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Cabinet Memorandum 8486 - Negotiations for a convention on climate change - progress report -  
Decisions 16125/SD and 16144

C A B I N E T M I N U T E

Canberra, 16 December 1991

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No. 16144

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Memorandum 8486 - Negotiations for a Convention on Climate  
and Change: Progress Report  
Minute 16125 (SD)

The Cabinet noted the conclusions of paragraphs 15 and 16 of the Memorandum.

2. The Cabinet agreed that :-

- (a) at the fourth Intergovernmental Negotiating Committee meeting, Australia continue to seek an effective and equitable treaty commanding the widest possible support and which would have minimum adverse impacts on the Australian economy or trade competitiveness; and
- (b) the Department of Foreign Affairs and Trade, the Department of the Arts, Sport, the Environment, Tourism and Territories, the Department of Industry, Technology and Commerce, the Department of Finance and other departments as

.../2

2.

No. 16144 (contd)

necessary, assess, as a priority, funding and  
technology transfer options and their likely  
costs and benefits.

(This endorses Minute 16125(SD) of 10 December 1991.)



Secretary to Cabinet

C A B I N E T M I N U T E  
Sustainable Development Sub-Committee  
Canberra, 10 December 1991

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No. 16125 (SD)

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Memorandum 8486 - Negotiations for a Convention on Climate Change: Progress Report

The Committee noted the conclusions of paragraphs 15 and 16 of the Memorandum.

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- (b) the Department of Foreign Affairs and Trade, the Department of the Arts, Sport, the Environment, Tourism and Territories, the Department of Industry, Technology and Commerce, the Department of Finance and other departments as necessary, assess, as a priority, funding and technology transfer options and their likely costs and benefits.



Committee Secretary

C A B I N E T M I N U T E

Sustainable Development Sub-Committee

Canberra, 10 December 1991

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No. 16125 (SD)

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Memorandum 8486 - Negotiations for a Convention on Climate Change: Progress Report

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Committee Secretary

FOR CABINET

Title	NEGOTIATIONS FOR A CONVENTION ON CLIMATE CHANGE: PROGRESS REPORT
Date	26 November 1991
Originating Department(s)	Department of Foreign Affairs and Trade, and Department of the Arts, Sport, the Environment, Tourism and Territories
Cabinet or Ministerial Authority for Memorandum	Called for by Minister for Foreign Affairs and Trade and the Minister for the Arts, Sport, the Environment, Tourism and Territories
Purpose of Memorandum	To provide Ministers with a mid-term progress report on the negotiations for a framework Convention on Climate Change
Legislation	No
Consultation: Departments consulted	PM&C, DPIE, TREASURY, DITAC, FINANCE, DOTC, DHHCS, AG's, CSIRO,
Is there agreement?	Yes: the Memorandum has been endorsed by all Departments members of the Commonwealth Greenhouse IDC
Cost: This fiscal year	N/A
year 2	
year 3	



**BACKGROUND**

UN General Assembly resolution 45/212 of 12 December 1990 established the Intergovernmental Negotiating Committee (INC) to prepare an effective framework Convention on Climate Change to be completed prior to the United Nations Conference on Environment and Development (UNCED) in June 1992. The INC has held three sessions: in Washington, D.C. (4-14 February); in Geneva (19-28 June); and in Nairobi (9-20 September). Fourth and fifth sessions will be in December 1991 and February 1992.

2. CM 14798 of 22 January 1991 established the guidelines and objectives for Australian negotiators. Australia is seeking a Convention consistent with the protection and advancement of Australia's interests in accordance with the terms of CM 14531 of 11 October 1990 and CM 14798 of 22 January 1991.

**ISSUES**

3. Progress in the negotiations has been slow. By the end of the third, mid-term session, the INC has yet to produce a negotiating text. Given the time constraints, it is now unlikely that this phase of the negotiations will produce much more than a broad framework agreement. This would provide a foundation for more detailed, substantive commitments in negotiations continuing well beyond UNCED.

4. There are several reasons for the slow progress and likely modest results from these negotiations. Firstly, the Convention is perhaps one of the most ambitious and complex multilateral treaties ever attempted, and certainly within five two-week negotiating sessions over 18 months (the Law of the Sea Convention - the only multilateral treaty of comparable complexity - took a decade to negotiate).

Moreover, the negotiations are charting new territory in international law, where few precedents exist. The provisions envisaged for the Convention encompass the full range of economic activity. The science of climate change is complex and there are still areas of uncertainty: some countries (including the US, China and the USSR) exploit this to negotiate for minimal legal obligations.

5. Secondly, awareness is growing that the Convention could affect radically national and international economic fundamentals introducing into the negotiations wider international political and economic issues. Thirdly, the realisation is growing that the costs of implementing the Convention may fall more heavily on some than on

others. A key to the achievement of an effective Convention is likely to be the equitable economic treatment of all countries. We are pursuing measures to recognise the situations of individual countries. In addition to supporting the interests of small island States and others likely to be adversely affected by climate change impacts, Australia has striven for recognition of the potential for the Convention to impose inequitable burdens on economies highly dependent on the production and exportation of fossil fuels and energy intensive products or which rely heavily on the more carbon intensive fossil fuels for domestic energy needs.

6. As in the Preparatory Committee for UNCED, the negotiations for a Biological Diversity Convention and elsewhere in post Cold War international relations, the major rift is between the developed and the developing countries. The dominant ideologists of the South - India, China, Malaysia and Mexico - have seized on the Climate Change Convention negotiations as a new opportunity to achieve the Third World objectives of the 1970s and 1980s. These influential countries' objectives for the negotiations relate less to the protection the global environment, than to the reversal of the imbalance of wealth between developed and developing countries, through inter alia the acquisition of Western technology and financial assistance. They see the Convention as a means to inject into international law new principles going well beyond the climate change regime, such as a proposed principle prohibiting the introduction of barriers to trade on environmental grounds. If accepted, this proposal would lead to inconsistencies with the GATT and other environmental treaties with trade provisions. The Indian delegate has told us that, the Climate Change Convention negotiations are the most important economic negotiations outside the Uruguay Round.

#### Developed countries

7. Among the developed countries, although the environmental genesis of the Convention is still evident, economic and political imperatives increasingly drive negotiating strategies and goals. Superpower rivalry between the US and the emergent European Communities (EC) dogs the debate. The EC support a Convention with targets for stabilizing carbon dioxide (CO<sub>2</sub>) emissions (around 1990 levels by 2000), but no longer call for emission reductions. They oppose a comprehensive target covering all greenhouse gases (GHG),



partly because of their vulnerability on the issue of methane and agriculture, and partly because of the difficulty in quantifying emissions of gases other than CO<sub>2</sub>. The EC clearly see themselves as winners in economic terms under their preferred form of Convention and judge that stabilisation would not entail unacceptable costs or loss of competitiveness provided industries in competitor countries are subject to similar costs. (The EC can stabilize their CO<sub>2</sub> emissions at low cost through a pooling arrangement which allows some members to increase their emissions). With Japan's acceptance of CO<sub>2</sub> stabilisation targets, the EC's primary diplomatic objective is now to persuade the US to accept similar commitments. Except for the US, all developed OECD countries accept stabilisation targets under the Convention. Six (Australia, New Zealand, Austria, Denmark, Germany and The Netherlands) are willing to reduce emissions. The US argue (citing its energy-intensive economy, heavy reliance on coal and continental transport systems) that meeting such targets would be too costly and adamantly oppose their inclusion. However, the US has invested considerable sums in energy efficiency and alternative energy research.

#### Developing countries' demands for funding and technology

8. Developing countries, notably China and India, argue that the First World has caused enhanced greenhouse climate change and that the moral, practical and financial responsibility to take action lies there. The developed countries should reduce their emissions and agree to a "massive" mobilisation and transfer of financial resources and technology to developing countries to assist the implementation of environmentally sustainable development policies. India has stated that any action to address global warming acceptable to the developing countries would be conditional on the provision of new, adequate and additional funding. The EC and Nordic countries have accepted this condition. Australia, Canada, New Zealand, the US and Japan have adopted a more cautious stance. Technology transfer and additional funding are central issues in the negotiation of an effective Convention covering the major GHG producers in the developing world.

9. However, there are deep fissures within the developing country bloc. Some are genuinely worried about the adverse consequences for them of climate change. Most prominent among these is the Alliance of Small Island States, an influential 37-member grouping which

includes the majority of South Pacific island countries. African countries, particularly the arid and drought prone Sahelian States, are also concerned. Other developing countries are concerned that the tough conditions proposed by India and other hard-liners will prove unacceptably costly for the developed countries and deprive the poorer countries of the more modest financial and technology transfer likely to be produced by the Convention.

Possible outcome of the negotiations

10. Although it is difficult to predict the scope of the final framework package, our best judgement is that it could include for developed countries: stabilisation targets (at 1990 levels by 2000), rather than the reduction targets Australia is seeking; and commitments to provide additional funding and technology to developing countries. The framework Convention will not include emission targets for developing countries: more likely for them is a commitment, conditional on provision of funding and technology, to assess and monitor their emissions, and possibly to undertake efficiency measures. It could also include a commitment by all Parties to continue negotiations on more detailed obligations in the form of protocols. It is likely that there will be special provisions to assist countries particularly vulnerable to the impacts of climate change, but there can be no confidence that the particular concerns of fossil fuel dependent economies will be addressed. Australia's ability to achieve this and other objectives would be assisted by early consideration of the nature, extent, costs and benefits of our contributions to funding and technology transfer commitments beyond our existing contributions to the Global Environment Facility and our overseas environment assistance program (this is not to imply a commitment in the absence of an effective Convention). Maintaining our willingness to contribute our "fair share", and strengthening our capacity to enunciate this in practical ways is very necessary to reinforce Australia's credentials in the negotiations, and help to deflect criticism of "special pleading" on fossil fuels.

Recalcitrance of the major greenhouse gas (GHG) producers

11. The countries with the greatest actual or potential GHG emissions (US, USSR, Brazil, China and India) have so far not demonstrated a willingness to accept obligations to control emissions. These countries collectively account for about half of global GHG

emissions. An agreement without them would not be effective. At the same time, the effectiveness of an agreement embodying the commitments currently acceptable to these countries would be severely reduced. Some key countries could well reject the framework agreement which is negotiated by June 1992.

12. Australia's decision to sign the June 1992 framework Convention will depend, inter alia, on its content and our commitment not to proceed with measures which have net adverse economic impacts nationally or on Australia's trade competitiveness in the absence of similar action by major GHG producing countries. Australia will have to assess carefully the costs, benefits and other implications of becoming a Party to the framework Convention.

13. If provision for transboundary emission reductions is included in the Convention, a cost-effective option for Australia to reduce its emissions may be through technology transfer or projects which reduce emissions in developing countries. Attachment A discusses this issue and Attachment B contains a preliminary indicative list of technology transfer options for consideration as Australia's contribution to the greenhouse component of a financial and technology transfer package.

14. However, although the negotiations are at mid-term in a temporal sense, they are only now beginning in a policy sense. As UNCED approaches and more Heads of Government commit themselves to participation, the political pressure to produce a credible Convention will increase and may force a compromise. The final agreement may only fall into place at the last minute.

#### CONCLUSIONS

15. By June 1992, only the broadest framework agreement is likely to be achieved. Australia's key environmental objective of obtaining international agreement to the Toronto target on CO<sub>2</sub> and other GHGs as a global target will not be achieved by June 1992. This would not preclude Australia continuing to advocate this target as a longer-term objective for ongoing negotiations.

16. If the trend towards a stabilisation commitment by developed countries is confirmed at INC4 in December 1991, before INC5 in February 1992 Australia will need to reassess its negotiating position approved by Cabinet in CM 14798. Beyond this, and before UNCED, Australia will need to consider the implications of becoming a Party to the framework Climate Change Convention. An important factor in this consideration will be Australia's commitment not to

proceed with measures which have net adverse economic impacts nationally or on Australia's trade competitiveness in the absence of similar action by major GHG producing countries.

17. In the meantime, i.e. at INC4 in December 1991, we should continue to seek an effective and equitable treaty commanding the widest possible support and which will have minimum adverse impacts on the Australian economy or trade competitiveness. Crucial elements of such a treaty will be, for Australia, recognition of the concerns of fossil fuel dependent economies, and for all Parties, an acceptable bargain on funding and technology transfer. We should, as a priority, assess funding and technology transfer options, and their likely costs and benefits, because decisions are needed on what Australia can offer.

CLIMATE CHANGE AND TECHNOLOGY TRANSFER

## SUMMARY

This paper describes the current position on technology transfer in the negotiations on climate change and raises some of the key issues. It discusses approaches which might yield the best outcome for Australia, including the possibility of an emissions credits system (which has already been proposed in the negotiations). In Attachment B are some lists of current and possible programs which Australia is undertaking or could undertake in other countries to meet the kinds of obligations we may acquire under the convention. Further work will be necessary to provide a firmer basis for decision when the nature of obligations acquired under the convention becomes clearer.

2. Developing countries see technology transfer as a means to meet both environmental and economic objectives, the latter through the transfer of significant resources (funds and/or technology). Developed countries are wary of the open-endedness of that claim, but recognise that some concessions will be necessary to entice developing countries to become parties to the convention. There is also the prospect of commercial advantages for firms in the developed countries.

3. Among the issues being considered in the negotiations are the treatment of intellectual property, the mechanisms for promoting technology transfer under the convention, and the prospect of countries meeting emission reduction obligations by reducing emissions outside their own borders (an emissions credits proposal by Norway is an example). Many key aspects of these issues are yet to be clarified.

4. It is probable that Australia will acquire obligations under the convention to fund or mount some form of technology transfer program related to climate change. Attachment B lists existing and possible climate change activities in order to illustrate the kind of program that could be assembled. Australia should formulate such a program to maximise emission reductions on a

global basis (within Australian resource constraints and the agreed objectives of the convention) while optimising overall economic benefits to Australia.

5. The need for and the funding of such a program cannot be decided until the shape of the convention is clearer and more information is available about the cost and benefits of, and emission reductions resulting from, various project possibilities.

#### BACKGROUND

6. Technology transfer in the context of current international environment negotiations refers to the transmission of knowledge, techniques and understanding from one country to another. Knowledge may be embodied in plant and equipment, and frequently the term is taken to mean the transfer of hardware; in practice, hardware transfers are generally not successful in raising the level of technology in the recipient country unless accompanied by the soft technologies of education, training, skills and infrastructure in order to allow the hardware to be used, maintained and adapted. Much technology transfer involves little or no hardware transfer, eg, improvement of agricultural practices through training programs.

7. Technology transfer occurs through a multiplicity of means and channels. The major channel is commercial arrangements (purchase, licence, joint venture). Technology transfer also occurs through Australia's development co-operation program including:

- (a) training and education programs
- (b) provision of experts for advisory programs
- (c) institution and infrastructure building
- (d) maintenance techniques and practices
- (e) science and technology, monitoring and baseline study programs.

8. Australia's existing development co-operation program, and other government and semi-government programs carried out in developing countries, include a number of activities directed to climate change, and others which, while directed to quite different objectives, would have climate change benefits, either directly (through emission reductions) or indirectly (eg improved infrastructure). Examples (totalling some \$80 - \$100 million, most funded by AIDAB) are listed at Attachment B.

#### CURRENT NEGOTIATIONS

9. In current environmental negotiations, technology transfer becomes an issue because of the north-south flavour of the debate. Developing countries see climate change both as a result of developed countries' behaviour, and as a developed country responsibility. The attitude is that developed countries created the problem and must solve it, not only by cutting their own emissions, but also by the transfer of resources to developing countries to enable them to control theirs. Those resources can be in the form either of technology or of funding, or both.

10. In the climate change negotiations, developing countries view suggestions that they should cut emissions as direct threats to their economic growth, and see financial and technological transfers as insurance against such threats. From the start, developing countries have emphasised technology transfer as an essential element in any successful climate change convention. Although some possible convention mechanisms (such as tradable emission rights) might not in the first instance require separate technology transfer and funding provisions, in the current state of preparations adequate provisions on funding and technology from the developed countries are a sine qua non if developing countries are to become parties to the Convention at UNCED (of course, the developing countries differ amongst themselves in the firmness of their insistence on financing and technology provisions).

11. It is, however, important that developing countries agree to some obligations if the convention is to be effective. The top

ten greenhouse gas emitting countries include Brazil, China, India and Indonesia (as well as the Soviet Union), and it is projected that developing countries will contribute more than half the total emissions by about the year 2010. It is therefore essential that acceptable technology transfer provisions are included in the convention in order to encourage these countries to assume appropriate obligations. The central purposes of this Attachment are therefore to set out some of the issues relevant to climate change technology transfer negotiations and to illustrate the kinds of programs that could possibly be used to meet Australia's technology transfer obligations that may arise under the convention.

12. In addition, it is important that any financial and technological transfers are related directly to greenhouse gas emission reduction and adaptation. From a global perspective, the most cost-effective actions by any particular country will be those that result in the maximum level of greenhouse gas emission reductions for each unit of expenditure. Tighter controls on efficient industries in one country could lead to a net negative effect in greenhouse terms if the end result is an "export" of those industries to countries which are less efficient and which enforce lower environmental standards.

#### INTELLECTUAL PROPERTY

13. One of the potential sticking points relates to intellectual property. Developing countries have argued for "preferential and non-commercial" transfer of technology, and that phrase has sometimes been interpreted to mean that intellectual property rights in donor countries would be abrogated in some way. Australia has consistently adopted the position that an improvement to existing intellectual property systems is necessary for technology transfer to take place, and that such transfers are more likely where recipient countries have strong intellectual property systems in place. It is worth noting that the positions of some developing countries on intellectual property have softened substantially in the context of current



Trade Related Aspects of Intellectual Property Rights negotiations (due to end in December 1991).

#### FUNDING

14. The issues of funding and technology transfer are intimately connected. Developing countries see funding as necessary to cover the incremental costs of meeting the higher environmental standards demanded by developed countries; those costs are mostly incurred in achieving the level of technology necessary. Unless claims for compensation become part of the convention (which is unlikely), it appears that climate change transfers of technology could in principle almost completely substitute for financial transfers (although this conclusion cannot be applied equally to other environmental negotiations, such as biodiversity and UNCED). In practice, however, some mix of direct financial transfers and technology transfer (itself supported through aid budgets) will probably be needed.

#### EMISSIONS CREDITS

15. Australia should seek an approach to technology transfer which minimises the costs to the budget and maximises the flow of funds and other benefits returning to the Australian economy (while meeting environmental objectives). To promote the cost-effectiveness and environmental impact of technology transfer, consideration could be given to the concept of emission credits as a means of meeting emission reductions of the donor country. As an example, the replacement of old, inefficient power generation equipment in a developing country could meet technology transfer obligations, and also be claimed as an emission reduction credit for the donor country. Initial studies have shown that such options for emission reductions are frequently cheaper in terms of emissions saved per dollar of expenditure than reductions within the donor country's borders (where efficiencies are already comparatively high).

16. The nature of any technology transfer/funding obligations that may be included in the convention are not known at this

stage. There is a wide range of options. Nevertheless, the possibility of an emission credits scheme has been raised at the climate change negotiations by Norway. The Norwegian proposal envisages that emission credits would not replace technology transfer and funding arrangements, but rather be an additional element which would serve as a further incentive for developed countries to promote adoption of greenhouse-friendly technologies in developing countries. It is also understood that actions for which emission credits were sought would be in addition to a country's national greenhouse response program.

17. The Norwegian proposal, which has so far only been put forward in outline, envisages a kind of clearing-house for the matching of developed country technologies with developing country needs. It would therefore facilitate bilateral transfers, and in particular projects where one country was able to claim an emission credit for work done in another.

18. The proposal raises a number of issues which are yet to be clarified. Among them are how to quantify and assess emissions savings from projects; how to treat existing projects; how to determine firm citizenship; how to treat programs that increase emissions in other countries; what the side effects of emissions credits might be (eg encouragement of exclusive trading arrangements or discouragement of technological advances). The Norwegian proposal also raises as an issue the role of the private sector in the funding and implementation of projects; it is not clear how commercial transfers of technology could be incorporated into any formal commitments on technology transfer. All these issues will be examined further during the course of the INC process.

19. The concept of emissions credits could offer a useful synergy between funding, technology transfer and emissions reductions obligations. If countries could meet several different requirements with each project, the costs of a climate change convention could be significantly reduced. The costs could be expected to be reduced further if contracts were to flow back to Australia or normal commercial flows of contracts, goods and

services were involved. If the issues raised above, and others which may arise, can be satisfactorily resolved, emissions credits may have some attractions for Australia. The types of projects covered by this attachment, however, do not depend on an emissions credits scheme for their justification; they are likely to be necessary in any case to meet technology transfer or burden-sharing obligations under a convention.

#### APPROACHES TO TECHNOLOGY TRANSFER

20. A possible model for technology transfer is set out below. The model seeks:

- (a) to build on existing activities and strengths;
- (b) to avoid introducing distortions into existing programs and arrangements;
- (c) to minimise direct calls on government budgets;
- (d) to encourage developing country participation in the convention;
- (e) to contribute to emission reductions in developing countries;
- (f) to maximise returns to Australia through trade and trade-related activities;
- (g) to balance the hard and soft technology components of technology transfer under the convention.

21. We would expect normal processes - both aid and other co-operation programs and commercial transactions - to be the main vehicles for technology transfer. For this reason the convention should make allowance for a plurality of mechanisms.

- (a) Some assistance would be required for activities aimed at developing a better understanding of climate change problems, and at addressing options other than emission reductions; that could cover country studies, greenhouse gas emission inventories, climate modelling, research generally, education and training, institution building, infrastructure development and adaptation. This would be an obligatory

first tier of technology transfer, which could be provided in part bilaterally and in part multilaterally.

- (b) Those activities would be complemented by other programs which would contribute directly to greenhouse gas emissions reductions. These latter programs would be the second tier of technology transfer, including aid, and possibly, subject to the caveats above, concessional financing and commercial transfers. They could then be assessed against countries' technology transfer and emissions reductions obligations (assuming an emissions credits arrangement is agreed).

22. It has always been Australia's position that commercial channels should be used to the maximum extent possible in technology transfer under a convention. The tenor of the negotiations is that developing countries would expect to be compensated by developed countries for the incremental costs arising from meeting their obligations under the convention. Such incremental costs could possibly be met through bilateral aid, multilateral funds or organisations or concessional financing of commercial operations.

23. Funding may therefore be required for:

- (a) most of the first tier;
- (b) the aid component of the second tier;
- (c) concessional financing;
- (d) incremental costs associated with commercial projects, and trade promotion activities related to such projects.

24. The question inevitably arises as to whether Australia should seek to concentrate the provision of assistance through bilateral or multilateral mechanisms. Bilateral mechanisms have the advantage that there is a direct flow of returns to Australia. Multilateral mechanisms, on the other hand, allow Australia to participate in or contribute to programs which are beyond us acting alone for reasons of scale, expertise, comparative advantage or access. In practice a mix will be required, but the direct returns from bilateral programs - especially if an emission credits regime is adopted - should be borne in mind when

and if Australia comes to formulate a technology transfer program under the convention.

25. In this year's Budget AIDAB was allocated additional funds to bring its environmental assistance program to \$80 million for four years. Some of those funds are already allocated to climate change activities, and others (eg population, forestry, coastal zone management and ozone depletion activities) would also have climate change benefits (see Attachment B). There is limited opportunity to redirect those funds, as they are virtually totally committed already. Priority was allocated following discussions in Cabinet prior to final deliberation between Ministers. Any reallocation would probably mean breaking present commitments or turning back already raised expectations (eg assistance to the Indonesian Environmental Protection Authority).

26. A possible outcome for Australia might be for the first tier obligations to be specified under the convention; the second tier obligations would be only loosely framed so that commercial activities unrelated to the convention could nevertheless be assessed under the convention against technology transfer obligations (and also, possibly, for emissions credits). Although it is not yet clear that such an arrangement will be adopted under the convention, this model has the advantage of providing a basis for the participation of developing countries, and for reducing the needs for increases in their emissions, regardless of whether they assume emission reduction obligations under the convention. Furthermore, the second tier activities should yield direct returns to Australian companies participating in commercial and aid-funded transactions.

#### MECHANISMS PROPOSED IN NEGOTIATIONS

27. Some specific mechanisms have already been proposed in negotiations. The US has proposed the conduct of country studies (mentioned as a first tier activity above) as the first step in generating response strategies for developing countries, and, in particular, for determining the costs of action. It is the USA

view that costs of actions to reduce emissions will be less than many countries believe.

28. Country studies would assess current greenhouse gas sources and sinks, catalogue technical options to reduce emissions and enhance sinks (through the use of technology clearing houses) and evaluate response strategies based on the most appropriate technologies or practices.

29. The use of information clearing-houses has been supported both in the country studies context and as a general means to enhance flows of technology. This concept of a clearing-house usually incorporates a mechanism to collect, store and disseminate information about technologies and practices. Australia is already a participant in clearing-houses of this type; for example, the Centre for the Analyses and Dissemination of Demonstrated Energy Technologies (CADET) and the Network for Environmental Technology Transfer (NETT).

30. The Norwegian clearing-house proposal goes a step further and proposes a match-making mechanism to link specific technology demands with technology suppliers. This clearing-house would enable emissions credits to be allocated through its operations.

31. Country studies and clearing-houses have proven useful in other contexts, and Australia should support their establishment under the climate change convention. The extent to which Australia can benefit from the arrangements will depend on the strength, applicability and availability of technologies and information offered by us.

OPTIONS FOR A TECHNOLOGY TRANSFER PROGRAM

Within our overall objective of an effective climate change convention, and within resource constraints, Australia should aim to achieve maximum impact, and returns, from technology transfer and co-operation activities. A technology program should be based on the dual objectives of maximising emissions reductions on a global basis, and, maximising net benefits to the Australian economy. It would be expected that the program would concentrate on action in the Asian-Pacific region.

2. In pursuing this goal, Australia should support the development of mechanisms which would:

- (a) allow emission reductions outside of national boundaries to be credited against its national emission reduction obligations to the degree that this enhances the cost effectiveness of emissions limitations and is in Australia's interests;
- (b) promote the formulation of effective response measures, especially through the application of country studies and clearing-houses;
- (c) promote a balance in technology transfer between plant and equipment and the supporting soft technologies and information/infrastructure programs;
- (d) allow for both commercial and non-commercial technology transfer and cooperation, without compromising intellectual property, standards and regulations of participating countries, companies or organisations.

The offshore mechanisms that Australia might support should focus particularly on activities within the Asian-Pacific region in concert with our regional responsibilities and development cooperation priorities. It would be expected that appropriate emphasis be given to bilateral and regional cooperation.

3. It must be accepted, however, that to some extent maximising emission reductions and maximising benefits to Australia may not

be compatible. In such circumstances expenditures should be targeted to reducing emissions in the most cost effective manner.

4. This attachment provides an initial listing of possible programs which could be taken up under a new greenhouse abatement program. This list is notional only - an almost infinite list of possible programs could be assembled. The listing is categorised in several different ways:

- (a) projects are classified as developing responses (first tier - country studies and baseline data; infrastructure and institution building; adaptation to the effects of climate change) or implementing strategies (second tier);
- (b) they are also described as pipeline (in current planning and may be funded in the normal course of events), pre-pipeline (contemplated but not yet definitely included in plans) or hypothetical (no plans at present, but exemplifies what could be done).

5. Projected costs can be put against only some of the projects at this stage. Rough estimates of the existing projects listed suggest that the total cost comes to of the order of \$100 million. A package of new measures could consist of the following activities:

- (a) country studies;
- (b) clearing-house activities;
- (c) development assistance for first tier activities;
- (d) development assistance for second tier activities;
- (e) extension of cap for Development Import Finance Facility;
- (f) supplementary funding for commercial activities.

6. The budgetary cost of any new program would vary in accordance with its size, the obligations acquired under the convention, the scope for reallocation of existing resources, and the degree to which funds applied to technology transfer are required to be additional to existing development cooperation programs. The listing of existing projects illustrates that unless international attention to environmental issues wanes rapidly,



there is likely to be a substantial program of international climate change activities being carried out by Australia for the foreseeable future. This list illustrates what a base case (ie no net funding increase) climate change program might look like. Reallocation of funds and resources from other programs could conceivably add to that base case program, but in practice the opportunity is likely to be limited, both because of existing commitments and by the probable need to undertake other technology transfer programs, for example in the context of the proposed biodiversity convention and the UN Conference on Environment and Development.

7. In practice we would wish to rank the possible programs by greenhouse abatement per dollar of expenditure; that information is, however, unavailable at present. In any case it would need to be balanced against other criteria - eg international political preferences, existing programs, Australian expertise and technology, objectives of the development assistance program, and costs and benefits to Australian industry and the wider community. At this stage the available information allows only the lowest level of confidence in any such ranking; a major priority is to gather information - including existing country studies - so that a choice of priorities can later be made with some degree of confidence.

#### EXISTING GREENHOUSE INITIATIVES

##### DEVELOPING GREENHOUSE RESPONSE STRATEGIES

#### 8. Data acquisition

- (a) World Bank funded environmental studies in Malaysia, Thailand and the Philippines (ELCOM).
- (b) \$1.0 million to Climate Change modelling in Commonwealth countries (AIDAB).
- (c) \$1.0 million in 991/92 for the monitoring of sea levels in Pacific nations (AIDAB).
- (d) Pacific Regional Energy Assessment (series of energy country studies) (World Bank, UNDP and AIDAB).

- (e) energy sector study of the Philippines (AIDAB and ELCOM).
- (f) global Climate Change tripartite agreement with the UK and NZ (DITAC \$50,000).
- (g) France/Australia meeting on environmental research, June 1990 (DITAC).
- (h) joint scientific venture in India (CSIR) on climate modelling (DITAC/DASETT \$31,000).
- (i) funding UNEP impact studies (\$50,000 DASETT).

#### 9. Infrastructure and institutions

- (a) ESCAP Regional Energy Program (training by Joint Coal Board)
- (b) training in tree seed technology at the Tree Seed Centre, Indonesia (CSIRO).
- (c) operational management support, plant audit and review of training needs in Malaysia (ELCOM).
- (d) training programs and engineering advice for the Thailand Electricity Authority (ELCOM).
- (e) operating staff to Chinese power station (ELCOM).
- (f) training programs for power plant operators in the Philippines, Singapore and China (ELCOM).
- (g) conference "Greenhouse: an Asian Perspective" (funding from DITAC, DASETT and CSIRO \$55,000).
- (h) conference on "coal, the environment and development" (Sydney, November 1991) (IEA/DPIE).
- (i) environmental training covering impact assessments, technology, management and planning (AIDAB \$1.41m).
- (j) APEC Energy Project: international cooperation in clean coal, energy conservation, and energy data bases.
- (k) training, technical cooperation and exchange of personnel in meteorology to developing countries (Bureau of Meteorology).

#### IMPLEMENTING GREENHOUSE RESPONSE STRATEGIES

#### 10. Energy

- (a) support of Australian consultants bidding for international work with black coal (QEC).

- (b) technical support to Austpower for the development of a power station in China (ELCOM).
- (c) site selection studies and preparation of specifications for a coal-fired power station in Egypt (ELCOM).
- (d) conceptual report for a build/own/operate coal-fired power station in Thailand (ELCOM).
- (e) collaboration with Californian Electricity Authority into linking photovoltaic cells to an electricity grid (\$70,000 per year for 3 years) (DITAC).
- (f) Kirby CFC free compressor manufacturing in China (AIDAB).
- (g) developing clean technologies for coal use with Germany (DITAC \$150,000).
- (h) village electrification schemes (AIDAB).
- (i) projects under the Austenergy group of Austrade.
- (j) Pacific Energy Development Program.
- (k) joint venture between local electricity authorities and BP Solar in providing a demonstration project for photovoltaic electricity in a small village.
- (l) Hydroelectricity in China (AIDAB \$6.5m).
- (m) improving access of Australian energy technology to overseas clients (Austenergy/Austrade).

11. Industry, housing and domestic energy use

- (a) CADDET (information exchange about efficient technologies).
- (b) training and demonstration projects to show how nucleonic gauges can be used to 'on-line' data for process control. For example in the coal, minerals, paper and steel industries (ANSTO).
- (c) the introduction of ultra-violet light into the printing, paint drying and wood products coating industries with substantial energy savings (ANSTO).
- (d) increased energy efficiency in ASEAN (AIDAB/Austenergy \$5.6m).
- (e) energy efficiency in Thailand (AIDAB \$0.5m).
- (f) domestic cooking in China, Laos and Micronesia, includes fuelwood and solar ovens (AIDAB \$6.3m).
- (g) improving access of Australian energy technology to overseas clients (Austenergy/Austrade).

## 12. Transport

- (a) transport research and modelling in China (AIDAB \$5.6m).

## 13. Agriculture

- (a) land rehabilitation in Ethiopia (AIDAB \$13m)
- (b) solar water pumps in Thailand (AIDAB \$13.4m).

## 14. Forest use

- (a) \$4.3 million will be spent in 1991/92 involving bilateral aid with PNG and the ASEAN nations and some multilateral aid on forest use (AIDAB).
- (b) rainforest research with Brazil and PNG (DITAC \$30,000).
- (c) Australian hardwoods for fuelwood and agroforestry; Australian woody species for saline soils in Asia; ACAIR forestry coordination project and the South Pacific Environment Study (CSIRO).
- (d) development of breeding plans for Eucalyptus globulus in Chile (CSIRO).
- (e) reforestation programs in Cambodia, China, India, Solomon Islands, Vietnam, Thailand, and Tanzania (AIDAB \$12.6m).
- (f) forest management projects in PNG, the Solomon Islands, and South East Asia (AIDAB \$9.62m).
- (g) Tropical Timbers Research (DPIE).

## 15. Other

- (a) \$1.5 million has been allocated to a number of population control activities in 1991/92 (AIDAB). (Of this, \$800,000 will be spent on multilateral activities under the UNFPA and \$700,000 on bilateral activities in South East Asia and the Pacific.)
- (b) CSIRO Institute of Natural Resources and Environment research with France on Climate Change (\$40,000).
- (c) bilateral funding Greenhouse related research (\$20,000 - 30,000).

- (d) during the period of July 1988 to June 1990 CSIRO undertook 45 international consultancies, mostly in developing nations. Of these, several related to Climate Change.

POSSIBLE AND PROPOSED GREENHOUSE INITIATIVES

DEVELOPING GREENHOUSE RESPONSE STRATEGIES

16. Data acquisition (establishing baseline data)

- (a) GHG emission inventories (including projections) which would identify opportunities for GHG emission reductions and, in the longer term, monitor changes in the level of emissions.
- (b) national energy needs (including projections for energy production and use).
- (c) national climate change adapting/ameliorating resources available.
- (d) sustainability of agricultural and forestry practices.  
(An example is the NSW Electricity Commission (ELCOM) study into the energy sector of the ASEAN nations.)
- (e) Climate change modelling of atmospheric and ocean currents, CO<sub>2</sub> cycles, marine resource movements. (Examples include the carbon cycle in monsoonal marine tropics at a cost of \$7m over 5 years, and carbon transport fluxes in the sub-tropical convergence and the Southern Ocean at a cost of \$9.7m over 5 years, by the Australian Academy of Science).
- (f) Studies of sinks.
- (g) Studies of alternative food and renewable fuel/energy resources including the introduction of improved crop strains and farming methods.
- (h) Studies of the effects of climate change on individual countries including extending a network of sea level monitoring stations in South Pacific nations. (For example, country case studies on sources and sinks of GHGs by AIDAB, pre-pipeline \$4.5m).

17. Infrastructure and institution strengthening

- (a) greenhouse awareness programs with Australian experts involved in institutional or community level campaigns to disseminate information about the nature of the Greenhouse problem and simple lifestyle changes that can reduce it.
- (b) economic feasibility studies and cost/benefit analyses would result in national greenhouse strategies tailored to the requirements of individual countries.
- (c) policy development and planning, with Australia's contribution being largely through contributions to existing international organisations. For example, development of least cost GHG emission reduction plans (AIDAB pre-pipeline \$9.5m).
- (d) education and training, with best practice management demonstrations being held overseas or courses being conducted in Australia.

(i) State Energy Authorities to train operators and managers to effectively run large power stations (will foster links between Australian suppliers and overseas management/operators).

(ii) industry representatives presenting seminars on introducing economically and environmentally energy efficient manufacturing measures.

- (e) science and technology collaboration by, for example, extending the International Science and Technology Major Grants Program.
- (f) Asia Climate Research and Training Centre (CSIRO pre-pipeline).

18. Adaptation and limitation measures

- (a) assessment of the need for adaptation measures.
- (b) assistance with land use and population planning to facilitate planning for climate change and adaptation of patterns of land use and settlement suited to a local

environment in which, for example, flooding is more frequent.

- (c) support for capital projects aimed at natural disaster mitigation.
- (d) assistance in developing flexible agricultural practices and adaptable marketing strategies.

IMPLEMENTING GREENHOUSE RESPONSE STRATEGIES

19. Energy production

- (a) demonstrations and pilot projects of the use of photovoltaic cells for electricity generation in specific developing countries (hypothetical).
- (b) demonstration projects in implementing energy conservation in lighting, air conditioning, waste heat recovery and combustion efficiency (Gas & Fuel Corp Vic, hypothetical).
- (c) Engineering consultancy work in the design, management and maintenance of efficient coal-fired power stations (ELCOM pre-pipeline).
- (d) The sale of liquid petroleum gas and natural gas as a replacement for crude-oil-based fuels in motor vehicles (gas & Fuel Corp, hypothetical).
- (e) Fuel substitution (gas for coal) projects involving the transport, storage, and utilisation of gas for the generation of electricity (Gas & Fuel Corp Vic, hypothetical).
- (f) biomass gasification in Brazil (AIDAB pre-pipeline \$7m).
- (g) non-conventional energy in India (AIDAB pre-pipeline \$30m).
- (h) Synroc process for immobilising high level radioactive waste from nuclear power stations (ANSTO pipeline).
- (i) limiting emissions of GHGs in China (AIDAB pre-pipeline \$2m).
- (j) optimising the development of small hydro-electric resources of hilly regions of India (AIDAB pre-pipeline \$7.5m).

## 20. Industry, housing and domestic energy use

- (a) pilot project to adapt local building techniques to more fully utilise passive solar heating and cooling concepts and building insulation in construction (hypothetical).
- (b) development and adoption of energy performance standards for new commercial, industrial and domestic buildings (hypothetical).
- (c) use of solar thermal technology for the generation of domestic hot water (hypothetical).
- (d) photovoltaics for household and community use in Zimbabwe (AIDAB pre-pipeline \$7m).
- (e) promotion of electric energy efficiency in Thailand (AIDAB pre-pipeline \$15m).
- (f) high efficiency lighting pilot project (AIDAB pre-pipeline \$10m).
- (g) series of seminars on the economic benefits of adopting energy efficient technologies (ANSTO pre-pipeline).

## 21. Agriculture

- (a) emissions of global warming gases from rice soils (AIDAB pre-pipeline \$5m).
- (b) Demonstration project of a CSIRO produced oral remedy that dramatically reduces the livestock production of methane (CSIRO hypothetical).

## 22. Forest use

- (a) adoption of CSIRO developed land reclamation procedures using the multi-purpose Casuarina tree. This will result in unproductive land reclamation, action as a carbon sink and relieve native forests by providing a sustainable alternative source of firewood (CSIRO pipeline).
- (b) major forestry projects in Thailand, Vietnam and Ethiopia (AIDAB pre-pipeline \$30m).