

## **Submission to the Joint Standing Committee on Treaties: Inquiry into the Kyoto Protocol**

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Chairman Greenhouse Science Advisory Committee

The Greenhouse Science Advisory Committee (GSAC) has a responsibility to advise the Minister for Environment and Heritage on scientific aspects of the ‘Greenhouse Effect’, i.e. the nature, causes, and consequences of changes to the composition of the Earth’s atmosphere, particularly those changes resulting from burning of fossil fuels and of biomass.

GSAC is multidisciplinary and provides a forum for discussion of key developments and issues in greenhouse science among atmospheric scientists, earth scientists, ecologists and agricultural scientists, oceanographers and biologists. GSAC also advises the Minister on links between greenhouse science and relevant policy matters. The GSAC has a particular interest in identifying and evaluating scientific aspects underpinning and guiding Australian policy with respect to international negotiations, such as the developments arising from the Kyoto Protocol.

In preparation of advice to Government, GSAC is concerned to maintain the ethical principles for the scientific method and scientific community, recognising that ‘Greenhouse’ issues have attracted sensationalist media attention, marginal science and pseudo science and special interest groups — and policies with respect to ‘Greenhouse’ have global, regional and local impacts politically, economically and socially.

Thus to address the second dot point of the Inquiry’s Terms of Reference, i.e. “*The veracity of conflicting scientific theories on global warming and any solutions proposed for it*” it is necessary to state that the ‘rules’ require adherence to the scientific approach of ‘organised scepticism’ (as opposed to authority, precedent or popularity criteria) and acceptance that scientific knowledge is published knowledge with the publication process including the key peer review process and enabling the scientific community at large to use, debate, endorse or falsify, the published material.

In its role in advising the Australian Government on Greenhouse Science, GSAC has prepared a document, “The Australian Greenhouse Science Initiative – a Strategy and Business Plan

2000-2005”, which sets out a program to address the uncertainties in Greenhouse science including climate change, the predicted impacts of atmospheric change and the possible adaptations and mitigation approaches. Research to understand natural variability in atmospheric composition, and in climate is an integral part of the GSAC proposal.

The attention of the Joint Standing Committee on Treaties is drawn to the membership of the Committee (GSAC) (attached) In addition, in preparing the 1999 advice, GSAC conducted a series of workshops in which the scientific issues were debated amongst scientists from universities, government institutions and the private sector. This consultation parallels that at an international level which underpins the work of the International Panel on Climate Change (IPCC).

As Chairman of GSAC, I submit the following direct response to the second dot point of your Committee’s Terms of Reference. Policy responses to the Greenhouse issues should accept that it is verified scientific knowledge that:

- a) The composition of the Earth’s atmosphere is changing at an unprecedented rate, directly attributable to the burning of fossil fuels and to changes in the Earth’s biomass, i.e. to anthropogenic causes.
- b) The Earth’s Climate has warmed through the 20<sup>th</sup> Century at a rate exceeding that of the 19<sup>th</sup> Century.
- c) Global Sea-Level has risen at a mean rate of  $1.5 \pm 0.5$  mm/year over the past 100 years. This rate exceeds that of the 19<sup>th</sup> Century.
- d) The Earth’s Climate is naturally variable resulting from complex interactions between solar/planetary factors, atmosphere, oceans, ice-caps, biosphere and lithosphere. The natural variability of climate is not yet predictable on a global or regional scale but historical and geological evidence establishes rapid rates of change and magnitudes of change with severe impacts on biological and social systems.
- e) The current levels of greenhouse gases in the atmosphere, and their predicted levels, exceed those inferred for past climates and their effects cannot be interpreted from records of past climates. Such records of past climate provide an invaluable guide to potential changes and a template against which to test model predictions.

- f) The combination of observations on present and past climates with physical understanding of the processes controlling climate have led to complex models (global climate models) which have predictive capacity with respect to effects of changes in the earth's atmosphere and changes in other regional and global characteristics.
- g) All global climate models in wide scientific usage and which relate global temperature to atmospheric composition, predict atmospheric warming as a consequence of the rise in greenhouse gases.

The above statements summarise the position taken by the scientific community following in-depth consultation and responsibly using published scientific information. It is a position which leads to the scientific community advocating, in the strongest terms, the adoption of measures to decrease greenhouse gas emissions and the recognition that this is a global issue to be addressed through international agreements.

GSAC has identified the need for targeted research to underpin Australia's role in the global response to Greenhouse. The scientific data bases and scientific understanding of complex processes and feedbacks are inadequate to achieve the desired level of predictability of natural climate variability and of climate change resulting from the 'Greenhouse Effect'. In international negotiations, Australia can only pursue independent objectives suited to Australia's national interest and particular mix of greenhouse gas sources and sinks, if it has the scientific underpinning for its policy position. As noted in the GSAC advice, Australian science has high international standing in this area and the regionalisation of climate observations, impacts, adaptation and mitigation strategies means that Australia plays a lead scientific role for nations in its region. However, targeted funding for Greenhouse is approximately \$3.5 million per annum (through 2002/03) to core programs in CSIRO, Bureau of Meteorology and National Tidal Facility. GSAC has advised that these programs are inadequate to meet Government expectations for sound and timely scientific advice, particularly to underpin and validate much larger expenditures in the Australian Greenhouse Office for Greenhouse Gas Abatement, Carbon Accounting and National Greenhouse Gas Inventory programs.

GSAC has sought funding to address highest priority objectives under

- a) Greenhouse and the Climate System — emphasising the interactions of the climate system with the carbon cycle, the roles of aerosols and the refinement and evaluation of climate models.
- b) Climate Variability and Trends — establish Australia's natural climate variability over 100's to 1000's years time-scale and its relationship to changes in greenhouse gases.
- c) Impacts and Adaptations — atmospheric and climate changes affect terrestrial and marine environments and have direct and indirect impacts on human society. These impacts may be positive or negative for particular activities and economic or biological systems — in either case prediction and adaptation are important. Prediction of impacts and preparations for adaptation methods need to be based on sound science and a well-informed society.

The Inquiry in the second dot point of its Terms of Reference refers to ...”global warming and any solutions proposed for it” From its consultations among Australian scientists and its awareness of the pending IPCC report derived from global consultation, GSAC considers that the ‘do nothing’ option is irresponsible and programs to limit growth of, and then to reduce, greenhouse gas emissions, to enhance greenhouse gas uptake (‘sinks’) and test sequestration concepts are all necessary components of “solutions” for the greenhouse effects. There is no single solution and Government initiatives in the National Greenhouse Gas Inventory Program, the National Carbon Accounting Program and the Greenhouse Gas Statement Program are expressions of commitment to an effective national response.

GSAC has emphasised the scientific basis for these response strategies and expressed concern that a full understanding of the components contributing to atmospheric changes and of the interactions between various sources and sinks has not yet been achieved. Scientific input to, and monitoring of, these programs is essential and appropriate scientific research in mitigation strategies, and in tracking and quantifying greenhouse gas sources and sinks, is a necessary part of the above Programs. Of particular importance for Australia, the potential for enhancement of sinks and reduction of emissions through changed land-use practices in relation to forests and soils, requires improved scientific understanding. Such research is often region and climate specific, cannot be imported and must draw on Australian expertise and studies. GSAC has expressed concern that the necessary scientific research is not currently adequate for policy purposes.

## **Conclusion**

The Greenhouse Science Advisory Committee (GSAC) has reported to Government in terms which directly address the second dot point of the Inquiry's Terms of Reference. The Earth's atmosphere is changing composition due to human activities, particularly in the burning of fossil fuels and in changes to vegetation and land use. The Earth's climate is warming and although apparently within the range of natural variability in the past 2000 years, all science-based models predict global warming in response to increased concentrations of greenhouse gases. The scientific basis for more specific prediction and particularly for prediction of regional climate change and climate variability is currently inadequate. Mitigation and adaptation strategies require underpinning and auditing by scientific research which is currently unfunded.

Australia's international policy positions and national interests can only be successfully pursued if they are based, among other things, on scientific research of highest international standing and focussed in specifically Australian and regional programs and contexts. Australia does not currently have the required level of scientific research activity and is increasingly dominated by external authority or diminished by loss of significant researchers to overseas programs.

## **The Greenhouse Science Advisory Committee consisted of the following members in 1999.**

### *Members (1999)*

Professor David Green, Director, Research School of Earth Sciences, Australian National University (Chairman)

Dr Peter Bridgewater, Chief Science Adviser, Environment Australia (until March 1999)

Professor Graham Farquhar, Head, Environmental Biology Group, Research School of Biological Sciences, Australian National University

Dr Colin Grant, Deputy Chief Executive, Australian Greenhouse Office (from March 1999)

Professor Ann Henderson-Sellers, Director, Environment, Australian Nuclear Science and Technology Organisation

Dr Mike Manton, Chief, Bureau of Meteorology Research Centre

Dr Graeme Pearman, Chief, Atmospheric Research CSIRO

Dr Brian Walker, Chief, Wildlife and Ecology, CSIRO

*Secretariat*

Mr Ian Carruthers, Ms Kay Abel, Dr Angela Ivanovici, Mr John Vidas

25.8.00