CHAPTER 7: ATMOSPHERE

KEY POINTS

- The Government has been an active and constructive participant in the global negotiations to extend international commitments to address the threat of climate change, particularly in the Kyoto Protocol negotiations under the United Nations (UN) Convention on Climate Change.

- In November 1997 the Government announced a substantial package of domestic measures to address climate change. These measures, totalling nearly $180 million over the five years 1998–99 to 2002–03 were launched in the Prime Minister's Statement *Safeguarding the Future: Australia's Response to Climate Change* and are expected to achieve a reduction of a third of our expected net emissions growth from 1990 to 2010.

- The Government supports Australia's role as a world leader in the development and implementation of effective measures to protect the stratospheric ozone layer and is funding atmospheric monitoring and research activities.

- The Government has been active in the development and implementation of national air quality standards and strategies targeting urban air pollution.

The Government's expenditure on atmospheric protection programmes is outlined in Table 7.1

CLIMATE CHANGE

International

The United Nations Framework Convention on Climate Change provides the international focus for action to protect the global climate system. The Convention's ultimate objective is to stabilise 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system'.

As a Party to the Convention, the Government takes very seriously its responsibility to ensure that Australia makes a realistic, sustainable, fair and effective international contribution to global action on climate change.

The Kyoto Protocol

Australia played an active and constructive role in negotiations over developed country commitments for the post-2000 period which culminated in the adoption of the Kyoto Protocol to the Convention in December 1997. The Commonwealth's approach to these negotiations was to seek solutions which reflected national capacities and circumstances.

Table 7.1: Atmosphere — New Measures and Programme and Tax Expenditure Estimates

Description	1997–98 $m	1998–99 $m	1999–00 $m	2000–01 $m	2001–02 $m
NEW MEASURES					
Enhanced Package of Climate Change Measures-PM's Statement	–	34.1	38.9	41.1	29.3
Continuation of Climate Change Programme	–	3.9	4.0	–	–
PROGRAMME AND TAX EXPENDITURE ESTIMATES					
Climate Change					
International Development Cooperation					
Global Environment Facility (a)	8.9	4.5	5.5	5.5	5.1
National Greenhouse Response					
Climate Change Programme	3.3	3.9	3.9	–	–
Greenhouse Challenge	2.8	6.0	6.0	6.0	6.0
National Energy Efficiency Programme	1.9	1.8	1.8	1.8	na
Renewable Energy Industry Programme	2.0	1.2	–	–	–
CRC for Renewable Energy	1.6	1.5	1.5	1.5	1.5
Exemption from fuel excise of alternative fuels (b)	660.0	710.0	785.0	855.0	na
Energy Research and Development Corporation	20.6	1.5	0.5	0.3	0.1
Household Greenhouse Action	–	0.7	0.7	0.6	0.3
Cities for Climate Protection	–	2.6	2.6	2.6	2.6
Light Commercial Vehicles-Compressed Natural Gas (CNG) Infrastructure	–	–	0.7	1.2	1.2
Bush for Greenhouse	–	1.2	1.1	1.1	1.1
Ethanol Pilot Plant	0.5	1.0	0.5	–	–
Offset for Ethanol Pilot Plant from ERDC	–0.5	–1.0	–0.5	–	–
Environmental Strategy for Automotive Industry	–	0.3	0.3	–	–
Mandatory Targets for the Uptake of Renewable Energy in Power Supplies	–	1.2	0.7	0.7	0.7
Efficiency Standards for Power Generation	–	1.6	0.6	0.6	0.6
Renewable Energy Innovation Investment Fund (c)	–	2.5	3.1	3.3	3.4
Renewable Energy Innovation Loans and Grants	–	2.3	4.5	6.5	6.5
National Carbon Accounting System for Land Based Sources and Sinks	–	3.4	3.2	2.7	1.2
Energy Performance Codes and Standards for Domestic Appliances and Industrial Equipment	–	0.9	1.0	0.9	0.9
Energy Performance Codes and Standards for Housing and Commercial Buildings	–	0.7	0.9	1.0	1.0
Industry Efficiency Benchmarking and Best Practice	–	1.5	2.2	2.2	2.2
Reducing Methane Emissions from Livestock	–	0.4	0.3	0.3	0.1
Accelerating Energy Market Reform	–	1.5	1.5	1.5	1.0
Plantations-2020 Vision	–	1.0	0.5	0.3	0.1
Activities Implemented Jointly	–	2.0	2.0	2.0	–
Renewable Energy Showcase	–	3.5	3.5	3.5	–
Renewable Energy Technology Internet Site	–	0.1	0.1	0.1	0.1
Funding Envelope for other NGS Measures	–	3.7	3.5	3.3	–
Air Quality					
Air Pollution in Major Cities	3.5	3.7	4.0	3.5	na

Table 7.1: Atmosphere — New Measures and Programme and Tax Expenditure Estimates continued

Ozone Protection					
Ozone-related activities	na	na	na	na	na
Ozone Protection Trust Fund receipts	-0.7	-0.5	-0.6	-0.5	-0.6
Ozone Protection Trust Fund expenditure (e)	0.5	0.5	0.5	0.5	0.5
DASCEM Halon Community Collection and Destruction	4.1	6.6	5.4	–	–
Atmospheric Research					
National Greenhouse Research Programme	3.6	3.5	1.6	–	–
Greenhouse Gas Emissions Inventory Programme	1.0	1.0	–	–	–
CSIRO (total) (f)	16.7	20.9	21.0	na	na
Atmospheric composition	3.8	3.9	4.0	na	na
Climate processes	5.0	5.0	5.0	na	na
Climate modelling	2.1	2.2	2.2	na	na
Climate impact	2.8	2.9	2.9	na	na
Air quality	3.0	3.0	3.0	na	na
Solar fossil fuel power	–	2.4	2.4	–	–
Hybrid electric car technologies	–	1.5	1.5	–	–
Bureau of Meteorology (g)	7.3	7.2	7.1	7.1	7.0
Bureau of Resource Sciences					
Energy efficiency	0.3	0.4	na	na	na
Greenhouse science	0.3	na	na	na	na
Biosheric sources and sinks	1.3	1.8	2.2	1.8	1.0
Remote Sensing of Agricultural Land Cover Change	0.7	0.1	–	–	–
ANSTO climate change	1.0	1.0	0.2	–	na
Nuclear Safety Bureau, airborne radioactive discharges	0.4	0.5	0.6	0.7	0.7
Australian Radiation Laboratory, environmental radioactivity monitoring	0.3	0.3	0.3	0.3	na
Australian Radiation Laboratory, solar UV levels	0.2	0.2	0.2	0.2	na
CRC for Southern Hemisphere Meteorology	1.9	1.7	1.5	–	–

New measures are expressed in outturn prices and other expenditure and revenue figures are expressed in 1998–99 prices.
Programme and tax expenditure estimates include the effect of new measures.
– denotes nil; na denotes not available

(a) These are total Australian contributions to the Global Environment Facility (GEF) (see Chapter 2). Approximately 40 per cent of GEF funds are used for climate change activities and 10 per cent for ozone-related activities. Figures for 1998–99 onwards do not include future replenishments as they have not yet been determined.

(b) The alternative fuels excise exemption has environmental, energy security and terms of trade objectives. The figures for the exemption are estimated revenue foregone. These are updated estimates that differ from those published in *Tax Expenditures Statement 1995–96* mainly because they are based on the February 1997 ABARE projections of fuel use while those in the *Statement* are based on the February 1995 estimates.

(c) Up to $21 million will be available to be drawn down from 1998–99 over the ten year life of the fund.

(d) The figure for 1999–2000 does not include future replenishments as they have not yet been determined.

(e) From 1997–98 expenditure will be higher than shown, following establishment of an industry committee to advise on expenditure priorities.

(f) This is the total of the figures against indented descriptions below.

(g) Estimates of appropriation-based Bureau of Meteorology (BoM) expenditure attributable to atmospheric monitoring, research and service provision in support of environmental objectives.

Next Steps

The Kyoto Protocol is a significant step forward in the development of an international response to global warming. However, the Protocol does not address the issue of commitments by developing countries to reduce their emissions, and this will be a focus of ongoing negotiations under the Convention. In addition, there are a number of technical and implementation issues related to the new Protocol, for example, arrangements for emissions trading, which require further consideration and negotiation.

While the Protocol was agreed by countries at the Third Conference of Parties in December 1997 it is still to enter into force. This may take several years in view of the ongoing international negotiations on a number of elements of the protocol and consideration of domestic signature and ratification processes by the various countries involved in the negotiations.

The domestic package of greenhouse measures announced in the Prime Minister's Statement *Safeguarding the Future* on 20 November 1997 will make a major contribution toward achieving Australia's Kyoto target.

BOX 7.1: OUTCOMES FROM KYOTO

At Kyoto, developed countries agreed to reduce their collective emissions by at least 5 per cent below 1990 levels. This is the first time the international community have agreed to legally binding emission targets to deal with climate change.

Australia will be required to limit its growth in greenhouse emissions in the period 2008 to 2012 to 8 per cent above 1990 levels.

The framework agreed in Kyoto gives countries considerable flexibility in meeting their targets. The inclusion of land clearing gives recognition to the decline in their emissions since 1990 and delivers an environmental benefit by ensuring that all avenues for reducing emissions are covered. Provision for international emissions trading and joint implementation with developing countries (through a Clean Development Mechanism) offer further opportunities for low-cost emissions reductions.

Other international activities

The Commonwealth:

- reports internationally on Australia's progress on Convention implementation;

- prepares and presents Australian input on scientific and technical climate change issues to relevant international fora, including: the Convention's subsidiary bodies; the Intergovernmental Panel on Climate Change (IPCC); and other international bodies such as the Organisation for Economic Cooperation and Development (OECD) and the International Energy Agency;

- makes a significant contribution to international scientific effort. Australia actively contributes to the work of the IPCC, which operates as the authoritative international body to assess the state of knowledge on climate change. IPCC assessments are a key input to international and national climate change policy;

- plays a key role in the Asia Pacific Economic Cooperation (APEC) Energy Working Group in promoting more efficient and sustainable development and use of regional energy resources in the APEC economies through a wide range of actions; and

- is providing $6 million to the year 2000–01 to establish Activities Implemented Jointly (AIJ) projects which will reduce greenhouse gas emissions overseas. Funding

will facilitate the establishment of commercial projects and help meet the additional transaction costs incurred by business in undertaking AIJ projects.

International Development Cooperation

Australia's overseas aid programme is funding programmes and projects which help abate greenhouse gas emissions and facilitate adaptation to climate change, while simultaneously assisting developing countries to reduce poverty. Currently these programmes and projects have a total value of approximately $154 million. They include bilateral and regional projects worth around $122 million. Expenditure on projects and programmes in the 1996–97 financial year was approximately $47 million.

BOX 7.2: OVERSEAS AID PROJECT — GONGZUI HYDROSTATION IN CHINA

The Government is providing funding of $1.3 million for the automation of the Gongzui hydrostation in China. The installation of an automatic start-up facility will enable the production of an extra 60 GWh of electricity each year through improved operational efficiency. As a result the project will reduce CO_2 emissions to the atmosphere by around 90,000 tonnes each year. Development benefits include the supply of increased power for uses such as irrigation, schools and small business ventures.

The aid programme also supports a wide range of projects to improve environmental management in sectors such as energy, forests and land resources. These activities indirectly enhance the ability of developing countries to address climate change issues. They are not included in the above figures.

National Greenhouse Response

The Government demonstrated its commitment to an effective and credible domestic response to the critical issue of global warming through the Prime Minister's Statement *Safeguarding the Future*. This package will provide $177.9 million for a comprehensive range of programmes to the year 2002–03.

It is conservatively estimated that the package will reduce by a third the projected net emissions growth from 1990 to 2010. This means emissions growth from non-land use sectors is expected to fall from 28 to 18 per cent, a reduction of 39 million tonnes of emissions in 2010.

Key measures in the Prime Minister's Statement *Safeguarding the Future* include:

- support for and mandatory targets for the uptake of renewable energy;
- accelerated energy market reform, including attention to greenhouse issues;
- an environmental strategy for the automotive industry;

- an expanded system of energy efficiency labelling, codes and standards for buildings, domestic appliances and equipment;

- tree planting and revegetation;

- major partnership programmes with industry (Greenhouse Challenge), and with local government (Cities for Climate Protection); and

- establishment of the Australian Greenhouse Office within the Environment portfolio to coordinate domestic climate change policy and ensure the package of measures is delivered. The Office is now the lead Commonwealth agency on greenhouse matters.

The Prime Minister's package of measures will be complemented and supported by the continuance of the current Climate Change Programme, to be administered by the Australian Greenhouse Office, at a cost of $7.9 million to 1990–2000, together with other Commonwealth-funded climate-related activities identified below.

Revised National Greenhouse Strategy

Following release of the Prime Minister's Statement *Safeguarding the Future* in November 1997, it was agreed that the finalisation of the new National Greenhouse Strategy (NGS) will be rescheduled to mid 1998. The NGS will now incorporate new Commonwealth measures arising from the Prime Minister's Statement, including $10.5 million for NGS-related Commonwealth measures additional to the key initiatives identified above.

Greenhouse Challenge is a joint initiative of the Commonwealth Government and Australian industry, to encourage industry to reduce its contribution to greenhouse gas emissions. This is achieved through voluntary cooperative agreements consistent with growth and competitiveness. *Greenhouse Challenge* is a tripartite programme of Environment Australia and the Departments of Industry Science and Tourism and Primary Industries and Energy.

BOX 7.3: GREENHOUSE CHALLENGE PROGRAMME

Greenhouse Challenge has proven highly successful. Since being launched in October 1995, over 240 enterprises have joined. As of November 1997, 101 organisations have signed cooperative agreements which together cover more than 45 per cent of Australia's industrial greenhouse emissions. Participants have committed to reduce forecast growth in emissions by about 22 million tonnes of carbon dioxide equivalent by the year 2000.

As part of the Prime Minister's Statement *Safeguarding the Future*, additional funding of $27.1 million will be provided to the year 2002–03 to extend the programme to smaller companies and to increase the number of signed agreements with large and medium enterprises to 500 by the year 2000 and to more than 1,000 by 2005.

Cities for Climate Protection Programme

Cities for Climate Protection (CCP) is a joint initiative of Environment Australia, the Australian Local Government Association and Environs Australia. In 1996–97 the Commonwealth provided over $200,000 to implement a pilot of the programme with a target of 30 participating councils to operate in 1997–98.

The CCP programme assists local governments to quantify greenhouse emissions from both their own operations and the community, and to develop local action plans to reduce these emissions.

It has been estimated that local governments have direct influence on over 50 per cent of Australia's greenhouse gas emissions. The CCP programme will harness this influence to reduce greenhouse emissions at the community level.

As part of the Prime Minister's Statement *Safeguarding the Future* extra funding of $13 million will be provided to fully implement the programme with a target of 300 councils participating by 2002.

Commonwealth Operations

The Government recently confirmed its commitment to energy efficiency and sound environmental management in its own operations by announcing a series of initiatives including:

- the introduction of mandatory standards for Commonwealth occupied buildings, and procurement of office equipment and appliances;

- investigation of options for improving the fuel efficiency of the Commonwealth vehicle fleet;

- establishment of the Energy and Environment Services Unit within the Department of Finance and Administration's Domestic Property Group, to assist agencies with the implementation of energy efficiency initiatives in the built environment (see Box 7.4);

- the introduction of energy performance contracting aimed at improving the energy efficiency of Commonwealth premises;

- certification of the ability of capital works' projects to meet energy performance standards; and

- centralised procurement of energy and related services.

In addition, many Commonwealth agencies are actively implementing specific environmental management systems for lighting, heating and equipment, together with other energy efficiency measures and innovative building management practices. EcoNet, recycling and composting programmes are also well established in some agencies.

Energy

The energy sector was a major focus of the Government's greenhouse response package announced in the Prime Minister's Statement *Safeguarding the Future*. The package contains a range of measures that focus on energy efficiency and alternative energy sources. The Government has put in place a system of cooperative agreements, market reform, regulations, information programmes and support for alternative energy development, to address emissions from this sector. The Government is reassessing key energy policy issues that may need to be addressed in the light of Kyoto outcomes.

BOX 7.4: COMMONWEALTH ENERGY MANAGEMENT GUIDELINES

One of the priority tasks for the recently established Energy and Environmental Services Unit (EESU) will be to develop updated *Commonwealth Energy Management Guidelines* targeted at agency level staff responsible for energy, property and resource management activities. The Guidelines will provide a valuable management tool to achieve energy efficient targets in agency operations, and cover such topics as the implementation of energy performance contracts; procurement of energy in the de-regulating national energy market and more effective monitoring of energy demand. The EESU will also assist in the development and implementation of a Commonwealth utilities procurement strategy.

Commonwealth initiatives in this area will also drive the development of national guiding principles on energy efficiency, which may be adopted by other jurisdictions through various inter-governmental fora.

Energy efficiency continues as a major focus of government activity, recognising its important economic as well as environmental benefits. The Government will spend $8.8 million to the year 2002–03 developing energy efficiency labelling, codes and standards for residential and commercial buildings as well as a wide range of appliances and equipment. $10.3 million to the year 2002–03 is allocated to developing and disseminating energy efficiency best-practice benchmarks, which will also assist in formulating *Greenhouse Challenge* agreements.

Australia will continue to be a world leader in energy market reform, with $5.6 million being provided to the year 2002–03 to ensure the process continues to move toward a more competitive and efficient market in which all energy sources can compete more fairly. This will include efforts to extend electricity market reform and deliver compatible arrangements for gas and electricity in order to facilitate the delivery of energy services, as well as development of mechanisms to identify the greenhouse intensity of electricity pools. $4.1 million will be spent on developing efficiency standards for power generation, to ensure that fossil fuel power stations move towards best practice.

Greenhouse abatement in energy will also be a major element of more comprehensive programmes including the *Greenhouse Challenge Programme*, *Cities for Climate Protection* programme and *Household Greenhouse Action*. Together, these programmes will ensure greenhouse issues, including energy, will be addressed in a systematic fashion in the industrial, commercial, residential and local government sectors.

Agriculture and Land Use

As part of the Prime Minister's Statement *Safeguarding the Future*, the Government has allocated $5.5 million to the year 2002–03 to Bush for Greenhouse, which will provide opportunities for Australian companies and industries which generate greenhouse gas emissions to invest in vegetation sinks.

BOX 7.5: RENEWABLE ENERGY PROGRAMMES

While more greenhouse friendly fossil fuel use, including greater penetration of natural gas, will be a major source of greenhouse abatement, increased use of renewable energy is a central component of a long-term greenhouse response. The Government has developed a programme of support for renewable energy on both the demand and supply sides. This will ensure that Australia remains at the forefront of renewable energy technology application, with consequent reductions in greenhouse emissions.

Key elements of the Government's renewable programmes over the period 1998–99 to 2002–03 include:

- a requirement for electricity retailers and major wholesale customers to purchase an additional 2 per cent of their electricity from renewable sources by 2010. $3.8 million has been provided to the year 2002–03 to develop this measure;
- $21 million to the year 2002–03 for a renewable energy innovation investment fund, to support firms with promising renewable energy technologies;
- $29.6 million to the year 2002–03 for a renewable energy technology commercialisation loans and grants programme to support and promote strategically important renewable energy initiatives with strong commercial potential; and
- $10.5 million to the year 2000–01 to support a number of leading edge 'showcase' renewable energy projects.

Competitive programmes will be developed to administer these funds to ensure maximum impact.

$1.9 million was also provided to the year 2001–02 in the Prime Minister's Statement *Safeguarding the Future* to remove impediments to the development of commercial plantations to achieve the Plantations 2020 vision of trebling the plantation estate by the year 2020. This will build on the $22 million provided to the year 2000–01 for farm forestry and the $328 million provided to the year 2000–01 for the revegetation programme being undertaken under the Bushcare Initiative of the Natural Heritage Trust. In 1997-98, $42 million was expended on Bushcare.

The Regional Forest Agreement process may also lead to increased plantation establishment and intensification of native forest management through resource enhancement initiatives in a number of regions. On signing the Tasmanian RFA, the

Commonwealth committed funding of $110 million to the year 1999–2000 for a range of industry development initiatives, including a schedule of plantation establishment (5,000 hectares each year) and silvicultural intensification, and measures to include areas of private land in the extended reserve system.

For full details of the ongoing Bushcare and RFA programmes for 1998–99, see Chapter 3: Biodiversity and Chapter 4: Land Resources.

Transport

The Prime Minister's Statement *Safeguarding the Future* includes a range of measures aimed at reducing greenhouse emissions in the transport sector. The key measure involves the implementation of an Environmental Strategy for the Motor Vehicle Industry with funding of $500,000 to the year 1999–2000.

While the Environmental Strategy focuses largely on improving the fuel efficiency of new vehicles, the *Safeguarding the Future* package also includes two measures to promote the development and uptake of more environmentally friendly transport fuels.

The Government has allocated $3.8 million to the year 2002–03 to support the development of a network of compressed natural gas (CNG) refuelling stations in selected metropolitan areas where support by local organisations has been proven. The aim of the programme is to encourage fleet operators, particularly operators of light commercial vehicles, to switch to CNG. Light commercial vehicles are estimated to be a key source of growth in Australia's transport emissions to 2010.

BOX 7.6: ENVIRONMENTAL STRATEGY FOR THE MOTOR VEHICLE INDUSTRY

Key elements of the Environmental Strategy include:

- negotiation with the automotive industry of National Average Fuel Consumption (NAFC) targets for 2005 and 2010 which are to secure a 15 per cent improvement in fuel efficiency of new cars over business as usual;
- extension of the NAFC framework to include light commercial vehicles and four-wheel drives;
- mandatory fuel efficiency labelling of new vehicles;
- fuel efficiency targets for the Commonwealth fleet from 2003;
- partnerships with consumer groups to promote fuel efficiency;
- harmonisation with international vehicle emission standards by 2006; and
- a bringing forward of the phase out of leaded fuel.

The Government has also reaffirmed its commitment to contribute $2 million to the year 1999–2000 to establish a pilot plant to produce ethanol from woody wastes and fibres. Ethanol has the potential to become an important renewable fuel for the Australian transport sector over the long term. One of the barriers to the development and use of ethanol is the cost of production using existing technologies. The pilot plant will test new production technologies which have the potential to produce ethanol at significantly lower costs with clear greenhouse benefits.

These measures complement the Government's existing fuel excise exemption for the alternative transport fuels of liquefied petroleum gas, CNG, ethanol and other alcohol blends. The cost to revenue in 1998–99 of this exemption is estimated to be $710 million. The original objective for the establishment of the exemption was security of the national energy supply. While security has declined as an objective, it remains important. Alternative transport fuels also have other benefits in terms of the balance of trade. The Government is continuing the exemption to encourage the use of more environmentally friendly transport fuels.

The Government remains committed to working with State and Territory governments to progress microeconomic reform within the transport sector. As with a number of other greenhouse measures, strategies for the transport sector require coordinated action by the Commonwealth, State and Territory and local governments through the National Greenhouse Strategy.

Waste

In November 1997, the Minister for the Environment launched a waste management workbook on methane capture and use from waste. The workbook is designed to ensure that local government and industry have access to information about management strategies and technologies appropriate for dealing with organic wastes.

AIR QUALITY

The Government is committed to policies and programmes which promote improvements in air quality. Commonwealth initiatives are designed to provide national leadership and to complement work underway in the States and Territories.

Air Pollution in Major Cities Programme

The Government will provide $3.7 million in 1998–99 for the Air Pollution in Major Cities Programme under the Natural Heritage Trust. The aim is to develop national strategies and standards to minimise adverse impacts of air pollution and address key threats to sustainability with respect to air quality.

The programme is focusing on urban air pollution, and on the six key pollutants (carbon monoxide, nitrogen dioxide, ozone, lead, particles and sulfur dioxide) to which the majority of Australians are exposed.

A draft National Environment Protection Measure (NEPM), establishing mandatory standards and monitoring and reporting protocols for six pollutants, was released for

public comment in November 1997. It is anticipated that the measure will be finalised in June 1998.

Reviews of emission standards for both new petrol and diesel engines are also underway, together with the proposed development of a NEPM addressing diesel emissions, which will look at the issue of diesel fuel quality. The Government has allocated $400,000 in 1998–99 for the conduct of an integrated comprehensive review of all Australian environment fuel quality needs.

Inquiry Into Urban Air Pollution

The report of the Inquiry into Urban Air Pollution recommended options to maintain and improve urban air quality in line with ambient standards being established under the auspices of the National Environment Protection Council. The Government's response to these recommendations is a package of measures that will be implemented over the three years from 1998–99.

Resources have been allocated for research into the problems associated with monitoring fine particles (which is integral to the Air NEPM). Over $200,000 has been allocated for this work in 1998–99. In addition, funding will be provided to improve emission standards for nitrogen dioxide from domestic appliances, and establishing codes of practice for vapour recovery from small to medium businesses. Over $200,000 has been provided in 1998–99 for this work.

A joint programme, with the CSIRO and the Bureau of Meteorology, to develop a high definition pollution forecasting system, will be conducted over the four years from 1997–98 with $400,000 being provided in 1998–99.

The Government provides funding for collaborative education programmes to address air pollution through the Smogbusters programme associated with motor vehicles. In addition, activities in schools will be supported by the development of a national programme for monitoring air quality, known as Airwatch. Nearly $500,000 has been provided for these purposes in 1998–99.

OZONE PROTECTION

Damage to the stratospheric ozone layer, which protects life on earth from harmful ultraviolet radiation from the sun, occurs through the release into the atmosphere of certain widely used ozone-depleting substances.

The Commonwealth plays a leading international role in ozone protection, particularly in the development and implementation of cost-effective mechanisms to ensure the phase out of ozone-depleting substances by all countries.

The Commonwealth contributes to the Multilateral Fund of the Montreal Protocol on Substances that Deplete the Ozone Layer, which supports the transfer of 'ozone-friendly' technology to developing countries (see Table 2.1 and Chapter 2, international activities). The Commonwealth provided $10.8 million over the three calendar years from 1994 to the Multilateral Fund and expects to contribute an additional $10.5 million over three calendar years from 1997. It also contributes to the Global Environment

Facility (see Chapter 2), which funds ozone-related activities in former Eastern bloc countries and provides assistance to developing countries through focused bilateral projects in the Asia-Pacific region and by participation in a regional network of government ozone units.

At the national level, the Government works with the States and Territories, industry and other stakeholders to phase out the import, export and manufacture of ozone-depleting chemicals in line with Australia's international obligations under the Montreal Protocol and where possible exceed, Montreal Protocol requirements.

In 1997–98 the Government invested in a survey on the use of hydrochlorofluorocarbons (HCFCs) and HFCs in Australia. While not as significant as the chlorofluorocarbons (CFC) refrigerants they replace, these substances are commonly used as refrigerants and HFCs are scheduled to be phased out by the year 2020.

BOX 7.8: THE PHASE-OUT OF METHYL BROMIDE USE IN AUSTRALIA

Methyl bromide is an ozone-depleting substance controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer.

The Government released a Draft National Methyl Bromide Response Strategy for public comment in February 1997 in anticipation of an acceleration of the methyl bromide phase-out schedule for soil disinfestation uses in developed countries. At the Ninth Meeting of Parties to the Montreal Protocol in September 1997 the final phase-out date was brought forward from 2010 to 2005. The finalised Strategy is expected to be published in May 1998.

Implementation of the Strategy has already commenced through commitment of the Ozone Protection Trust Fund to funding of a communication strategy targeting users of methyl bromide and $600,000 to the year 1999–2000 to fund the development and field trialing of application methods for alternatives to methyl bromide.

The survey results provide base information on the different types of use of these alternative refrigerants as well as current and predicted future activity levels in the relevant industry sectors. This will assist in the development of complementary policies relating to the potential ozone-depleting and global-warming impacts of refrigeration and air-conditioning equipment and practices.

Enforcement

The Ozone Protection Trust Fund, which holds funds received as licence fees under the *Ozone Protection Act*, supports expenditure on administration and enforcement of the Act. There have been significant developments in enforcement in 1997–98. At the international level, Australia was instrumental in gaining agreement at the Ninth Meeting of the Parties to the Montreal Protocol to require all Parties to establish a licensing system, to assist in preventing illegal trade in ozone-depleting substances.

At the domestic level, Australia already has a comprehensive licensing system. During 1997–98, the Government has improved the efficacy of this licensing system by

implementing a computerised barrier system, maintained by the Australian Customs Service, which prevents the import or export of unlicensed shipments of ozone-depleting substances.

Halon

The Government is currently consulting with the shipping and airline industries to continue the decommissioning of non-essential halon. Australia was successful at the Ninth Meeting of Parties to the Montreal Protocol in gaining agreement that the Montreal Protocol's Technical and Economic Assessment Panel should reassess the feasibility of requiring Parties to decommission non-essential halon equipment.

An Australian Halon Management Strategy (AHMS) is currently being developed, which once finalised and agreed, will provide the framework for responsible management of Australia's halon stock to 2030.

ATMOSPHERIC RESEARCH

Several Commonwealth agencies conduct a broad range of scientific atmospheric research, including the development of assessment methodologies, and modelling tools and undertaking analysis of future trends in greenhouse gas emissions. Australia's research programmes also provide the scientific basis for our approach to addressing climate change in international fora.

Climate Change

The Government will provide $3.5 million in 1998–99 for the National Greenhouse Research Programme. The programme aims to improve understanding of how Australia's climate will change and what the impacts of those changes will be, thus allowing more informed planning and decision making.

In 1997 the Government created the Greenhouse Science Advisory Committee to provide the Environment Minister with independent advice on greenhouse science issues. During 1998 the Committee, which comprises eminent Australian scientists from a range of climate-related disciplines, will be examining priorities for greenhouse research for the next few years.

The National Greenhouse Gas Inventory Programme is overseen by the National Greenhouse Gas Inventory Committee comprising of Commonwealth, State and Territory representatives. The committee ensures that national input is received and national considerations are taken into account in the National Greenhouse Gas Inventory.

As part of its international and national commitments, the Government prepares an annual National Greenhouse Gas Inventory of anthropogenic (human induced) emissions and will provide funding of $1 million for this in 1998–99. An inventory for 1995 (the most recent inventory) was completed in 1997. Considerable effort is being focused on reducing the high level of uncertainty in the emissions resulting from land-use change and forestry activities, including measurement of vegetation cover using satellite monitoring.

Significant research into climate change is also undertaken by the CSIRO. In 1998–99 funding for atmospheric research, includes:

- $3.9 million for monitoring the changing chemical composition of the atmosphere;
- $5 million for researching interactions between energy and hydrological cycles, climate system dynamics and advanced modelling;
- $2.2 million for modelling to predict climate change and variability; and
- $2.9 million for assessment of climate change impacts.

The Bureau of Meteorology also contributes to climate change research and research related to monitoring and modelling. Direct expenditure on climate change research work is around $7 million each year. The Australian Nuclear Science and Technology Organisation (ANSTO) has been provided nearly $1 million in 1998–99 for projects relating to the application of nuclear science and technologies to understand global climate change.

The Bureau of Resource Sciences (BRS) provides scientific advice to enhance the sustainable development of Australia's primary, energy and resource industries. BRS also undertakes scientific research into greenhouse gases and climate change, particularly in the areas of land use change, forestry, soil carbon and biomass and energy efficiency and provides scientific analyses of greenhouse policy options.

Other Climate Change-related Research

The Government provided $100,000 in 1997–98 for a collaborative Commonwealth/State project on remote sensing of agricultural land-cover change. This three-year project will be completed in December 1998 at an approximate cost of $6 million on a 1:1 basis between the Commonwealth and participating State agencies.

The Australian CRC for Renewable Energy receives annual funding of $1.5 million for the six-year period from 1997–98. The CRC undertakes research in four programmes: power generation, energy efficiency, energy storage and power conditioning. The research focuses on a number of sources including photovoltaics, solar-thermal, electric windows and wind.

The CRC for Antarctica and the Southern Ocean has, as a primary goal, development of a greater understanding of global climate change. The Australian Geological Survey Organisation, a partner in the CRC, whose work includes a focus on environmental issues in the Southern Ocean, including climate change, received funding of nearly $400,000 in each of the four years from 1997–98.

The CSIRO has been provided $2.4 million in 1998–99 to undertake a feasibility study 'Towards Sustainable Energy' to demonstrate new concepts for the production of electric power at up to twice the thermal efficiency of currently installed coal-fired power systems. The system will be a solar fossil-fuel hybrid incorporating carbon dioxide recovery from the fuel prior to its utilisation in fuel cells and microturbines and may have appreciable environmental benefits.

The CSIRO has also been provided $1.5 million for each of the years 1998–99 and 1999–2000 for a project demonstrating an integrated group of hybrid-electric car technologies designed to improve fuel efficiency and reduce greenhouse and noxious gas emissions.

Air Quality

The Commonwealth is supporting a $200,000 joint programme by the CSIRO and the Australian Nuclear Science and Technology Organisation (ANSTO) to better identify the source of particulates in the urban atmosphere, therefore assisting in air quality management strategies.

The Commonwealth is providing $500,000 in 1998–99 to the Nuclear Safety Bureau for protection of the environment from hazards arising from the operation of the ANSTO HIFAR Reactor. Commonwealth funding of nearly $700,000 in 1998–99 is being provided to ANSTO for projects assessing and managing air pollution.

The Commonwealth is also providing $1.5 million over the five-year period from 1997-98 for the environmental surveillance programme conducted by the Australian Radiation Laboratory (ARL). The programme involves an Australia-wide network of air and rainfall sampling stations for monitoring radioactive fallout.

The Bureau of Meteorology operates, jointly with the CSIRO, the Cape Grim Baseline Air Pollution Station and Australia's national monitoring network for stratospheric ozone. The Commonwealth provides in excess of $2 million operational costs each year. The Bureau of Meteorology Research Centre, which contributes significantly to the international atmospheric effort, has developed a preliminary set of indicators for the atmosphere in preparation for the revised State of the Environment Report, scheduled for release in 2001.

Ozone Protection

The Commonwealth will provide nearly $200,000 in 1998–99 for the Australian Radiation Laboratory to determine the character of the ultraviolet (UV) environment and to assess the impact of damage to the ozone layer on UV levels and its consequences for human health.

The CRC for Southern Hemisphere Meteorology is focused on three main research programmes: ozone, transport modelling and Southern Hemisphere climate dynamics. The CRC has established the first programme to measure CFC replacement chemicals in the Southern hemisphere. The measurements by the CRC will determine the atmosphere lifetimes for these chemicals and their effects.