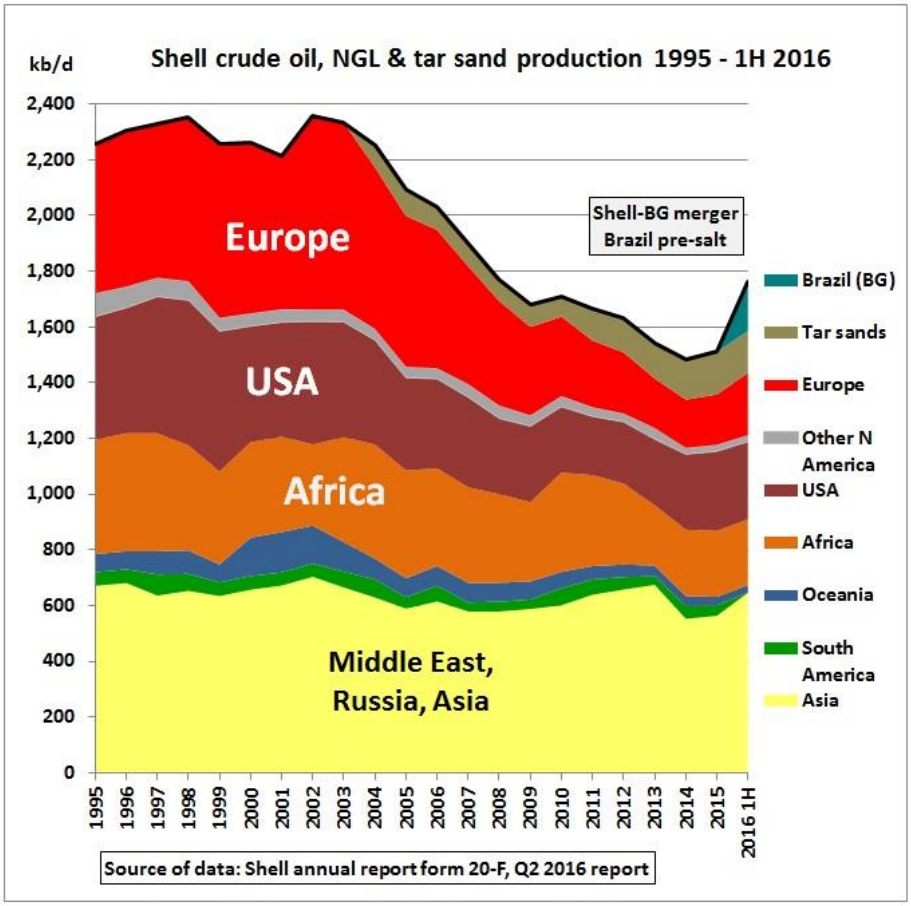
3 refinery closures have made the situation worse because crude oil imports for these refineries were more diversified than fuel imports which replaced local refinery outputs.



Even Malcolm Turnbull got it completely wrong

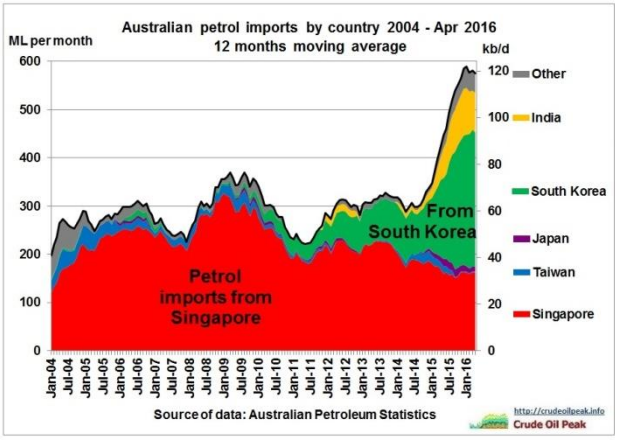
7/7/2016 Prime Minister Malcolm Turnbull's exciting energy security in Australia
http://crudeoilpeak.info/prime-minister-turnbulls-exciting-energy-security-in-australia

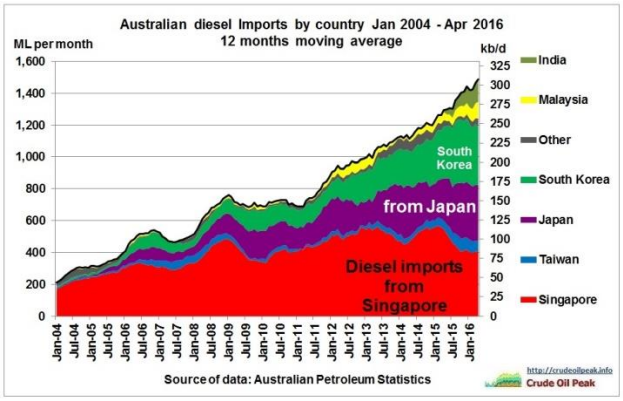
The refineries closed because oil production of IOCs peaked. Example Shell

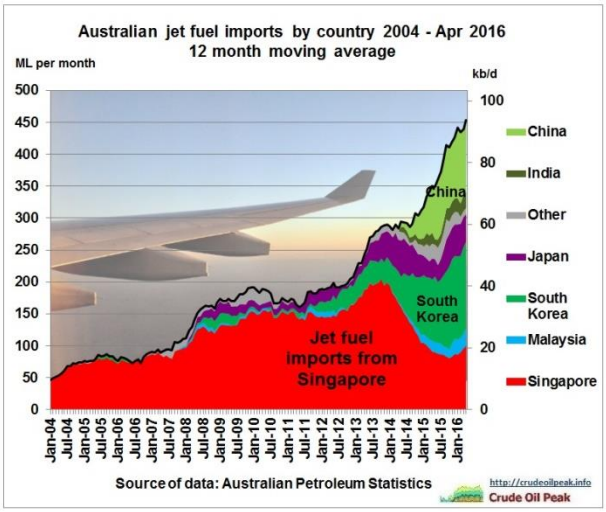


There is no better symbol for the end of the oil age than the detonation of the Clyde refinery chimneys, right in front of Parramatta Council's eyes. Yet, planners cannot connect the dots and still plan for perpetual growth in La La land.

Consequently, fuel imports have skyrocketed.







When there is a military confrontation in the South China Sea Australians will start walking within a week or two. Singapore, South Korea and Japan all depend on the Middle East. When that disintegrates, the lights will go out.

I was invited to a Senate Inquiry on Australia's non existent strategic oil reserve last year but no action was taken after a report was released. MPs seem to think this is all a debating club competition.

That's why I am saying the more people there are in oil dependent cities, the longer the petrol lines.

Storms of my Grandchildren

This chapter is not easy for me to write. My Master thesis in 1969 was on stability of multiframe highrises and the computer programs I wrote at the time were used to build a couple of those in Frankfurt.

When I read "Storms of my Grandchildren" by NASA climatologist James Hansen it dawned on me that it would not be good to build more highrises, not to mention skyscrapers, for energy and wind speed reasons.

Energy and CO2

The Green Building Council of Australia and World Green Building Council chair, Tony Arnel, challenged the high density vision for our cities when he told the G'Day Conference in the US recently that high-rise buildings were not more sustainable than the suburban home.
Arnel, who is also Victorian Building Commissioner, quoted an Allen Consulting report done for the Victorian Building Commission that has found there is "no conclusive evidence that vertical living was more sustainable than conventional homes."
The study, says Arnel, suggests buildings above three storeys begin to use more energy due to the need for lighting in common areas, lifts, security and the lifestyle of residents.
Certainly this is backed up by our earlier story where we reported that a NSW Energy Australia study found a high-rise apartment uses 30 per cent more power than a typical detached house, much of it in common areas such as foyers and car parks. On the question of water use, Sydney Water statistics show multi-unit dwellings account for 14.3 per cent of Sydney Water's consumption compared to 45.7 for single dwellings
A recent energy and water audit by Willoughby Council of the common areas in 25 Sydney multi-unit buildings showed that high-rise buildings generated four times as much CO2 as villas/townhouses and three times as much as low and medium-rise

buildings. The council undertook the audits as part of its ClimateClever Apartments program and the buildings included townhouses and low, medium and high-rise apartment buildings.

The overall use and intensity of use of both power and water was much greater in high-rise than the other three categories. Willoughby Council concluded this was potentially due to “the additional centralised plant and equipment that often occur in high-rise buildings, such as swimming pools, spas, saunas, cooling towers, pumps and lifts.”
“The high energy usage may also be attributed to the arrangement of central hallways and underground carparks in high-rise buildings which generally have no natural light and must be lit and ventilated at all times to ensure safety and amenity for the large numbers of occupants.”
Embedded energy is another issue. A decade ago researchers at the School of Architecture, Deakin University, and the School of Architecture, University of Tasmania, found that high-rise buildings had 60 per cent more energy embodied per unit GFA in their materials than the low to medium-rise buildings. While the figure has improved due to improved manufacturing processes, embedded energy is still greater in tall buildings because of the higher load requirements.
http://www.thefifthestate.com.au/articles/high-rise-living-%E2%80%93-is-it-the-sustainable-answer/20345

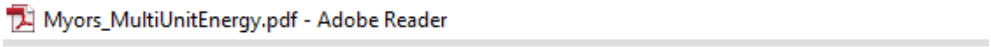


TABLE 3: TOTAL ANNUAL GREENHOUSE GAS EMISSIONS BY DWELLING TYPE.

Building type	ANNUAL GREENHOUSE EMISSIONS	
	per dwelling (tonnes CO_2/ dwelling/year)	per person (tonnes CO_2/ person/year)
High-Rise	10.4	5.4
Mid-Rise	7.3	3.8
Low-Rise	6.5	3.4
Townhouse + Villas	5.1	2.1
Detached	9.0	2.9
AVERAGE	8.0	4.1

http://www.ausgrid.com.au/Common/Our-network/Demand-management-and-energy-efficiency/Energy-use-facts-and-figures/~/media/Files/Network/Demand%20Management/Energy%20use%20resources/Networks_multi_unit_sumrep_Oct08.pdf

Carlingford Road

It is argued that flats generate less car traffic. If that were the case then why are all flats built with huge basement car parks (driving up construction costs)?

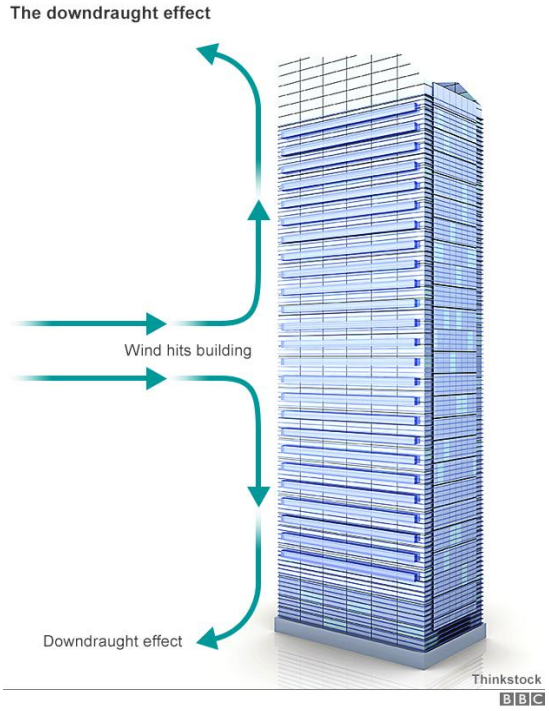
Look at the flats along Carlingford Rd. A car coming out from the steep car park ramp is illegally crossing lanes to the other side of the road (waiting for the bus to pass).

The traffic report prepared for the DA and submitted to Hornsby Council fraudulently claimed there would be "free-flowing" traffic on Carlingford Rd. It was rubber stamped because Council feared to be dissolved if not compliant with State government "targets". That is how low we have come. Where would the light rail go? Car lanes would have to be closed.

By the way, there are no solar water heaters and no solar panels on the roofs of these flats. Even if panels had been installed the available area per flat would be small. Nothing is sustainable in this picture. On my house I have both and I am a net energy exporter

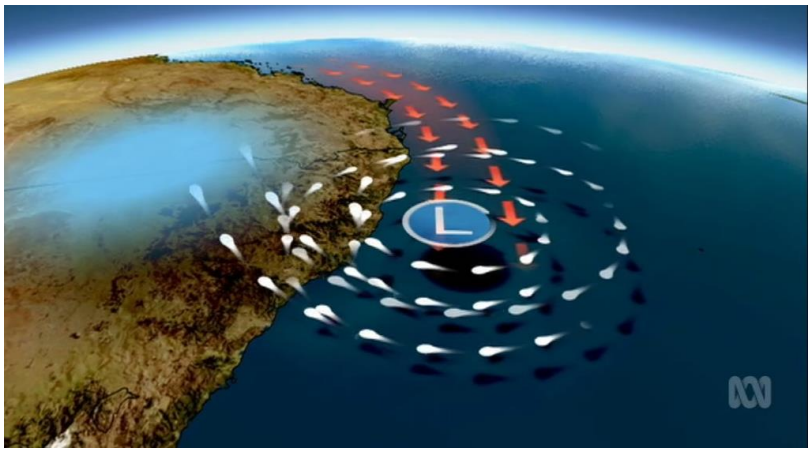
Wind speeds

“The City of London is promising that high-rise buildings will be monitored to ensure they don't make conditions unbearably windy in surrounding streets.



And, if several towers stand near each other, there is an effect known as "channelling", a wind acceleration created by air having to be squeezed through a narrow space.
http://www.bbc.com/news/magazine-33426889

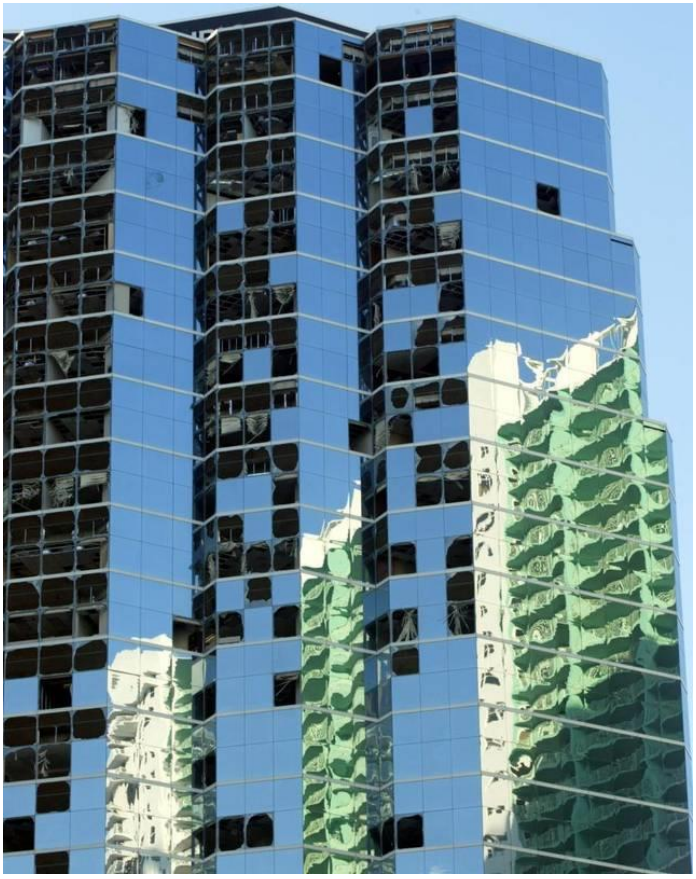
Wind speeds will be much higher in future. In Sydney, storms beyond our experience will come from East Coast Lows. This problem has started recently.



The higher the temperature of the ocean, the more moisture and energy in the atmosphere will drive these storms.

Doomsday scenarios are no longer fiction

It is outright stupid to build high rises in exposed locations on the ridge Top-Ryde – Hornsby.



Blown out windows (Miami)

Façade damage from hurricane (Florida)

In UK with 70 mph

Swaying skyscrapers in high winds will make for uncomfortable living.

Hurricane experience in Houston

“The engineers had driven in the middle of the night through rising gales and past sandbagged garages. A maintenance worker inside the building, on lockdown for the storm, had to operate the elevator for them. It wobbled on the way to the sky lobby, where the floor was already swaying noticeably, and then to the top, where the maintenance worker had the good sense to promptly return to the ground floor.

….they stayed for several hours—past the point when they could no longer walk upright, well beyond the moment when they realized they could see flickering lights in the distance coming in and out of view as the tower contorted.

....The floor seemed to shift beneath him unpredictably. The wind pushed and pulled on the windowpanes, turning the glass into funhouse mirrors reflecting distorted images of the men inside.

Skyscrapers really start to rock when the vibrations caused by vortex shedding bring the building's motion into harmony with its natural (eigen) frequency."

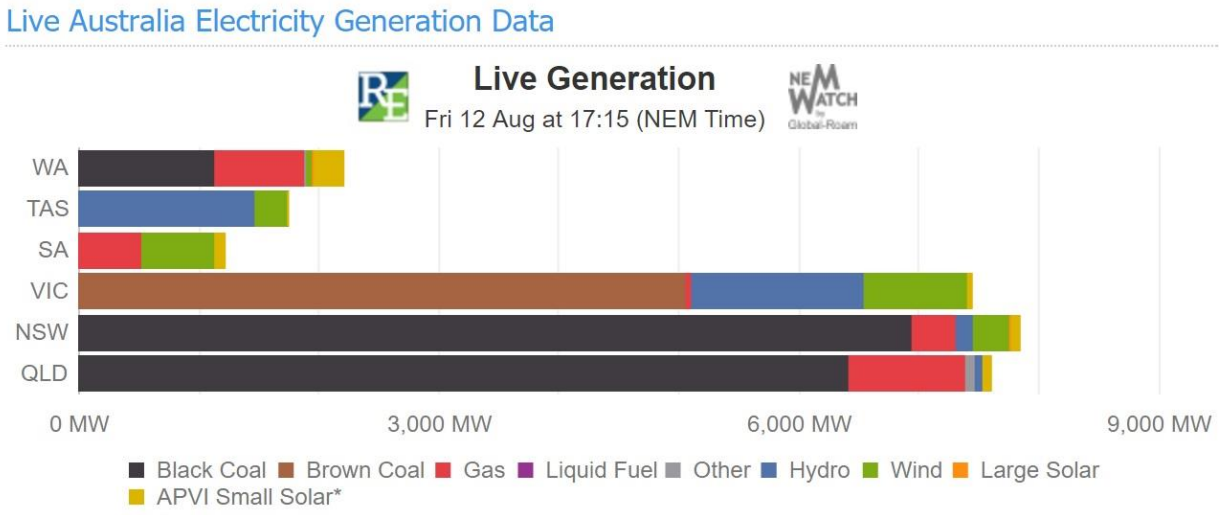
http://gizmodo.com/how-much-do-skyscrapers-actually-move-1707522178

This hurricane related damage will come to Sydney, too. The experience for residential occupants will be horrifying. After one such event they will very likely move out, leaving the building vacant, due for detonation. There are other reasons for problems in highrises.

The coming blackouts
Load shedding

The world is not really taking serious steps to reduce CO2 emissions. That is why action will only be taken when there is undeniable abrupt climate change i.e when it is too late to avoid serious damage.

The following graph shows NSW is the worst sinner among all states with a high usage of black coal.



http://www.energymatters.com.au/energy-efficiency/australian-electricity-statistics/

This means that all high rises are basically driven by coal (lifts, ventilation, lights, air conditioning). That is totally unsustainable.

The recent power shortages in SA have shown how difficult the transition to renewable power will be. Gas is needed to supplement wind and solar on short notice. Hydro power would be better. This will require building new dams. Coal cannot do this. Minister Frydenberg mentioned gas shortages were caused by LNG exports (Queensland). There you are.

The problem goes back to Howard. Yes, Howard. Gas decline in Gippsland and Moomba were well known at the time. Remember John spruiked Australia as energy superpower with all these LNG exports? He failed to impose a condition on the gas industry: namely to build a gas pipeline from West to East using conventional offshore gas.

Now unconventional coal seam gas on the East coast is irreversibly damaging our landscape, causing unrest and divisions among the rural population while the gas is still exported, for a pittance and little tax paid. To be fair, that goes on the account of Labour. This example shows the disastrous consequences of a wrong "energy policy" for decades into the future.

This all means that when the time comes the only "solution" to reduce emissions will be load shedding, the equivalent to petrol rationing. Such measures could be imposed by the UN with sanctions and penalties by the IMF, Central Banks or BIS.

To live in highrises will require physical fitness, patience and independence from electrical appliances. You can save yourself the gym.

The slums of the future

That's the destiny of many highrises. A huge waste of material with the end result of more CO2 in the atmosphere.

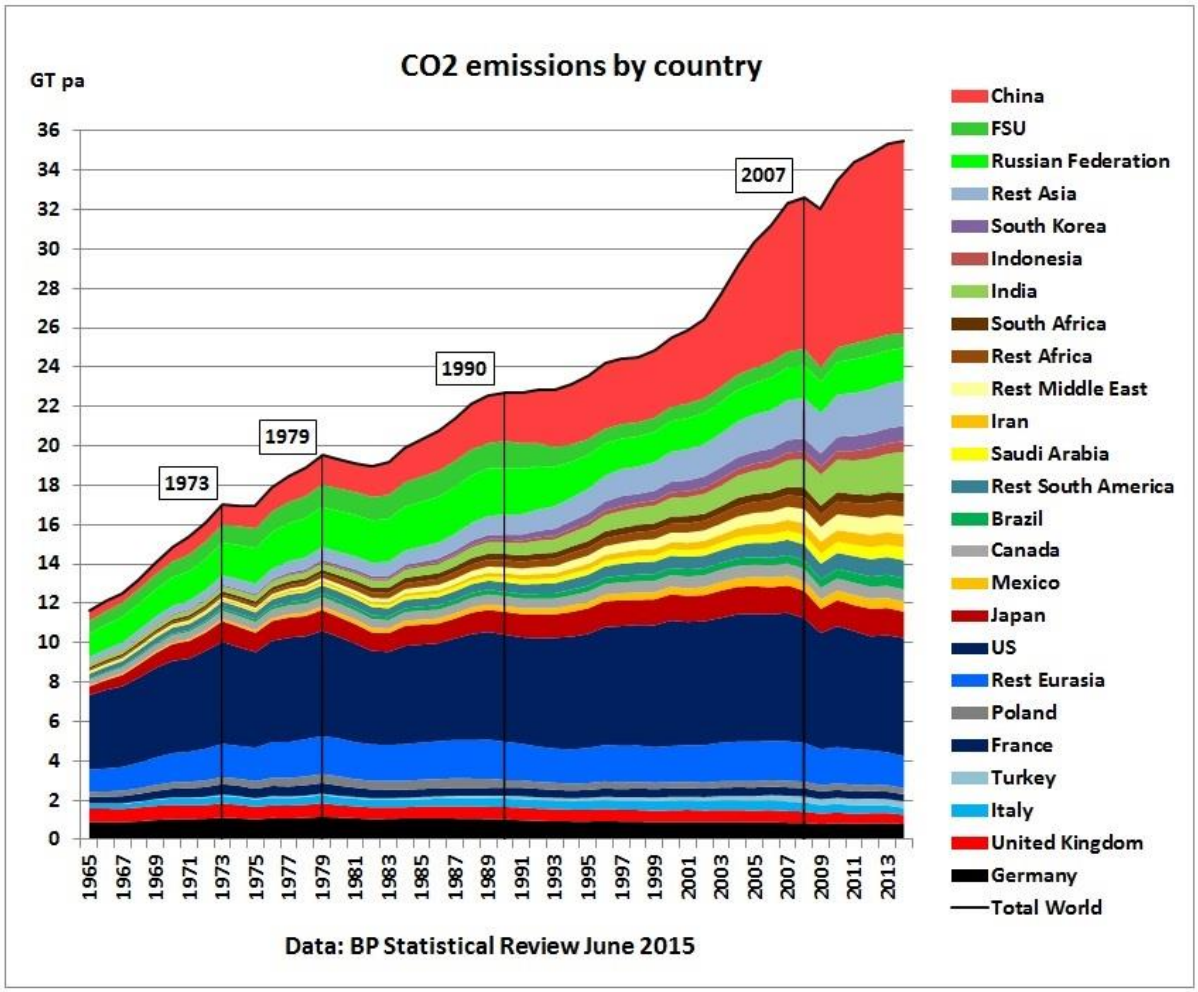
The proper solution would of course be:

(1) Replace all coal fired power plants by renewable energy for the EXISTING consumption
(2) Build up additional renewable power for your highrise pet projects

(3) Then build them if you still find prospective tenants.

What is now being done is the opposite. The cart is put before the horse.

Peak oil and CO2 emissions

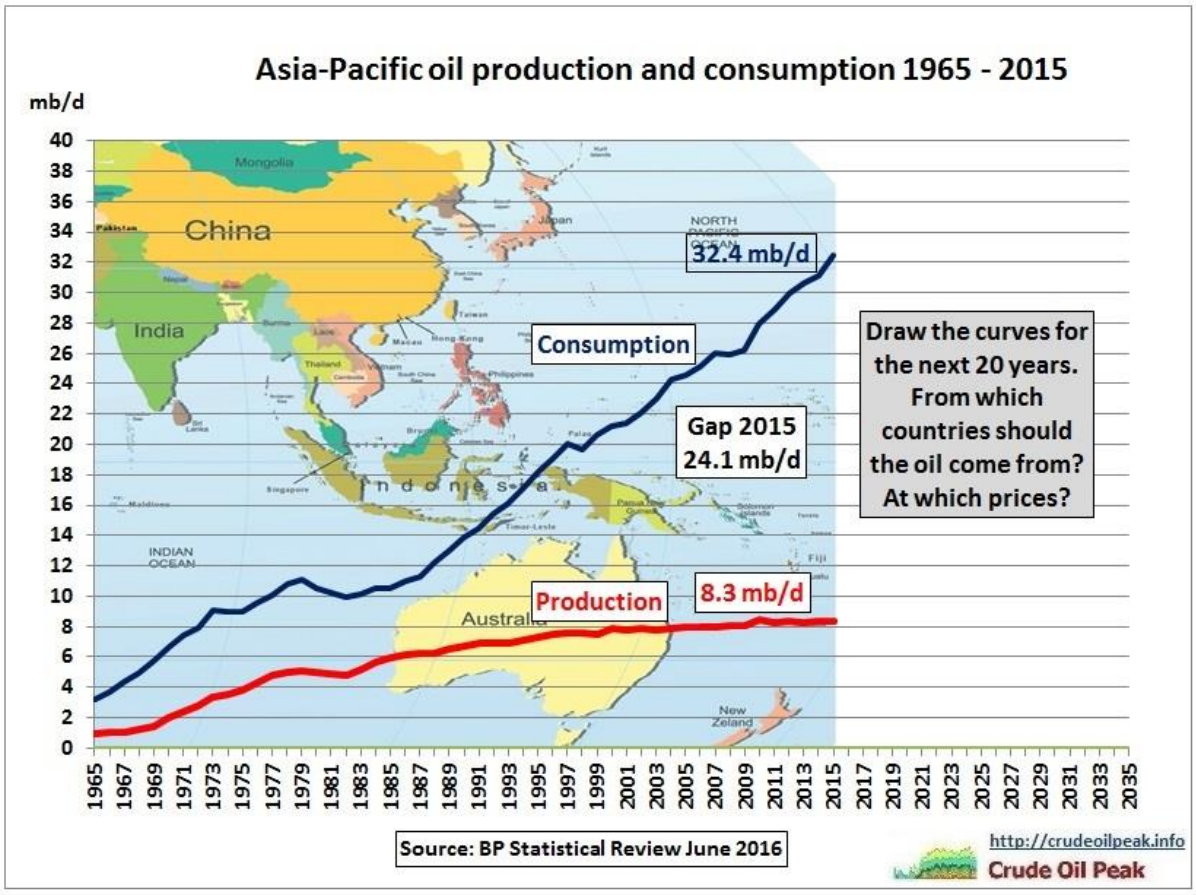


In the past, only oil crises have reduced CO2 emissions. This means that only peak oil will bring about a peak in annual emissions. So that is a good thing. Whether that will limit warming to 2 degrees is another question. I have done following calculations:

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

Badgerys Creek

Federal and State governments “dream” there will be a 850 million strong new Chinese Middle class with millions of tourists descending on us. Imagine how many additional pollutants from burnt jet fuel would end up in your lungs. But it won’t happen. Just fill out this graph:



Typical landing in high winds under global warming conditions:

Solutions

(1) Change you mindset from perpetual growth to preparing for hard, unpredictable times in the next years. The Treasurer hinted today at a recession
(2) IMMEDIATE reduction of overseas migration
(3) Crash program to secure oil supplies for agriculture and food transport to cities
(4) Do not convert Epping – Chatswood tunnel for single deckers to retain operational flexibility for double deckers
(5) Prepare for petrol rationing and car pooling
(6) Prepare to bail out Transurban with $12 bn debt
(7) Stop construction of NorthConnex or investigate whether this can be used as a rail tunnel
(8) Do not start WestConnex
(9) Do not start any infrastructure for Badgerys Creek
(10) Instead of an expensive Chatswood – Bankstown metro spend money for a rolling light rail PROGRAM (not project) on all arterial roads. Car lanes can be closed. Cost should not be more than $30 million per km plus rolling stock, maintenance yard, depot and power supply. Build up a light rail technical planning department with in-house staff (instead of expensive consultants) and employ subcontractors to do the very simple work of track laying, overhead wire installation, substation work, platform concreting and station shelters.
(11) Stop building highrises
(12) Stop building huge underground car parks
(13) Roll out bike lanes
(14) Decentralise to regional cities OUTSIDE the commuting distance of Sydney
(15) Introduce objectively verifiable indicators for this document

http://www.industry.nsw.gov.au/invest-in-nsw/regional-opportunities/economic-development-strategy-for-regional-nsw

So that you can measure progress

(16) All rolling stock to be manufactured in Australia, preferably in areas with high unemployment

(17) Electrify all interstate trunk rail lines otherwise capital cities will get disconnected in the next oil crisis as airlines will fall back into losses

In other words governments will be Ok by doing exactly the opposite of what they are doing now. My track record is excellent

http://crudeoilpeak.info/i-told-you-so/north-south-bypass-tunnel-clem7-brisbane
http://crudeoilpeak.info/airportlink-brisbane

Where is my 1 per mille success fee?

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