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## Is Labor's 60/2050 emissions reduction target backed by the science?

On 2 May 2006, Labor's environment spokesperson, Peter Garrett, announced Labor's support for a 60% reduction in Australian emissions by 2050, in a media statement, "Labor's Greenhouse Reduction Target - 60% by 2050 Backed By the Science" (1).

In the statement, a number of primary sources were quoted in support of Labor's target. Are these sources quoted accurately and in full, do they constitute a fair representation of current research on the topic, and would Labor's policy "prevent dangerous anthropogenic interference with the climate system" as is proposed?

### SUMMARY

- Labor's statement in support of a target of a 60% reduction in emissions by 2050 fails to define "dangerous climate change" either in terms of the internationally accepted maximum temperature target (2 degrees C) or atmospheric greenhouse gas levels.
- Prominence is given to out-of-date research and more recent research on emissions targets to avoid dangerous climate change is not considered.
- The use of quoted material from the CSIRO's "Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions" is misleading and deceptive.
- Labor's 60/2050 policy is consistent with a temperature target of 3 degrees C, which would constitute "dangerous anthropogenic interference with the climate system".

**LABOR SAYS:** "Australia has signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC)" and "The ultimate objective of the UNFCCC is "the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

**ANALYSIS:** What is not said is that the aim of preventing more than 2°C of warming has been adopted overtly by the UN and the European Union, implicitly by the British, German and Swedish governments and advocated widely by leading climate scientists as a key target in avoiding dangerous climate change. The 2-degree target is nowhere mentioned in Labor's statement.

**LABOR SAYS:** "The UK Royal Commission on Environmental Pollution in 2000 identified 550 ppmv (550 parts per million by volume) as the upper limit at which carbon dioxide (CO<sub>2</sub>) should not exceed due to a likelihood that it would constitute "dangerous anthropogenic interference", or dangerous climate change."

**ANALYSIS:** The UK report actually says "we propose that an atmospheric carbon dioxide concentration of 550 parts per million by volume ... should be regarded as a limit which should not be exceeded", but there is little discussion in the UK report as to why 550 ppm was "proposed". In chapter 4, under the intriguing subtitle "A pragmatic approach", a brief discussion based on the 1995 IPCC report merely asserts 550ppmv whilst acknowledging that "Some environmental groups (including the Global Commons Institute) regard 550 ppmv as a dangerously high concentration which is incompatible with the aim of sustainable development...." (page 53).

In the world of climate change science and politics, this is an old report, relying on IPCC report now 12 years out of date; since 2000 there have been two more IPCC reports, the research has moved on, and the UK government has since changed its targets (more below).

More recent and relevant European research is not referred to. For example, a 2006 paper by climatologist Malte Meinshausen (who did modelling for the Stern report) suggests that if greenhouse gases reach 550 ppm CO<sub>2e</sub>, there is a 63-99% chance (with an average value of 82%) that global warming will exceed 2 degrees, the UN's upper limit in avoiding dangerous climate change (2).

Indeed a wide range of research concludes that a great deal lower than 550ppm CO<sub>2</sub> is required. In another paper Meinshausen says that "Our current knowledge about the climate systems suggests that only stabilization around or below 400ppm CO<sub>2</sub> equivalence will likely allow us to keep global mean temperature levels below 2°C in the long term", and that for stabilization at 450ppm CO<sub>2</sub> equivalence, the chance to stay below 2°C is still rather limited according to the majority of studies, namely "medium likelihood" or "unlikely" (3). The UK's Institute for Public Policy Research says that "To have an 80% chance of keeping global average temperature rise below 2°C, this paper concludes that greenhouse gas concentrations would need to be prevented from exceeding 450-500ppm CO<sub>2</sub>-equivalent in the next 50 years and thereafter should rapidly be reduced to about 400ppm CO<sub>2</sub>-equivalent. If, in attempting to achieve that, non-CO<sub>2</sub> emissions are as significantly constrained as CO<sub>2</sub>, levels of CO<sub>2</sub> alone would probably need to be stabilised at about 360ppm" (4). Another paper gives the probabilities of staying below 2 degrees: "450ppm CO<sub>2</sub>-equivalent has a 50% chance of staying below 2°C; 550ppmv CO<sub>2</sub>-equivalent has a 10-20% chance of staying under 2°C" (5).

As a side issue, there is also a nomenclature sleight of hand in the quoted material. The target is described as "550 parts per million", but this is 550 parts of carbon dioxide alone. If other greenhouse gases are included, this is equivalent to 666ppm carbon dioxide equivalent (CO<sub>2e</sub>). According to the Stern Report, at 650ppm CO<sub>2</sub> there is a 60-95% chance of 3 degrees of warming (6).

The key issue, of which Labor seems unaware, is that, as George Monbiot elaborates: "The British government has been aware that it has set the wrong target for at least four years. In 2003 the environment department found that "with an atmospheric CO<sub>2</sub> stabilisation concentration of 550ppm, temperatures are expected to rise by between 2°C and 5°C" (7). In March last year it admitted that "a limit closer to 450ppm or even lower, might be more appropriate to meet a 2°C stabilisation limit" (8). (9)

**LABOR SAYS:** "In 2006, CSIRO's "Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions", concluded that: "Limiting future increases in atmospheric CO<sub>2</sub> to 550 ppmv, though not a panacea for global warming, would reduce 21st century global warming to an estimated 1.5–2.9°C, effectively avoiding the more extreme climate changes."

**ANALYSIS:** This is misleading and deceptive.

1. The report actually says "As mentioned previously, some nations view 60% reductions by 2050 as consistent with placing the world on a path to achieving a 550 ppmv CO<sub>2</sub> stabilisation level. According to climate model results with the WRE550 stabilisation scenario, this level of mitigation would limit 21st century global warming to 1.5–2.9°C, with an additional 0.3–0.9°C of warming in subsequent centuries" (10). In the whole CSIRO document all temperature increases are taken from a 1990 baseline (0.6C at 1990) as is made explicit on page 6, for example, so that the phrase "21st century global warming to 1.5–2.9°C" means a total rise over pre-industrial levels of 2.1-3.5°C by 2100. Add in the "additional 0.3–0.9°C of warming in subsequent centuries", and the full temperature rise range becomes 2.4–4.4°C for 550ppm. This clearly would clearly constitute dangerous anthropogenic interference and the use of the selected phrase in the statement is deceptive.

2. The next paragraph in the CSIRO report (page 33) reads: "However, it is becoming increasingly clear that 550 ppmv may not be a sufficient stabilisation goal for preventing DAI. Emission reductions beyond 60% by 2050 would leave the option for stabilising at 450 ppmv or lower open. This would limit 21st warming to approximately 1.2–2.3°C, with an additional warming of 0.3–0.6°C in subsequent centuries. Such a threshold is thereby more consistent with the temperature thresholds for DAI in Table 1, although additional warming beyond 2100 would exceed the mean threshold of 1.5°C." To reiterate, the CSIRO report says that 450ppm is "more consistent" than 550ppm in avoiding dangerous climate change. Why was this key paragraph, which contradicts the sentence quoted by Garrett in his statement, omitted?

**LABOR SAYS:** "The 2006 Stern Review found that the risks of the worst impacts of climate change can be substantially reduced if greenhouse gas levels in the atmosphere can be stabilised between 450 and 550ppmv."

**ANALYSIS:** Between 450ppm and 550ppm there is a world of difference. What is not said in Labor's statement is that Stern actually advocates 550ppm, which is a 3-degree target. Nicholas Stern in his 2006 report to the UK government says that constraining greenhouse gas levels to 450ppm "means around a 50:50 chance of keeping global increases below 2°C above pre-industrial" temperatures, but keeping levels to 450ppm is "already nearly out of reach" because "450ppm means peaking in the next five years or so and dropping fast". In other words, it would require immediate and strong action that Stern judges to be neither

politically likely nor economically desirable. So instead Stern pragmatically says the data “strongly suggests that we should aim somewhere between 450 and 550ppm”, but his policy proposals demonstrate that he has the higher figure in mind as a practical goal: “It is clear that stabilising at 550ppm or below involves strong action... but such stabilisation is feasible”. So his policy framework is focussed on constraining the increase to 550ppm, at which “there is around a 50:50 chance of keeping increases below 3°C” (11).

It is crystal clear that Stern identifies 2 degrees with 450ppm CO<sub>2</sub> and 3 degrees with 550ppm CO<sub>2</sub>. The latter is his target in advocating the 60/2050 policy, as he did during his March 2007 visit to Australia, when he told the Age that “It would be a very good idea if all rich countries, including Australia, set themselves a target for 2050 of at least 60 per cent emissions reductions” because “the planet would be left with about 550 parts per million of carbon dioxide equivalent by 2050” and this would “leave us roughly a 50/50 chance of being either side of 3 degrees Centigrade above pre-industrial times” (12). A number have followed in Stern’s footsteps, including ex-ABARE chief Dr Brian Fisher, Australia’s lead delegate to the May 2007 IPCC meeting, who says the two-degree target, with emissions peaking by 2015, “is exceedingly unlikely to occur... global emissions are growing very strongly... On the current trajectories you would have to say plus three degrees is looking more likely” (13).

**LABOR SAYS:** *“The 2007 CSIRO submission to the Prime Minister’s Emission Trading Task Group stated: “if the objective is to ensure no more than 2°C warming, national emissions trajectories that are consistent with stabilising global GHG concentrations at 400-500 ppmv CO<sub>2</sub>e may be necessary...most of the literature suggests the need for reductions in annual GHG emissions of 60-90% from 1990 or 2000 levels by 2050 for countries listed under Annex 1 in the Kyoto Protocol.” [Annex 1 includes developed countries like Australia]”*

**ANALYSIS:** “400–500 ppmv CO<sub>2</sub>e” is approximately 350–450 ppm CO<sub>2</sub> alone. This a long way from the 550 ppm positively quoted in other parts of Labor’s policy statement.

“Most of the literature suggests the need for reductions in annual GHG emissions of 60-90% from 1990 or 2000 levels by 2050 for countries listed under Annex 1 in the Kyoto Protocol.” Recent research suggests that the reductions need to be 60-70% average for the whole world. Because Australia’s emission’s are around six times the global average, a contract and converge target for Australia is therefore six times greater than 60%, which means more than 90% for Australia (14). This corresponds with new data which suggests a global target of 80% and 95% for developed nations using the principle of “contract and converge” (15). It should be noted that “contract and converge” is not equitable, because the developed nations are responsible for three-quarters of all anthropogenic emissions, have the capacity and responsibility to support developing countries in carbon-substituting technology and resources, and the capacity and responsibility to cut per capita emissions more deeply than developing nations.

Labor does not square it’s 60/2050 target with this research.

**LABOR SAYS:** *“What a 3° increase means for Australia. For Australia, a 3 degree temperature increase could mean: Australian net primary production falls by 6%; Flows in the Murray-Darling fall by 6%; 97% of the Great Barrier Reef bleached and 80% of Kakadu’s freshwater wetlands lost; 15-70% increase in very high/extreme high fire danger days in southeast.”*

**ANALYSIS:** What is interesting is what Labor doesn’t say about 3-degree impacts. Today at less than 1°C the floating ice at the north pole is disappearing fast, likely to be gone within a few decades (16); and we are close to or at the tipping point when the Greenland ice sheet starts the irreversible melting that will lift sea levels by five to seven metres, in as little as a century according to James Hansen (17). At two degrees it will be too late for Greenland, and over a third of species will be committed to extinction.

In the Pliocene, three million years, when temperatures were 3 degrees higher than our pre-industrial levels, the northern hemisphere was free of glaciers and icesheets, beech trees grew in the Transantarctic mountains, sea levels were 25 metres higher (18). There are also strong indications that during the Pliocene, permanent El Nino conditions prevailed. James Hansen says that rapid warming today is already heating up the western Pacific Ocean, a basis for a coming period of ‘super El Ninos’ (19). Between two and three degrees the Amazon rainforest may turn to savannah, as drought and mega-fires first destroy the rainforest (20). The carbon released by the forests destruction will be joined by still more from the world’s soils, together boosting global temperatures by a further 1.5°C (21). The collapse of the Amazon would be part of the reversal of the carbon cycle projected to happen around 3 degrees, a view confirmed by a range of researchers using carbon coupled climate models. Vast amounts of dead vegetation stored in the soil – more than double the entire carbon content of the atmosphere – will be broken down by bacteria as soil warms. The generally accepted estimate is that the soil carbon reservoir contains some 1600 gigatonnes, more than double the entire carbon content of the atmosphere. The conversion will begin of the terrestrial carbon sink to a carbon source due to temperature-enhanced soil and plant respiration overcoming CO<sub>2</sub>-

enhanced photosynthesis, resulting in widespread desertification and enhanced feedback (22). Some recent studies suggest that the earth's carbon sinks are smaller than expected and climate by century's end could be on average up to 1.5 degrees hotter than current "business as usual" projections suggest (23). New research published in "Science" in May 2007 suggests that the earth's ability to soak up the gases causing global warming is beginning to fail because of rising temperatures, in a long-feared sign of "positive feedback" (24).

This is the 3-degree world of which Labor does not speak, the world of Labor's 550ppm CO2 target.

## Notes

- (1) [http://parlinfoweb.aph.gov.au/piweb/view\\_document.aspx?id=139151&table=PRESSREL](http://parlinfoweb.aph.gov.au/piweb/view_document.aspx?id=139151&table=PRESSREL)
- (2) Malte Meinshausen (2006) "What Does a 2°C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates" in Hans Joachim Schellnhuber (Ed in Chief), *Avoiding Dangerous Climate Change*, Cambridge University Press.
- (3) Meinshausen, M. (2005), "On the risk of overshooting 2 degrees Celsius", *Proceedings from International Symposium on Stabilisation of Greenhouse Gas Concentrations -- Avoiding Dangerous Climate Change*, Exeter, 1-3 February 2005, [www.stabilisation2005.com/14\\_Malte\\_Meinshausen.pdf](http://www.stabilisation2005.com/14_Malte_Meinshausen.pdf)
- (4) Retallack, S. (2005) "Setting a long-term climate objective: A paper for the International Climate Change Taskforce", Institute for Public Policy Research, [www.ippr.org](http://www.ippr.org)
- (5) Baer, P. and M. Mastrandrea (2006) "High Stakes: Designing emissions pathways to reduce the risk of dangerous climate change", Institute for Public Policy Research, [www.ippr.org](http://www.ippr.org)
- (6) Stern, N. (2006) *Review on the Economics of Climate Change*, part 3, page 194, [www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)
- (7) DEFRA (2003) *The Scientific Case for Setting a Long-Term Emission Reduction Target*, [http://www.defra.gov.uk/environment/climatechange/pubs/pdf/ewp\\_targetscience.pdf](http://www.defra.gov.uk/environment/climatechange/pubs/pdf/ewp_targetscience.pdf)
- (8) HM Government (March 2006) *Climate Change: The UK Programme 2006*, <http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/ukccp06-all.pdf>
- (9) George Monbiot (2007), "Giving Up On Two Degrees", *The Guardian*, 1 May 2007, <http://www.monbiot.com/archives/2007/05/01/1058/>
- (10) Preston, B.L. and Jones, R.N. (February 2006), "Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions", A consultancy report for the Australian Business Roundtable on Climate Change, CSIRO, page 32
- (11) Stern, N. (2006) *Review on the Economics of Climate Change*, speaking notes and executive summary, [www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)
- (12) Hannam, P. (2007) "New Stern climate warning", *The Age*, 28 March 2007, <http://www.theage.com.au/news/national/new-stern-climate-warning/2007/03/27/1174761470838.html>
- (13) Liz Minchin (2007), "A climate of change", *The Age*, 5 May 2007
- (14) Carbon Equity (April 2007), "The 2-degree target: How far should emissions be cut", [www.carbonequity.info/pdfs/2degree.pdf](http://www.carbonequity.info/pdfs/2degree.pdf)
- (15) Nathan Rive et al, 10th March 2007. To what extent can a long-term temperature target guide near-term climate change commitments? *Table 1. Climatic Change* 82:373-391. DOI 10.1007/s10584-006-9193-4
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- (18) *Climate Dynamics*, 26, 249-365
- (19) *Proc. Nat. Acad. Sci.*, 103, 39, 14288-93
- (20) *Theor. App. Climatology*, 78, 137-56
- (21) *Nature*, 408, 184-7
- (22) *Physics Today*, [www.aip.org/pt/vol-55/iss-8/p30.html](http://www.aip.org/pt/vol-55/iss-8/p30.html)
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- (24) McCarthy, M. (2007) "Earth's natural defences against climate change 'beginning to fail'", *The Independent*, 18 May 2007, [http://environment.independent.co.uk/climate\\_change/article2556466.ece](http://environment.independent.co.uk/climate_change/article2556466.ece)

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