Comments on

Barriers to effective Climate Change Adaptation

(A) Summary

The biggest barrier to adaptation is lack of understanding the physics of global warming by governments, the corporate sector and the banking system. To overcome this, a pro-active education program of the Federal government must be put in place, using web-sites, print media and ABC Radio/TV. The latter works still on the assumption of global warming being a topic for an endless debating club competition as exemplified in the recent Q&A show "Can I change your mind"

NASA climatologist James Hansen has given Australian coal just 10 years meaning the mining industry will be in big problems in the next decade. Together with the prospect of global oil production declining (peak oil - which is a complex process - started in 2005) and the evolving debt crisis the convergence of these factors will impact on public budgets and also on super funds. Therefore, the window of opportunity to fund adaptation measures e.g. against sea level rises, may be limited to just one decade.

The PC report must assume worst case scenarios when confronted with uncertainties. This means to determine safety factors which keep adaptation measures away from continuing future damages ("rebuilding along transient coast lines" - Hansen)

Adaptation should be paid for by those who caused the global warming problem in the first place, on a pro-rata basis, and this is the fossil fuel industry. Hansen says what matters is cumulative emissions, but in court many CO2 emitters will claim the CO2 problem was not known until at least the 1970s and 1980s. It could well be that the 2007 IPCC report will be taken as the threshold year from whereon everyone was reasonably expected to have known that human CO2 emissions are causing global warming. So cumulative emissions since 2007 could be used to allocate responsibilities for paying adaptation measures. Courts will decide. The PC report needs to check on this legal status.

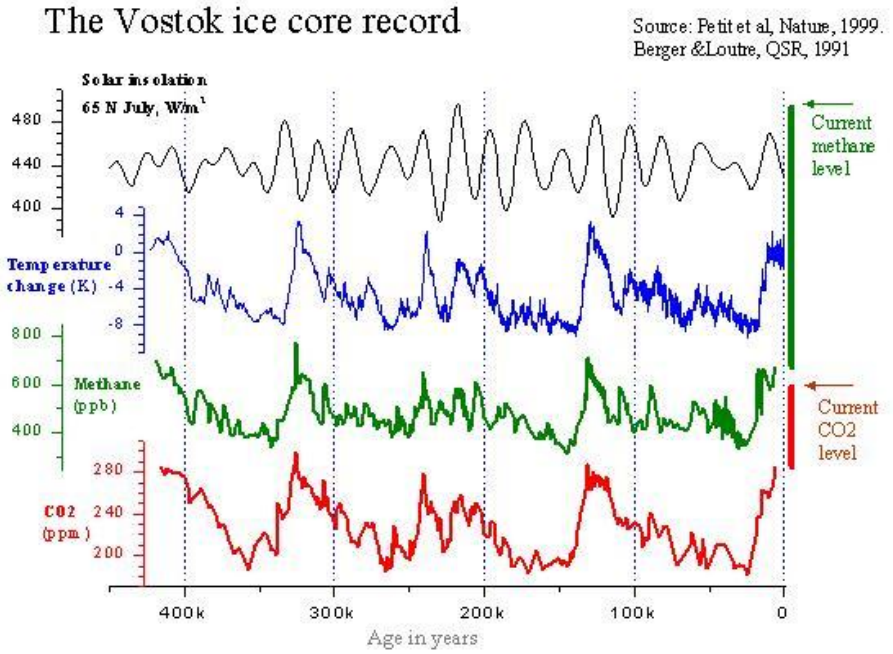
Adaptation to future international compensation claims, possibly to be paid in kind by providing land and basic infrastructure for climate change refugees, have been completely omitted in the report.

(B) Response to certain sentences in the report

Quote (page 3)

"….but climate change is expected to continue to occur **gradually**, unfolding over decades and centuries."

Comment: "gradually" is incorrect. Climate change and therefore also human induced global warming is non-linear as can be seen from the temperature record:



http://www.cmar.csiro.au/e-print/open/image/Image49.gif

This is a document in relation to these potentially rather rapid changes:

Rapid and Surprising Change in Australia's Future
Anticipating and preparing for future challenges and opportunities on the way to a sustainable Australia, by Steven Cork, Richard Eckersley, and Brian Walker
An Australia 21 Monograph
http://www.australia21.org.au/oldsite/pdf/Rapid_and_Surprising_Change.pdf

See also: http://en.wikipedia.org/wiki/Meltwater_pulse_1A

Tipping points:

According to NASA climatologist James Hansen 'tipping points' refer to the notion that the climate system 'can reach a point where, without additional forcing, rapid changes proceed practically out of control'. At some juncture the system moves beyond a 'point of no return', where certain consequences are inevitable, even if climate forcings are reduced. This entails irreversibility, at least within non-geological timeframes.

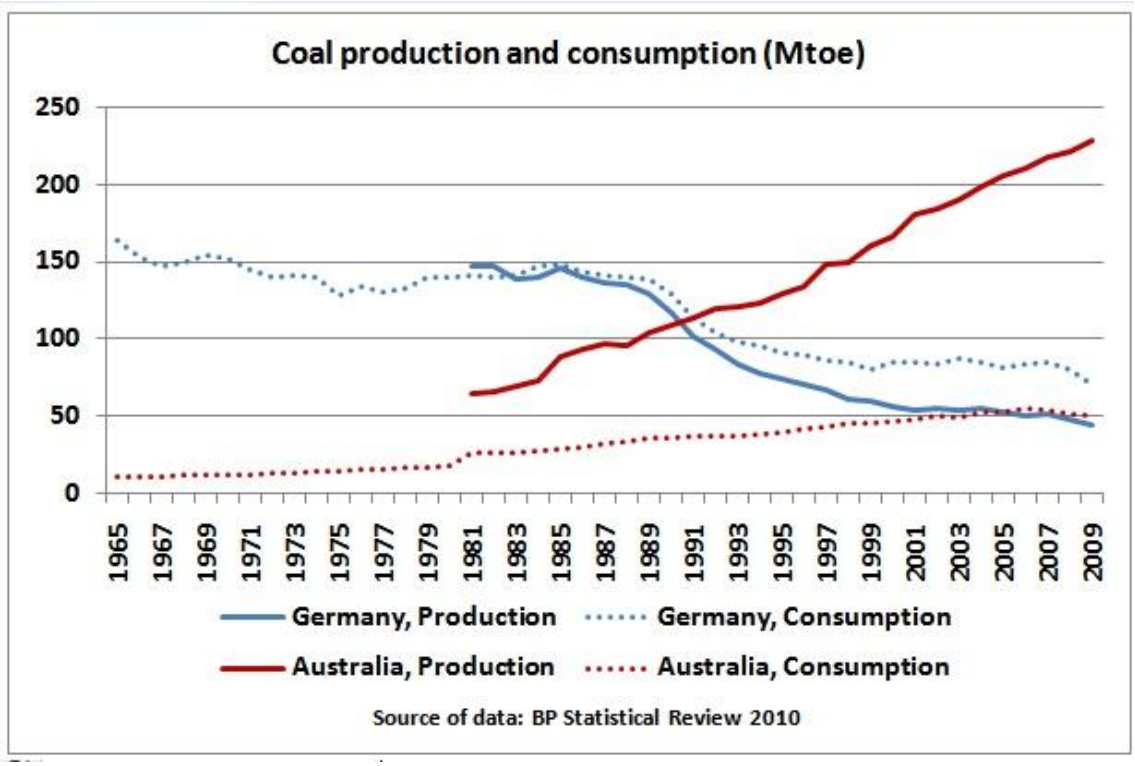
Conclusion: One barrier to adaptation is insufficient knowledge of stakeholders about the science of global warming

Quote (page 7):

"For example, Brisbane Airport Corporation is considering climate change adaptation in its New Parallel Runway Development. The runway site is potentially subject to inundation. In order to mitigate these risks, the Corporation is raising the site for the development above the projected 1-in-100-year flood level and building a new seawall and tidal channels."

Comment: At the same time, most airports prepare for a substantial growth in air traffic implying increasing CO2 emissions.

Conclusion: One cannot separate adaptation measures from the strategy to reduce CO2 emissions. It makes no sense for Government s to spend billions on adaptation and at the same time to allow projects to go ahead which make this adaptation more expensive. It is generally assumed and believed that Australia's contribution in emissions is small in comparison to other countries or global emissions. But this is not the case.



One example to show the disconnect between adaptation and mitigation is the Federal Government's financial contribution for the 3rd track of the Hunter coal train line.

Track work in the Hunter for coal trains will make adaptation more expensive

This rail line between Sydney and Newcastle will be flooded

"**Equity funding of $580 million** provided by the Australian Government is assisting in enabling a number of major projects to be undertaken. This funding will be supplemented with **debt from ARTC** and will take the planned investment in the Hunter Valley rail network to $1.4 billion."
http://www.artc.com.au/library/Links%2021.pdf

Another example:

What should be the adaptation of coal fired power plants to either drought (lack of cooling water) or floods? Repair the damage and continue with coal or closing it down?

Floodwaters pour into coal mine (6/6/2012)
http://www.smh.com.au/environment/weather/floodwaters-pour-into-coal-mine-but-power-supplies-safe-minister-20120606-1zv5e.html

07/12/2009
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

Quote: (page 8)

"The existence of a 'barrier' to effective adaptation only indicates that there is potential for governments to improve outcomes by removing or reducing the adverse impacts of that barrier."

Comment: Applying the principles of prudent governance, adaptation is the Governmet's duty, not just a potential for improvements.

Quote: (page 9)

"The idea behind the real options approach is that in some cases, people have to make decisions under uncertainty. If they have a reasonable expectation that their knowledge will increase in the future to reduce the level of uncertainty, there could be benefits in delaying action (particularly costly action) until better information is available."

Comment: This sentence reflects a wrong risk mindset of the authors of the this report which can be found in many other instances elsewhere. The approach to uncertainty is just the other way around. Applying engineering principles, we have to assume the worst case scenarios. For example, if as a structural engineer I design a multi span bridge I look for a load pattern which will cause a failure of the structure. This load pattern can occur tomorrow or in 50 years, it would not matter. Once the critical load is determined, I apply safety factors to prevent failures. The safety factor depends on

- the degree of uncertainty in the calculations and its underlying assumptions, i.e. the higher the uncertainty, the higher the safety factor
- the magnitude of the potential damage (injuries, deaths, property)
- whether the failure is partial or total

As an example, the safety factor for retaining walls against overturning is 3 (three). One question the PC must deal with is therefore: What would be the safety factor in the case of sea level rises with 100,000s of deaths and millions of refugees?

Conclusion: The report must determine safety factors for the events for which adaptation measures are proposed.

Quote (page 10):

"Some reforms would address barriers to adaptation to uncertain future climate trends, and would only have benefits under certain climate change scenarios."

Comment: This is another example of the above mentioned wrong approach to risk assessment. It would be the job of this report to list the "climate change scenarios" and make appropriate recommendations

(C.) Topics not covered in the report

Adaptation to international compensation claims

It would be naïve to think that Australia's emissions including pro rata scope 3 emissions from coal exports would not have international legal consequences.

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

Funds need to be set aside to pay these future claims. For that purpose, Government should collect contributions from the fossil fuel industry. This is on top of the carbon tax.

Half metre sea level rise is practically guaranteed. That means 10s of millions of Bagladeshi's will look for land. They will all ultimately come to Australia because all neighbouring countries (India, Burma, Thailand, Malaysia, Indonesia) will have the same problems of coastal areas being flooded and these refugees will see Australia is the only empty place, high and dry. Australia will have to provide basic infrastructure in the North to accommodate these millions of climate change refugees.

Science
AAAS

Kinematic Constraints on Glacier Contributions to 21st-Century Sea-Level Rise

W. T. Pfeffer, *et al.*

Science **321**, 1340 (2008);
DOI: 10.1126/science.1159099

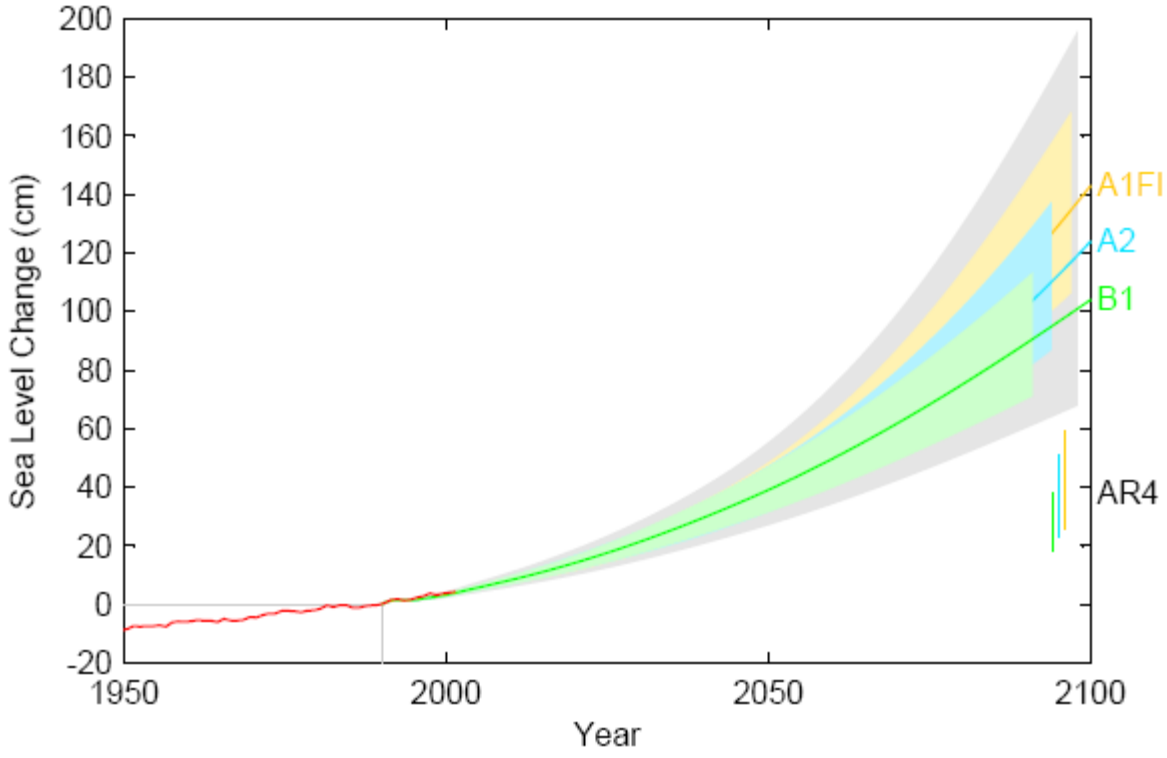
Table 3. SLR projections based on kinematic scenarios. Thermal expansion numbers are from (*22*).

	SLR equivalent (mm)		
	Low 1	Low 2	High 1
Greenland			
Dynamics	93	93	467
SMB	71	71	71
Greenland total	165	165	538
Antarctica			
PIG/Thwaites dynamics	108		394
Lambert/Amery dynamics	16		158
Antarctic Peninsula dynamics	12		59
SMB	10		10
Antarctica total	146	128	619
Glaciers/ice caps			
Dynamics	94		471
SMB	80		80
GIC total	174	240	551
Thermal expansion	300	300	300
Total SLR to 2100	785	833	2008

On the basis of calculations presented here, we suggest that an improved estimate of the range of SLR to 2100 including increased ice dynamics lies between 0.8 and 2.0 m. We emphasize that assumptions made to arrive here contain substantial uncertainties, and many other scenarios and combinations of contributions could be considered. However, the net eustatic SLR from other combinations explored fell within the range given in Table 3. Hence, these values give a context and starting point for refinements in SLR forecasts on the basis of clearly defined assumptions and offer a more plausible range of estimates than those neglecting the dominant ice dynamics term. Certain potentially significant sinks and sources of SLR, such as terrestrial water storage, are still absent altogether. Among the uncertainties explored, the potential for dynamic response from GIC is comparable in magnitude to dynamic response from Greenland or Antarctica but is exceptionally poorly constrained by basic observations. Without better knowledge of the number, size, and catchment areas of marine-based outlet glaciers in the GIC category, improvements on the estimates made here will be very difficult.

Sea levels as projected by Prof. Tad Pfeffer from INSTAAR
http://instaar.colorado.edu/people/bios/pfeffer.html

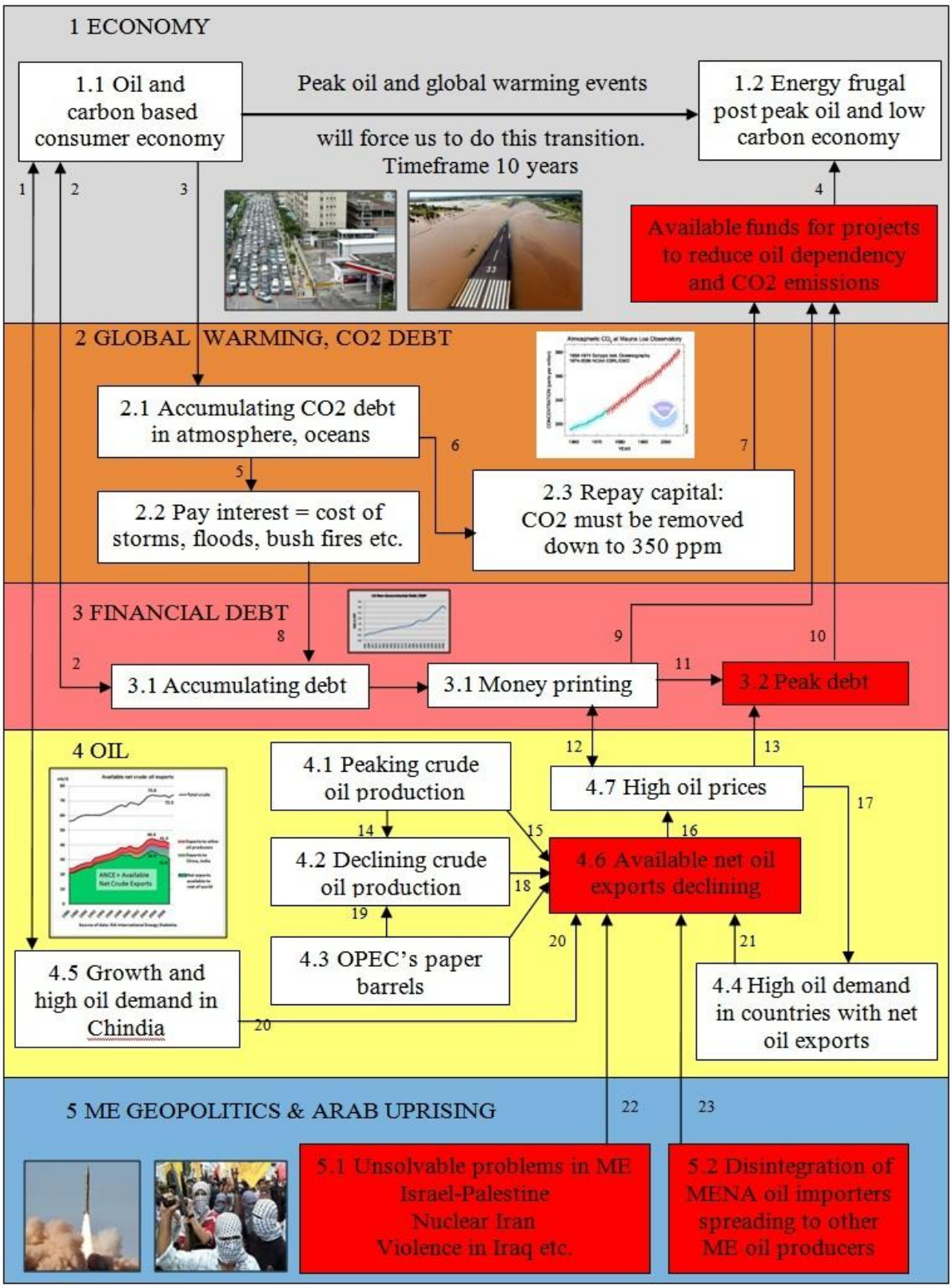
Another projection can be found from PIK



http://www.pik-potsdam.de/sealevel/

(D) System dynamics

From my website:



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

Appendix

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"

20 seconds clip:
http://www.youtube.com/watch?v=qMD2sd0lPeg
Full lecture:
http://www.youtube.com/watch?v=5E5EdbiB4HU
From here:
http://www.usyd.edu.au/sydney_ideas/lectures/2010/professor_james_hansen.shtml

http://www.stormsofmygrandchildren.com/

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