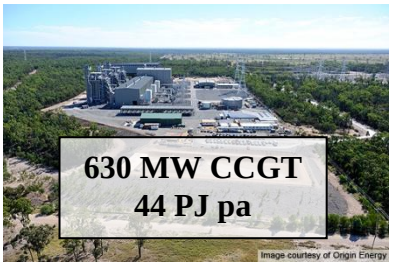
Submission to NSW Coal Seam Gas Inquiry September 2011

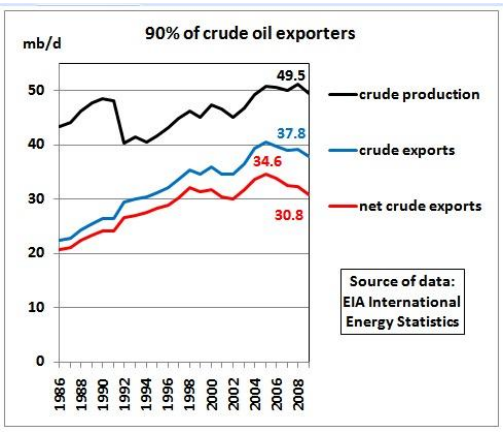
<<< LNG exports will make Australia poor in alternative transport fuels

Convert coal to gas >>>



<<< Use as alternative fuel

Net crude oil exports peaked in 2005, down by 30% in 2020>>>



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Note: the size of the images on the front page correlates to the annual gas consumption

Summary:

(1) The Federal Treasury's carbon price modelling for replacing brown coal in the Latrobe valley power stations by natural gas over a period until 2050 uses coal seam gas which has already been committed in LNG exports from Gladstone
(2) The whole East coast gas demand has been over booked by 78% in relation to 3P reserves and furthermore rests on the untested assumption that speculative 2C resources can be developed economically in a period of economic and financial challenges
(3) No gas has been set aside for use as transport fuel to replace dwindling oil production and declining global net oil exports which will lead to a deep global oil crisis within this decade
(4) No priorities have been set for the use of gas in Australia: (a) replace oil (b) replace coal
(5) The coal seam gas business in the context of the lack of international agreements to leave an energy equivalent amount of coal in the ground for good will INCREASE CO2 emissions.
(6) Every LNG ship generates future compensation claims, in particular from Asian neighbours whose river deltas will be flooded and whose population will head for the North of Australia to look for new cropping land.

Recommendations:

(a) Due to the interconnection of the East coast gas network the whole gas supply situation from Queensland to Victoria must be reviewed. It is already very late because many LNG projects in Queensland have already been approved and/or are under construction. This will have a negative impact on NSW.
(b) The Inquiry should first assess for which purposes how much gas is needed in NSW over the projection period. It is not sufficient to argue there will be gas demand growth of x percent. Requirements from utilities, generators, residential use, other projects **and for transport fuels** (equivalent to 5.5 LNG trains) must be specifically listed and **prioritised**.
(c.) On the gas supply side a clear distinction should be made between most economic 2P (proven and probable), more expensive possible resources (giving a total of 3P) and speculative 2C resources. 2P reserves must be set aside for priority uses.
(d) Under no circumstances should NSW embark on an LNG project as the gas will be needed for local uses.
(e) The Sydney Metropolitan Strategy must be urgently reviewed because the Planning Department has done no energy requirement calculations (oil, gas, coal) for its growth plans.
(f) Instead of an export bonanza, resource nationalism and conservation must be promoted.

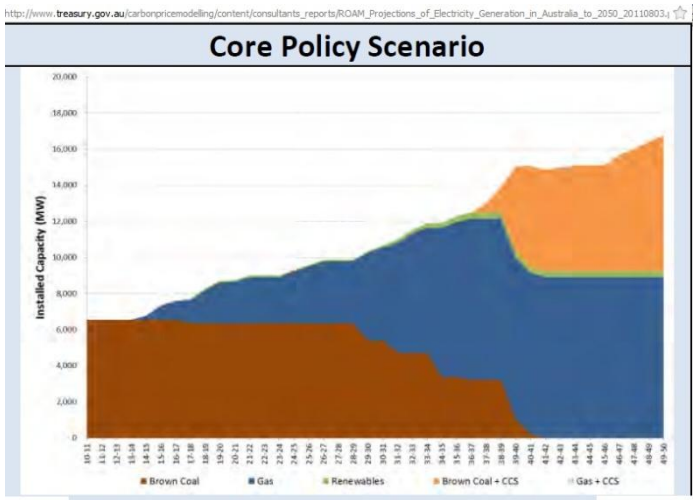
(1) CSG gas use in Treasury's carbon price modelling

The Treasury website on carbon price modelling
http://www.treasury.gov.au/carbonpricemodelling/content/consultantreports.asp

has this report from Roam Consulting dated 3/8/2011

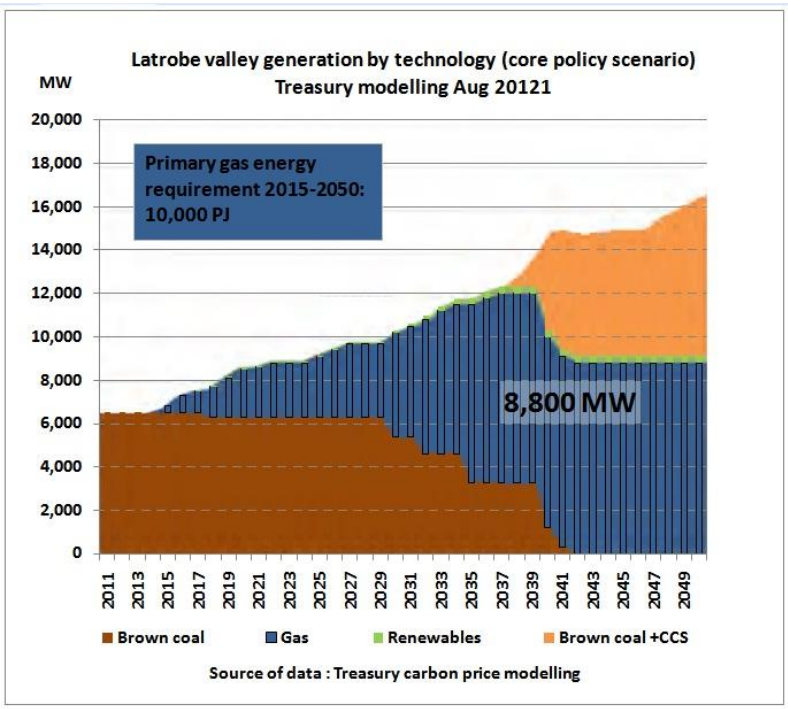
Projections of Electricity Generation in Australia to 2050
http://www.treasury.gov.au/carbonpricemodelling/content/consultants_reports/ROAM_Projections_of_Electricity_Generation_in_Australia_to_2050_20110803.pdf

It contains a graph on phasing out brown coal in the Latrobe valley under the "core policy scenario" by using various technologies:



evolution of Latrobe Valley generation by technology

Conventional use of brown coal in existing power plants is phased out and replaced by natural gas over the next 30 years. In the last 10 years of the projection period carbon capture and storage is assumed to be commercially viable, using again brown coal.
When digitising the graph in a spreadsheet



one finds that the gas plant capacity would have to reach 8,800 MW by the mid 2030s in order to allow a growth in electricity consumption of 2.5%

(1.1) Gas requirements Latrobe valley

These Latrobe valley brown coal power plants are base load plants. Let us assume they run 80% of the time so each 1,000 MW would produce 1,000 MW * 0.8 * 365 * 24 h = 7,000 GWh

Using 1 KWh = 3.6 MJ this would be 25.2 PJ pa

Taking an efficiency factor of 50% (some coal plants are running at 35% now) that would be a primary energy requirement of 50 PJ pa of gas for each 1,000 MW.

The total requirement would therefore be 8.8 * 50 = 440 PJ pa in 2037. The total gas requirement until 2050 would be roughly

Subtotal (1) 10,000 PJ until 2050

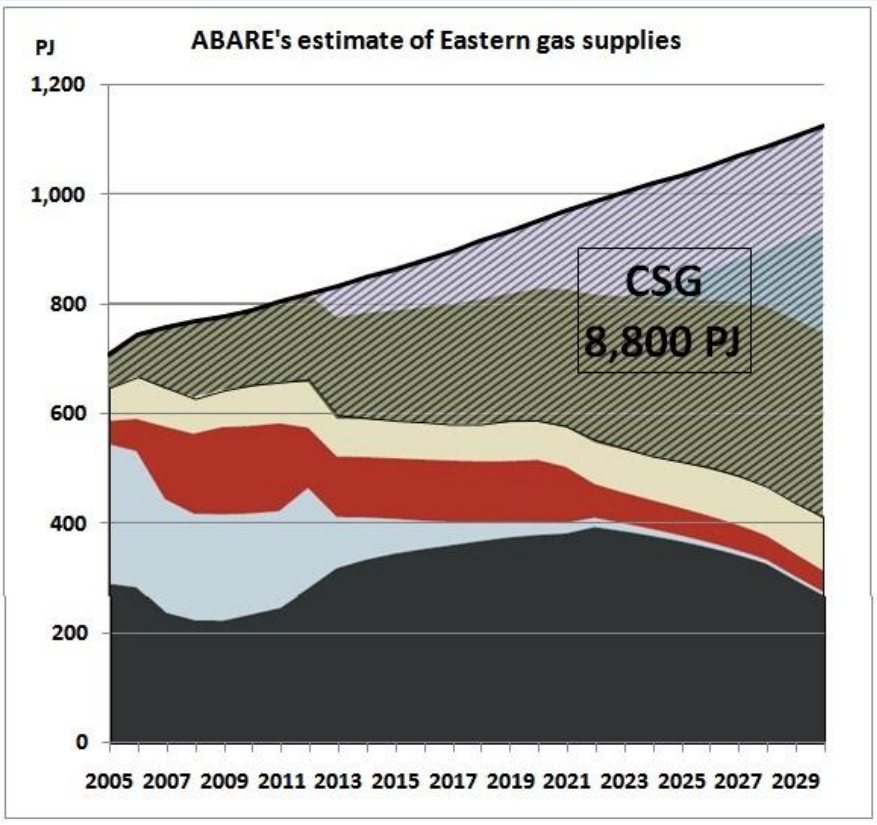
(1.2) Offseting conventional gas decline and providing for normal domgas growth

Conventional gas production from the East coast is fully booked for normal current and future demand.

Let us take ABARE report 06.26 (from December 2006) which actually concedes that Eastern gas demand will outstrip supply by 2012/13 - see page 42

http://adl.brs.gov.au/data/warehouse/pe_abare99001338/arr06.26_energy_projections.pdf

and calculate the total to fill the gap between conventional gas declining from 600 PJ pa to 415 PJ pa and demand going up to 1,100 PJ in 2030.



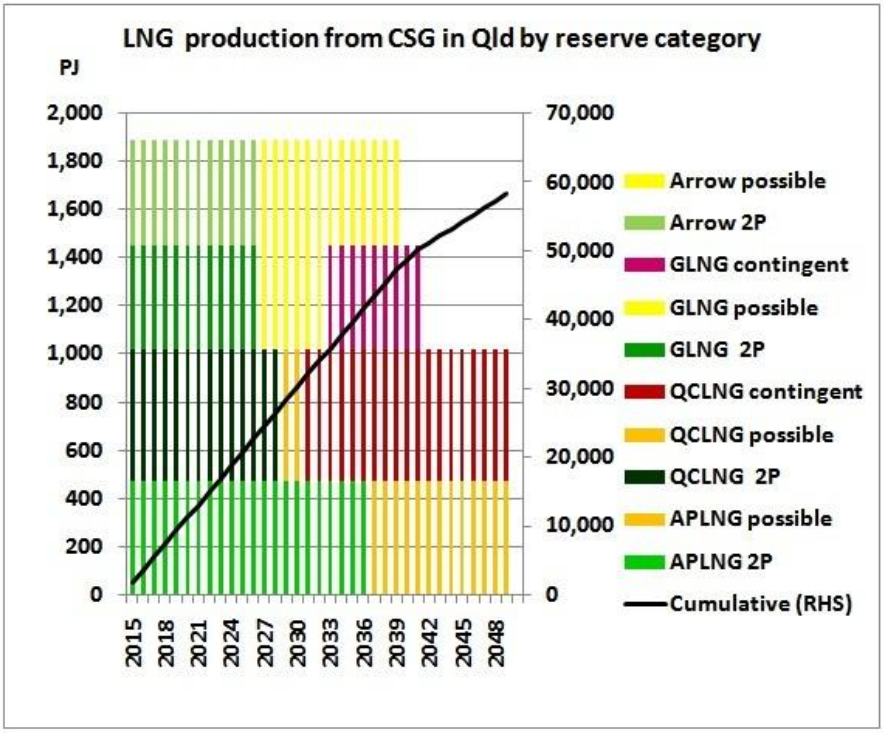
For 2030-2050 let us assume that gas demand remains at 1,100 PJ pa and conventional gas is petering out by 2050 so we'll need another

1,100 * 20 - 415 * 20 * 0.5 = 17,850 PJ

Subtotal (2) 26,650 PJ until 2050

(1.3) LNG exports from Queensland

We have following LNG projects in Qld with around 1,900 PJ pa. (without detailed phasing)



For comparison and to understand the magnitude of this exported energy, replacing the East coast's 33,000 ML of diesel and petrol consumed in 2009 - a quasi recession year - a minimum of 1,200 PJ pa would be needed.

The cumulative production in the above graph is:

2P reserves:	28,500 PJ
3P:	44,000 PJ
2C:	14,300 PJ

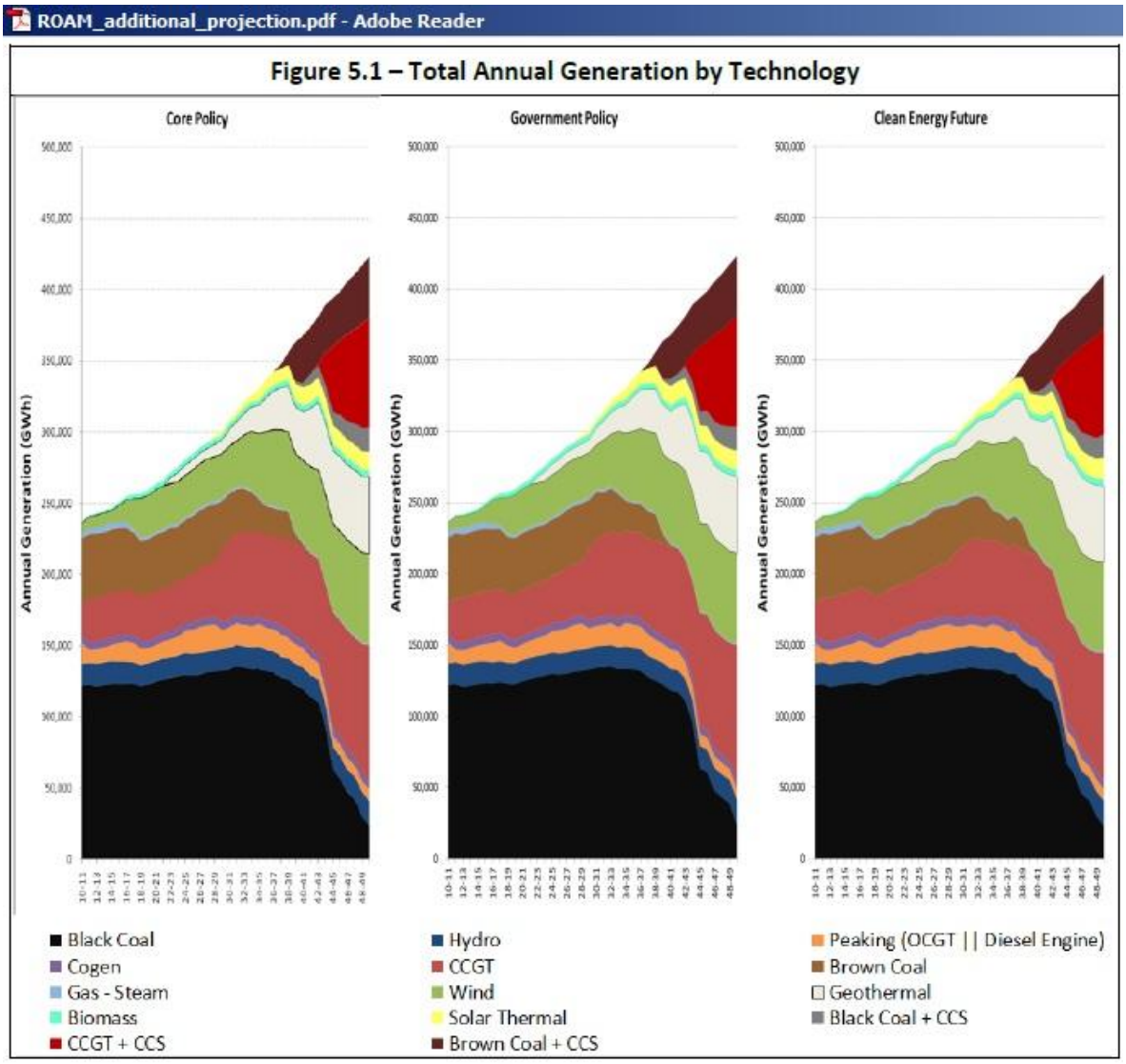
Subtotal (3) 3P plus 2C is 58,300 PJ

(1.4) Adding it all up until 2050

Treasury's Latrobe valley transition to gas:	10,000 PJ
Conventional gas decline offset and domestic growth:	26,650 PJ
4 LNG projects at Gladstone	58,300 PJ
Grand total	94,800 PJ

As we shall see under (1.6) this gas has been overbooked.

These are primary energy transition graphs in Roam's additional projections:



It should be noted that more gas than just that for the Latrobe valley will be required.

It goes beyond the scope of this submission to evaluate these graphs for underlying gas requirements but it should be clear from the following calculations that gas has been overbooked already on the basis of the Latrobe valley transition.

http://www.treasury.gov.au/carbonpricemodelling/content/consultants_reports/ROAM_additional_projection.pdf

(1.5) CSG reserves as at Dec 2010

CSG reserves as at Dec 2010 are taken from Energy Quest's website
http://www.esaa.com.au/content/detail/2011_ReportsandPublications_esaa_domestic_gas_study

110919DomesticGasProject_Stage2Report.pdf - Adobe Reader

ENERGY QUEST

Table 2 Australian coal seam gas reserves and resources December 2010 (PJ)

Field	Basin	Net (N)/ Gross (G)	Production PJ year ended Sept 2010	Reserves/Resources PJ as at December 2010			
				1P	2P	3P	2C
Queensland							
Origin Energy fields							
APLNG	Surat-Bowen	N	19	1 527	10 099	14 538	4 844
Spring Gully (minority interests)	Bowen	G			48	60	
ATP788P (Ironbark)	Surat	G				1 003	
Total Origin Energy Fields				1 527	10 147	15 601	4 844
QGC and BG Group operated fields							
QCLNG (excl Woleebee Ck)	Surat-Bowen	N	14.9	727	7 420	7 420	10 730
Woleebee Creek	Surat	G		26	280	853	221
Total BG fields				753	7 700	8 273	10 951
Shell/PetroChina operated fields							
Surat	Surat	G	6.6	472	4 648	6 375	
PL 191 Moranbah Gas Project	Bowen	G	4	336	998	2 040	
ATP 364P North Goonyella	Bowen	G			492	2 614	
Total Shell/PetroChina fields				808	6 138	11 029	
Santos-operated fields							
GLNG	Bowen	N	14	1 427	5 005	7 737	3 732
Mahalo (ATP 337)	Bowen	G					553
Other Queensland	Surat/Bowen	N					
Total Santos fields				1 427	5 005	7 737	4 285
Molopo-operated fields							
Mungi, Harcourt	Bowen	G	0.2	34	250	628	789
Lilyvale and Oak Park	Bowen	G			65	242	166
Timmy	Bowen	G					371
Total Molopo fields				34	315	870	1 326
WestSide							
Meridian Seamgas	Bowen	G	0.9	58	184	334	
Tilbrook/Paranui	Bowen	G				422	
Total WestSide fields				58	184	756	
Bow Energy							
Don Juan	Surat	G			101	195	
Blackwater	Bowen	G			59	1 596	173
Comet	Bowen	G				871	439
Vermont	Bowen	G					1 402
Total Bow Energy fields					160	2 662	2 014
Icon Energy (Lydia)	Surat	G					1 115
Blue Energy (Monslatt)	Bowen	G					454
Comet Ridge (Gunn Project Area)	Galilee						67
Total Queensland			59	**4 607**	**29 649**	**46 928**	**25 055**
NSW							
Eastern Star Gas (Narrabri)	Gunnedah	G	0	115	1 520	2 797	3 515
AGL-operated fields							
Gloucester	Gloucester	G		15	669	832	
Camden	Sydney	G	1.4	60	153	199	
Hunter	Sydney	G			142	271	
Total AGL operated fields			1.4	75	964	1 302	
Metgasco (South Casino)	Clarence-Morton	G		3	397	2 239	1 177
Total NSW			**1.5**	**193**	**2 881**	**6 338**	**4 692**
Total			**60.4**	**4 801**	**32 530**	**53 266**	**29 748**

The total of 3P and 2C is 83,014 PJ
http://www.esaa.com.au/Library/PageContentFiles/73077044-5eae-407b-99bc-da94a789349d/110919DomesticGasProject_Stage2Report.pdf

(1.6) Balancing it

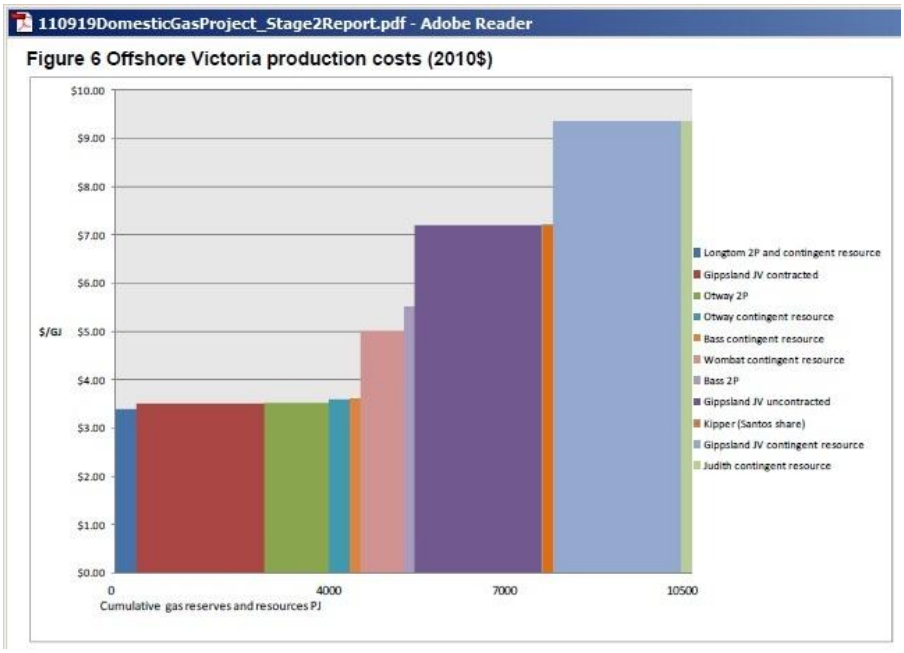
So from (1.4) we have a total gas demand until 2050 of 94,800 PJ which exceeds

East coast 2P reserves of 32,530 by 190%
East coast 3P reserves of 53,266 by 78%
East coast 3P + 2C resources by 14%

This means project participants and government bureaucracies are working on a set of numerous untested assumptions, namely that 3P and later 2C resources can be turned into 2P reserves,

- at the right price and at the right speed by drilling 1,000s of wells pa.
- fighting all land holders who are against it
- finding finance during the evolving debt crisis – which will NOT go away

It needs to be understood that the cost of producing gas is increasing as gas is produced. This graph shows how offshore production costs in Victoria almost triple as reserves are being developed and produced:



http://www.esaa.com.au/Library/PageContentFiles/73077044-5eae-407b-99bc-da94a789349d/110919DomesticGasProject_Stage2Report.pdf (March 2011, page 24)

This will be similar with non-conventional gas. It is to be expected that the gas industry will develop, produce and export the easy and cheap coal seam gas 2P reserves first (80% of 2P reserves for LNG is already consumed by 2026) and then proceed to the more expensive 3P and 2C resources. This means that when the gas industry will be called upon to supply gas for the domestic market, eg. for an oil to gas transition as calculated in chapter 2 there will be a big and bad surprise.

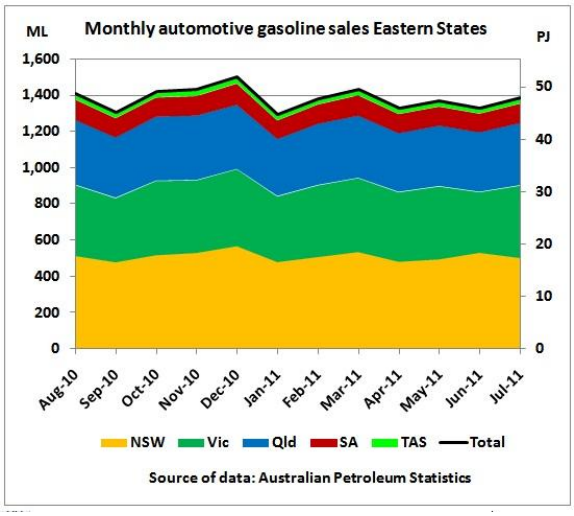
(1.6a) Calculation up to 2035 (=end of 1st 20 years of LNG exports), roughly

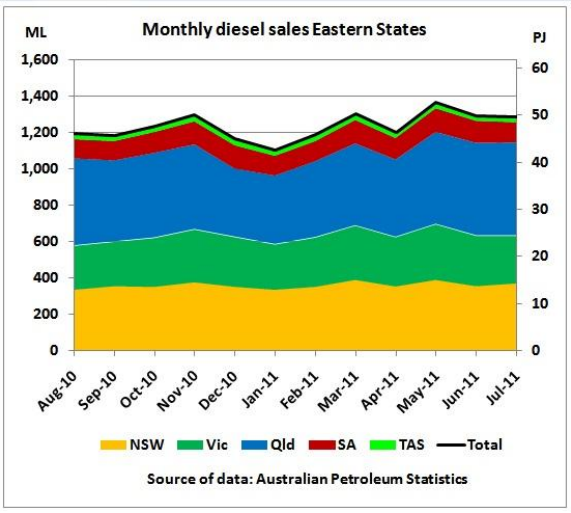
Latrobe gas conversion	3,560 PJ
Offset conventional gas decline	12,300 PJ
4 LNG projects	39,700 PJ
Total	**55,560 PJ also exceeding current 2P reserves**

(2) Replacing declining oil production by gas

The points covered above deal with what can be found in the documentation referenced above. But what is being forgotten is that there is a need to replace declining oil production both domestically and globally by using gas as a transport fuel. Appendix 2 describes the current oil supply situation and Australia's dependency on oil imports.

We have currently 1,200 PJ of petrol and diesel on the East coast to be replaced by gas.





The data for the above graphs are from the Australian Petroleum Statistics

http://www.ret.gov.au/resources/fuels/aps/pages/default.aspx

Speed of the transition from oil to gas

(2.1) Linear transition

Most models assume a smooth and peaceful transition, e.g:

CSIRO: Road transport sector modelling (July 2011)

http://www.treasury.gov.au/carbonpricemodelling/content/consultants_reports/CSIRO_Road_transport_sector_modellingv2.pdf

Therefore, let us assume linearly over 40 years (up to the end of Treasury's projection period) a transition away from oil.

40 years * 0.5 * 1,200 PJ pa = **24,000 PJ**

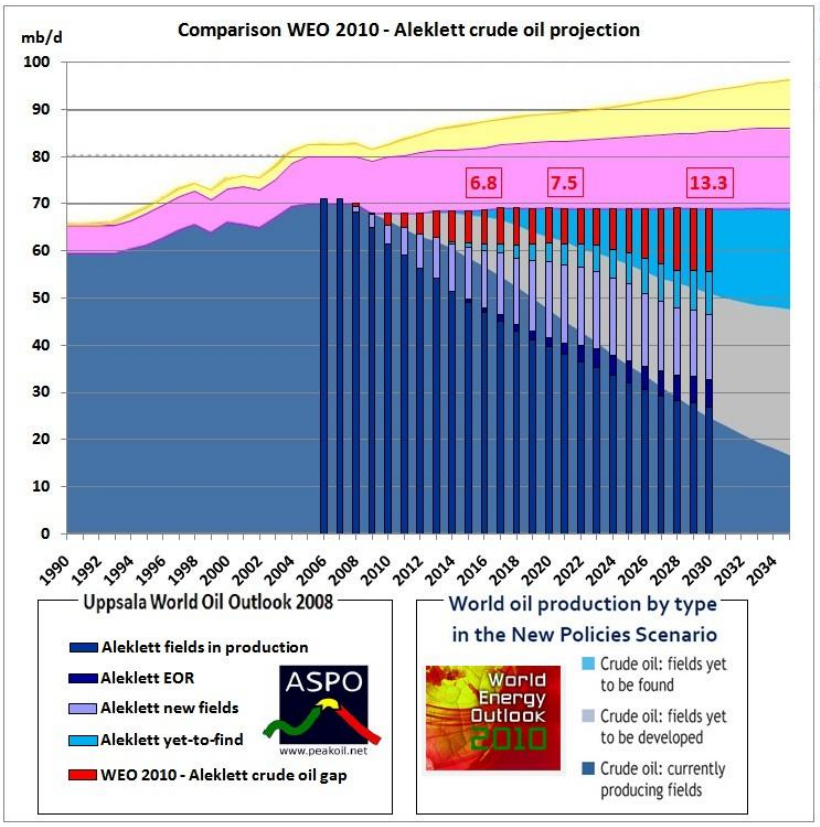
Such a linear transition would already require 300 PJ pa by 2020. The total transition to 1,200 PJ pa is the equivalent of 5.5 LNG export trains.

This simple calculation does not include any growth in demand for petrol and gas so this would be on the low side.

It could also be higher because 1 PJ of gas may yield less vehicle kilometres travelled (VKT) or ton km of freight as 1 PJ of petrol or diesel would achieve.

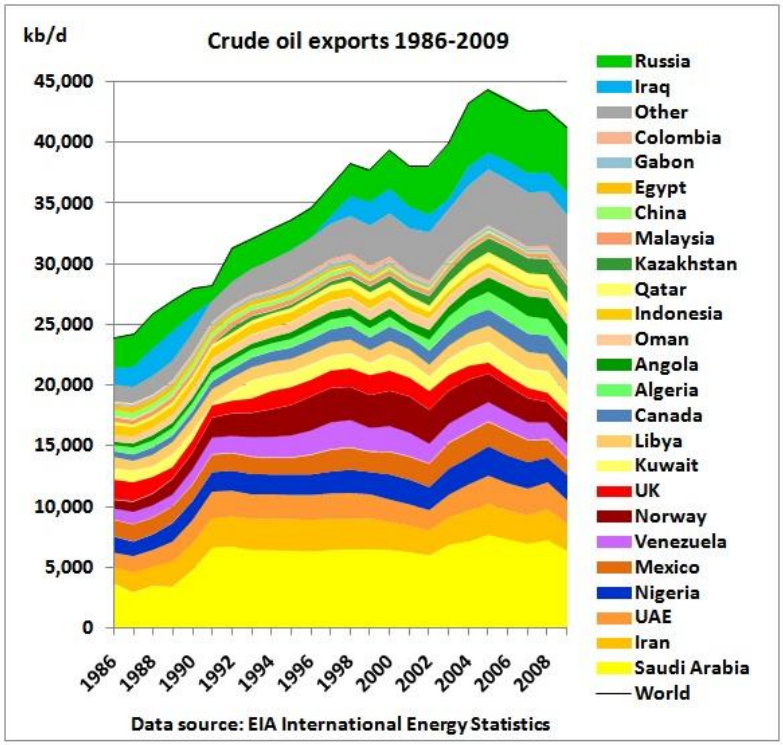
(2.2) Oil decline until 2020

Prof. Aleklett from ASPO http://www.peakoil.net/about-aspo/aspo-president
has calculated that the assumed oil extraction rates of the International Energy Agency in its WEO 2010 are too high and that crude oil production will decline by 6.8 mb/d by 2015 and 7.5 mb/d by 2020, around 10%



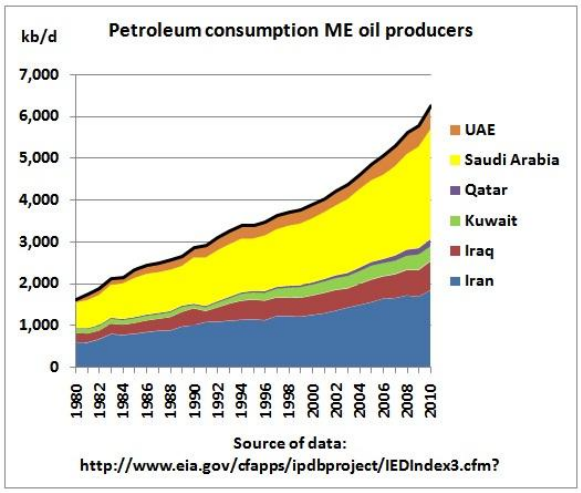
http://crudeoilpeak.info/aspo-2020-crude-oil-production-down-by-around-8-mbd

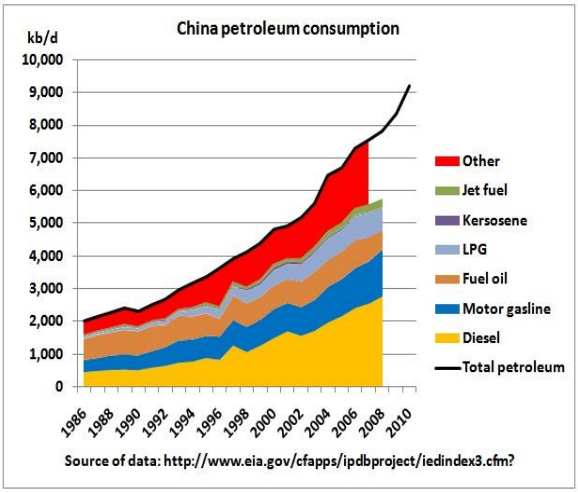
Global crude oil exports have already peaked in 2005



Many oil exporters have become also importers in the last decade so net oil exports available on the global market have shrunk even more than the total volume of exports. Therefore, global net crude oil exports will decline faster than global production.

As an example, in the Middle East, petroleum consumption went up by 2.4 mb/d in the last 10 years (left). China also eats into the cake of crude oil exports available to the rest of the world (right).

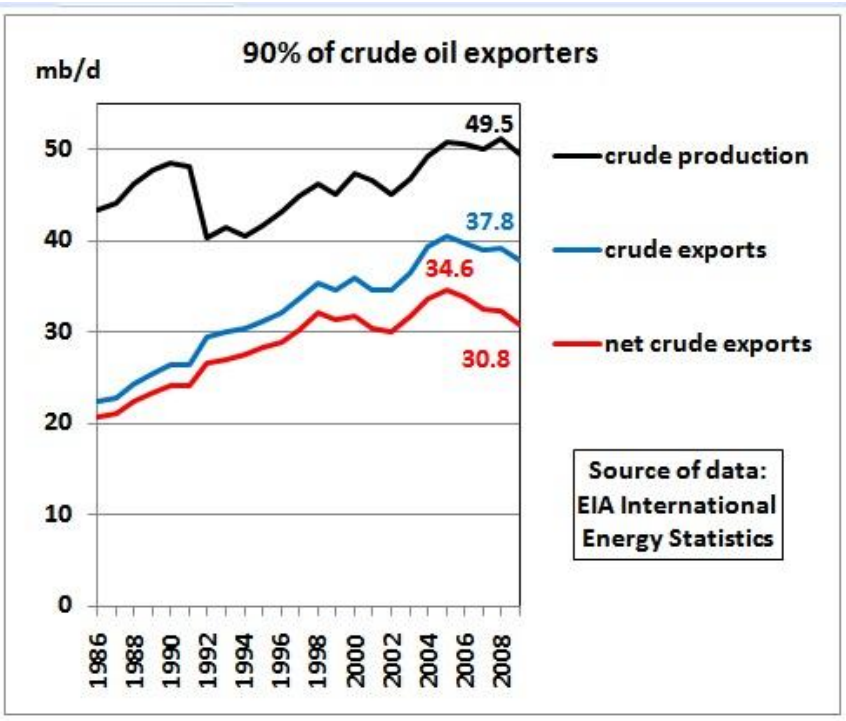




The following graph shows net crude oil exports (exports – imports) of 90% of crude oil exporters. China - although not a major oil exporter - is included with 3.9 mb/d of imports in 2009 so that the net oil exports reflect the oil available to the rest of the world, a point which was made by petroleum geologist Jeff Brown in response to a recent article in the Wall Street Journal "There will be oil":

An additional metric is Available Net Exports (ANE), which we define as Global Net oil exports less Chindia's (China + India's) combined net oil imports

http://www.energybulletin.net/stories/2011-09-18/daniel-yergins-letter-peak-oil-community-and-rebuttal

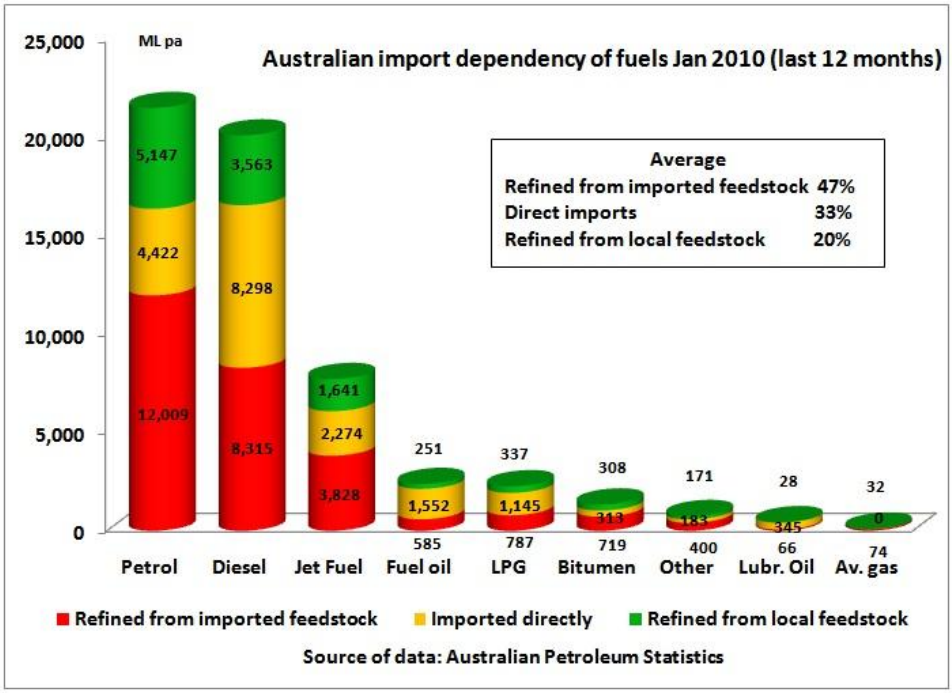


Net crude exports peaked in 2005 and declined by 3.8 mb/d in 4 years. If this trend continues, net crude exports could be down by around 10 mb/d in 2020 or by 30%. Add a decline in production of 10% (see ASPO's estimate above) and there could be some very dramatic decreases in available net oil exports. It is possible that continuing high oil prices or a recession will reduce demand for oil imports so it is assumed here that the combined effect of production and export decline will still be around 30%.

It should be noted that these scenarios are peaceful scenarios **without** oil and energy wars in the Middle East. However, as we are in year #7 of peak oil and as we have seen in the last months it is unlikely that the evolving oil crunch will go without fights. When war breaks out in the Middle East it will be bitterly regretted that no oil to gas transition was done earlier.

(2.3) Oil replacement requirement until 2020

Australia's oil import dependency is 80%.



So we would need to replace until 2020

Petrol: 0.3 * 16,400 ML = 4920 ML = 172 PJ pa (@ 35 MJ / litre)
Diesel: 0.3 * 16,600 ML = 4980 ML = 181 PJ pa (@ 36.4 MJ / litre)

Annualy 353 PJ pa, this is the equivalent of 1.6 LNG trains (1 train = 4 mt pa or 220 PJ pa)

Appendix 1: The equivalent of conventional gas reserves consumed in just 20 years

From the Australian Energy Resource Assessment chapter 4 on gas (West coast and East coast together, March 2010) we find this estimated production profile:

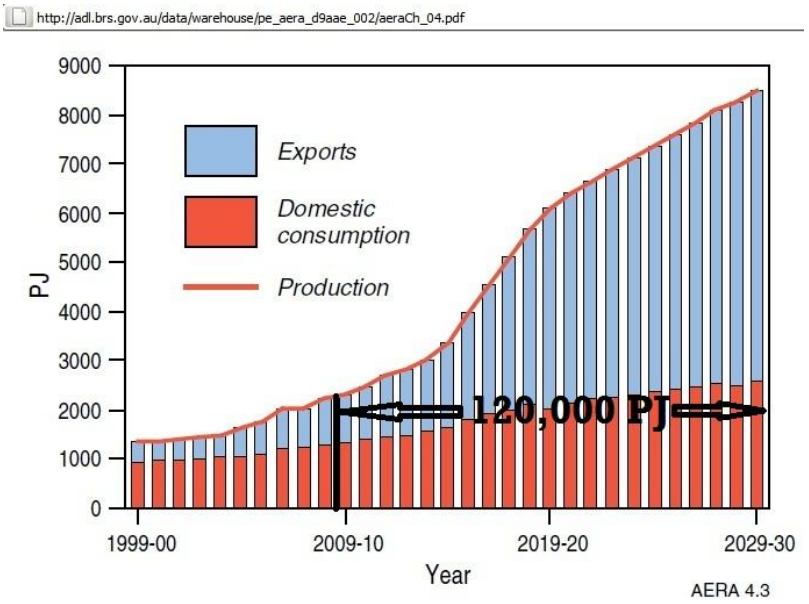


Figure 4.3 Outlook to 2030 for the Australian gas market

Source: ABARE 2009a, 2010

http://adl.brs.gov.au/data/warehouse/pe_aera_d9aae_002/aeraCh_04.pdf

The total assumed to be produced between 2009 and 2030 is 120,000 PJ, 37% domestic consumption and 63% exported. This is approximately the ***equivalent*** of the total "Economic Demonstrated Resources" of conventional gas (Jan 2009) as can be seen from this table:

Australian Energy Resource - Chapter 4 - Gas - Adobe Reader

Table 4.7 McKelvey classification estimates by basin as at 1 January 2009

McKelvey Class.	Basin	Gas	
		PJ	tcf
EDR	Carnarvon	81 400	74
EDR	Browse	18 700	17
EDR	Bonaparte	11 000	10
EDR	Gippsland	7 700	7
EDR	Other	3 300	3
Total EDR		**122 100**	**111**
SDR	Carnarvon	22 000	20
SDR	Browse	17 600	16
SDR	Bonaparte	15 400	14
SDR	Gippsland	1 100	1
SDR	Other	2 200	2
Total SDR		**58 300**	**53**
Total (EDR + SDR)		**180 400**	**164**
Inferred Resources		~22 000	~20
Total		**202 400**	**184**

Source: Geoscience Australia 2009

The gas resources are classified as EDR and SDR

Conventional gas

EDR= Economic Demonstrated Resources (2P = proved and probable)

SDR= Subeconomic Demonstrated Resources

Will the SDR ever be produced? Can the economy afford to pay higher prices for this gas?

Australian Energy Resource - Chapter 4 - Gas - Adobe Reader

Table 4.20 Outlook for Australia's gas markets,

	2029–30	Average annual growth 2007–08 to 2029–30
	PJ	%
Eastern gas market		
Production	2861	6.7
conventional gas	353	-2.2
coal seam gas	2507	14.9
Consumption	1501	3.6
Exports	1360	-
Northern gas market		
Production	677	4.5
Consumption	93	2.2
Exports	583	5.0
Western gas market		
Production	4968	7.1
Consumption	982	3.2
Exports	3986	9.0
Australian total		
Production	8505	6.7
Consumption	2575	3.4
Exports	5930	9.5

Note: Production includes imports from JPDA
Source: ABARE 2010

The above production profile contains coal seam gas with an assumed production of 2,507 PJ pa in 2030, from following reserves:

Australian Energy Resource - Chapter 4 - Gas - Adobe Reader

Table 4.9 CSG Resources at December 2008

CSG Resources	PJ	tcf
Economic Demonstrated Resources	16 590	15.1
Sub-economic Demonstrated Resources	30 000	27.2
Inferred Resources	122 020	111
Total	**168 610**	**153**

Source: Geoscience Australia 2009; Queensland Department of Mines and Energy 2009; subeconomic and inferred resources compiled by Geoscience Australia from company reports and other pubic domain information

Please note that CSG EDR and SDR have increased since this assessment (as quoted from Energy Quest above) but the total production and use of gas in comparison to EDR reserves is shockingly high. **The public is being told gas reserves will last x hundred years at current production levels**. But these production levels will be increased almost 10 fold. So the gas industry's arguments are misleading just like the oil industry's argument that oil supplies will last for 40 years.

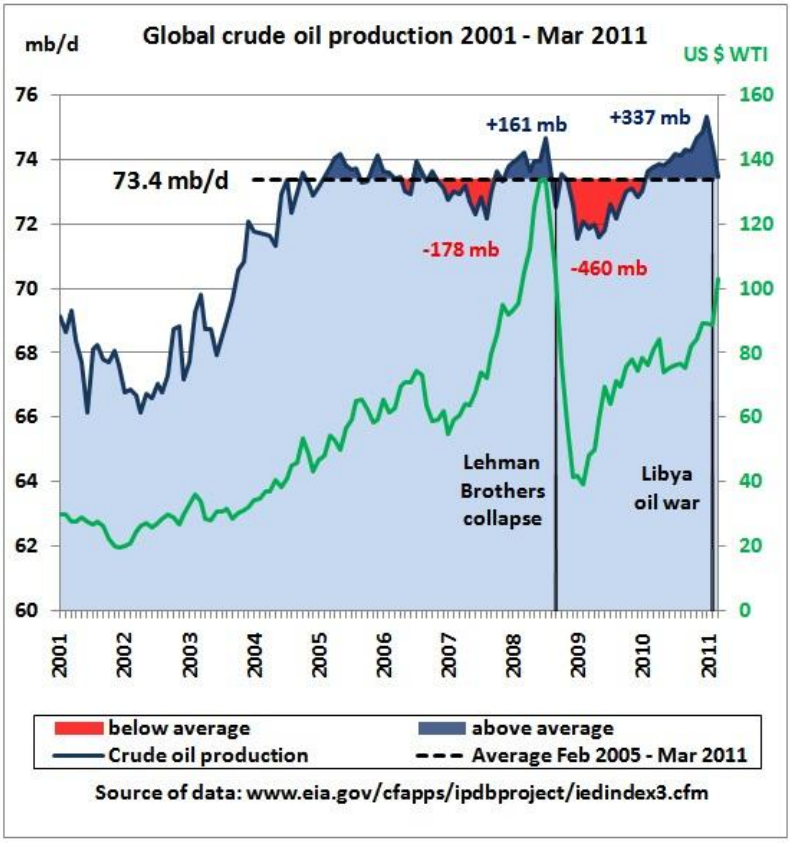
It is an untested assumption that an economy damaged by peak oil is strong enough to finance the development of inferred gas resources for which no production cost estimates have been done.

Peak oil and LNG export concerns were already raised in 2004 with the Howard government

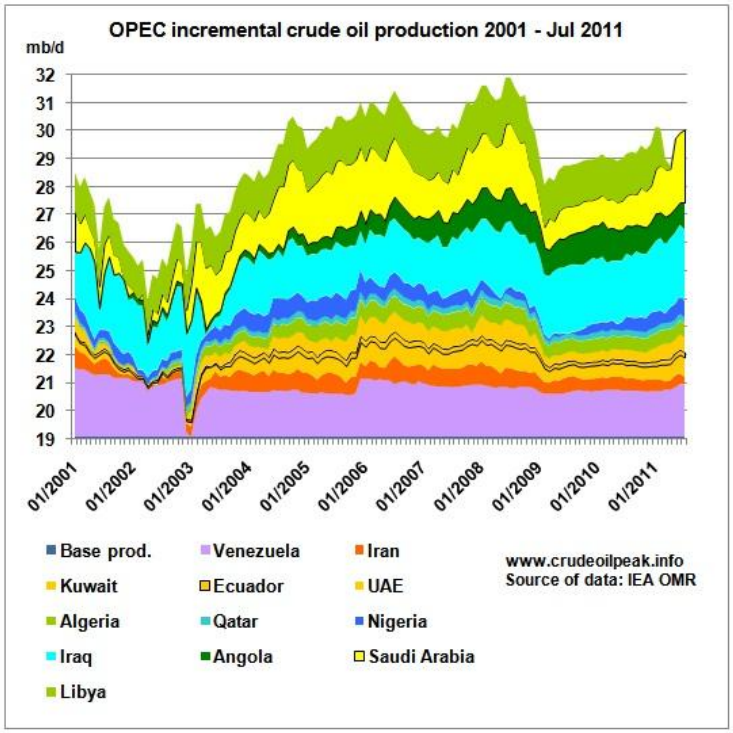
8/11/2004 Critique of Energy White Paper June 2004
http://www.crudeoilpeak.com/?p=208

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

Appendix 2 – peak oil



Global crude oil production remained on a bumpy plateau since 2005

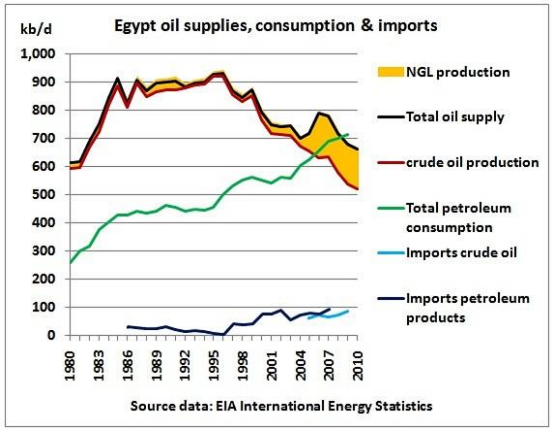


OPEC has peaked. We can clearly see that Saudi Arabia could not immediately increase production to compensate for production losses in Libya. The Strategic Oil Reserve had to be used. The IEA definition of spare capacity is to activate extra production within 30 days and maintain it for 90 days. Further details are on my websites

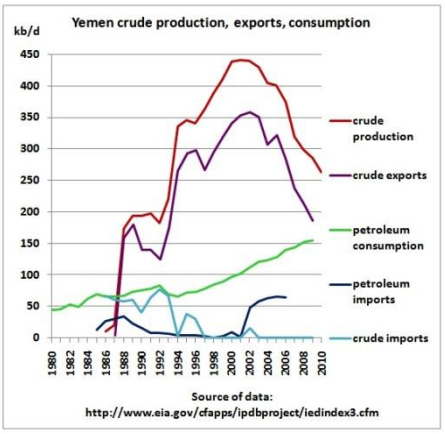
http://www.crudeoilpeak.com/ and http://crudeoilpeak.info/

Disintegration of MENA countries

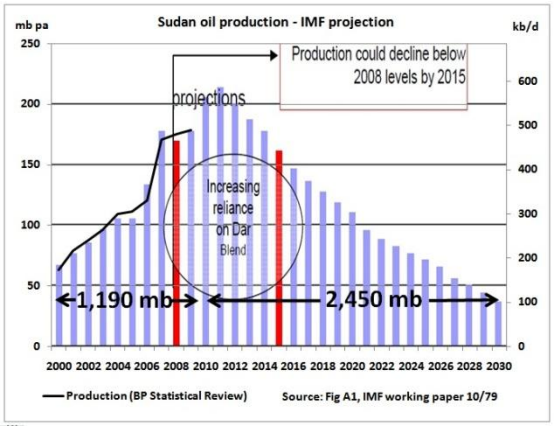
Peak oil in several key countries has left dictators with less money to distribute to their oppressed population:



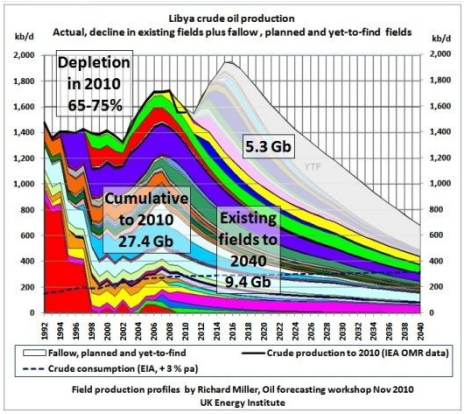
Egypt must import oil now at world market prices



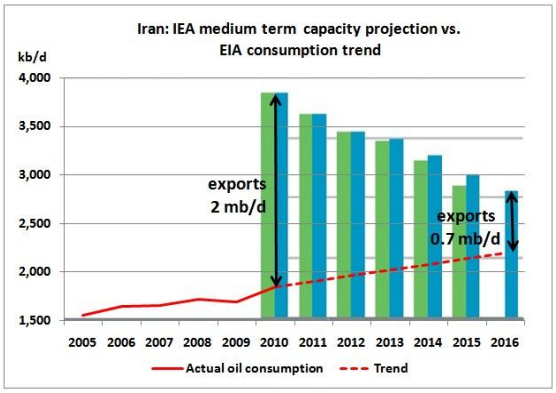
Yemen's oil peak



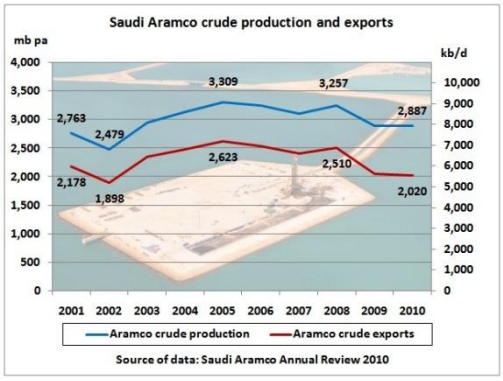
Sudan: oil in the South, pipelines in the North



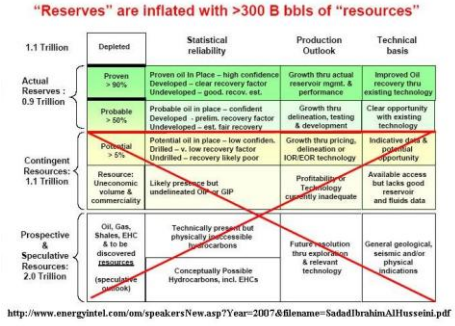
Libya: surprises ahead



Iran heading towards oil export extinction



Saudi exports have peaked



<<< OPEC paper barrels crossed out by Ex-Saudi Aramco chief Sadad al Husseini at an oil and money conference in October 2007 in London, organised by Energy Intelligence.

The equivalent of 30 years OPEC oil supplies are speculative resources, not easily or economically recoverable reserves.

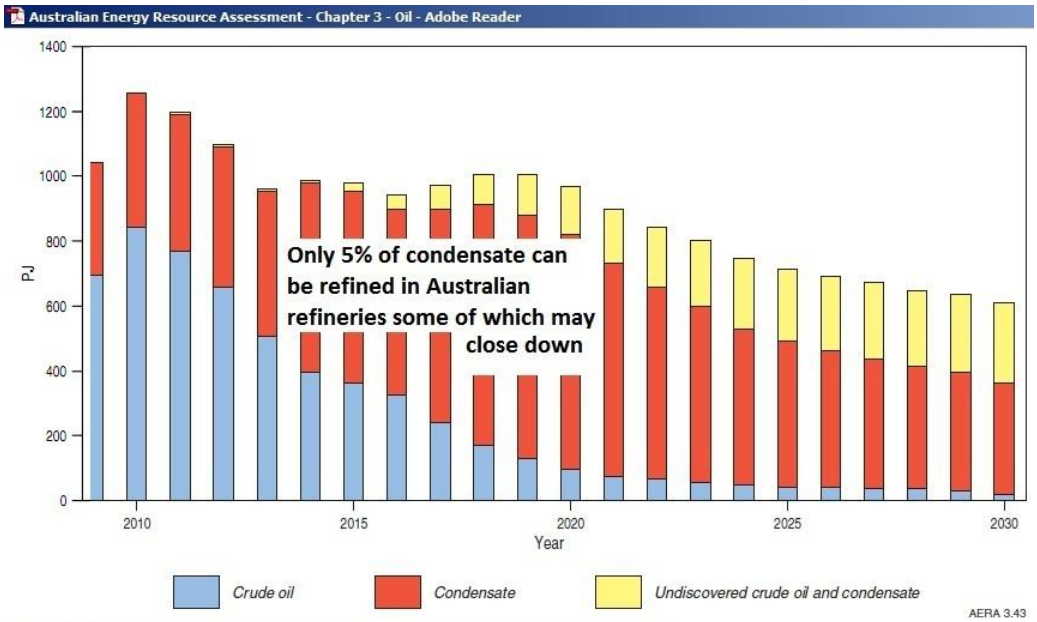
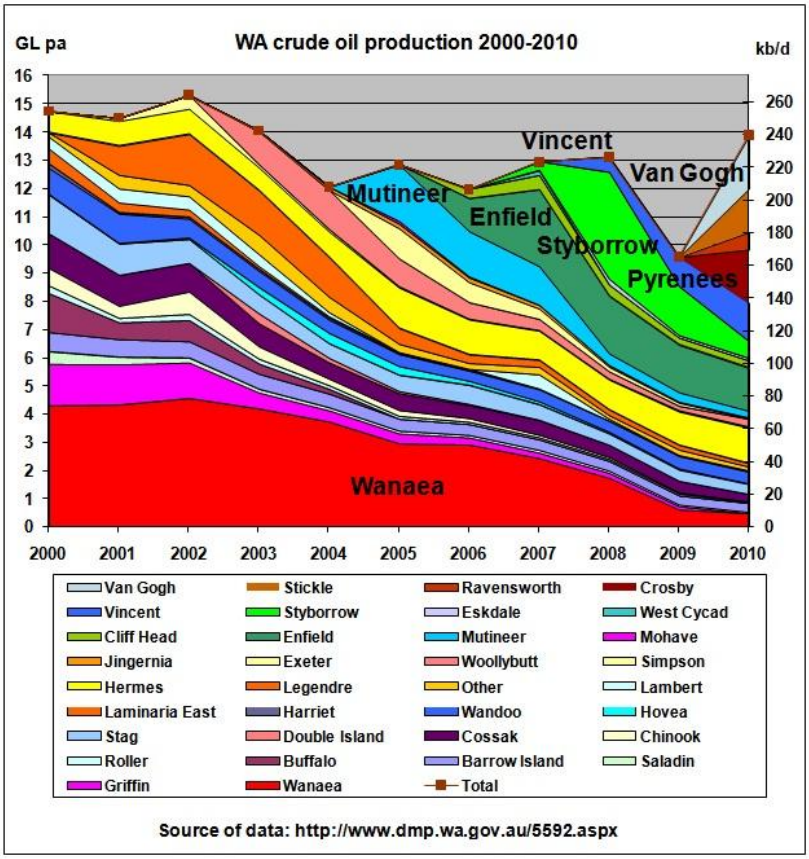


Figure 3.43 Australian oil production outlook from proven hydrocarbon basins

http://www.abare.gov.au/publications_html/energy/energy_10/ch_3.pdf

Australian crude oil equivalent to almost 4 LNG trains will be gone in just a decade.
Question: Why are we exporting all our energy?



Crude oil production in WA increased again in 2010 but the underlying decline in maturing fields is clearly visible. Once the new fields peak the decline rate is given by these old fields.

Read: 11/7/2011 WA crude oil depleted by 75%
http://crudeoilpeak.info/wa-crude-oil-depleted-by-75-pct

Appendix 3: Green house gas emissions from CSG and priority use of gas

(a) LNG exports

Total global CO2 emissions will be reduced by LNG exports from CSG only if there are binding intergovernmental agreements in place which force destination countries to leave an energy equivalent amount of coal in the ground, for good. This is because CO2 is a long lived gas 30 % of which stays in the atmosphere for more than 100 years. See

Bern's CO2 impulse response function
http://unfccc.int/resource/brazil/tuning_carbon/bern_irf.gif

from this article:
http://unfccc.int/resource/brazil/carbon.html

It is NOT sufficient to argue that CO2 emissions from e.g. CCGT power plants in which LNG might be used are lower than those from coal fired power plants. The existing coal fired power plants in the destination countries must be REPLACED. If this is not done, CO2 concentrations in the atmosphere will just increase as CO2 from gas is added on top of that from coal. Australian LNG burnt in Japanese power plants replacing nuclear power will add to CO2 emissions 100%. It is not Australia's national job to solve energy problems in other countries.

NASA climatologist James Hansen has calculated that on a global basis the production of 50% of non-conventional gas will increase CO2 concentration in the atmosphere by 50 ppm

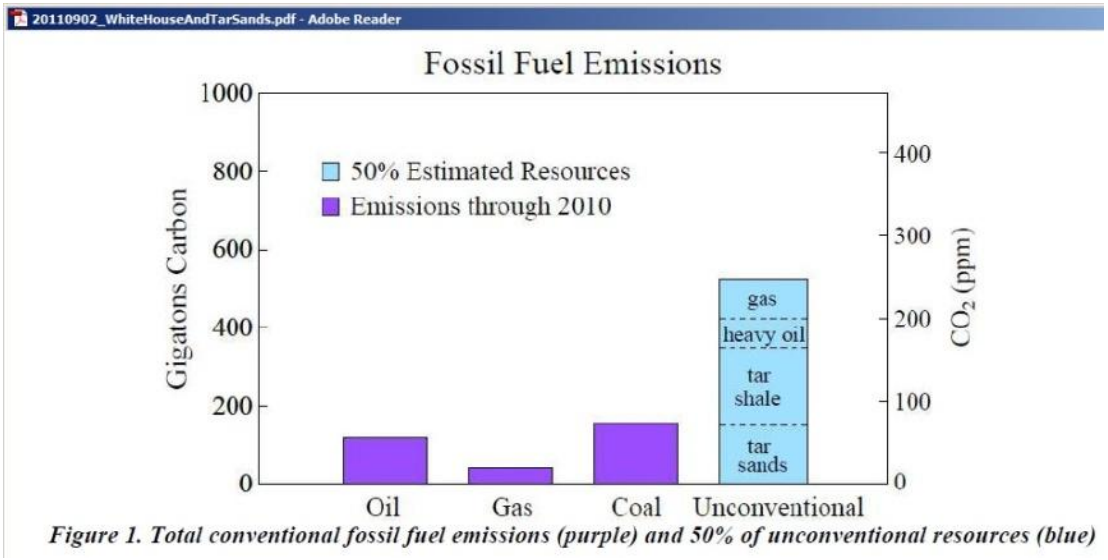


Figure 1. Total conventional fossil fuel emissions (purple) and 50% of unconventional resources (blue)

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

(b) CSG gas for CCGT power plants in Australia

Santos writes in its submission 337 (page 5):

"Gas fired power stations can replace higher carbon dioxide emitting coal fired power stations"

"can", yes, but they don't. On page 13 Santos writes:

"1,500 MW of new gas fired baseload generation has also been added to the NEM in the last ten years."

Santos fails to submit a list of coal fired power plants which have been replaced. The same applies to the peaking generation plus renewable energies. Also on page 13:

Since 2001, 4,300MW of gas fired peaking generation capacity has been added to the NEM. This trend of increasing renewable generation and complementary gas fired generation is expected to continue and increase as more intermittent renewable capacity is commissioned to meet the MRET targets.

Even if Australian coal fired power plants were replaced, if the coal so saved is then exported, there is no reduction in CO2. In fact, there is no intention whatsoever of the Federal government to reduce coal production:

Just a couple of days ago, on 22/9/2011, the Climate Change Minister (!!!) proudly announced:

Mr COMBET (Charlton—Minister for Climate Change and Energy Efficiency) (15:03): .....
But let's look at the coal industry and the facts in relation to that as well. The allegation made is that the industry will be destroyed; the fact is jobs will grow. Investment is growing—$70 billion of investment—19 new mines are coming.

http://www.aph.gov.au/hansard/reps/dailys/dr220911.pdf

In other words, to sum it up, coal seam gas in the context of other policies (or lack thereof), will just prolong Australia's fossil fuel addiction and INCREASE over-all emissions and the amount of CO2 remaining in the atmosphere.

(c.) Coal seam gas replacing oil

CO2 emissions from burning crude oil will go down with declining oil production. NASA climatologist James Hansen has assumed in his calculations that all oil will ultimately be burned and end up in the atmosphere as CO2 no matter whether we increase fuel efficiency in vehicles or not. When replacing oil by gas as transport fuel CO2 emissions will at least not go up. But like with all other gas uses, priorities will have to be set when converting to gas as transport fuel:

(i) Emergency vehicles
(ii) Agricultural machinery and trucks transporting agricultural implements and bringing food to the cities
(iii) Locomotives and all machinery and trucks working on rail (but not highway) projects
(iv) Trucks and diesel operated machinery used in utility sector (water, sewer, power etc.) and the renewable energy sector in particular
(iv) Trucks transporting other essential goods, materials and inputs for industry to work but not unnecessary consumer goods
…..list to be continued but the above gives an idea

The last priority would be to convert private cars to CNG.

The only sustainable land transport system is electric rail using renewable energies (solar thermal, geothermal, wind etc. – they all produce electricity, not fuels)

Appendix 4: Future of coal 10 years – will lead to serious electricity crisis

8/3/2010

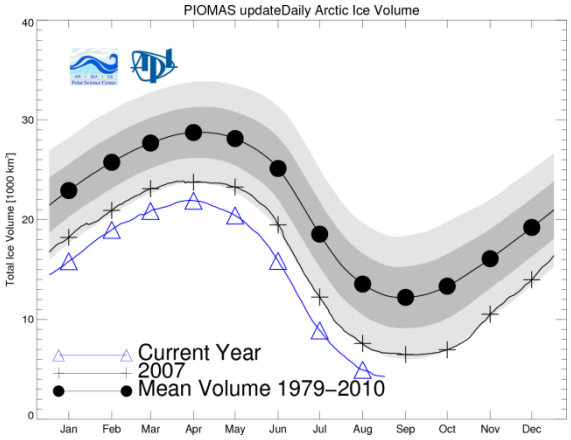
NASA climatologist James Hansen at Sydney Uni: "Australia doesn't agree now that they got to stop their coal, but they are going to agree. I can guarantee you that within a decade or so because the climate change will become so strongly apparent that's going to become imperative"

http://www.usyd.edu.au/sydney_ideas/lectures/2010/professor_james_hansen.shtml

One of the critical tipping points is the melting of the Arctic summer sea ice which will not only lead to more absorption of sunlight from space but will also change the whole climate on the Northern hemisphere in yet unknown ways.

Arctic sea ice volume estimated by NSIDC >>

Current trends suggest that sea ice volume in September goes towards zero already in this decade.



http://psc.apl.washington.edu/wordpress/research/projects/arctic-sea-ice-volume-anomaly/

At present, every month is wasted in Parliamentary debates instead of getting on with the job of replacing coal fired power plants with renewable energies like solar and wind. Moreover, new, energy hungry projects like Barangaroo and many other high rise developments have been approved and/or are under construction, which will add to more demand for coal fired electricity. This energy ignorance will worsen the evolving electricity crisis.

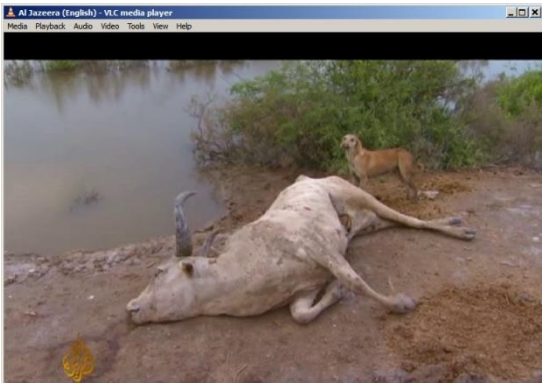
http://www.heraldsun.com.au/news/special-reports/floods-halt-brisbanes-economy/story-fn7kabp3-1225986227911

Flooded coal mine near Rockhampton: Revenge of nature as moisture in the atmosphere increases with global warming. Read Tony Jones' interview with James Hansen: http://www.abc.net.au/lateline/content/2008/s2764523.htm

Dust storm in Phoenix

Hurricane Irene tests NY skyscrapers

Floods in Pakistan Monsoon 2011



Dead Livestock in Pakistan 2011

Hail stones in Poland September 2011

Manila flooded September 2011

Question:
How do energy planners think that will be in 10 years time?

Huge compensation claims will have to be paid by the fossil fuel industry

Salt water intrusion in coastal areas of Bangladesh from sea level rises and storms destroys all vegetation and farmland

M.H. Talukder, State Minister, Water Resources (Bangladesh)

"Regionally, we are sufferer, and it is not created by us, it is our national argument that the responsible parties must compensate for it"

http://www.youtube.com/watch?v=UisJSsPw-U0

Every LNG ship, every coal ship will generate future compensation claims which will be acted and decided upon by courts, possibly even by the ICC which deals with genocide.

Already with existing CO2 in the atmosphere there will be sea level rises which will flood major river deltas in South East Asia resulting in mass migration to where? Australia's North which has also a monsoon season climate will be a major destination.

9/4/2010
Australian Population Scenarios in the context of oil decline and global warming http://crudeoilpeak.info/australian-population-scenarios-in-the-context-of-oil-decline-and-global-warming