Legislation referring to Climate Change

Threatened Species Conservation Act 1995 No 101
Schedule 3 defines "key threatening processes" to include anthropogenic climate change

Water Management Act 2000 No 92
Section 42A of the Act provides that if a report of the Natural Resources Commission recommends changes to a management plan that will result in a reduction of water allocations in relation to which compensation might be payable under section 87AA, the Commission is to state in the report whether the purpose of the proposed changes is to do certain things, including to restore water to the environment because of natural reductions in inflow to the relevant water source, including but not limited to changes resulting from climate change, drought or bushfires.

Section 46 provides that if the Minister makes a replacement management plan or amends a management plan and the replacement plan or amendment will result in a reduction of water allocations in relation to which compensation might be payable under section 87AA, the Minister is to include in the order in which the replacement plan or amendment is made, or in another order, a statement as to whether the purpose of the reduction to water allocations is to restore water to the environment because of natural reductions in inflow to the relevant water source, including but not limited to changes resulting from climate change, drought or bushfires.

Section 87AA provides that the holder of an access licence is not entitled to compensation if the reduction in water allocations is for the purpose of restoring water to the environment because of natural reductions in inflow to the water source, including but not limited to changes resulting from climate change, drought or bushfires.

Legislation referring to Greenhouse Gases

Green Power - 10% Regulation
Since 15 January 2007, energy retailers are required to offer a 10% Green Power component to all new or moving residential customers.
Electricity Supply (General) Amendment (Renewable Energy Sources) Regulation 2006 amended the

Electricity Supply (General) Regulation 2001 by inserting a new Division 3 in Part 4 to make this a licence condition for suppliers of electricity to residential premises.

Electricity Supply Amendment (Greenhouse Gas Abatement Scheme) Act 2006
This Act extends the operation of the NSW Greenhouse Gas Abatement Scheme from 2012 to 2021 and beyond or until a national emissions trading scheme is established.

Electricity Supply Act 1995

Part 8A of the Act aims to reduce greenhouse gas emissions associated with the production and use of electricity and to encourage participation in activities to offset the production of greenhouse gas emissions. Specifically, it:

- establishes State greenhouse gas benchmarks and individual greenhouse gas benchmarks for the reduction of greenhouse gas emissions that are to be met by retail suppliers, market customers and certain other persons who supply or consume electricity
- provides for greenhouse gas benchmarks to be complied with by acquiring certificates relating to the carrying out of activities that promote the reduction of greenhouse gas emissions
- provides an economic incentive to undertake activities resulting in the reduction of greenhouse gas emissions by imposing a penalty on greenhouse gas emissions above the specified benchmark.

Electricity Supply (General) Regulation 2001

Part 8A sets out certain matters in relation to Greenhouse Gas benchmarks. Part 8B sets out certain matters in relation to the Greenhouse Gas Abatement Scheme.

Energy and Utilities Administration Act 1987

Division 3 of the Act establishes the Energy Savings Fund, one aim of which is to provide funding for cost effective energy savings measures that reduce greenhouse gas emissions arising from the use of energy.

Energy and Utilities Administration Regulation 2006

This legislation details the minimum standards that apply to certain electrical equipment. Schedule 1 lists electrical equipment that require registration and labelling with an energy efficiency label. These include:

- single phase airconditioners and single phase heat pumps (excluding ducted airconditioners and heat pumps)
- clothes washing machines
- dishwashers
- refrigerating appliances
- rotary clothes dryers

National Environment Protection Council (New South Wales) Act 1995

The Commonwealth, the States, the Australian Capital Territory, the Northern Territory and the Australian Local Government Association entered into an Agreement known as the Intergovernmental Agreement on the Environment setting out certain responsibilities of each party in relation to the environment. That Agreement provides that the Commonwealth, the States, the Australian Capital Territory and the Northern Territory will make joint legislative provision for the establishment of a body to determine national environment protection measures.

This Act is the NSW legislative provision.

Schedule 5 of the Act, entitled Climate Change, states that the parties

acknowledge the potentially significant impact of greenhouse enhanced climate change on Australia's natural, social and working environment, as well as on the global community and global environments. The parties accept and support the need for Australia to participate in the development of an effective international response to meet the challenge of greenhouse enhanced climate change and note Australia's participation in the development of an international convention on climate change.

The parties note their endorsement of the decision to adopt an interim planning target to stabilise greenhouse gas emissions (not controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer) based on 1988 levels, by the year 2000 and reducing these emissions by 20% by the year 2005. The parties reiterate their support, as agreed in October 1990, for the interim planning target to form the basis of development of the National Greenhouse Response Strategy, subject to Australia not implementing response measures that would have net adverse economic impacts nationally or on Australia's trade competitiveness, in the absence of similar action by major greenhouse gas producing countries. The parties agree that assessment of the implementation of the National Greenhouse Response Strategy against this agreed objective will be reviewed at Special Premiers' Conferences.

Passenger Transport Act 1990
Section 28C of the Act provides that a service contract for a regular bus service is to provide for performance standards to be observed by the operator of the service. The performance standards are to include standards concerning greenhouse emissions by buses that have been developed by the Director-General following consultation with the NSW Greenhouse Office in the Cabinet Office.

Environmental Planning and Assessment Regulation 2000
Section 50 provides that where a development application is also accompanied by a BASIX certificate with respect to any building, certain design quality principles need not be verified to the extent to which they aim to do certain things, including reduce emissions of greenhouse gases in the use of the building or in the use of the land on which the building is situated.

Standard Instrument (Local Environmental Plans) Order 2006
Section 30 provides that objectives of development in the coastal zone are to provide for the protection of the coastal environment of the State for the benefit of both present and future generations through promoting the principles of ecologically sustainable development and to implement the principles in the NSW Coastal Policy, and in particular to recognise and accommodate coastal processes and climate change.

Legislation relating to Carbon

Conveyancing Act 1919 No 6
Defines and establishes carbon sequestration rights.

Carbon Rights Legislation Amendment Act, 1998

This Act provides the basis on which Forests NSW was able to develop a new business area trading in carbon sequestration rights. The Act amends the Conveyancing Act, 1916 to recognise rights associated with carbon sequestrated by trees and forests from the atmosphere as type of forestry right. It also amends the Forestry Act, 1916 to enable the Forestry Commission to acquire and trade in such rights as well as to procure land and manage it for investors in such rights.

Crown Lands Legislation Amendment (Carbon Sequestration) Act 2006 No 85

An Act to amend the Crown Lands Act 1989 and the Western Lands Act 1901 to enable carbon sequestration and related forestry rights to be granted in respect of Crown land (including land held under Western lands lease); and for other purposes.

Energy Services Corporations Act 1995 No 95

The Act provides that an electricity generator or distributor may acquire, hold, sell or otherwise deal with or trade in carbon sequestration rights

Forestry Act 1916 No 55

The act provides that the NSW Forestry Commission may acquire, hold, sell or otherwise deal with or trade in carbon sequestration rights and related matters.

NSW Government Submission to

NSW Parliament's Legislative Assembly Standing Committee on

Natural Resource Management (Climate Change)

February 2008

A coordinated NSW Government submission to the Parliamentary Committee's Inquiry into Natural Resources Management (Climate Change) has been prepared. It provides a broad overview of each Term of Reference.

All levels of government in Australia recognise that climate change is one of the biggest challenges facing Australia today, and that coherent and comprehensive policies are required to meet those challenges in an effective manner. Accordingly, at its meeting on 20 December 2007, the Council of Australian Governments (COAG) committed to ensuring an effective national response to climate change, encompassing a single national emissions trading scheme, a nationally consistent set of climate change measures to support the emissions trading scheme, and a national cooperative approach to long-term adaptation to climate change.

A major input to governments' policy deliberations will be the Garnaut Climate Change Review, which has been commissioned by Federal Labor and the States and Territories to examine the impacts of climate change on the Australian economy, and recommend medium to long-term policies and policy frameworks to improve the prospects for sustainable prosperity. The Commonwealth Government has indicated that the finalisation of the detailed design of its emissions trading scheme, including the setting of interim emissions reduction targets, is contingent upon completion of the Garnaut Review. The Review's final report is due on 30 September 2008, with a draft by 30 June 2008.

This submission provides information on current natural resource management policies and programs that address issues of sustainability, and which will help to address the challenges posed by climate change. However, it should be noted that the policy environment is evolving and NSW is working with the Commonwealth and the other States and Territories through the COAG process to develop an economically efficient and comprehensive suite of policies to tackle climate change.

Terms of reference

(a) The likely consequences of human-induced climate change on land (including salinity), water and other natural resources;

The likely consequences of human–induced climate change are identified through a number of sources at the international, national and state levels. The published research of the International Panel of Climate Change (IPCC), the CSIRO and the Bureau of Meteorology, indicate that climate change is already having demonstrable impacts on natural resources in the area within and around NSW. Examples include changes in critical timings for some agricultural enterprises, observed changes to habitats of migratory birds, increased incursions of feral animals into alpine and sub-alpine areas, increased severity of the most recent drought due to higher than normal temperatures and a measurable decrease in alpine snow depths over the last 40 years, with concomitant encroachment of snow gums into higher elevations. Sea levels have also continued to rise at a rate of 1.2mm/yr since 1920, and this rate is also now accelerating.

The NSW Department of Environment and Climate Change (DECC) is undertaking ongoing work to understand the likelihood and magnitude of climatic changes, and their consequences for NSW's natural resources. The following summary has been prepared by the Climate Change Science unit at DECC:

- Temperature: There is very strong evidence that annual average temperature will continue to increase in most areas of NSW. 2007 was officially the hottest year on record in NSW, continuing a warming trend that has seen no below average annual temperatures for over a decade. At existing rates of anthropogenic emissions, the average annual increase is likely to exceed 1.5° C by 2070, and as a worst case scenario, is likely to exceed 4° C by the end of the century. In addition, there is evidence that:
    - both average daily maximums and minimums will continue to rise;
    - there is a probable likelihood of more extreme (hot) days, fewer cold/frost days, and fewer snowfalls; and
    - changes across the state are likely to be highly variable, although no areas are likely to decrease in average temperature.
- Rainfall and stream flow. Findings include:
    - there is a likely change in variability and extremes of precipitation;

- there is uncertainty in the modelling as to whether there will be an increase or decrease in average rainfall, and the magnitude of that change. It may be that climate variability is having a greater impact than climate change on rainfall at this time. There is still considerable debate in the climate science community on the effects of rising carbon dioxide levels and temperature on rainfall for the climate bands occupied by NSW. These effects are also expected to be different at different latitudes within NSW;

- CSIRO projections indicate that there is a wide range of possibilities, with the most likely being a small decrease in rainfall, less than 3 per cent in annual rainfall by 2030 for most of NSW, and a larger decrease, between 5 and 7.5 per cent, by 2070; and

- in some parts of the State, most notably the north east, there may be increases in summer rainfall.

- Translation of rainfall changes to streamflow changes is even more complex, with runoff being a function of many factors, including vegetation cover and rainfall intensity and duration, all of which could potentially be affected by rising carbon dioxide levels and temperature.

- Evaporation:

  - Potential wind reductions under the recent warmer climate may have mitigated against increased evaporative losses, at least in the short term, although the long term likelihood is for average evaporation and evapotranspiration to increase and cause further aridity.

- Carbon dioxide concentrations:

  - There is very strong evidence for a continued rise at an increasing rate unless global mitigation action is taken. The current rise in greenhouse gas emissions is tracking at or above the highest projections of the IPCC.

  - Current carbon dioxide levels in the atmosphere are the highest for at least two million years, and probably longer. Carbon dioxide fertilisation effects on vegetation are probable and likely to alter growth patterns.

- Sea level rise:
  - There is very strong evidence that sea level is rising at a rate equal to or faster than the upper level projections of the IPCC.

These climatic changes will impact on a range of existing environmental and social conditions. Some of the more likely significant impacts are:

- sea level rise, associated increases in coastal flooding effects on coastal communities, industries (such as oyster farming), ecosystems and cultural heritage;
- loss and or change of biotic communities in most areas of the state, including species extinctions;
- increased soil erosion from more intense storms;
- increasing carbon dioxide concentration which is likely to increase plant growth, so where trees are not water-limited, climate change is likely to expand some growing seasons in southern Australia and potentially increase productivity. On the flip side, it could also adversely affect runoff characteristics due to increased vegetation cover;
- increased instability in river channels and increased channel change;
- loss of marginal ecosystems (e.g. alpine areas, beaches, estuaries);
- uncertainty about rainfall distribution, and potential impacts on water resource availability and ecological integrity;
- likely increase in fire frequency and intensity, noting Australia's south-east is already recognised as one of the most fire-prone areas in the world;
- a decline in the agricultural viability of certain crops and lands in the face of changing conditions, while new agricultural opportunities in new regions may emerge;
- current rates of climatic change are greater than natural and will act to exclude marginal and vulnerable species, while promoting those species most able to

adapt. For these reasons many current weed and pest species are likely to pose increasing problems;

- the distribution and relative proportions of certain plants are likely to change in response to elevated carbon dioxide, potentially changing the species mix in pastures and increasing the risks to biodiversity, particularly in the semi-arid and arid zones;
- increased carbon dioxide concentration in sea water will increase ocean acidification, making it more difficult for corals and molluscs to grow and function,
- increasing damage to agriculture, private property and infrastructure from increased storm activity; and
- potential economic and social changes as patterns of agricultural and other economic activities change, particularly in rangeland and coastal areas.

(b) Options for ensuring ecologically sustainable natural resource use, taking into particular account the impacts of climate change;

In April 2007 the NSW Government appointed for the first time a Minister for Climate Change, Environment and Water and established the NSW Department of Environment and Climate Change (DECC). These decisions reflect community concern and the Government's commitment to respond to climate change, and recognise that managing the prosperity of the State into an uncertain climatic future will require Government intervention and leadership.

The NSW State Plan has a strong emphasis on ecologically sustainable natural resource management, particularly in the Environment for Living theme. It acknowledges the challenges of climate change and sets natural resource management targets, with associated programs being brought forward to deliver on them.

The NSW Government has put in place a wide range of polices and programs directed toward ensuring ecologically sustainable natural resource use. The concept of ecologically sustainable development is found in a number of pieces of NSW environment and natural resources management legislation. Some of the most recent and relevant reforms are outlined below.

Natural Resource Management Reforms

In 2003, the NSW Government initiated a series of natural resource management reforms, resulting in three significant pieces of legislation:

- *Catchment Management Authorities Act 2003* which established Catchment Management Authorities (CMAs) for thirteen catchment areas. The CMAs are responsible for preparing catchment action plans to address the priority natural resource management issues facing their region, which may include climate change. CMAs are the primary vehicle for the delivery of funding from the NSW and Commonwealth Governments to help land managers improve and restore the State's natural resources;

- *Native Vegetation Act 2003* which prevents broadscale clearing unless it improves or maintains environmental outcomes. This has made a major contribution to NSW's emission reduction efforts. The Act also seeks to protect native vegetation of high conservation value, having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation; and

- *Natural Resources Commission Act 2003* which established an independent commission to provide sound scientific bases for management of natural resources in the social, economic and environmental interests of the State, and to recommend state-wide standards and targets for natural resource management. The Commissioner is also responsible for the review and audit of Catchment Action Plans prepared by the 13 CMAs.

Rural Water Planning

Water reform has also been an important priority for the NSW Government. Legislative, institutional and on-ground reforms have demonstrated the NSW Government's continuing commitment to both the 1994 COAG Water Reforms and the 2004 National Water Initiative (NWI). Concern about climate change is recognised as a driving factor for reform, along with factors including: increasing competition for finite resources, river and wetland degradation; over allocation of groundwater resources; and the vital role of water in regional economics.

In 2000, the NSW Government introduced the *Water Management Act*, which outlined a water sharing framework, and provided legal status and security for water users.

The Act is designed to manage water allocations in NSW's notoriously variable climate, and in NSW's rivers whose flow is amongst the most variable in the world. The mechanisms

established by the Act to manage climate variability mean the Act is well placed to manage the increased climate variability expected as a result climate change.

Water sharing plans are the key mechanism in the Act for achieving an appropriate balance between competing interests as they:

- provide new rules for managing extractions and environmental water,
- increase allocations for the environment and other public purposes, such as Aboriginal cultural heritage,
- allow implementation of the property rights and risk-sharing principles of the NWI,
- provide secure allocations for the various users of water, including the environment, as a basis for more robust property rights and water trading, and
- provide a framework for adaptive management with provisions for five and ten year independent reviews by the Natural Resource Commission.

The Plans give priority to planned environmental water, that is, water allocated in the Plans for fundamental ecosystem health. The Plans specify the flow rules needed for environmental health, the long term limit on water extraction for consumptive use from each water source and detail the access rules which in effect determine how the water is to be apportioned between the environment and competing users.

The key mechanism in the Act for managing climate variability is the Available Water Determination. The Act does not provide water access licence holders with a set volume of water, rather it provides licence holders with a share of the available water. Access licence holders get the same share of available water each year but the actual volume they receive varies because the volume of available water depends on rainfall. The Available Water Determination process means that if climate change reduces water availability users will get less, but if it increases availability users will get more.

The Water Sharing Plans also make water users' access licences secure and, where appropriate, tradeable assets. This creates a market for water and therefore creates an incentive for water efficiency, and for water to be traded to those end uses with the highest return. This provides a market mechanism to facilitate the movement of scarce water resources to high return industries, which helps reduce the impacts of climate variability on regional economies. This is a key requirement of the National Water Initiative.

The Plans are 10 year plans, with a standard five year review of their implementation under the Act. This means the key environmental water rules in the Plans can be varied as new knowledge of the impact of climate change on water availability is acquired. This long term adaptive planning framework allows for these issues to be gradually dealt with in a strategic manner, and is consistent with the risk assignment clauses in the National Water Initiative. The Natural Resources Commission will also provide advice during the five and 10 year reviews of the Plans, particularly on the contribution of the Plans to progress towards catchment and river health targets.

However, the likely impacts of carbon dioxide and temperature rises on rainfall, run-off, storage volumes and therefore available water are not yet clear and may vary between regions in the State. Better scientific understanding, information and modelling on the likely interaction of these processes would help ensure future modifications to environmental water rules and long term extraction limits are more appropriate, and provide a better guide for water users on the volumes they may expect to be provided under any new planning regime.

For this reason NSW is cooperating closely with other partners on a number of major projects to improve knowledge on potential impacts:

- The CSIRO was contracted by the National Water Commission to report on current and future water availability in the MDB, including the possible impacts of climate change, at 2030. This will be a comprehensive analysis, assessing surface and groundwater in each significant tributary of the MDB independently, as well as explicitly modelling their linkages. NSW has provided input to this process including data, river basin models, some staff, and is reviewing the work in progress;

- NSW is a partner in the Murray-Darling Basin Commission Risks Program and Risks Strategy. The objective of the Risks Strategy is to protect the environmental objectives and water entitlements for potentially decreased water availability resulting from a range of risk factors, currently including climate change, and increases in: farm dams; groundwater usage; irrigation efficiency, plantation forests, and bushfires; and

- As a member of the MDBC, NSW is also a co-funder of the South East Australian Climate Initiative project (SEACI), conducted by CSIRO and the Bureau of Meteorology for MDBC, AGO, Land and Water Australia, and Victorian Department of Sustainability and Environment. SEACI is a 3-year $7million research program investigating the causes and impacts of climate variability in south east Australia.

Urban Water Planning

The Department of Water and Energy is overseeing a number of Initiatives for addressing the effects of climate change on urban water use management, including:

- the 2006 Metropolitan Water Plan outlines the mix of measures essential to ensuring Sydney's water needs are met in response to drought, a changing climate and the medium term needs of a growing population;

- the requirement that non-metropolitan water utilities must prepare 30 year Integrated Water Cycle Management strategies which are reviewed every six years. These Strategies must consider natural processes within the catchment, local industries, neighbouring water utilities, climate change and greenhouse emission production;

- a range of actions to help restore and protect the rivers and aquifers of the Sydney region, and their catchments, including:

    - new rules for the release of water from Tallowa Dam to improve the environmental health of the lower Shoalhaven River;

    - modifications to Avon Dam to allow environmental water to be released into the Avon River for the first time; and

    - reconfiguring Cataract, Cordeaux and Nepean Dams, and the weirs downstream of them, to enable water to be released and pass down the rivers to improve their environmental health; and

- a collaborative study into 'Climate Change and its impacts on water supply and demand in Sydney', which is funded by the Commonwealth Department of Environment and Heritage, the Department of Environment and Climate Change, the Sydney Catchment Authority and Sydney Water Corporation, will increase understanding of the impacts of climate change and natural climate variability on the supply of, and demand for, drinking water in Sydney and to formulate policies for the resulting range of possible future water supply/demand balance scenarios.

Primary Industries

Key natural resources sectors such as agriculture, forestry, fisheries and mineral resources are also affected by climate change. While primary industries are particularly exposed to the greater seasonal variability associated with climate change, they also have the experience and capacity to foster adaptation of their systems to projected climatic changes. The forest industry can also play a valuable part in mitigating climate change through carbon sequestration, use of wood products to displace more greenhouse intensive products and the use of forest biomass to displace the use of fossil fuels through the generation of bioenergy.

Department of Environment and Climate Change programs

The Department of Environment and Climate Change has lead responsibility for developing and implementing programs and policies designed to ensure ecologically sustainable natural resource use, taking into particular account the impacts of climate change. The centrepiece of the NSW Government approach in this regard is the $340 million Climate Change Fund which assists families, businesses and communities fight climate change with practical and simple solutions that reduce greenhouse gas emissions and conserve energy and water resources. The fund includes:

- a $100 million Residential Rebate Program which provides rebates for solar and gas hot water, rainwater tanks, and energy efficient insulation;
- a $40 million Renewable Energy Development Program to support projects which are expected to lead to large scale greenhouse gas emission savings in NSW, by demonstrating renewable energy technologies in NSW and supporting their early commercialisation;
- a $30 million Green Business Program for projects that will save water and energy in business operations in NSW;
- a $30 million Public Facilities Program for water and energy saving projects in facilities which are open to, and frequently accessed by, the public including schools, community buildings, sporting facilities, museums and art galleries;
- a $100 million Recycling and Stormwater Harvesting Program;
- a $20 million School Energy Efficiency program; and

- a $20 million Rainwater Tanks in Schools program.

In addition the Environmental Trust, an independent statutory body managed by the Department, provides financial support to exceptional environmental projects in the categories of Education, Research and Urban Sustainability. The Trust's support of climate change related projects in these areas is forecast to be $2.9 m this financial year, rising to $6.2m in 2008/2009 and $5.9m in 2009/2010.

In November 2005, the NSW Government released the NSW Greenhouse Plan to set NSW on a path to meet its greenhouse gas emission reduction targets of limiting 2025 emissions to 2000 levels, and reducing emissions by 60 percent by 2050. The measures in the Greenhouse Plan focus on raising awareness of climate issues, promoting understanding of the likely impacts on NSW, and promoting cooperative approaches by Government, individuals, business and community groups to combat climate change.

The Department of Environment and Climate Change is continuing to oversee a series of climate change adaptation initiatives that were commissioned under the NSW Greenhouse Plan. Over $2 million is allocated over four years for researching the potential effects of climate change in NSW. The outputs of these studies will inform the development of policy frameworks and decision tools to foster adaptation to climate change. The studies address the following areas:

- health;
- threatened species;
- aquatic ecosystems;
- bushfires;
- conservation planning;
- invasive species;
- coastal impacts; and
- water supply and demand.

Other natural resource management measures under the NSW Greenhouse Plan include:

- opportunities for Catchment Management Authorities to pool carbon sequestration activities;

- strengthening the Department or Primary Industries' climatology in agriculture program by developing adaptation tools and guidelines for use by land managers and

- improving the estimates of carbon sequestered through improved soil and vegetation management.

There are also a series of land use change-related projects under the Climate Action Grants Program of the NSW Greenhouse Plan, the natural landscape and soils management programs and the Riverbank program of the Department of Environment and Climate Change.

Since the establishment of the Department of Environment and Climate Change in April 2007, new impacts and adaptation studies have commenced, including the development of climatic scenarios and corresponding biophysical projections based on the best available science for the State Plan regions for the year 2030. These scenarios and projections will provide regional guidance on likely impacts and implications of climate change into the future, for all levels of NSW decision-makers.

(c) Approaches to land and water use management practices on farms and other natural resource management practices, having regard in particular to the role of such practices in contributing to climate change or as a tool in helping to tackle climate change;

According to the Australian Greenhouse Office, in 2005 the Australian agriculture sector contributed 87.9 Megatonnes of carbon dioxide equivalent to national greenhouse gas emissions, representing 15.7 percent of total national emissions. This figure is relatively unchanged since 1990, and is now substantially greater than that from the Land Use, Land Use Change and Forestry sector (6 percent of national emissions in 2005) which has declined substantially (by 73.9 percent since 1990) due to the cessation of broad scale land clearing.

Within the agriculture sector, livestock industries are by far the greatest source of greenhouse gas emissions while emissions from agricultural soils (arising from soil management, cultivation and fertiliser use) are also significant. The adaptation capacity and approaches of some different agricultural sectors is examined below.

Dryland and irrigated farming

Dryland broad-acre croppers in NSW have always experienced significant seasonal variability and the farming systems they use incorporate a range of management factors and technologies to reduce this risk. While these industries may be particularly exposed to the greater seasonal variability associated with climate change, they also have the capacity and experience to allow them to adapt their systems relatively quickly to these changes. One factor facilitating this adaptation for many will be the experience of those already farming in more marginal environments. Similarly, increased climate variability may require irrigators to be more flexible in the ways they use available land and water to generate income.

Forestry

Forestry can play a valuable role in mitigating climate change through three major avenues: carbon sequestration in new forests; use of wood products to displace more greenhouse-intensive products; and use of forest biomass for bioenergy, displacing fossil fuels. Research and technology expansion of biofuels and bioenergy are currently underway by the Department of Primary Industries. Research into the measurement and management of soil carbon is also underway.

Fisheries

The Department of Primary Industries is currently developing risk management frameworks for incorporation into its governance of commercial and recreational fisheries, to enable the fisheries sector to adapt to climate change. In general, temperature increases for NSW, as predicted by the climate change models, will benefit the culture of most fish and crustacean species in NSW, especially prawn farming aquaculture in northern parts of the state though trout (culture of that species) will be disadvantaged.

However, the area of estuaries suitable for oyster culture is expected to change due to rising sea levels and salt water intrusion further into estuaries. This may require relocation of shore line infrastructure associated with the oyster industry, with associated cost implications. Increasing storm intensity and frequency impacts on estuarine and marine infrastructure for all aquaculture activities may further affect economic return in the industry.

Department of Primary Industries programs

The NSW Government has a range of programs which facilitate approaches to sustainable land and water management on farms or other natural resource management practices. Adaptation strategies for climate change currently being undertaken or investigated by the Department of Primary Industries include:

- delivering PROfarm workshops, including Stockplan, Prograze and the Farmers' Guide to Managing Climate, which provide farmers with the tools and skills to manage drought situations and climatic variability on-farm;
- the Climatology in Agriculture Program, which is developing tools and guidelines for use by farmers and catchment management authorities in managing their risks and understanding of adaptive strategies for their farming systems. This program is supported by a $1 million grant from the Department of Environment and Climate Change;
- preparation of a NSW Invasive Species Plan, which will include actions to minimise the impacts of disturbance factors such as climate change on the incidence and control of invasive species (including invertebrate, vertebrate and aquatic pests, and invasive weed species);
- research into downscale global climate models in a Geospatial Information System framework to get a better picture of the impact of climate change on specific NSW primary industries and regions;
- research to develop new plant varieties (agriculture and forestry) that are more resilient to changed climatic conditions (such as drier conditions, shorter seasons and variable rainfall intensity);
- development of a range of information packages to assist primary producers make better decisions in the face of climate variability;
- research into the direct effect of increased atmospheric carbon dioxide on plant growth. For example, the Hawkesbury Forest Project, which is examining the impact on plantation forests of the interaction between elevated atmospheric carbon dioxide and water availability;
- ten regional forums, in partnership with CMAs, Landcare and local government, to help farmers and rural communities understand climate change predictions. This program was supported by the Department of Environment and Climate Change;
- research into alternative species of Eucalypt that have the potential to produce economically viable forest plantations in low rainfall environments of NSW; and
- research to evaluate different management strategies to address the effects of climate change on fisheries (collaborative project with CSIRO).

Department of Primary Industries emissions reduction initiatives that are underway include:

- the world's first carbon dioxide emissions trade for carbon sequestration by planted forests in a mandatory trading scheme, undertaken by Forests NSW under the NSW Greenhouse Gas Reduction Scheme, and development of sophisticated carbon accounting procedures to support the Forests NSW emissions trading business;

- the development of a system to allow Catchment Management Authorities to act as carbon pool managers on behalf of landholders, to facilitate participation in the NSW carbon trading market, thereby providing an incentive for revegetation. This program is funded by the Department of Environment and Climate Change;

- research into use of recycled organics in agriculture and forestry as a soil amendment to supply nutrients and sequester carbon, including their application in mine site rehabilitation;

- research into the use of char as a soil amendment to sequester carbon and improve water holding capacity and nutrient cycling. The project is funded by the Department of Environment and Climate Change;

- research into reducing methane emissions from ruminant livestock, currently focused on selecting for superior feed conversion efficiency;

- research to reduce enteric methane emissions from ruminant livestock;

- research through the Cooperative Research Centre for Greenhouse Gas Technologies into geosequestration.

- investigating sites in the Sydney and Darling Basins that have the potential for the geosequestration of carbon dioxide as part of the Geosequestration Project;

- investigation of the suitability and productive capacity of native woody species that may be integrated into farming systems for bioenergy production (collaborative project with other States, through the Future Farm Industries Cooperative Research Centre); and

- research into the management of soil carbon stocks in agriculture and forestry to offset greenhouse gas emissions This program is funded the Department of Environment and Climate Change.

(d) The effectiveness of management systems for ensuring that sustainability measures for the management of natural resources in New South Wales are achieved, having particular regard to climate change;

The NSW State Plan – Environment for Living

The NSW Government has adopted State-wide targets for natural resource management, on advice from the Natural Resources Commissions. The targets are now enshrined in the State Plan under Priority E4 - *Better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways*. Climate change is incorporated as a risk under the standards that accompany these targets. State Plan Priority E3 – *Cleaner air and progress on greenhouse gas emissions* – establishes specific climate change related targets, including the Greenhouse Plan target of a 60 per cent cut in greenhouse gas emissions by 2050.

Monitoring, auditing and reporting progress

The NSW Government has endorsed a Monitoring, Evaluation and Reporting Strategy for natural resource management, which is being implemented by the Natural Resources and Environment CEO Cluster Group, relevant NSW agencies and Catchment Management Authorities. The Strategy will inform policy and investment decisions of natural resource managers at a range of scales, and assist in the assessment of progress against the state-wide targets.

The NSW State of the Environment Report will use the data provided by the Strategy to report progress towards natural resource targets detailed in State Plan Priority E4, and provide an evaluation of the status of natural resources in NSW, in accordance with the requirements of section 10 of the *Protection of the Environment Administration Act 1991*. The State of the Parks report provides an evaluation of the status of the reserve system which is managed by DECC for sustainability and incorporates climate change considerations in its pests, fire and weeds programs. The next report will be issued in 2008.

The Natural Resources Commission (NRC) plays a quality assurance role by:

- auditing the effectiveness of CMAs' implementation of their Catchment Action Plan in terms of compliance with the Standard and contribution to the targets;
- reviewing technical issues to provide a sound scientific basis for decisions on specific NRM issues;
- developing and revising the Standard and targets and facilitating their use by natural resource managers across the state; and

- conducting reviews on natural resource issues as requested by the Government.

Stakeholder engagement

The NSW Government actively engages with community in a number of ways to create a more inclusive approach to natural resource management that draws upon the extensive knowledge and experience of natural resource stakeholders.

The primary institutional vehicle for this approach is the Natural Resources Advisory Council of NSW (NRAC). NRAC is an independent advisory body reporting to the Minister for Climate Change, Environment and Water. NRAC comprises members representing a broad range of NRM stakeholders including State and local government, forestry, fishing, farming, environmental, Aboriginal, union and industry sectors. It provides these stakeholders with a single voice to clearly articulate their position to the Government. NRAC's principal functions are:

- to provide the Government with policy advice on sustainable natural resource management and economic development in NSW;
- to assist the Government to prioritise resources and strategies to promote sustainable natural resource management in NSW;
- to strategically oversee the policy and regulatory environment and the NRM legislative reforms in NSW; and
- to acknowledge differences, facilitate common understanding and broker consensus between stakeholder representatives when necessary.

Key to building partnerships in natural resource management in a changing climate will be the continued involvement of the community, through the Catchment Management Authorities and other programs such as *LandCare.*

For natural resource management in agricultural sectors, the Department of Primary Industries actively encourages farmers to develop Environmental Management Systems (a risk-based, continuous improvement process) to manage risks, including climate change. For example Forests NSW has obtained the internationally recognised Australian Forestry Standard for an Environmental Management System covering most of its operations in January 2007.

There is also extensive consultation in the preparation of water sharing plans, with the Department of Water and Energy and the Catchment Management Authorities conducting

both a targeted consultation phase and a public exhibition phase, whereby all stakeholders have an opportunity to input into the rules to be put in place by the plans.

Accountability

Across all the Natural resource and land management sectors, the accountability mechanisms of the Parliament can also be brought to bear on the effectiveness of the State's natural resource management approaches, including the effects of climate change. For example the NSW Auditor-General recently investigated the approach of the Department of Primary Industries to improving efficiency of irrigation water use on farms, and found

DPI's WaterWise on the Farm education and training program was effective in increasing awareness of water use efficiency practices and technologies, in educating and training irrigators in farm water resources planning and management, and in encouraging them to change practices.

(e) The likely consequences of national and international policies on climate change on natural resource management in New South Wales.

International and national policies on climate change can assist in providing policy coherence and direction. The recent ratification of the Kyoto Protocol and the imminent establishment of a national market for emissions trading will provide market incentives for carbon sequestration opportunities in the NSW natural resources sector. However, as Australia is not currently a signatory to article 3.4 of the Kyoto protocol these incentives may not extend to activities that sequester carbon in the soil, they may be limited to forestry activities. The establishment of a national emissions trading scheme will also provide a broader market signal for reducing greenhouse gas emissions and thereby mitigating potential future impacts of climate change on natural resources.

Co-operative national policies, such as the National Water Initiative, The National Action Plan for Salinity and Water Quality, the National Heritage Trust funding, and the COAG endorsed National Framework for Adaptation, also have a significant impact to the administration of natural resource management in NSW.

A good example is the work that is being progressed through various Ministerial Councils under the National Framework for Adaptation. The framework includes possible actions to assist the sectors and regions most vulnerable to climate change, such as agriculture, biodiversity, fisheries, forestry, coastal, water resources.

Another example is the Commonwealth Government announcement of a 20 percent renewable energy target by 2020 equating to approximately 60.000 gigawatt hours. The target will incorporate the existing Commonwealth and State renewable energy targets, and will work in concert with a national emissions trading scheme. The expansion of renewable energy provides opportunities in relation to land management as the predominant technology encouraged is wind energy, and the sites of these projects are typically in regional locations where they may provide income streams for landowners/natural resource managers.

The Commonwealth Government's Water Act 2007 will also increase the potential for the Commonwealth to participate in water management, by providing a more direct legislative means by which Federal perspectives can be brought to bear on water management.

Additional Term of Reference: **The Committee will also be investigating measures to improve the sustainability of commercial and industrial buildings.** The Government is investigating and participating in a number of sustainability programs for commercial and industrial buildings. Please see Tab A for information on NSW Government programs in this area.

ADDITIONAL TERM OF REFERENCE

MEASURES TO IMPROVE SUSTAINABILITY OF COMMERCIAL AND INDUSTRIAL BUILDINGS

Commercial Building Rating Tools - Green Star, NABERS and ABGR

The Green Star and National Australian Built Environment Rating Systems (NABERS) are complementary benchmarking systems for the commercial property sector. Both are voluntary benchmarking tools.

The purpose of the Green Star rating tools is to assist building designers and developers predict the greenhouse performance of new buildings. Green Building Council of Australia develops and manages these tools nationally. The purpose of NABERS is to assist commercial building owners and occupiers to measure the operational impacts of existing buildings on the environment. Department of Environment and Climate Change (DECC) develops and manages NABERS nationally. NABERS now incorporates the widely used Australian Greenhouse Building Rating tool (ABGR).

The ABGR tool, has strong support within the property industry. It has been used to rate 30 percent of the national office building market (approximately 600 buildings), including 44 per cent of Sydney metropolitan office space. Green Star rating has been used to design around a further 100 buildings nationally.

The strong support for ABGR is underpinned by its strengths, which are now being incorporated into the expanded NABERS:

- It provides a simple, direct and transparent measure of actual environmental outcomes – including greenhouse, water, waste and indoor environmental health and comfort;
- It helps actual building owners identify real costs savings from their current operations (identifying on average a 25% improvement in energy efficiency);
- It provides a credible, verifiable and independent rating of operational buildings; and
- It was developed in close consultation with industry.

Market based policy incentives for energy efficiency in the property sector

The NSW Greenhouse Gas Abatement Scheme (GGAS) presently allows creation of carbon credits (NGACs) for projects which reduce electricity demand in ways that exceed present regulatory requirements. In this way property developers and owners are able to obtain revenue for improving building performance under either NABERS, GreenStar or ABGR. Theoretically projects which exceed BASIX requirements could also obtain revenue under GGAS. However the Independent Pricing and Regulatory Tribunal (IPART), which administers GGAS, reports that few such projects have been undertaken.