

Office of the Convenor, Ministerial Group on Climate Change

The Chair

## **CABINET POLICY COMMITTEE**

### **CLIMATE CHANGE IV: ADAPTING TO CLIMATE CHANGE**

#### **Purpose**

1. This paper reports on progress in identifying and addressing the impacts of climate change on New Zealand, and the development and implementation of adaptation policies through a staged programme (CBC Min (01) 1/3 refers). It summarises work completed under stage 1 of this work programme, seeks agreement on long-term objectives, and requests funding for stage 2 of the programme. It is part of a suite of five papers on the Government's response to climate change and the Kyoto Protocol.

#### **Executive Summary**

2. The rate of global temperature change during the 21<sup>st</sup> century is very likely to be greater than any natural variations over the past 10,000 years, even for the lower end of current emission scenarios and taking uncertainties into account. New Zealand needs to understand and adapt to the resulting climatic changes and their effects, both within and outside its territory.

3. Management decisions made today can affect our ability to cope with climate variability as well as future change. Adaptation aims to minimise damages and maximise opportunities arising from human-induced climate change by proactively adapting to the anticipated changes. Adaptation could therefore be described as "the ambulance at the bottom of the cliff". It complements mitigation, which seeks to reduce the rate and amount of climate change itself by reducing the global emissions of greenhouse gases.

4. A key role of Government in this context is to provide information on climate change impacts and their likely costs, evaluate the vulnerability of sectors, and facilitate the uptake of adaptation opportunities into decisions made by sector stakeholders. ....

5. Cabinet agreed to a staged approach to identifying climate change impacts and developing adaptation policies (CBC Min (01) 1/3 refers), outlined in Table 1. Stage 1, now completed, produced a number of reports on the likely impacts of climate change on New Zealand. The present paper outlines stage 2, consisting of more detailed work on the impacts of climate variability and long-term change, and assessment of adaptation options. Stage 3 will consist of the development and implementation of adaptation policies, including guidance and assistance to local government, and on-going work to better characterise sector-specific climate impacts and assist with the building of adaptive capacity in industry and community.

**Table 1.** Milestones of the staged approach to analysing climate change impacts and developing and implementing adaptation policies (CBC Min (01) 1/3 refers).

|                                                                             |                                                                                                                                                                               |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stage 1 (completed)                                                         | Summary report on likely physical and sector-level impacts of climate change on New Zealand, and scoping for more in-depth <del>and sector specific analysis in stage 2</del> |
| Stage 2 (outlined in this paper)                                            | Detailed socio-economic assessments and sector-specific studies, and scoping of <del>adaptation options for stage 3</del>                                                     |
| Stage 3 (details depending on outcomes from stage 2 outlined in this paper) | Development and implementation of adaptation policies as part of an on-going <del>process</del>                                                                               |

6. This paper proposes three concurrent components for stage 2 of work on impacts and adaptation:

- a) An assessment of the economic impacts of climate change, linkages between sectors, and immediate co-benefits from adaptation to potential future change. This assessment would initially focus on the effects of climate variability and extreme events such as droughts, floods and coastal storm surges, and will link with programmes of the Ministries for Civil Defence and Emergency Management and Agriculture and Forestry.
- b) A better definition of the roles of local and central government in dealing with environmental hazards arising from climate change, identification of vulnerabilities, development of options to assist local government planning, and provision of appropriate guidance for planning and decision-making.
- c) Facilitation of a greater awareness of business opportunities and risks arising from climate change effects, and exploitation of synergies from collaboration across sectors. This will require a better appreciation of the potential effects of climate change, both within New Zealand and overseas, across all sectors of society and the economy.

7. This paper seeks agreement and funding for assessing the costs of climate variability and extremes, and for work with local government on guidance and assistance with planning for climate change (paragraphs 6a and 6b). Officials will report back to Cabinet on progress of these work items by the end of July 2002, coinciding with final recommendations on mitigation policies. Officials expect to make recommendations for next steps for development and implementation of adaptation policies under stage 3 of this work stream by 28 February 2003.

8. The work with local government on impacts and adaptation complements the partnership and guidance approach proposed between central and local government to reduce greenhouse gas emissions. Additional work to increase awareness of climate change and its impacts is addressed in the public (refer to *Climate Change V : Public Awareness Programme*).

## Background

9. Cabinet approved on 29 January, 2001, that the New Zealand Climate Programme, under the lead of the Ministry for the Environment, update the work previously done on the impacts of climate change on New Zealand in several stages (CBC Min (01) 1/3 refers).

10. Stage 1 of this work stream was to produce a summary report on the impacts of climate change on New Zealand. This report was released in July 2001. Further work under

stage 1 of this work stream included scoping of options for a more comprehensive assessment of the impacts of climate change on New Zealand and of adaptation options.

11. Stage 2 of this work stream, subject to approval by Cabinet, was to undertake detailed sector-specific studies of the impacts of climate change, and this paper outlines a pertinent work programme. Stage 3 will be to develop and implement appropriate adaptation policies.

#### *Stage 1 review - reports to date on climate change impacts*

12. The degree of global warming and associated climate change in the 21<sup>st</sup> century is still subject to uncertainty. However even at the lower end of current estimates, the rate of the global temperature rise during the 21<sup>st</sup> century is very likely to be larger than any natural variations over the past 10,000 years. In response, New Zealand needs to understand the impacts of this global change and to develop appropriate adaptation mechanisms.

13. A summary report, describing the current state of scientific knowledge on climate change impacts on New Zealand, was produced by the New Zealand Climate Change Programme and released in July 2001.<sup>1</sup> Additional sector-specific reports on climate change impacts and preliminary assessments of adaptation options for New Zealand coasts, agriculture, human health, and biodiversity were released between September 2001 and February 2002.

14. These studies and reports complete stage 1 of the work stream on climate impacts.

#### *Stage 2 and 3 objectives - the need for, and scope of adaptation strategies*

15. Changes in climate averages and extremes will affect New Zealand's environment, economy and society. These systems will autonomously adapt to those changes, but it is highly unlikely that a purely reactive adaptation will be cost effective. The overarching objective of adaptation policies therefore is to minimise damages and maximise opportunities arising from climate change by proactively adapting to anticipated future changes, and by improving the capacity to manage climate change impacts as part of an evolving process.

16. Adaptation decisions have to be made under varying degrees of uncertainty about the level of future climate change, about its direct and indirect impacts, costs and opportunities, and about social and economic developments. Scientific research will not fully eliminate uncertainties over the next few decades. Nonetheless, management decisions in industry and local government made today could affect our ability to cope with scenarios of future climate change through locking-in current practices and resource needs in urban, industrial and regional development.

17. Government therefore has an important role to play in ensuring that industry, local government and the general public are well informed about climate change scenarios, are prepared to adapt to the effects of those changes, and are aware of the likely costs and benefits of impacts and adaptation in the near and long term. The role of Government will be to provide and integrate information, to evaluate the vulnerability of sectors, and to develop and implement policies that support a consistent uptake of findings into sector-specific decision-making processes. ....  
.....

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<sup>1</sup> "Climate Change Impacts on New Zealand", published by the Ministry for the Environment, 2001.

18. Climate change is only one of many external changes and pressures that businesses and communities continuously have to adjust to. Risks and opportunities represented by climate change tend to develop over longer periods than many other economic and social pressures. Adapting to climate change therefore should not be regarded as a qualitatively new challenge, but as an extension of standard long-term risk management plans.

19. Adaptation mechanisms are therefore likely to be most efficient and cost-effective if they can exploit co-benefits by improving our ability to cope even with current climate variability, use planning mechanisms that are already in place, are based on locally relevant scenarios of future change, and base projections of future costs on well-understood historical examples rather than model projections only.

20. Based on these long-term objectives, this paper outlines three concurrent components for stage 2 of the impacts and adaptation work stream:

- improving our understanding of the economic and social impacts of climate change on New Zealand, with a particular focus on short-term climate variability and extremes;
- a better definition of the relationship between local and central government in managing environmental hazards arising from climate change, and assistance and guidance to local government in planning for the impacts of climate change;
- promoting an increased incorporation of climate change in long-term investment horizons of government and industry, and enhanced collaboration between sectors, recognising co-benefits of adaptation to climate change and resulting business opportunities.

## **Stage 2(a): Economic analysis of climate change impacts**

21. One prime motivation for New Zealand to participate in global efforts to reduce greenhouse gas emissions is the likely cost of unmitigated climate change. Some potential impacts of climate change cannot be fully monetarized, for example the loss of cultural values and ecosystems, large-scale shifts in the global climate system, and international and intergenerational equity issues. Nonetheless, macroeconomic estimates of the costs of climate change could still help to determine a minimal level of acceptable mitigation costs.

22. At present, the relatively short-term costs and sectoral effects of mitigation are much better understood than the long-term costs of climate change impacts and adaptation. Substantial research progress, both in New Zealand and overseas, will be required before the aggregate costs of climate change on New Zealand can be estimated with greater certainty:

- Uncertainties about future climate change are multiplied by uncertainties about the responses of natural and human production systems to these changes. Some responses are relatively well quantified, but others have only been identified “in principle”;
- Costs of climate change impacts can be altered by adaptation, which can reduce adverse and increase beneficial effects. However, the effectiveness of adaptation depends on choices made in the scope and timing of introduction, and technological progress;
- Impacts of climate change occur over time scales of several decades or more. Economic projections over such time frames are very dependent on model assumptions such as world socio-economic developments and implementation of new technologies.

23. Furthermore, climate change occurring overseas will also affect New Zealand's economy. The magnitude of this effect could be comparable to any direct domestic impacts:

- Climate change is likely to alter world trading markets through changing the availability of goods produced in competing markets as well as the interests of key trading partners;
- The impact of climate change on all nations has the potential to change international patterns of resource access and distribution, restricting development and decreasing environmental security in some regions (for example, the Pacific). This could require New Zealand to increase aid and contribute to an appropriate response should environmental instability become a defence and security issue.

24. For these reasons, a comprehensive analysis of the impact of long-term climate change on New Zealand's economy is not a practical objective for the near future. In the short term, we should focus our economic analysis on the effects of current climate variability and extreme events, which would have the following immediate benefits:

- Most damage from future climate change is likely to occur through shifts in the frequency and intensity of extremes such as droughts, floods and coastal storm surges;
- Extreme weather and climate events are causing damages even under present climate conditions. Better understanding of climate variability reduces current damages and saves costs while at the same time better preparing us for any future changes;
- The impacts of past climate extremes tend to be relatively clearly defined, and thus cost estimates can be more clearly derived and extrapolated into the future than for long-term changes in average climate conditions;
- Case studies of historical extreme events increase our knowledge of cross-sectoral linkages and social flow-on effects. Together, these elements contribute to the long-term goal of comprehensively modelling the macroeconomic effects climate change.

25. The Ministry for Agriculture has for many years been involved in the monitoring of extreme weather events and their bio-physical and economic impacts on agriculture. It has estimated the farm gate losses caused by droughts and other extremes associated with the 1997/98 El Niño event at \$425 million. Flow-on effects of this event are more difficult to quantify but could be of a similar magnitude. These figures highlight that:

- even moderate improvements in our ability to understand and adapt to climate extremes could result in significant cost savings, and
- any increase in climate variability could have significant economic impacts if we are unprepared for such changes.

26. Appendix 2 lists details of a work programme to identify recent events of climatic variability and extremes suitable to be used as case studies, to analyse their sector-specific economic impacts and flow-on effects (including social, environmental and international), and to work towards identifying economic and structural adaptation options for such events. Officials will report back to Cabinet on progress of this work in July 2002.

27. This work is complementary to on-going work carried out by a number of government departments (particularly Ministry for Agriculture and Ministry for Civil Defence and Emergency Management), industry and science providers. The work proposed in this paper will integrate outputs from these areas and will form one part of stage 2 of the work stream on climate change impacts and adaptation (CBC Min (01) 1/3 refers).

## **Stage 2(b): Guidance and assistance from central government to local authorities**

28. Most direct risks arising from climate change are "normal" environmental hazards in that climate change gradually alters the frequency or severity of hazards, but does not

introduce a qualitatively new dimension. Environmental hazards and natural resources are largely managed by local government under the Resource Management Act 1991 (RMA). Local authorities therefore are the relevant agencies to plan for climate change impacts such as flooding and erosion, water allocation, sea-level rise and coastal changes, and effects on infrastructure.

29. Climate change impacts and vulnerabilities, and priorities for other development issues, differ between different regions, districts and cities. Planning for, and adaptation to climate change by local government needs to reflect this diversity. However, in some instances local authorities may not be able to plan as well as possible for climate change because of their limited information about plausible climate change scenarios, availability of funding, or because a clearer legal mandate to take climate change scenarios into account is seen to be required.

30. A recent workshop on climate change impacts and adaptation options for local government, attended by local government councillors and planners, scientists and government officials, agreed that increased networking and best practice examples would have immediate benefits and be consistent with wider goals of sustainable development. There was no clear agreement on the need for and potential scope of a legally binding mandate for local authorities to take climate change projections and impacts into account in their planning processes.

31. This paper proposes that central government needs to provide guidance and assistance to local government to ensure that local authorities are well informed about relevant climate change scenarios, projected impacts and adaptation options, have the capacity to plan for climate change, and have a consistent view of the mandate under which they incorporate climate change in their planning processes. This paper proposes work with local government in two phases:

- a) to identify information needs for locally relevant climate change scenarios and related impacts, and to survey and publicise both best practice and barriers in local government planning for climate change;
- b) to provide assistance through provision of relevant climate change scenarios, comprehensive best practice guides and training, and to issue guidance on implementation, including for example design parameters for infrastructure. The potential role and scope of a legally binding mandate will need to be based on findings of the first phase of this work, as well as further consultation with local government and scientists.

32. The first phase of this work programme (paragraph 31a), is described in detail in Appendix 3. This work forms the second part of stage 2 of the work stream on climate change impacts and adaptation (CBC Min (01) 1/3 refers).

33. Officials will report back to Cabinet in July 2002 on progress of this work, and expect to provide Cabinet by 28 February 2003 with recommendations on long-term assistance for local government to plan for climate change impacts, and on the preferred scope and legal status of guidance on implementation. Long-term training, assistance and guidance to local government (paragraph 31b) will, subject to approval by Cabinet, form part of stage 3 of the impacts and adaptation work stream (CBC Min (01) 1/3 refers).

34. This work complements the partnership approach being proposed between central and local government on emission reduction opportunities, including clarification of the role of the RMA in the treatment of greenhouse gas emissions (refer to concurrent paper on the role of local government). The proposed work is also consistent with recommendations of the

Inquiry into the role of local government in meeting New Zealand's climate change target, a report by Parliament's Local Government and Environment Select Committee.

## **Stage 2(c): Opportunities and risks for business development and collaboration**

35. Climate change affects the New Zealand economy and society through changing the availability of shared resources, and through flow-on effects from one sector to others. Research into the vulnerability to climate change, and maximisation of opportunities arising from changes in New Zealand and overseas, is therefore likely to be more effective if it is aware of and makes use of synergies and shared concerns between sectors.

36. Proactive adaptation to climate change presents important business opportunities, either directly through the avoidance of costs or increase of gains arising from beneficial changes, or indirectly through the development and marketing of tools to manage climate risks. Business opportunities arising from climate change impacts, and adaptation to climate changes, are incorporated in the Economic Opportunities work stream led by the Ministry for Economic Development.

37. As with research into greenhouse gas mitigation, effective options to adapt to climate change impacts can only be developed through a collaborative effort between public and private end-users and science providers. This will require an increased awareness across society of the potential impacts and implications of climate change in the short and long term, both within New Zealand and overseas. Communication of the science and impacts of climate change is part of the Government's public awareness strategy (refer to concurrent paper on climate change public awareness).

## **Financial and legislative implications**

38. There are no direct legislative implications of this paper.

39. Work on the now completed stage 1 of the impacts work stream cost about .....  
..... and was absorbed by Vote: Environment.

40. The work to progress our understanding on the economic impacts of climate variability and extremes, outlined in Appendix 2, is estimated to cost .....  
.....

41. Initial work to assist local government in planning for climate change impacts through a survey of existing plans, identification of vulnerabilities, and publication of best practice examples, outlined in Appendix 3, is estimated to cost .....  
.....

42. Development and implementation of guidance tools and long-term assistance for local government would form part of stage 3 of the impacts work stream (CBC Min (01) 1/3 refers). Officials will report back to Cabinet by 28 February 2003 on preferred options and detailed funding implications. Different assistance and guidance tools are estimated to cost between ..... depending on their nature and comprehensiveness, as outlined in Appendix 4.

## **Consultation with other departments**

43. The following departments have been consulted in the preparation of this paper: Ministry of Agriculture and Forestry, Ministry of Civil Defence and Emergency Management,

Ministry of Consumer Affairs, Ministry of Defence, Ministry of Economic Development, Ministry of Education, Ministry for the Environment, Ministry of Fisheries, Ministry of Foreign Affairs and Trade, Ministry of Health, Ministry of Social Development, Ministry of Research, Science and Technology, Ministry of Transport, Te Puni Kokiri, The Treasury, the Department of Internal Affairs, the Department of Conservation, the Department of Statistics.

44. The Energy Efficiency and Conservation Authority (EECA) and Local Government New Zealand have also been consulted in the development of this paper

## Recommendations

It is recommended that the Committee:

- 1) **note** that the rate of climate change during the 21<sup>st</sup> century is very likely to be greater than any natural variations during the past 10,000 years;
- 2) **agree** that improved bio-physical, economic and social understanding of climate change impacts on New Zealand, and the development of adaptation strategies, are essential parts of New Zealand's response to climate change;
- 3) **note** that Government has agreed to a staged approach in its work stream on climate change impacts and adaptation (CBC Min (01) 1/3 refers), and that stage 1 has been completed with the release of a series of reports on likely climate change impacts on New Zealand between July 2001 and February 2002;
- 4) **agree** that government should focus its attention under stage 2 of this work stream on three concurrent components:
  - a) assessing the economic impacts of climate change,
  - b) guidance and assistance to local government in adapting to climate change,
  - c) increasing understanding and awareness of business opportunities and risks arising from climate change effects, and promoting collaborative research to that effect.

### Stage 2(a): Economic analysis

- 5) **note** that identification of the economic and flow-on effects of climate variability and extreme events would have large immediate benefits and would contribute to a comprehensive macroeconomic analysis of climate change impacts in the long term;
- 6) **note** that the cost of this initiative is estimated at .....  
.....through Vote Prime Minister and Cabinet;
- 7) **note** that funding of the costs outlined in recommendation (6) is being considered as part of the 2002 Budget process;

## **Stage 2(b): Guidance and assistance to local government**

- 8) **note** that local authorities are the relevant agencies to plan for climate change impacts and implement adaptation options, and that central government needs to provide assistance and guidance on planning and implementation;
- 9) **note** that the cost of this initiative is estimated at ..... through Vote Prime Minister and Cabinet;
- 10) **note** that funding of the costs outlined in recommendation (9) is being considered as part of the 2002 Budget process;
- 11) **note** that further funding between ..... subject to approval by Cabinet, to develop and implement long-term assistance and guidance to local government on adapting to climate change;

## **Stage 2(c): Business opportunities and risks from climate change impacts**

- 12) **note** the existence of economic opportunities and avoided costs arising from timely adaptation to climate change, and from marketing of intellectual capacity and tools to respond to climate-related management and information needs;
- 13) **agree** that increased public understanding and awareness of the potential impacts of climate change, and of collaborative research opportunities, will be necessary to allow all relevant parties to maximise their capacity to adapt to the impacts of climate change;

## **Report-back**

- 14) **direct** officials to report back to Cabinet, by 31 July 2001, on progress of the work programmes on economic effects of climate extremes and developing assistance and guidance options for local government;
- 15) **note** that officials expect to provide Cabinet with recommendations on long-term assistance and guidance to local government as part of stage 3 of the work stream on climate change impacts and adaptation, by 28 February 2003.

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## Appendix 1

### Key findings on climate change and direct impacts on New Zealand

1. Despite international progress to reduce greenhouse gas emissions under the Kyoto Protocol, inertia in climate and socio-economic systems means that the world will inevitably experience some on-going climate change during the 21<sup>st</sup> century and beyond.
2. The degree of global warming and associated climate change in the 21<sup>st</sup> century is still subject to uncertainty. However even at the lower end of current estimates, the rate of the global temperature rise during the 21<sup>st</sup> century is very likely to be larger than any natural variations over the past 10,000 years.
3. Projections of region-specific climate change are generally less certain than estimates of global average changes. Nonetheless, all climate models agree that New Zealand's climate will warm in the 21<sup>st</sup> century, and that sea levels will continue to rise. Most models agree that average rainfall would decline in many eastern regions of New Zealand and increase in the west, but the absolute magnitude and regional extent of rainfall changes varies between models.
4. Regional climate patterns fluctuate over time scales of several years to about two decades. Over such time scales, natural fluctuations can regionally override or enhance the projected long-term trends in temperature and sea-level rise and rainfall patterns.
5. Besides changes in average climate conditions, important changes could also occur through increased climate variability and weather extremes. Examples include more frequent and heavier rainfall and flooding in all regions, fewer frosts, and periods of low rainfall leading to an increased risk of drought in eastern areas. While the direction of these changes is generally agreed, the absolute amount of change is still uncertain. For example, current estimates are that floods could become up to four times more frequent by 2070, but also include the possibility that no change will be observed.
6. Sector-specific work on the impacts of climate change has been carried out mainly on coast lines, agriculture, ecosystems and human health. Some potential impacts have been quantified, while other changes have only been discussed "in principle".
7. The effects of climate change on the agriculture sector are likely to be a mixture of positive and negative impacts. Positive impacts are likely to arise from increased carbon dioxide concentrations and an extended growing season which may be particularly beneficial in cool regions. The largest damages could occur from climatic extremes such as droughts and floods, and through an increase in competition for water in areas that are already water-stressed. Other effects such as changes in species composition and incidence of pests and diseases are poorly quantified at present.
8. Information is insufficient at present to allow reliable estimates of the economic impacts of climate change on New Zealand in the short or long term. Projections of the likely impacts of climate change are necessarily constrained by lack of knowledge about future technologies and socio-economic developments which could either reduce, but also increase climatic vulnerabilities. Any increases in climate variability and extreme events are likely to increase damages and reduce positive effects from climate change in most sectors.

## Appendix 2

### Stage 2(a) of impacts work stream:

#### Identification of economic impacts of climate variability and extremes

| Work item    |                                                                                                                                                                                                            | Timing               | Estimated cost (excl. GST) |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------|
| 1            | Summary of available knowledge of economic impacts of climatic extremes and on-going work by government departments and industry                                                                           | until July 02        |                            |
| 2            | Identification of events of climate variability and extremes over the past 20 years that could be suitable for economic impact analysis, and characterisation of their direct bio-physical impacts         | July 02 – Nov 02     |                            |
| 3            | Initial economic impact analysis for those sectors that were directly affected by the climate events                                                                                                       | Nov 02 – Apr 03      |                            |
| 4            | Report-back to Cabinet on progress                                                                                                                                                                         | 28 Feb 03            |                            |
| 5            | In-depth study of selected climate events, including identification of flow-on effects, including social, environmental and international, on sectors other than those directly affected                   | Apr 03 – Sep 03      |                            |
| 6            | Expert workshop, including stakeholders, to identify adaptation options that would reduce economic impacts                                                                                                 | Sep 03               |                            |
| 7            | Publication of findings including peer-review;<br><br>Recommendations to Cabinet on further work to improve economic understanding of climate variability and increase adaptive capacity to extreme events | Nov 03<br><br>Dec 03 |                            |
| <b>Total</b> |                                                                                                                                                                                                            |                      |                            |

Work item (1) would be carried out as part of the current (FY 2001/02) budget of the Climate Change Project team in the Department of Prime Minister and Cabinet. The total additional funding sought for this work is therefore .....

## Appendix 3

### Stage 2(b) of impacts work stream:

#### Identification of climate change impacts and vulnerabilities of local government, and development of assistance and guidance options

| Work item    |                                                                                                                                                                                                                                                                                                        | Timing           | Estimated cost (excl. GST) |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------|
| 1            | Selection of cross-section of local authorities to participate in survey, and identification of specific issues to be surveyed (e.g. coastal management, infrastructure and asset management, water management, natural hazard planning)<br><br>Selection of 10 different areas and topics             | until July 02    |                            |
| 2            | Analysis of relevant local authority plans, programmes and activities, carried out by external consultants in collaboration with local government staff and officials, identification of specific vulnerabilities and options for improvement<br><br>1-4 weeks consulting time each @ \$5,000 per week | July 02 – Nov 02 |                            |
| 3            | Publication of best practice examples through appropriate means of communication with local government, including guidance for implementation of best practice for specific issues                                                                                                                     | Nov 02 – Apr 03  |                            |
| 4            | Consultation with local government and science experts on preferred combination of long-term guidance and assistance options in planning for climate change                                                                                                                                            | Jul 02 – Feb 03  |                            |
| 5            | Report-back to Cabinet with recommendations for long-term assistance and guidance                                                                                                                                                                                                                      | 28 Feb 03        |                            |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                        |                  |                            |

Work item (1) would be carried out as part of the current (FY 2001/02) budget of the Climate Change Project team in the Department of Prime Minister and Cabinet. The total additional funding sought for this work is therefore .....

## Appendix 4

### Options for elements of stage 3 of impacts work stream:

#### Preliminary cost estimates for various assistance and guidance options to local government

| Assistance and guidance option                                                                                                                             | Timing                                                                                          | Estimated cost (excl. GST) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------|
| On-going training seminars for local government planners and region-specific impacts information                                                           | start in 2003<br><br>on-going with review after 2-3 years                                       |                            |
| Provision of detailed and regularly updated climate change scenarios and related impacts at sub-regional level, to inform local government decision-making | start in 2003-2007<br><br>review every 5 years based on new data and advances in climate models |                            |
| Comprehensive guidance to local government on planning for climate change, including design parameters for infrastructure and decision-making templates    | 2003/04<br><br>review in 2005                                                                   |                            |
| Changes to existing or concurrently developed legislation (e.g. RMA, Local Government Act, Building Act, Climate Change Act II)                            | 2002 – 2004<br><br>timing dependent on scope and link with other changes                        |                            |
| National Policy Statement on climate change impacts and adaptation                                                                                         | 2003 – 2006<br><br>timing dependent on comprehensiveness                                        |                            |

Different assistance and guidance options are not necessarily mutually exclusive.

Recommendations for the best mix of assistance and guidance tools will be informed by the outcomes of the work described in Appendix 3, including further consultation with local government planner and decision-makers and scientists, to ensure a wide ownership and practicality of the preferred approach.