Submission to the Senate Select Committee on Climate Policy, 8th April, 2009

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The text submitted is largely a summary of other documents. References are provided where possible.

Addressed in this submission are (c) and (d) from the Terms of Reference

Summary of Submission

- Given the urgency of the science findings, short-term targets are crucial to minimise the worst impacts of climate change and ensure adaptation measures remain within the realm of possibility.

- The IPCC recommends global reduction targets for developed nations of 25-40% below 1990 by 2020 and 80-95% below 1990 by 2050. Australia's proposed targets of 5-15% below 2000 levels (the lower target ~4% below 1990 levels) are an inadequate contribution to this global effort.

- Climate impacts outlined in the 2007 IPCC report are now being realised faster than expected.

- Global emissions are increasing at greater rates than projected.

- Continued support for fossil-fuel based economies pose serious financial and security risks, as well as increasing the risks of irreversible tipping points in the climate system.

- Equitable and fair allocations of emissions globally will be essential to ensure poverty alleviation at the same time as sustainable development. Australia ranks high in terms of both capacity to act and responsibility for historical emissions.

Addressing point (c) of the Terms of Reference

(c) whether the Government's Carbon Pollution Reduction Scheme is environmentally effective, in particular with regard to the adequacy or otherwise of the Government's 2020 and 2050 greenhouse gas emission reduction targets in avoiding dangerous climate change;

Urgency of climate science

Substantial evidence from science publications, including the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4), indicates that an increase in the global average temperature of more than 2 °C above pre-industrial levels poses severe risks to natural systems and human health and well-being. By 2007 global average temperature was around 0.8 °C above pre-industrial levels.

To have even a 50/50 chance of preventing temperatures from rising above 2 °C over pre-industrial levels, we must stabilize the concentration of heat-trapping gases in the atmosphere at or below 450 parts per million CO2-equivalent (CO2eq *). To have an 80% chance would require limiting the atmospheric concentration to around 380 ppm CO2eq. Note that 380 ppm CO2eq happens to be our current level, about 100 ppm higher than pre-industrial amounts. **Given the accelerating pace of climate impacts a lower concentration may be necessary**.

Major developments in climate change science have been reported since the publication of the comprehensive IPCC AR4. The latest climate science congress in Copenhagen (March 10-12th, 2009) presented recent research indicating that the **consequences of climate change are already occurring at a faster pace and are of greater magnitude than the climate models used by the IPCC projected.** Some of the main findings are:

- **More CO2 remaining in the atmosphere**
  More emitted CO2 is remaining in the atmosphere due to a decrease in the ocean's capacity to uptake carbon dioxide (Raupach et al., 2008). The ocean is one of two major sinks (along with the terrestrial biosphere) that have been absorbing approximately half of human emissions of CO2.

- **Increased sea-level rise observed**
  Global sea level has risen 50 percent faster than projected. Recent observations confirm that sea level is in the upper range projected by models used by the IPCC. New projections (that include ice sheet loss) show that sea levels may rise more than a metre this century.

- **Plummeting Arctic sea ice**
  Arctic sea ice observations show a much steeper decline than any IPCC projections expected (Stroeve et al., 2008). New estimates expect an ice-free summer Arctic by 2015.

The impacts outlined in the IPCC report are now considered on the conservative end of projections. Current global emissions are higher than the high range considered in the IPCC report.

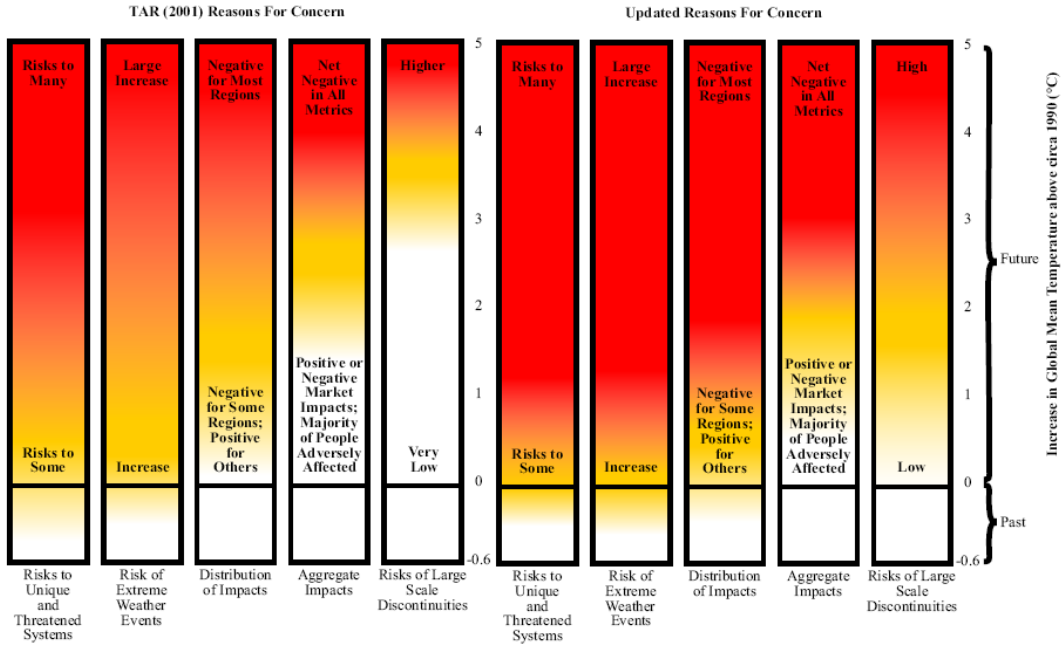

Figure From: Smith et al., 2009

Schematic showing the increase in risks from climate change documented in the IPCC Third Assessment Report, 2001, (left) and the IPCC Fourth Assessment Report, 2007 (right). The color scheme represents progressively increasing levels of risk. In all categories level of risk has increased markedly between assessments from observed changes in global mean temperature and increased understanding of vulnerability.

Reduction targets

The IPCC AR4 offers a literature review of the published estimates of reductions necessary to achieve atmospheric stabilization at 450ppm by the end of this century. In this review, the IPCC divides the share of responsibility for emissions between Annex 1 (industrialized) countries and non-Annex 1 countries (developing and emerging economies). Under this review, the IPCC expressed a range of reductions for Annex 1 countries in order to stabilize global atmospheric concentration levels at 450ppm CO2eq. **The range given is 25-40% below 1990 levels by 2020 and 80-95% below 1990 levels by 2050[i].**

The European Union has set short-term targets of 30% below 1990 levels by 2020.

Short-term targets are crucial to ensuring that long-term targets are both ecologically and economically achievable. Many emissions reduction strategies can be adopted today that would save consumers and industry money while providing benefits for air quality, energy security, public health, balance of trade, and employment. (UCS ref) The longer we wait, the harder and more costly it will be to limit climate change and to adapt to those impacts that will not be avoided.

Australia's targets

Australia's targets should be set with reference to these necessary levels to ensure that we avoid the worst impacts of climate change, and that we remain within the bounds of possibility for adaptation. The proposed targets of 5-15% below 2000 levels (the lower target about 4% below 1990 levels) by 2020 are completely inadequate to achieve this goal of avoiding dangerous climate change.

Australia should join with other industrialised nations to reduce emissions between 25-40% below 1990 levels by 2020 and 80-95% below 1990 levels by 2050.

Tipping Points

Without adequate reduction targets, the possibility of reaching potentially irreversible tipping points in the climate system is possible. New studies since the IPCC report show a number of these tipping points are likely to be triggered at global temperatures of 2°C above pre-industrial (Lenton et al., 2008). The IPCC identified sensitive areas vulnerable to irreversible damage, including the Great Barrier Reef, Kakadu, and the Murray-Darling Basin. Globally, tipping points exist in the cryosphere (ice sheets and Arctic sea ice), the terrestrial biosphere (permafrost, forest carbon stores) and the ocean (circulation and carbon dioxide uptake).

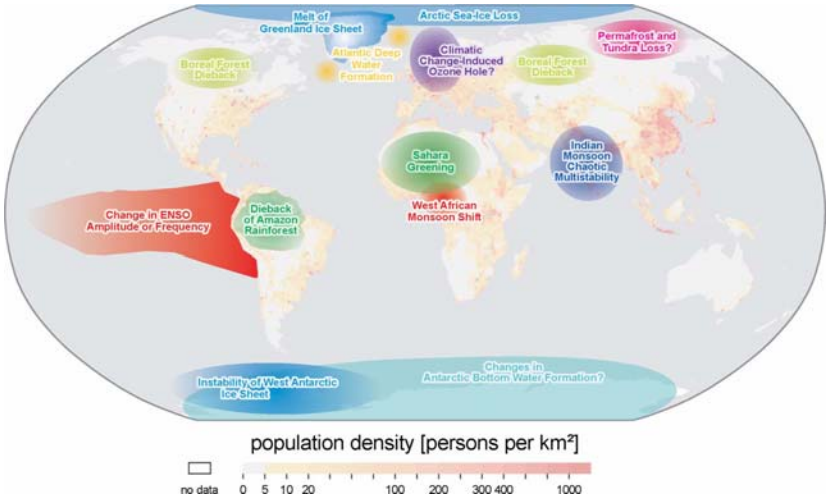

Figure From: Lenton et al., 2008

Addressing point (d) of the Terms of Reference

(d) an appropriate mechanism for determining what a fair and equitable contribution to the global emission reduction effort would be;

The Greenhouse Development Rights Framework – an outline (Baer et al., 2008)
http://www.ecoequity.org/docs/TheGDRsFramework.pdf

In this analysis, Australia ranks as the 13th highest country in terms of combined capacity to act on climate change and historical responsibility for emissions. Australia is responsible on this basis for 1.7% of the effort necessary to meet the 2050 targets of at least 80% reductions in global emissions below 1990 levels.

So constrained is the global carbon budget – global emissions must peak and start a precipitous decline in the next decade – that it is too late to talk of emissions reductions in Annex I countries alone. It is now necessary to secure significant cuts in emissions in the growing nations of the developing world. And yet, even in the burgeoning Chinese and Indian economies, there is still huge poverty. This is the crux of the current climate impasse.

The United Nations Framework Convention on Climate Change states in article 3.1 that "parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities". In article 3.4 it furthermore states, that "parties have a right to, and should, promote sustainable development". The Greenhouse Development Rights Framework attempts to work this idea through in a manner that explicitly safeguards the right to development. It lays out and quantifies an effort-sharing framework that would logically follow from clear and defensible measures of responsibility and capability defined so as to preserve developmental equity.

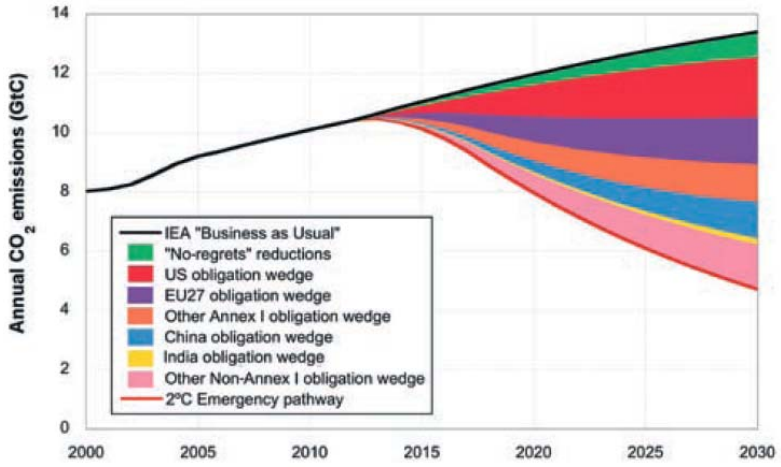

Figure ES3: Total global mitigation requirement, divided into "national obligation wedges." The widths of the wedges reflect the shares of the global mitigation burden that would be borne by particular nations (or groupings) in proportion to their share of the total global RCI.

Figure From: http://www.ecoequity.org/docs/TheGDRsFramework.pdf

The Greenhouse Development Rights (GDRs) framework is presented in the context of an extremely ambitious emission reduction pathway designed to hold global warming below

2°C. It defines national responsibility and capacity, and assesses national climate obligations, in a manner that relieves from the costs and constraints of the climate crisis those individuals who are still striving for a decent standard of welfare – represented by a "development threshold" defined at an income level modestly above a global poverty line.

The GDRs framework is designed to demonstrate how a global emergency mobilization to stabilize the climate can be pursued while, with equal deliberateness, safeguarding the right of all people to reach a dignified level of sustainable human development.

References

Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate change 2007: The physical science basis.* Contribution of Working Group I to the Fourth Assessment Paltsev, S., J.M. Reilly, H. Jacoby, A.Gurgel, G.E. Metcalf, A.P. Sokolov, J.F.Holak. 2007. *Assessment of U.S. cap-and-trade proposals,* Report No. 146. Cambridge, MA: Massachusetts Institute of Technology: Joint Program on the Science and Policy of Global Change.

IPCC AR4, Working BE Group III, Row 1 in Box 13.7 Note that only this row in the table is based on references that assume a brief overshoot of about 50 ppm during the early part of the emissions pathway considered a realistic assumption by the original publications given the current high emissions pathway we are currently on (i.e. the high emissions IPCC scenario A1FI). Chapter 13Box

Stroeve, J., M. Serreze, S. Drobot, S. Gearheard, M. Holland, J. Maslanik, W. Meier, And T. Scambos. 2008. *Arctic sea ice extent plummets in 2007, EOS, Transactions.* American Geophysical Union, 89:13-20.

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Lenton, T. M., H. Held, E. Kriegler, J. W. Hall, W. Lucht, S. Rahmstorf and H. J. Schellnhuber (2008) Tipping elements in the Earth's climate system, *Proceedings of the National Academy of Sciences*, USA 105(6), 1786–1793.

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M. R. Raupach, J. G. Canadell, and C. Le Quere, 2008. Anthropogenic and biophysical contributions to increasing atmospheric CO2 growth rate and airborne fraction, *Biogeosciences Discuss.*, 5, 2867–2896.