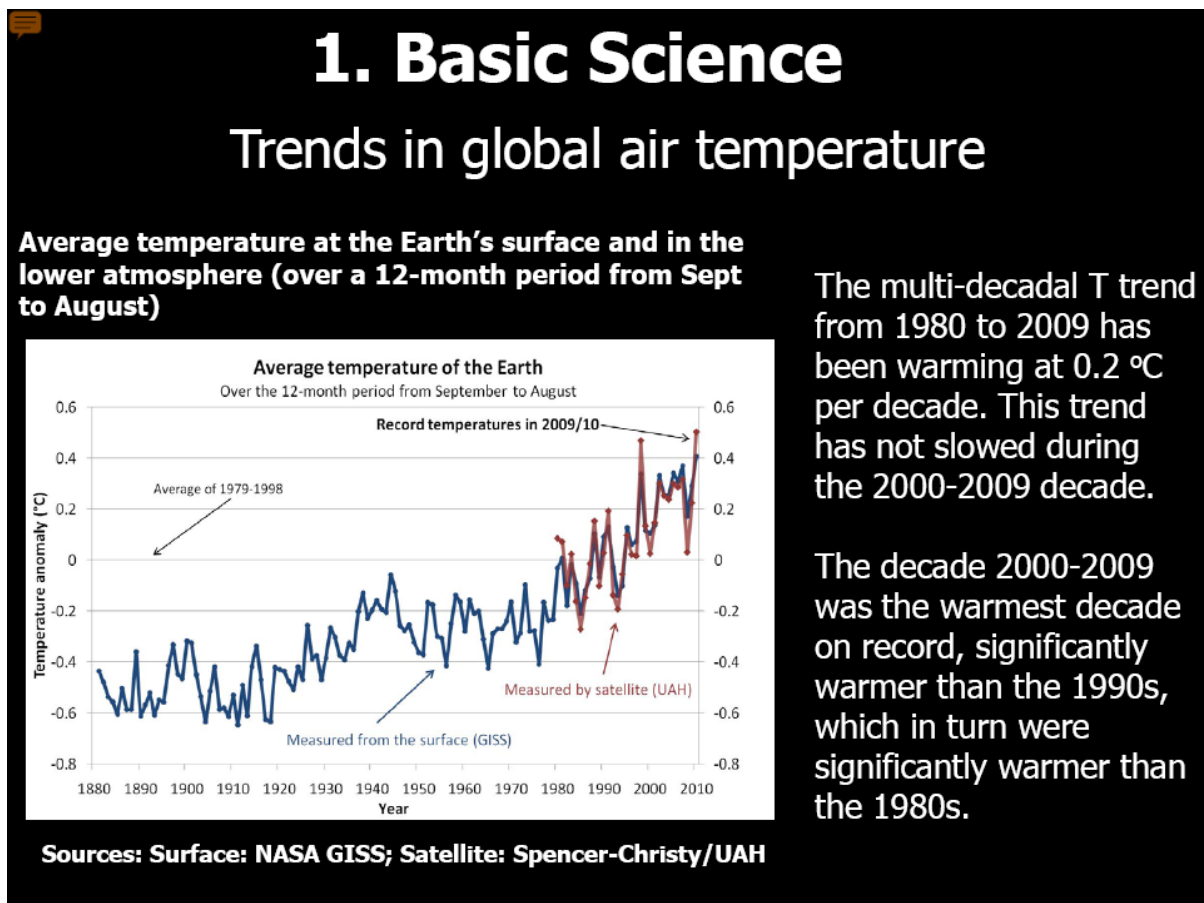


10th May 2011

I regret to have to point out to members of the MCCC that the Submission to your good selves by Will Steffen is full of seriously misleading and erroneous statements.¹

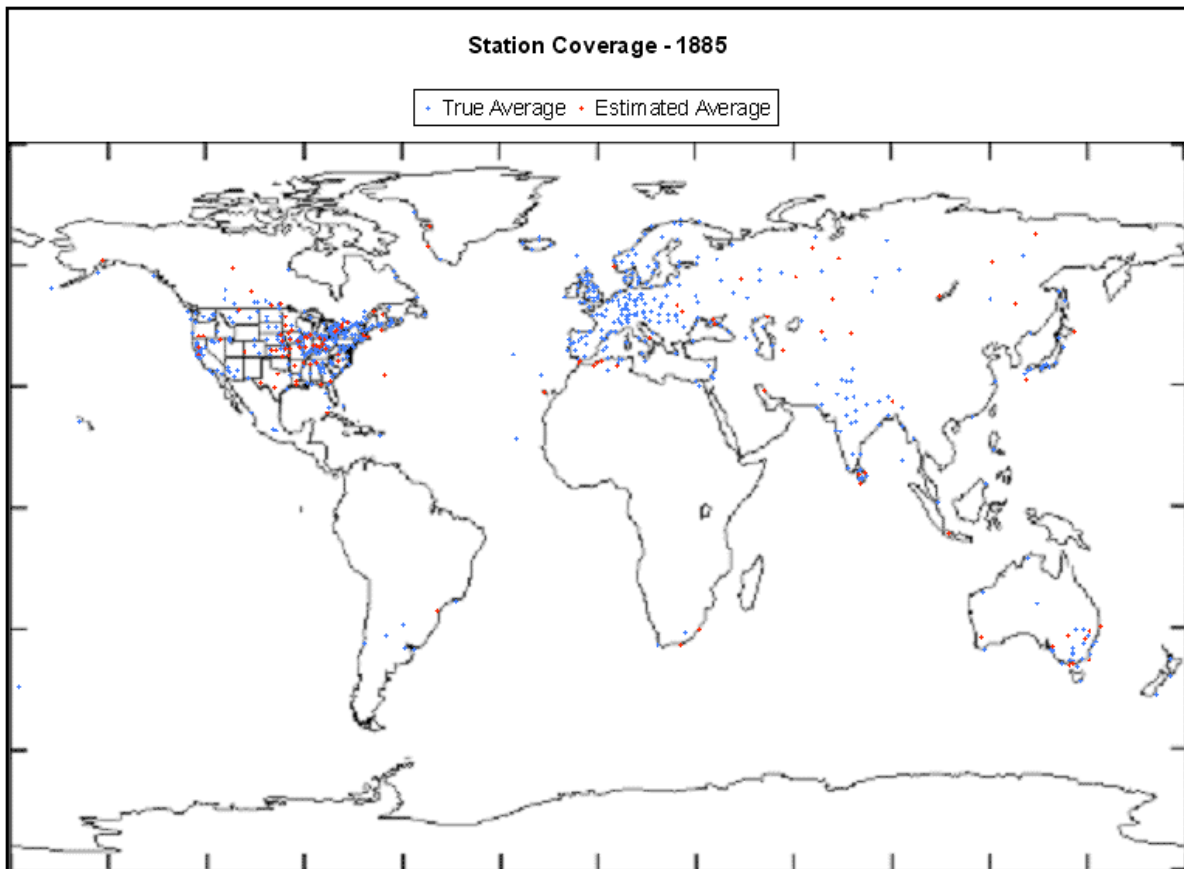
These begin with his first slide, which achieves its steeply rising “global (sic) air temperature” from 1880 to 2010 by cleverly leaving out all the (hot) tropics (eg virtually the whole of Africa and South America, and all of SE Asia), before at least 1910 as they had few if any instrumental records until well after then, see my Fig.1 overleaf. Steffen also omits to mention the sharp decline in the number of reporting meteorological stations in the (cold) higher latitudes of north America and Russia since 1990. Thus Steffen's “Basic Science” slide begins with a big deception.



But it is Steffen's Slide #13 that your Committee needs to study very carefully, as it contains a fraud which although intellectual is yet very similar to that of Bernard Madoff which earned him a sentence of 140 years. For Steffen there adopts a sleight of hand that more than doubles the actual increase in the atmospheric concentration of carbon dioxide which is what is supposed to cause global warming.

¹ *Climate Change 2010. Science, Risks Responses.*

Fig.1 “Global” temperature measurements in 1885 (Source: CDIAC/NOAA).



For Steffen’s Slide #13 misrepresents the whole of climate science since its earliest beginnings by informing you, honourable members of the MCCC, that what determines Climate Change is NOT the level of the *atmospheric concentration of carbon dioxide*, but the level of *emissions of carbon dioxide*. Elsewhere Steffen has shown (2009) that he is well aware that *less than half* of CO₂ emissions have remained airborne in the atmosphere, but when he is advocate, rather than scientist, as he was when he addressed your MPCC, then it seems any lie will do, like more than doubling in the increase in atmospheric CO₂. and the bigger the better (like his intellectual forebear, Goebbels). I have nailed the Meinshausen-Allen claims relied on by Steffen in a published paper (*Energy and Environment*, October 2009, see my Appendix here).

In brief, Steffen pretends that 100 percent of CO₂ emissions between 2000 and 2009 remained aloft in the atmosphere, causing accelerated climate change, whereas in fact only 45 per cent did. By more than doubling the actual increase in the atmospheric concentration of CO₂, he sought to goad you into extreme urgency in legislating a carbon tax.

Emission reduction trajectories: Cumulative emissions (budget) approach

- For a 75% probability of staying within the 2 C guardrail, humanity can emit 1000 Gt (1 trillion tonnes) of CO₂ (273 Gt C) between 2000 and 2050. The temporal pathway between now and 2050 is flexible, so long as the 2050 budget is achieved.
- From 2000 to 2009, 305 Gt CO₂ were emitted, over 30% of the total budget. This emphasises the urgency of turning the emissions trajectories downwards as soon as possible.
- National budgets can be derived from the global budget, but the process is complex and contentious because of equity and legacy issues.

Meinshausen et al. 2009; Allen et al. 2009

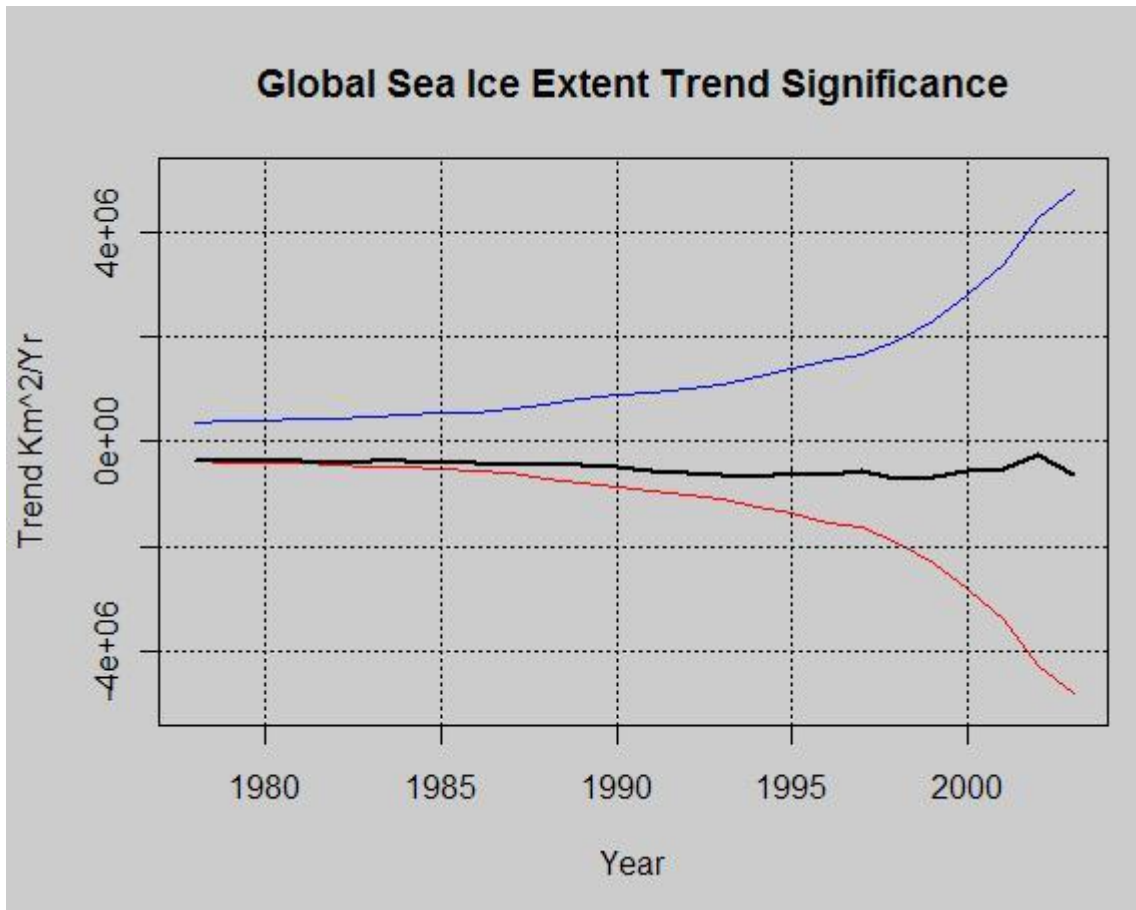
NB Although Steffen is right that 305 billion tonnes of CO₂ were emitted from 2000 to 2009, only 139 billion tonnes remained aloft in the atmosphere (according to CSIRO's Canadell and Raupach, www.globalcarbonproject.org), and it is the additions to the amount in the atmosphere that constitute the greenhouse effect. Clearly Steffen chose to more than double the increase for reasons of advocacy, not faithful reporting of science.

Steffen's Third and Fourth Slides deal with loss of sea ice and rising sea levels. Again he presents only sources that support his claims, and does not mention that there are many sources giving a different view of the data. For example, his sea-level slide claims satellite data (unspecified) show a rise of nearly 6 centimetres between 1993 and 2008, yet the actual University of Colorado satellite data show only a rise of 3.1 mm. p.a from 1993 to 2010, much less than Steffen's rate – Steffen seems to make it a habit always to enhance adverse trends!²

² T.W. Quirk, 2011. See also *The Science of Climate Change: Questions and Answers* published in August 2010 by the Australian Academy of Sciences which states that sea levels in Queensland have been rising since 1920 at the rate of about 1.2mm per year, again much more slowly than the 4 mm. claimed by Steffen.

Similarly Steffen's sea-ice slide relies on two satellite photographs and one graph of the apparently large declines in extent since 1980 but when the declines in the anomaly from the average are plotted as in my Fig.2, the declines are not statistically different from zero and the error bars are always widening.

Fig.2



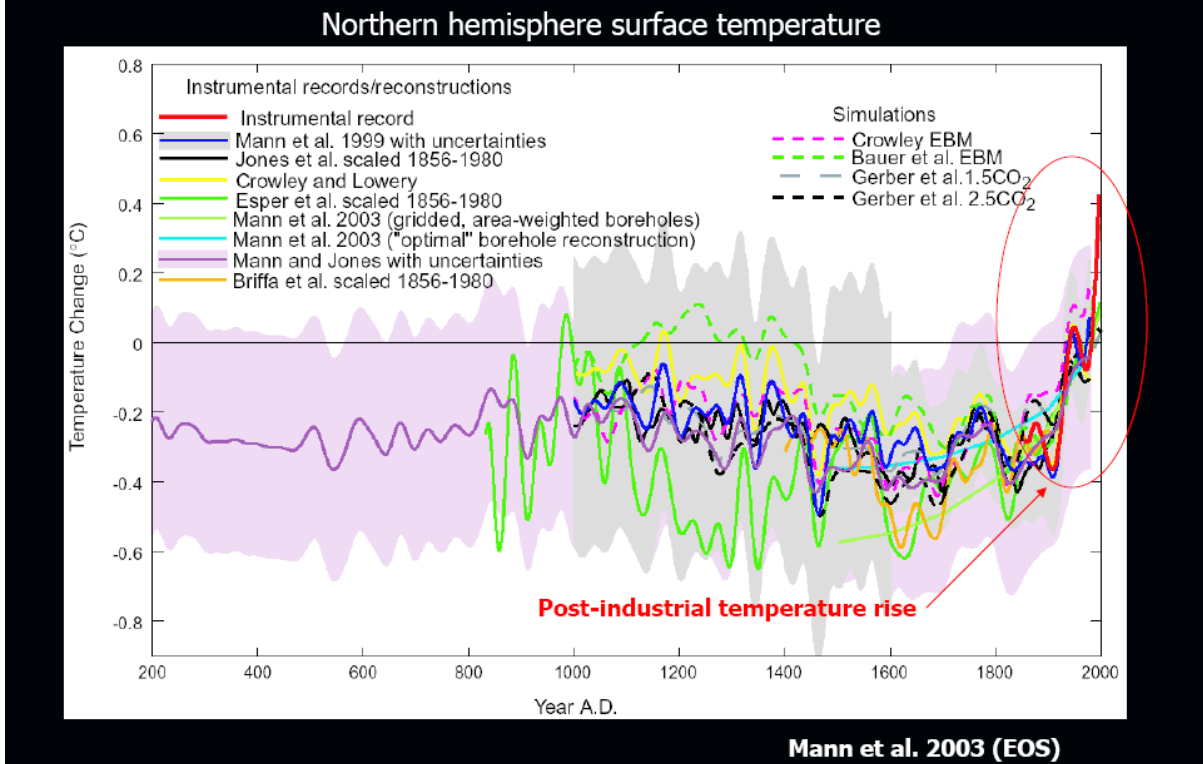
Source: Statistical Significance of Global Sea Ice Trend by Year. Blue and Red line - Upper and Lower Bounds. Black Line - Sea Ice Trend from Year to Present (Jeff Id, 2009, and NSIDC)

Steffen's second slide "Human causes change or natural variability" relies very heavily on the discredited "hockey stick" tree rings data of Mann, Jones, Briffa, and Crowley, *et al.*, which eliminate all previous warm periods like that of the Roman Empire at its zenith, and the Medieval Warm Period. A genuine scientist would at least mention that his sources for his

second slide have been hotly contested rather than presenting them to his audience as if they were Gospel truth.

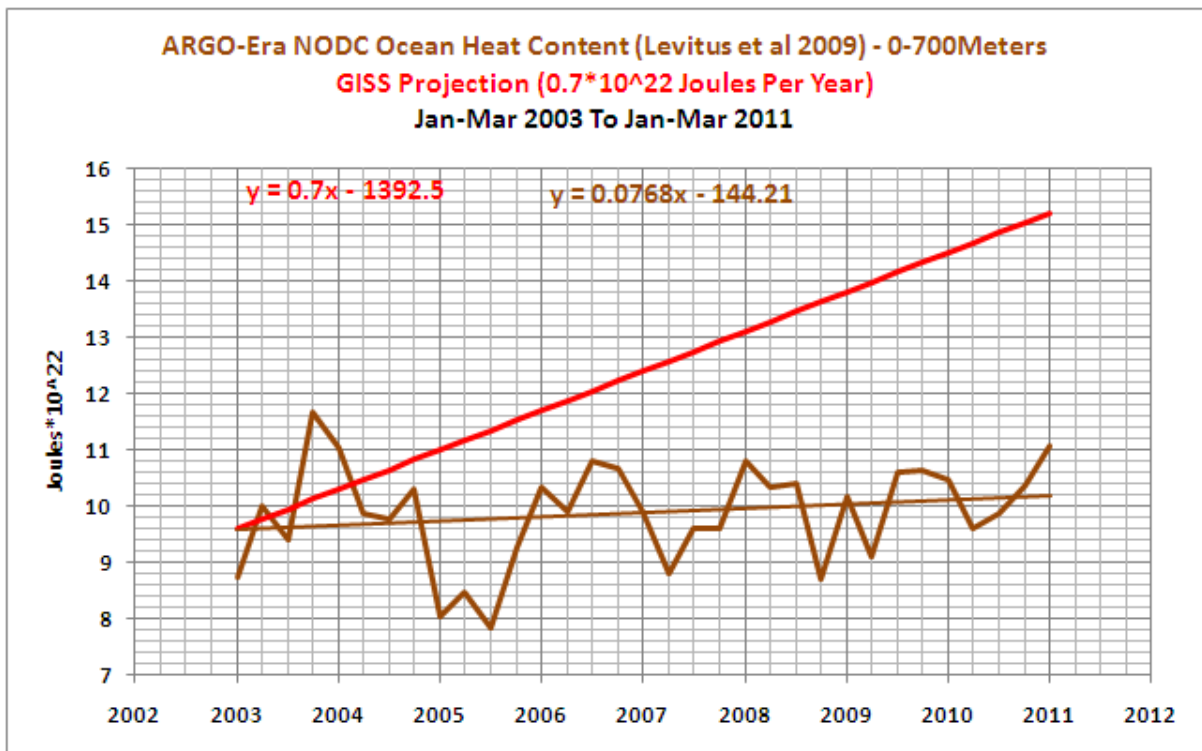
Steffen Slide #2:

Human-caused climate change or natural variability?



Steffen claims that the globe is “unequivocally” warming, but in practice there is no statistically significant upward trend in ocean heat content:

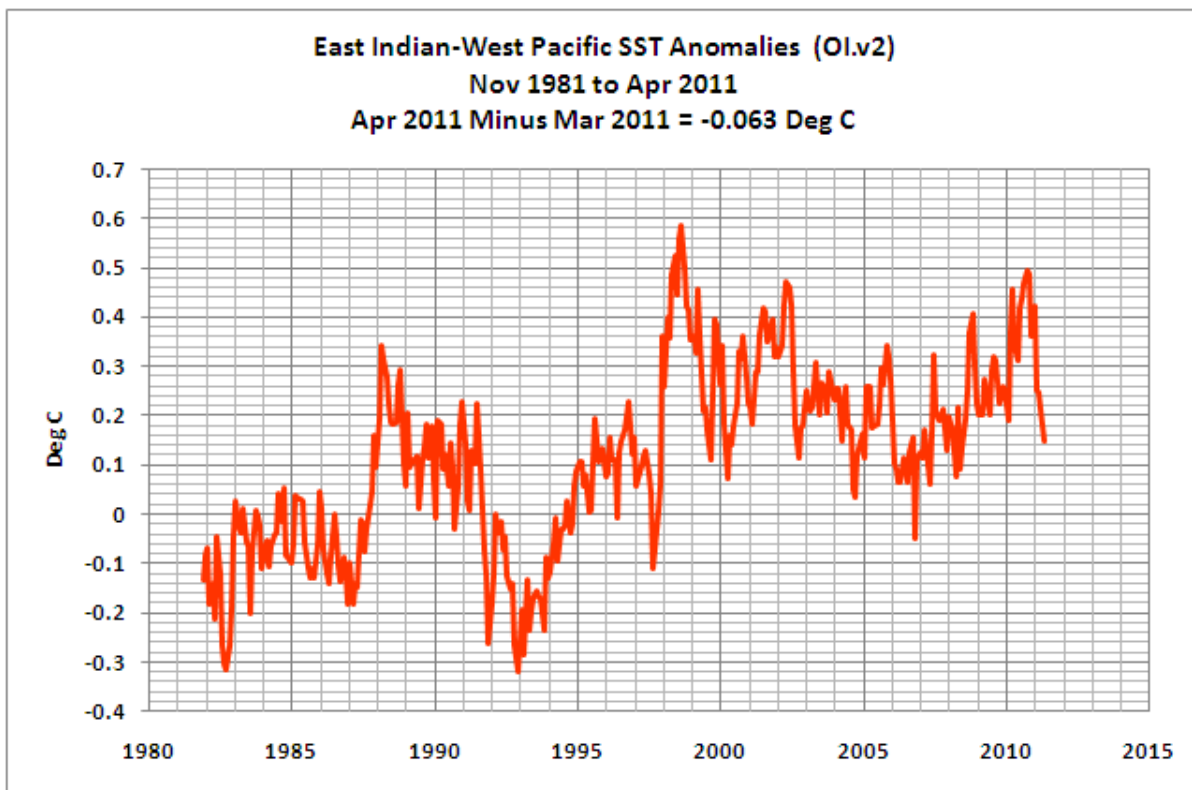
Fig.3 The Oceans appear not to be warming



SOURCE: Bob Tisdale - Optimally Interpolated Sea Surface Temperature Data (OISST) available through the NOAA National Operational Model Archive & Distribution System (NOMADS). http://nomad3.ncep.noaa.gov/cgi-bin/pdisp_sst.sh

The Great Barrier Reef is in the Western Pacific, and the next graph hardly confirms that it is subject to a permanent rising trend in the sea temperature surrounding it, as Ross Garnaut repeatedly claims.

Fig.4 Is the sea around the Great Barrier Reef warming?



SOURCE: Bob Tisdale - Optimally Interpolated Sea Surface Temperature Data (OISST) available through the NOAA National Operational Model Archive & Distribution System (NOMADS).http://nomad3.ncep.noaa.gov/cgi-bin/pdisp_sst.sh

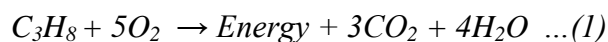
Steffen's Slide No.8 "Observed Changes in rainfall 1970-2005 and possible causes" does not mention ENSO (the La Nina/El Nino) cycle, which provides a *complete* explanation for all climatic variation in Australia since records began about 130 years ago. Thus the slide shows the dry conditions in eastern Australia resulting from a series of El Ninos, and leaves out the contrary situation in La Nina years. It also shows a curious certainty that climate change is responsible for drought in SW Australia, but not in eastern Australia, yet the level of atmospheric carbon dioxide is identical in both regions *at all times*.

At no point in any of his work, and certainly never in his wholly tendentious presentation to your MCCC, has Steffen analysed the problems inherent in the theory that atmospheric carbon dioxide is what causes global warming (if any there be), by trapping the energy which is radiated into the earth by the sun, but preventing its complete re-radiation into space by blocking in the infra-red spectrum. However, "Assuming the earth is at 290 deg Kelvin, Wien's law shows that the maximum radiation is emitted at 10 microns. Water has a massive infrared absorption band centred on 8.5 microns, and in sufficient quantities that can exist in the atmosphere, absorbs all the radiation in a band from about 7 to 11 microns, accounting for about 70 per cent of the radiation. By contrast, carbon dioxide and methane have a very few

intense, narrow absorption bands in this part of the spectrum. Those for carbon dioxide are at about 4 and 14 microns. However, the carbon dioxide absorptions are so intense that all the radiation that it is ever going to absorb is done by about 15 per cent of the atmosphere. So adding more carbon dioxide cannot increase its greenhouse effectiveness. The same is true of methane, except that the concentrations of methane in the atmosphere may be too low for it to have reached its maximum." James Cripwell (a pioneer of infrared spectrum analysis at the Cavendish Laboratories at Cambridge) continues: "Whatever is causing warming, it is not an increase in levels of carbon dioxide. A more plausible theory is that it is water put into high altitudes by aircraft; this would have roughly the same time line."

Moreover, neither Steffen nor any of his Potsdam colleagues like Schellnhuber, the Meinshausens and Rahmstorf have ever in any of their published work shown any cognisance of the CHEMISTRY of carbon dioxide and climate change. They, like all economists (and especially Stern 2006, Garnaut 2008, 2011, and Becker *et al.* 2011), assume that CO₂ emissions are invariably a negative externality (i.e. social cost) despite the substantial evidence for Freeman Dyson's position that the problem with CO₂ for all primary production is its scarcity*. Eliminating combustion of hydrocarbon fuels as is the ultimate aim of the MCCC will exacerbate that scarcity, as renewables like wind and solar lack any external benefit like increased recycling of carbon dioxide (a fertiliser) and water vapour (aka rainfall). Worse than that, as my attached paper explains, the wilful refusal of all climate scientists – and above all the IPCC's Susan Solomon (2007) – ever to refer to the formula for combustion of hydrocarbon fuels means that Steffen like them discounts the social benefit of the more rapid recycling of both carbon dioxide and water between the globe's surface to the atmosphere and back again.

Here are the inconvenient truths suppressed by all climate scientists and above all Will Steffen:



Formula (1) receives no mention in the IPCC's AR4 WG1 (Solomon *et al.*, 2007) despite its demonising of hydrocarbon combustion. It is not surprising that just as climate science never divulges equation (1) despite it showing how both CO₂ and H₂O enter the atmosphere when there is combustion of hydrocarbons, it also never mentions (2), the formula whereby a large proportion of the emissions of CO₂ and H₂O are absorbed by photosynthesis both on land and in the oceans:



Or, in words, carbon dioxide + water + light energy → carbohydrate (=food) + oxygen

The numbers are (for 2008-2009), from processes like that in (1), 30 GtCO₂ and 18 GtH₂O, *plus* net steam (coolant) from (2), emissions of over 300 GtH₂O of steam (which return to earth as rain, which according to Steffen has to be a negative externality). You will not of course be able to find these numbers in Steffen's presentation (2010) or in Solomon *et al.* 2007.

I fear that like a tribe of Aborigines, Australia's power brokers on its MCCC have too much taken on trust the witch doctors of climate science like Will Steffen.

*“The fundamental reason why carbon dioxide in the atmosphere is critically important to biology is that there is so little of it. A field of corn growing in full sunlight in the middle of the day uses up all the carbon dioxide within a meter of the ground in about five minutes. If the air were not constantly stirred by convection currents and winds, the corn would stop growing” (Dyson, *A many-colored glass*, University of Virginia Press, 2007).

Steffen's final slide “Climate Change: the Bottom Line” makes some very sweeping statements:

Climate Change: The Bottom Line

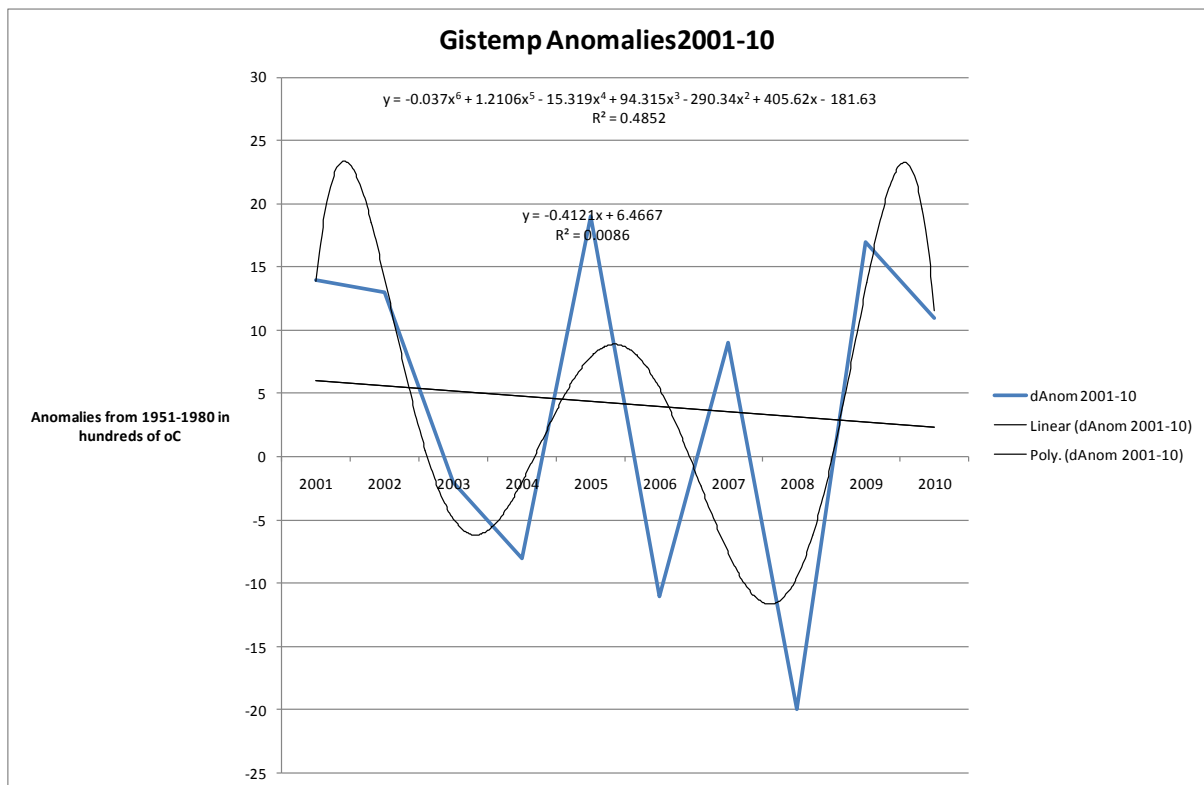
1. The Earth is warming (100% certainty).
2. Human emissions of greenhouse gases are the main cause of the warming observed over the last half-century at least (about 95% certainty).
3. Despite considerable uncertainty about the specific consequences of climate change in future, we know that the risks to society and environment are very large, and are growing as we gain more knowledge.
4. The scientific basis and imperative for rapid and vigorous action to reduce emissions is overwhelming. Decarbonisation of the economy by 2050 is required to meet the 2 C guardrail.

1. “The Earth is warming (100% certainty)” Actually there is no hard evidence for this, the total claimed increase in Global Mean Temperature since 1900 is less than 0.8°C, which is within the known margins of error of the instrumental record. Moreover that the GHCN, Gistemp, NCDC, and Hadley-CRU are in agreement on that figure is hardly a surprise, as those data sets are 95% the same (Jones), and are moreover artefacts, being as Jones puts it “homogenised”. Moreover, NASA-GISS' James Hansen determines global temperatures by assuming that everywhere within 1200 of a particular meteorological station has the same temperatures, which is like using Sydney's temperatures for those in Goulburn, Canberra, Gundagai, Albury, and

Wagga Wagga, which is exactly what Hansen’s Gistemp does for Canberra and the rest. In addition, my Fig.5 below shows that for the first decade of this century (2001-2010) the linear trend (black line) in Global Mean Temperature is actually down, although not hugely so. The major influences of the alteration of El Nino and La Nina are obvious in the blue line and its associated polynomial curve, which has a much better fit ($R^2=0.4852$) than the linear ($R^2=0.0086$), but also implies the down trend will continue into 2011.

The failure of Steffen to give a more nuanced presentation implies he did not have much confidence in the ability of his audience to follow any other than schoolboy graphs.

Fig.5 Global Surface Temperature Anomalies 2001-2010



The second incorrect statement in Steffen’s “Bottom Line” is his claim “human emissions of greenhouse gases are the main cause of the observed warming over the last half-century”, as that has never been demonstrated by multivariate analysis of both natural and human variables that affect warming. I attach my paper currently undergoing peer review which explains what is required and then shows there is no 95% certainty that greenhouse gases other than water vapour have anything to do with global warming (if any).

Steffen’s final statement is completely disingenuous. Nobody would suffer any inconvenience anywhere on earth from a rise in annual mean temperature of 2°C, given the current huge temperature range across the globe, from 50°C in summers in Dubai and 5°C in Alaska, and certainly not in Sydney, Canberra, Hobart, or Melbourne.

APPENDIX

A Critique of Steffen's sources for his Slide #13

NATURE'S NEW THEORY OF CLIMATE CHANGE

by

Tim Curtin (Australia)

ENERGY &

ENVIRONMENT

VOLUME 20 No. 7 2009

Nature's leading article "Time to Act" (30 April 2009)¹ supports the claim in Meinshausen *et al.*¹ that it is total cumulative or annual emissions that determine climate change, not the atmospheric concentration that emerges after taking into account net uptakes of carbon: "The 500 billion tonnes of carbon that humans have added to the atmosphere lie heavily on the world, and the burden swells by at least 9 billion tonnes a year (sic)" (p.1077), even though the actual increase in the atmospheric concentration of CO₂ (i.e. [CO₂]) recorded at Mauna Loa between May 2008 and May 2009 was only 1.68 parts per million by volume (ppm), equivalent to 3.56 billion tonnes of carbon (GtC), while the total increase in the atmospheric concentration since the pre-industrial era is only from 280 ppm to 390 ppm (May 2009). That 110 ppm equates to 233.2 GtC, somewhat less than the 500 GtC from which *Nature* claims it has "implicitly" subtracted the "net carbon uptakes".

This claim is in *Nature's* associate editor's (Michael White) comment to this author (pers. comm.), "the models used [by Meinshausen *et al.* and Allen *et al.* in *Nature* 30 April 2009] are in fact designed to represent the behaviour of more complex coupled models, which include a consideration of the full carbon cycle. Thus, the net uptake of carbon is implicitly simulated". So "implicit" accounting for net carbon uptakes apparently *raises* the actual net increase in CO₂ at Mauna Loa from 3.56 GtC since May 2008 to *Nature's* "at least 9 GtC a year"⁶. Or does White believe that net carbon uptakes are in fact zero or even negative as postulated by Allen *et al.*? It is true that in the Supporting Information (SI) to Allen *et al.*, various models are mentioned that do refer to the full carbon cycle, but only in a tendentious fashion.

The projections of the net carbon uptakes in *all* models relied on by the IPCC's Solomon *et al.*³ assume that the proportion of emissions taken up by oceanic and terrestrial sinks declines either monotonically (Bern) or asymptotically (MAGICC *et al.*). Allen *et al.* use the latter assumption (first introduced by Wigley) and although it has never been validated empirically, it asserts that beyond a certain level of atmospheric concentration of CO₂ (or emissions), no further increase in net uptake of carbon will be possible, as the sinks will be "saturated". Allen *et al.* state *explicitly* (SI, p.6) "the terrestrial carbon cycle model has both vegetation and soil components stores. The vegetation carbon content is a balance between global average net primary productivity (NPP) (*parameterized as a function of atmospheric carbon dioxide, which asymptotes to a maximum value* multiplied by a quadratic function of temperature rise in order to represent the effect of climate change) and vegetation carbon turnover" (my italics). Thus the Allen paper *explicitly* assumes that net carbon uptakes become first zero and then negative as allegedly "climate change" *reduces* NPP. Amongst other questionable features, this asymptotic assumption implies that after saturation, it will never again be possible either to plant new land to high yielding crops or to develop and grow new higher yielding crops with their automatic increased photosynthetic uptake of CO₂.

The asymptotic assumption conveniently generates projections that future emissions will result in more than doubling the observed rate of growth of [CO₂] of 0.41% p.a. between 1958 and 2008 to 1% p.a. between 2000 and 2050 (e.g. ref.(1), p.1158).

Meinshausen *et al.*¹ state “limiting *cumulative CO2 emissions* over 2000–50 to 1,000 Gt CO₂ yields a 25% probability of warming exceeding 2o C and a limit of 1,440 Gt CO₂ yields a 50% probability (my italics)”. These authors do not explain why when cumulative emissions over the period 1958 to 2008 were actually 25% larger than their benchmark, at 1,253 Gt CO₂, for an observed warming of only 0.46°C over that period, a lower cumulative increase in emissions from 2000–50 than in 1958–2008 has 25% probability of raising warming by over 4 times more. Their paper’s Fig. 2 also relates temperature changes only to total cumulative emissions and therefore *explicitly* makes no allowance for the net carbon uptakes that will reduce the impact of their emissions scenarios on the future level of the atmospheric concentration of CO₂ (i.e.[CO₂]). Allen *et al.* concur: “We find that the peak warming caused by a given cumulative carbon dioxide emission is better constrained than the warming response to a stabilization scenario”.

The underlying issue raised here has very serious implications for the emission reduction policies adopted by the USA’s House of Representatives (26 June 2009) which seeks to enact (if the Senate concurs) that the USA’s emissions will be reduced by 88% from the 2005 level by 2050. If emulated and applied globally, this implies that by 2050 global emissions (mainly from burning fossil fuels) will be reduced to 1.16 GtC (including reductions in land use change), far below the global biospheric net uptakes of carbon, at 4.3 GtC in 2005, an El Niño year, and 6 GtC in 2006 (La Niña).

Ironically, and contrary to the apparent beliefs of both *Nature* and the US Congress, there is an alternative to reducing total emissions below the current level of natural net uptakes of carbon, and that is to raise the net carbon uptakes (which have averaged 57% of total emissions since 19585, of which the terrestrial component rose from an average of 1.24 GtC in 1960 to 1969 to 2.32 GtC in 1998–2007) to say 80% of the ongoing rising level of emissions. That would imply raising food availability across the globe, a demonstrably more cost-effective solution than the geo-engineering solutions, like creating stratospheric sunshades, that Nature favours. “A world slightly shaded from the Sun while its carbon levels are brought down by means of active capture would be a strangely unnatural place—but not necessarily a bad one, compared with the alternatives”. *Nature*, vol. 458, 30 April 2009, doi:10.1038, 1077–1078 (2009). Why are *Nature*, its authors, and the US Congress opposed to the alternative of raising not reducing food availability?

Endnotes:

1. Meinshausen, M., Meinshausen, N., Hare, W., Raper, S.C.B., Frieler, K., Knutti, R., Frame, D.J. & Allen, M.R. Greenhouse gas emission targets for limiting global warming to 2°C. *Nature*, vol. 458, 30 April 2009, doi:10.1038, 1158–1162 (2009).
2. Allen, M.R., Frame, D.J., Huntingford, C., Jones, C.D. Lowe, D.A., Meinshausen, M. & Meinshausen, N. Warming caused by cumulative carbon emissions towards the trillionth tonne. *Nature*, vol. 458, 30 April 2009, doi:10.1038, 1163–1166 (2009).
3. Solomon, S. *et al.* (eds). *IPCC Climate Change 2007: The physical science basis*. (CUP, 2007)
4. Wigley, T.M.L. Balancing the carbon budget. *Tellus*, 45B, 409–425. (1993).

5. Canadell J.G., C. Le Quéré, M.R. Raupach, C.B. Field, E.T. Buitenhuis, P.Ciais, T.J.Conway, N.P. Gillett, R.A. Houghton, G.Marland. Contributions to accelerating atmospheric CO₂ growth from economic activity, carbon intensity, and efficiency of natural sinks. *PNAS*, 104.47, 18866–18870. (2007).
6. NOAA, <http://www.esrl.noaa.gov/gmd/ccgg/trends/> (2009).
7. NOAA, [www.ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/](http://ftp.cmdl.noaa.gov/ccg/co2/trends/) (2009).