

Introduction

Purpose of the Report

- 1.1 This report examines issues arising out of Australia's ratification of the Kyoto Protocol in December 2007 and recommends an approach for Australia to adopt at the 15th Conference of the Parties to the United Nations Framework Convention on Climate Change in Copenhagen, Denmark.

Conduct of the Committee's Review

- 1.2 The review contained in this report was advertised in the national press and on the Committee's website.¹ Invitations to lodge submissions were also sent to all State Premiers, Chief Ministers, Presiding Officers of Parliaments and to individuals who had expressed an interest in being kept informed of proposed Treaty actions. Submissions received and their authors are listed at Appendix A.
- 1.3 Public hearings were conducted by the Committee in Canberra, Brisbane, Darwin and Perth from August to December 2008. In total,

1 The Committee's review of the proposed Treaty action was advertised in *The Australian* on 9 July 2008. Members of the public were advised on how to obtain relevant information both in the advertisement and via the Committee's website, and invited to submit their views to the Committee.

33 witnesses were examined at nine public hearings. The dates and locations of the hearings, including the names of the witnesses who appeared before the Committee, are at Appendix C.

- 1.4 Access to the published submissions to the inquiry, transcripts of evidence taken at public hearings, and an electronic copy of the report are available on the internet from the Committee's website:
<http://www.aph.gov.au/house/committee/jsct/reports.htm>

Approach to this Report

- 1.5 The Committee has taken a conscious decision in this report to adopt a scientific evidence-based approach as it relates to the issue of climate change and greenhouse gas emissions.
- 1.6 Scientific evidence provides a sound basis for policy in this instance because the nature of scientific evidence makes it a uniquely reliable source in describing the behaviour of the physical world, and this report largely addresses how the international community ought to react to that behaviour.
- 1.7 Scientific evidence is based on what is called the 'scientific method'. The scientific method involves scientists testing the findings of their peers' assertions in an attempt to falsify them. The more that attempts to falsify a finding fail, the more reliable that finding is considered to be.
- 1.8 Eventually, should the initial result be repeated often enough, it can come to be considered a general rule that can be relied on in most circumstances.
- 1.9 This process of continuous testing provides for uniquely reliable evidence. The reliability of the scientific method means it is used in everything from testing the effectiveness of new medicines to testing the reliability of aircraft.
- 1.10 The evidence for human caused greenhouse gas emissions increasing the average temperature of the planet has successfully avoided falsification for long enough and by enough scientists in the field to be considered robust and reliable.

Structure of this Report

1.11 This report contains five chapters. Chapter one is this introduction.

Chapter two

- 1.12 Chapter two details the evidence that human caused greenhouse gas emissions are causing climate change, discusses the effects of climate change, and proposes an appropriate stabilisation level for greenhouse gases in the atmosphere.
- 1.13 Evidence from ice cores has shown that the Earth's climate has remained relatively steady for the past 400,000 years. For that period, temperatures and greenhouse gas levels have fluctuated in parallel, with higher concentrations of greenhouse gases coinciding with higher average temperatures. The highest level of greenhouse gases in the atmosphere in the last 400,000 years was 280 parts per million.
- 1.14 However, 150 years ago levels of greenhouse gases in the atmosphere began to rise rapidly. The latest measurement for greenhouse gases in the atmosphere is 380 parts per million, already 100 parts per million higher than it has been for the past 400,000 years. In line with the evidence from ice cores, the increase in greenhouse gases is coinciding with an increase in the average temperature, both in the atmosphere and in the oceans. The average temperature increase over the 100 years prior to 2005 was 0.74 degrees Celsius. Average temperature measures show that the temperature has risen more quickly since 1950.
- 1.15 The concentration of greenhouse gas in the atmosphere is higher than it has been for the last 400,000 years and corresponds to the increased use of fossil fuels and other chemicals to provide power and raw materials to industry and households. The combustion of fossil fuels and other chemical processes produces the greenhouse gases that are now increasing in the atmosphere. These processes are collectively called 'anthropogenic', that is, caused by humans. The quantum of emissions from human caused sources exceeds those from natural sources.
- 1.16 Modelling greenhouse gas emissions and temperature increases into the future shows that, in a business as usual scenario, greenhouse gases could reach a concentration of 1130 parts per million by 2060, with average temperatures increasing between 4.9 and 6.1 degrees Celsius above the pre-industrial average.

- 1.17 A business as usual scenario is likely to result in the extinction of 80 per cent of all species, the destruction of the Greenland ice shelf, with a consequent five metre rise in sea level, and the loss of all coral reefs.
- 1.18 In order to avoid effects of this sort, human caused greenhouse gas emissions need to be reduced.
- 1.19 The degree to which greenhouse gas emissions need to be reduced is calculated on the basis of what is considered an acceptable level of greenhouse gas concentrations in the atmosphere. The calculation of an acceptable level of greenhouse gases in the atmosphere means striking a balance between what reductions are achievable and the level of climate disruption the community is prepared to accept.
- 1.20 Most discussion within the global community about an appropriate level of greenhouse gases in the atmosphere ranges between 370 parts per million and 550 parts per million.
- 1.21 At concentrations of 550 parts per million, Australia risks the loss of a significant number of species, a drier and hotter environment, and the likely loss of national icons such as the Great Barrier Reef. The Committee has found, in line with the conclusions of the Garnaut Inquiry, that it is in Australia's interests to secure global agreement to deliver deep cuts in emissions so as to stabilise concentrations of greenhouse gases in the atmosphere by 450 parts per million or lower by 2050.

Chapter three

- 1.22 Chapter three examines what level of reduction in emissions will be necessary to reach a target of 450 parts per million, and how the necessary reductions can be made.
- 1.23 In 2000, global emissions of greenhouse gases amounted to the equivalent of 42 gigatonnes of carbon dioxide. In a business as usual scenario, this is predicted to grow to 70 gigatonnes by 2050. In order to reach a target of 450 parts per million, annual emissions will need to decline to 12 gigatonnes of carbon dioxide annually by 2050. In percentage terms, this amounts to an international emissions reduction of between 60 and 80 percent by 2050.
- 1.24 No single nation, or group of nations, is capable of reducing emissions sufficiently to meet this target. Emissions reductions of this magnitude can only be achieved through a comprehensive international agreement.

- 1.25 There are two issues that need to be resolved by an international agreement to reduce greenhouse gases:
- how to distribute responsibility for reductions; and
 - what sort of mechanism is used to generate the reductions.
- 1.26 In terms of the mechanism for reducing emissions, the chapter considers two market based mechanisms. Market based mechanisms work by attributing a cost to the emissions used to produce goods and services. The greater the emissions used, the greater the cost. Market based mechanisms encourage consumers to purchase goods and services with lower emissions, and encourage businesses to invest in technologies to reduce emissions in their production process.
- 1.27 The two market based mechanisms considered in the chapter are:
- a carbon tax, where the carbon emitted during the production of a good or service is taxed; and
 - a carbon market, where permits to emit carbon become tradeable instruments.
- 1.28 The Committee recommends that the Australian Government adopt a carbon market mechanism to reduce emissions.

Chapter four

- 1.29 Having determined the level of greenhouse gas reductions Australia is required to make to avoid serious climate disruption, in chapter four the Committee goes on to consider a number of mechanisms that may contribute to the reductions Australia needs to make.
- 1.30 The chapter begins by pointing out that for an 80 percent reduction to occur between 2010 and 2050, a 40 year time frame, this would require emissions to be cut by an achievable two percent a year.
- 1.31 There are three types of mechanisms considered in the chapter. The first is policy settings by the Government. The Committee considers the Australian Government's Carbon Pollution Reduction Scheme (CPRS), and the Mandatory Renewable Energy Target (MRET) for major electricity producers.
- 1.32 The second mechanism considered by the Committee is modifying current practices that result in large greenhouse gas emissions. A number of sources of greenhouse gas emissions in Australia are due

to practices that could be modified with a change in attitude by the community. The practices are:

- use of private vehicles where public transport is a viable option;
- land clearing; and
- savannah burning.

- 1.33 In the Committee's view, there is scope to increase the use of public transport, to reduce emissions from land clearing, and reduce emissions from savannah burning in addition to the emissions reductions to be obtained from the CPRS and MRET.
- 1.34 The third mechanism is much wider deployment of low emissions technologies. The Committee considers the following low emissions technologies:
- wind generation;
 - geothermal energy;
 - ocean power;
 - solar power;
 - cogeneration;
 - carbon capture;
 - alternative fuels for vehicles; and
 - biochar.
- 1.35 A number of these technologies are in the early stages of development and will not contribute to reductions in emissions for some time, possibly up to a decade.
- 1.36 However, others, such as wind electricity generation, solar field electricity generation and hybrid vehicles are technologies available for use now, and are underexploited in Australia.

Chapter five

- 1.37 Chapter five moves on from considering how to reduce emissions to considering how Australia will adapt to the climate changes already in train.
- 1.38 The evidence presented in chapter two indicates that climate change is already occurring, and will continue to occur for some time even if

greenhouse gas emissions were reduced immediately. As the climate changes, it will become more important for the Australian Government to assist the community to adapt.

- 1.39 During the inquiry, the Committee was advised about two mechanisms to assist with adaptation: changing building regulations to encourage the construction of buildings more appropriate to warm climates; and reversing land clearing. These mechanisms are discussed in this chapter.
- 1.40 Currently all construction in the states and territories is regulated by the Building Code of Australia (the BCA). The BCA is administered by the Australian Building Codes Board on behalf of the Australian Government and state and territory governments. The BCA governs a range of factors relating to structure, fire safety, access, equipment, health and sustainability.
- 1.41 One of the objectives of the BCA is to reduce greenhouse gas emissions by ensuring the efficient use of energy in newly constructed buildings. This is achieved through a verification process where all proposed designs for new buildings must achieve an 'efficiency star rating' or equivalent level of efficiency.
- 1.42 The Committee heard that the efficiency star rating is devised for climatic conditions in southern Australia, but has universal application across Australia.
- 1.43 The Committee found that the verification process and star rating do not result in energy efficient buildings in northern Australia. Consequently, the Committee recommends that the BCA be reviewed so that it is flexible enough to recognise that energy efficient design varies depending on the climate.
- 1.44 In relation to land clearing, the Committee was apprised of studies which indicate that land clearing produces significantly higher temperatures than no land clearing. These temperature differences show a correspondence with areas where major clearing of native vegetation has taken place, such as eastern and southwest Western Australia.
- 1.45 Mean summer rainfall in eastern Australia and southwest Western Australia was lower by four to 12 percent and four to eight percent respectively compared to the non-cleared scenario.
- 1.46 In other words, land clearing increased the severity of drought.

- 1.47 The Committee considers that the restoration of cleared vegetation could limit the effect of global heating on temperature and rainfall at a regional level. Restoration of vegetation in certain regions could lead to higher rainfall and lower temperatures.
- 1.48 The Committee recommends that the Australian Government investigate using revegetation as an adaptation mechanism to reduce temperature and increase rainfall in applicable parts of Australia.
- 1.49 Finally, the Committee expresses a view that Australia needs to begin identifying and developing adaptation strategies now.
- 1.50 The Committee recommends that the Australian Government conduct an inquiry into adaptation strategies for climate change.