

The Auditor-General
Audit Report No.27 2009–10
Performance Audit

Coordination and Reporting of Australia's Climate Change Measures

Department of Climate Change and Energy Efficiency

**Department of Innovation, Industry, Science and
Research**

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of Australia 2010

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Canberra ACT
20 April 2010

Dear Mr President
Dear Mr Speaker

The Australian National Audit Office has undertaken a performance audit in the Department of Climate Change and Energy Efficiency in accordance with the authority contained in the *Auditor-General Act 1997*.

Pursuant to *Senate Standing Order 166* relating to the presentation of documents when the Senate is not sitting, I present the report of this audit and the accompanying brochure. The report is titled *Coordination and Reporting of Australia's Climate Change Measures*.

Following its presentation and receipt, the report will be placed on the Australian National Audit Office's Homepage—<http://www.anao.gov.au>.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Ian McPhee'.

Ian McPhee
Auditor-General

The Honourable the President of the Senate
The Honourable the Speaker of the House of Representatives
Parliament House
Canberra ACT

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AGEIS	Australian Greenhouse Emissions Information System
AGO	Australian Greenhouse Office
BAU	Business as usual
COAG	Council of Australian Governments
CPRS	Carbon Pollution Reduction Scheme
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
DCC	Department of Climate Change
DCCEE	Department of Climate Change and Energy Efficiency
DEWHA	Department of the Environment, Water, Heritage and the Arts
DRET	Department of Resources, Energy and Tourism
ERT	Expert Review Team
ETS	Emissions trading scheme
GHG	Greenhouse gases
IPCC	International Panel on Climate Change
LULUCF	Land use, land use change and forestry
Mt CO ₂ e	Million tonnes of carbon dioxide equivalent

NCAS	National Carbon Accounting System
NGER	National Greenhouse and Energy Reporting Act 2007
NIR	National Inventory Report
RET	Renewable Energy Target
UNFCCC	United Nations Framework Convention on Climate Change

Glossary

Abatement	Refers to reducing the degree or intensity of greenhouse gas emissions.
Afforestation	Under the Kyoto Protocol, afforestation is defined as the direct human-induced conversion to forested land of land that has not contained forest for at least 50 years.
Agriculture emissions sector	Emissions from enteric fermentation in livestock, manure management, rice cultivation, agricultural soils, savanna burning and field burning of agricultural residues.
Anthropogenic	Caused or resulted by human activities as opposed to natural processes.
Carbon dioxide equivalent	The standard unit for presenting greenhouse gas emission levels. This concept enables the aggregation of individual greenhouse gases through the use of conversion factors known as global warming potentials.
Emissions factor	A coefficient that quantifies the emissions or removals of a gas per unit activity. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions.
Expert review team	A group of international experts accredited and coordinated by the UNFCCC Secretariat who review national inventory reports.
Fugitive emissions	As by-products, waste or loss in the process of fuel production, storage or transport, such as methane release into the atmosphere during oil drilling and refining, or leakage from pipelines.
Greenhouse gases	The atmospheric gases responsible for causing global warming and climate change. The major greenhouse gases are carbon dioxide, methane and nitrous oxide.

Industrial processes sector	Covers non-energy emissions from mineral processing, the chemical industry, metal production and other industrial processes such as refrigeration and air conditioning.
Intergovernmental Panel on Climate Change	Established in 1988 by the World Meteorological Organisation and the United Nations Environment Programme, the IPCC surveys world-wide scientific and technical literature and publishes assessment reports.
Kyoto Protocol	An international agreement requiring separate ratification by governments, but linked to the UNFCCC. The Kyoto Protocol sets binding targets for the reduction of greenhouse gas emissions by industrialised countries.
Kyoto Target	Australia's Kyoto target is 108 per cent of 1990 emission levels, on average, over the Kyoto commitment period, 2008-2012.
Land use, land use change & forestry	Emissions and removals from the land based activities including, as forestry, deforestation and other land management issues, such as soil carbon, fire and drought.
Measures	Refers to past, current or committed Australian, State/Territory or local government policy actions designed to have an impact on greenhouse gas emissions. Measures can include grant programs, regulation, incentives, rebate schemes and voluntary initiatives.
Mitigation	In the context of climate change, mitigation is a human intervention to reduce the sources or enhance sinks of greenhouse gases.
Reforestation	Replanting of forests on lands that have previously contained forests but that have been converted to some other use.
Removal	Removal is the act of absorbing (or removing) carbon dioxide from the atmosphere. It is the opposite of an emission and is treated as a negative emission.

Sink	Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. Forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis.
Source	Any process or activity that releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.
Stationary energy sector	Electricity generation and combustion of fuels consumed directly in the manufacturing, construction and commercial sectors and other sources such as domestic heating.
Transport sector	Direct combustion of fuels by road, rail, domestic air transport and domestic shipping.
Waste sector	Primarily methane and nitrous oxide from solid waste disposed to landfill and from the treatment of domestic, commercial and industrial wastewater.

Summary and Recommendation

Summary

Introduction

1. Climate change caused by the emission of greenhouse gases, has been recognised as a global challenge. Although the impacts of climate change may vary worldwide, these can include increases in average surface temperatures, sea level rise, increased climate variability and extreme weather events, such as prolonged drought and severe storms.¹ There is evidence in Australia that climate change has already had an impact. The Australian Bureau of Meteorology has indicated that since the 1950s temperatures in Australia have, on average, risen by about one degree Celsius with an increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days.² Rainfall patterns have also changed with the northwest of Australia experiencing an increase in rainfall over the last 50 years, while much of eastern Australia and the far southwest have experienced a decline in rainfall and prolonged drought conditions.

2. The United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992. It sets out an overall framework for intergovernmental efforts to address the challenges posed by climate change. Australia is among some 194 national signatories to the convention, which is the primary forum for designing global climate change strategies. In recognition of the risks presented by rising greenhouse gas (GHG) emissions, the Kyoto Protocol was established under the convention in 1997. The protocol aims to foster national emission reductions through a binding international agreement. Forty countries, including Australia, have emission targets under the Kyoto Protocol designed to be achieved over the five year Kyoto period, 2008-12.

3. The Government has indicated that addressing climate change is a high priority and more than \$15 billion has been committed to climate change initiatives.³ The Government's response to climate change is based on its *Three*

¹ M Parry; O Canziani and J Palutikof; World Meteorological Organization Bulletin 57 (1) April 2008; *Key IPCC Conclusions on Climate Change Impacts and Adaptations*, p. 4.

² Bureau of Meteorology, Monitoring Australia's Climate Change fact sheet, [internet] BOM available from <<http://www.bom.gov.au/climate/change/docs/FactSheet3.pdf>> [accessed 5 January 2010].

³ Climate Change Budget Overview 2009–2010, p. 3.

Pillars strategy: reducing emissions; adapting to unavoidable climate change; and helping to shape a global solution.

4. The Department of Climate Change (DCC) was established in December 2007 to assist the government to pursue its climate change agenda. DCC had specific responsibility for:

- coordinating climate change policy;
- measuring and reporting national GHG emissions;
- international reporting commitments under the UNFCCC and the Kyoto Protocol; and
- measuring the impact of abatement measures towards national targets.

5. In March 2010, DCC became the Department of Climate Change and Energy Efficiency (DCCEE). The energy efficiency function of the Department of the Environment, Water, Heritage and the Arts was also transferred to the new department.

6. DCCEE also administers the recently legislated 20 per cent renewable energy target and will implement the Carbon Pollution Reduction Scheme (CPRS) being proposed by the Government subject to the passage of the legislation by the Parliament.⁴

7. State and Territory Governments have also introduced an extensive range of measures to reduce GHG emissions and to adapt to climate change. The Australian Government has been working with State and Territory Governments through the Council of Australian Governments (COAG) to achieve a coordinated intergovernmental response to climate change. In December 2007, COAG 'acknowledged the benefits in reducing the confusion, overlap, duplication, and red-tape associated with the current proliferation of climate change programs across jurisdictions.'⁵ In March 2008, COAG agreed that each jurisdiction would review their climate change mitigation measures⁶

⁴ The department has advised that it is establishing the Australian Climate Change Regulatory Authority to implement the CPRS.

⁵ Department of Finance and Deregulation, '*Strategic Review of Australian Government Climate Change Programs*,' Final Report, July 2008, p. 42.

⁶ Mitigation is achieved through abatement initiatives. The terms mitigation and abatement are used interchangeably throughout the report. Measures can include grant programs, regulation, incentives, rebate schemes and voluntary initiatives.

in order to harmonise and align existing and future programs with the proposed emissions trading scheme.

8. To measure Australia's GHG contribution, the Australian Government has maintained a national emissions inventory since the early 1990s. The inventory, which is managed by DCCEE, provides a detailed national profile of Australia's emissions. The inventory is classified into six internationally defined sectors, based on particular emissions processes:

- energy (including stationary energy, transport and fugitive emissions);⁷
- industrial processes;
- solvents and other products;
- waste;
- agriculture; and
- land use, land use change and forestry (LULUCF).

Australia's largest emitting sector is stationary energy and, in 2007, it contributed to over half of the national GHG emissions.⁸

9. Data from the inventory is used to meet international reporting requirements under the UNFCCC and the Kyoto Protocol, and to track progress towards the Kyoto emission target. Activity data, used to estimate GHG emissions, is principally sourced from other Australian Government agencies, such as the Australian Bureau of Statistics. The introduction of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) has also meant new reporting arrangements, as the Act mandates annual emissions reporting for corporations whose energy production, energy use, or GHG emissions exceed defined thresholds. Data collected under the NGER Act will supplement existing data collection arrangements.

10. Measures to mitigate the production of GHG emissions have been undertaken by all jurisdictions, primarily through a mixture of regulatory measures, grant programs, incentive and rebate schemes. To assess the impact of Australia's climate change programs, reliable and accurate calculations of

⁷ Fugitive emissions are by-products, waste or loss in the process of fuel production, storage or transport, such as methane released into the atmosphere during oil drilling and refining, or leakage from pipelines.

⁸ Department of Climate Change (2010) *Australia's Fifth National Communication on Climate Change*, p. 5.

the amount of GHG emissions abated is necessary. Abatement estimates are calculated by DCCEE to determine the aggregate and likely future impact of Government measures. The department's estimates are used to track Australia's progress towards meeting emission targets, including the Kyoto Protocol target. Abatement estimates for individual programs are also calculated by the agency responsible for delivering the program. The impact of Australia's abatement initiatives are reported by DCCEE in public reports and in the four yearly National Communications report to the UNFCCC.

Audit objectives and scope

11. The objective of this audit was to assess the coordination of Australian, State and Territory Government climate change programs and the integrity of measuring and reporting of Australia's greenhouse gas emissions and abatement. Particular emphasis was given to the:

- coordination of Australian Government and State/Territory climate change programs;
- integrity of the national inventory to measure Australia's greenhouse gas emissions; and
- integrity of measuring and reporting government abatement measures.

12. The effectiveness of the administration of specific climate change programs by the departments of the Environment, Water, Heritage and the Arts⁹ and Resources, Energy and Tourism is examined in ANAO Audit Report No.26, *Administration of Climate Change Programs*, tabled in conjunction with this report.

Overall conclusion

13. Australian, State and Territory Governments are taking action in response to climate change. Measures have been put in place across all jurisdictions to reduce Australia's GHG emissions and, under COAG, programs are being streamlined. Since 1992, Australia has also been involved in international efforts to address climate change through the UNFCCC. Australia's national inventory has been improved over time and provides a sound basis for understanding the sources, trends and levels of emissions from

⁹ The programs administered by the Department of the Environment, Water, Heritage and the Arts were transferred to the Department of Climate Change and Energy Efficiency in March 2010.

industry sectors. The inventory is also used to measure and report on Australia's progress in meeting the Kyoto Protocol emission target of 108 per cent of 1990 levels (under the UNFCCC).

14. In 2008, there were some 550 climate change related measures across jurisdictions, resulting in the overlap and duplication of programs. In general, the program reviews requested by COAG have resulted in some rationalisation and subsequent adjustment to programs to enhance complementarity and consistency with the proposed CPRS. However, progress in streamlining some State and Territory programs has been slower than anticipated by COAG, with some reviews yet to be finalised. There is still considerable scope for further rationalisation across jurisdictions. However, this is a matter for consideration by responsible governments.

15. Australia's national GHG inventory is well developed and provides a reliable method for measuring and reporting national emissions. Technical reviews, overseen by UNFCCC accredited experts, indicate that the inventory broadly meets international requirements for data preparation and reporting. The department has implemented 74 per cent of UNFCCC recommendations but could improve its process for the ongoing management of outstanding recommendations by documenting required actions, resources and timeframes.

16. The aggregate impact of all government mitigation actions has been revised by DCCEE over time. The estimated aggregate level of abatement is 74.5 Mt CO₂e¹⁰ annually over the five year Kyoto Protocol period; a 15 per cent revision down from 2007. The downward revision reflects a more realistic assessment of program achievements as well as the termination and adjustments to a range of programs. The aggregate abatement is made up of 35 measures, covering programs, legislation and strategies. Of these measures, only nine account for 85 per cent of the aggregate abatement. A first step would be to more clearly define a 'measure' and focus on those measures that are quantifiable and materially significant in terms of overall national abatement.

17. Overall, the methodology employed by DCCEE to estimate the impact of abatement measures provides a reasonable level of assurance as to the integrity of the aggregate abatement. The department uses the best available

¹⁰ Mt CO₂e refers to millions of tonnes (Mt) of carbon dioxide equivalents (CO₂e). 74.5 Mt CO₂e represented 13.5 per cent of Australia's emissions in 2008 using Kyoto Protocol accounting.

program level data, takes into account reasonable assumptions of future uptake and gives consideration to the overlap between programs that can result in double counting abatement. Notwithstanding, improvements could be made in estimating individual abatement measures through a more comprehensive consideration of 'business as usual' operations,¹¹ the attribution of overlap to individual measures, and improvements in the quality and consistency of data provided by delivery agencies.

18. There is no consistent approach by delivery agencies to estimating abatement. Guidelines and methodology are currently being developed by DCCEE to assist agencies to calculate the impact of abatement measures and cost new climate change initiatives. To be effective, the methodology will need to be applied consistently across all relevant delivery agencies and be supported by administrative practices and performance reporting frameworks. Extending this approach in the future to State and Territory agencies would facilitate a nationally consistent approach to performance measuring and reporting on GHG abatement.

19. DCCEE publishes national *aggregate* abatement estimates in four-yearly international submissions to the UNFCCC. However, the 2010 submission did not provide comparable figures for individual measures as it only gave an estimate for 2020. The *Tracking to Kyoto* report also provided an *aggregate* abatement estimate for the Kyoto period. Although previous reports were supplemented by emission sector papers that provided details of *individual* measures, this did not occur for the 2009 report. Currently, the absence and variability of abatement figures being reported means that a consolidated picture of individual abatement measures and aggregate abatement is lacking. For greater transparency, abatement figures for individual measures and in aggregate could be reported more regularly by the department in a consolidated domestic publication.

20. The public reporting of achievements for individual measures has also not been consistent across Australian Government agencies and has generally been poor. Where abatement figures are published in annual reports, they are often not comparable across years or programs. A more consistent approach to reporting abatement programs would inform the Government and Parliament of the success, or otherwise, of government program achievements.

¹¹ Business as usual refers to the likely action taken in the absence of the measure.

21. Despite these administrative shortcomings, current projections by DCCEE suggest that Australia is on track to meet its target under the Kyoto Protocol of limiting emissions to no more than 108 per cent of 1990 levels. Preliminary estimates by DCCEE indicate that Australia's total GHG emissions in 2008 were likely to limit emissions to 106 per cent of 1990 levels by 2012. However, confirmation of Australia's performance throughout the five year Kyoto period—through Australia's GHG inventory—will not be available until 2015.

22. The ANAO has made one recommendation aimed at improving the transparency and consistency of reporting of climate change abatement.

Key findings by chapter

Coordination of Climate Change Mitigation and Science Programs (Chapter 2)

Coordination of climate change programs

23. In March 2008, COAG agreed that each jurisdiction would review its climate change mitigation measures within the context of a proposed emissions trading scheme and agreed complementarity principles.¹² The aim of the reviews was to achieve a coherent and streamlined set of climate change measures across jurisdictions and reduce the confusion, overlap, duplication and red tape associated with the proliferation of climate change programs.

24. In July 2008, the Australian Government completed its *Strategic Review of Climate Change Programs* (the Wilkins Review). The review assessed whether climate change programs were efficient, effective and appropriate to address the challenges posed by climate change and the extent to which they complement the proposed Carbon Pollution Reduction Scheme (CPRS). The review assessed 62 Australian Government climate change programs.¹³

25. The Government's response to the Wilkins Review, and the Australian Government's 2009–10 Budget indicate that there has been some

¹² In summary, the complementarity principles were to focus programs on market failure, meet best practice regulatory principles and be targeted to manage the impacts of the CPRS on particular sectors of the economy. Where measures met these criteria, it was anticipated that they would be implemented by the level of government that was best able to deliver the measure.

¹³ The review also highlighted that there were in excess of 200 State and Territory climate change measures running concurrently.

rationalisation and redesign of existing Commonwealth climate change mitigation programs so that they are more compatible with the COAG principles and the proposed CPRS. Results from the State and Territory reviews also suggest that there has been progress in implementing the COAG commitments. In total, 488 measures were reviewed across all States and Territories, an important first step in the ongoing coordination of the 550 climate change mitigation measures across different levels of government.

26. The timeframes for completing the reviews have been slower than anticipated, and have been extended by over eight months. There are still a number of significant transitional measures in particular States that either directly conflict with, or overlap with the proposed CPRS. One transitional program in New South Wales, the Greenhouse Gas Reduction Scheme has the potential to directly conflict with a national CPRS.¹⁴ The Queensland Gas Scheme also has the potential to significantly overlap with the proposed CPRS.¹⁵ DCCEE will need to carefully monitor these programs and advise Ministers accordingly of any significant risks prior to the introduction of the proposed CPRS. Such an approach would give the Australian Government a reasonable level of assurance that the introduction of the proposed CPRS will not be impeded by the operation of State and Territory programs cutting across its objectives.

Coordination of climate change science and research

27. Across Australian, State and Territory Governments, there has been considerable investment made in climate change science and research. DCCEE has indicated that approximately \$466 million in Australian Government funding has been directed towards a National Framework for Climate Change Science. This is expected to be implemented by mid-2010. However, the ANAO has identified additional programs outside of this framework that may also be focused on climate change science and/or research. These additional programs, which cover five Commonwealth agencies, numerous State and Territory agencies and universities bring funding to at least \$675 million.

28. The Government has noted the importance of scientific research and the cost to the Australian economy as a result of ill-informed decisions and

¹⁴ The New South Wales Government has advised that it will terminate the Greenhouse Gas Reduction Scheme when the proposed CPRS commences.

¹⁵ The Queensland Gas Scheme requires electricity retailers and large users to source at least 13 per cent of their electricity from gas-fired generators (18 per cent by 2020).

poor contingency or adaptation planning. A Parliamentary review undertaken in 2009 also commented on the relatively fragmented way that research was conducted.¹⁶ Progressing the Framework for Climate Change Science is a key initiative and it will be important for DCCEE and the Chief Scientist to be mindful of the range of initiatives in train across governments to avoid any unintended overlaps or duplication in the delivery of climate change science and research.

Australia's Greenhouse Gas Emissions Inventory (Chapter 3)

International requirements for the inventory

29. The Australian Government maintains a GHG emissions inventory to measure national emission levels and to meet international commitments under the UNFCCC and the Kyoto Protocol. The inventory provides a national baseline of aggregate and sectoral emissions and allows emission levels to be tracked over time through consistent time series data going back to 1990. Australia has submitted annual inventory reports to the UNFCCC Secretariat since 1994. The first mandatory inventory report for the Kyoto Protocol is due in April 2010.¹⁷

Annual technical review by the UNFCCC

30. Inventory reports are the subject of an annual technical review, which is coordinated by the UNFCCC and undertaken by an international expert review team (ERT). ERT reviews for 2006 to 2008 indicate that Australia's inventory report has consistently been prepared in-line with the prescribed guidelines developed by the Intergovernmental Panel on Climate Change. The reports have met the requirements for completeness, transparency, key category identification, uncertainty analysis, recalculations and time series consistency.

¹⁶ The House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts; October 2009; *Managing our coastal zone in a changing climate*; ACE CRC, Submission 46, p.5. The Parliamentary report was particularly related to the specific and local effects of sea level rise and changes in ocean properties.

¹⁷ Annual inventory reports for the five year Kyoto Commitment period have additional reporting requirements and must include information on the Article 3.3 land based activities, changes to the emissions allowance, the national inventory system and the registry. These reports are submitted annually from 2010 to 2015.

31. Nevertheless, the ERT made 70 recommendations across all sectors of the inventory.¹⁸ DCCEE has implemented the majority (74 per cent) of these recommendations. Outstanding recommendations represent a mixture of actions currently in train and items planned for future review. While the department has provided a broad and indicative timeline for addressing outstanding recommendations, DCCEE could improve its process for managing ongoing ERT recommendations by explicitly documenting required actions, resources and timeframes.

Inventory accuracy

32. Uncertainty analysis is an estimate of the accuracy of a measurement or calculation. Using a Tier 1 or global default methodology,¹⁹ DCCEE has annually reported quantified uncertainty estimates from 2003 onwards. The aggregate inventory uncertainty has decreased from ± 5 per cent in 2003 to ± 2.4 per cent in the 2007 inventory submission. The department's uncertainty estimates conform to agreed guidelines and are largely consistent with the typical uncertainty ranges. However, international best practice suggests that the application of Tier 2 uncertainty analysis should be applied where resources permit. Currently, DCCEE does not apply Tier 2 uncertainty analysis comprehensively across all sectors. However, the department has indicated that the integration of data from the introduction of the *National Greenhouse and Energy Reporting (NGER) Act 2007* is a pressing national priority and the key focus of inventory improvement. Once the integration of the NGER data has been addressed, the department may wish to consider the expansion of Tier 2 uncertainty analysis, as appropriate, on a periodic, rather than annual basis.

Inventory supporting systems

33. The national emissions inventory is required to meet a number of institutional, legal and procedural requirements as set out by UNFCCC provisions. The ERT noted that the national inventory system is prepared in accordance with guidelines and the necessary procedures are working effectively. Although quality control and assurance plans and procedures are

¹⁸ These recommendations covered a range of issues from minor presentational items, to providing additional explanatory information about methodology, and cross cutting issues that impact upon the overall completeness and transparency of the inventory.

¹⁹ Tier 1 refers to a generic method or global default, which generally represents the minimum standard. Tier 2 methods are a nationally derived default that is generally more accurate than Tier 1 methods. Tier 3 methods are more refined again and refer to facility level approaches. Consequently, it is the most complex and accurate of the three approaches.

in place, DCCEE will need to continue to refine quality control tests and quality assurance mechanisms given the greater reliance that is now being given to data collected through the *National Greenhouse and Energy Reporting Act 2007*.²⁰

Measuring and Reporting the Impact of Australian Mitigation Measures (Chapter 4)

Measuring the impact abatement measures

34. Since 2003, the impact of mitigation measures, undertaken across all jurisdictions, has been periodically assessed. In 2009, the then DCC undertook a partial review of these measures, based on a more comprehensive assessment conducted in 2007. The 2009 revision builds upon and revises previous calculations and takes account of matters such as recently commenced and terminated measures and more up-to-date program data.

35. The cumulative impact of 35 individual measures is currently estimated at 74.5 Mt CO₂e, on average, over the five year Kyoto period. Revisions by DCCEE of individual measures have resulted in the downward revision of aggregate abatement by 15 per cent since 2007. This decrease reflects factors such as more realistic estimates of what measures have achieved and the termination of some programs. In undertaking these calculations, the department used the best available program level data, took into account reasonable assumptions of future uptake and gave consideration to the overlap between programs that can result in double counting abatement. Overall, this methodology provides a reasonable level of assurance as to the integrity of these calculations and the aggregate level of abatement.

36. The ANAO reviewed calculations of the nine largest abatement measures, which account for 85 per cent of total government emission reductions during the period, 2008-12.²¹ In relation to the calculation of individual measures, the ANAO noted that while the methodology used has been refined over time,²² there are a number of areas where there is scope to

²⁰ The reports from industry were received by the Department of Climate Change in October 2009.

²¹ The single largest measure is attributed to reduced rates of deforestation following the introduction of land clearing legislation in Queensland and New South Wales which accounts for 18.0 Mt CO₂e of abatement.

²² Methodology for estimating abatement measures varies according to the type of measure. Typically, estimation involves an estimation of the business as usual scenario, the collection of activity data of project level activities, such as energy consumption, and the conversion of activity data into units of abatement, carbon dioxide equivalents.

improve the accuracy of the estimation and transparency of the process. These areas are:

- greater precision in distinguishing government induced abatement measures from business as usual activities;
- better identification and reporting of overlaps between measures; and
- improved quality and consistency of source data.

37. For a number of measures, it has been difficult to distinguish abatement from business as usual activities. That is, the activities undertaken as part of normal business and economic conditions, and in the absence of government action. For example, business as usual activities may be largely driving abatement in the waste sector, where emission reductions have been identified from broader economic drivers, such as rising costs of landfill management. The distinction between business as usual abatement and government induced emission reductions will require ongoing consideration in the calculation of all abatement measures.

38. Six of the nine largest measures are affected by overlaps with other programs. For example, individual firms can be a party to several different programs at the national level as well as at the State or Territory level. This creates a potential overlap in any calculation of derived abatement. DCCEE has been working to improve the precision of the calculations of overlap but further work and consideration is required to attribute overlaps to individual programs. While overlaps account for a relatively small proportion of double counting, they have the potential to misrepresent the achievements of individual programs.

39. Although DCCEE is responsible for estimating total abatement for Government measures, the department is reliant on program delivery agencies for providing credible program data. Activity data of program performance forms a critical starting point in any abatement calculation. The consistency/quality of source data provided by delivery agencies could be improved and this will need to be a priority for all agencies delivering climate change programs.

40. DCCEE is currently developing guidelines and methodology to assist in determining the actual and forecast abatement as well as the economic costs of proposed climate change programs. To be fully effective, the guidelines will need to be consistently applied by delivery agencies and clearly set out roles and responsibilities.

Public reporting of abatement measures

41. The level of public reporting by Australian Government agencies on the impact of individual climate change programs has generally been poor. Typically, reporting of individual programs by responsible Australian Government agencies has been ad hoc, often activity based, and year on year abatement figures are not reported in a consistent matter. More consistent public reporting of program abatement would enhance transparency and provide a clear assessment of program achievements. However, reporting of the aggregate abatement impact of government action during the Kyoto period has been more consistent.

42. Since 2003, the Australian Government has published *Tracking to Kyoto* reports annually, which provide projections of national emissions during the Kyoto period and to 2020, including an aggregate abatement figure for the 2008-12. Official figures of individual abatement measures have been reported in a series of sectoral projections papers, published annually from 2003 to 2007. However, this reporting format fragments the results of the individual abatement estimates across multiple separate sectoral papers, making it difficult to examine the abatement achievements relative to the aggregate national figure. As a result, there is no domestic publication that draws together the aggregate, per measure and sectoral abatement figures.

43. At the international level, aggregate and individual abatement is reported in a four yearly submission to the UNFCCC. The Australian Government's most recent report, released in February 2010, presents a 2020 figure for the estimated impact of climate change programs, but does not provide comparable data with previous reports, such as abatement estimates for 2010. The publication of comparable figures for 2010 would assist in assessing the effectiveness of climate change programs and actual performance relative to their original abatement targets. While the public disclosure of the abatement achievements occurs in the four yearly National Communications report, the length of time between reports means that it is difficult to track results year to year and evaluate the progress of programs over time.

44. Given the absence and variability of abatement figures being reported by delivery agency reports, a consolidated picture of individual abatement measures and aggregate abatement is currently lacking. For greater transparency, abatement figures for individual measures and in aggregate should be reported more regularly by the DCCEE in a consolidated domestic publication.

Summary of agency responses

Department of Climate Change and Energy Efficiency

45. The Department notes the report shows that the methods used to estimate abatement are rigorous and reliable. In particular, that the Department "employs a sound methodology to estimate the overall impact of Government measures". DCCEE places a strong focus on quality assurance and consistency between and within estimates and the report provides a useful perspective on what refinements may further improve the transparency and understanding of estimates.

46. The Department agrees it would be desirable for Government agencies to report DCCEE approved estimates of abatement from climate change programs in their annual reports and against program targets where applicable. The Department of Climate Change and Energy Efficiency has a work program already in place to improve estimates of individual measures and, where feasible, to allocate overlaps to individual measures. Once this work program is complete, DCCEE intends to publish this data in a consolidated report to improve transparency and consistency.

47. The report also makes mention of the development of guidelines for abatement measurement and a costing methodology for new climate change policy proposals. This guidance will be a crucial tool to improve abatement estimation across agencies. There is also a process underway through the Senior Officials Group on Energy Efficiency (SOG-EE) to provide information to the State and Territory Government officials on the Australian Government's approach and methodologies for abatement and costing estimation.

Department of Innovation, Industry, Science and Research

48. The Department of Innovation, Industry, Science and Research has a key role to play in implementing science and research measures to respond to climate change, including through the Super Science Initiative announced by the Australian Government in May 2009.

49. The Department agrees that it is critical that measures relating to climate change science and research are well coordinated across the Australian Government as well as between levels of government and across key stakeholders. In particular, we wish to endorse the expectation that the implementation of the National Framework for Australian Climate Change Science would promote a coordinated approach to climate science and research activities and of the resources and funding for climate change science.

Recommendation

Recommendation No 1

Paragraph 4.57

To increase transparency and consistency of reporting the impact of climate change abatement measures, the ANAO recommends that:

- (a) Australian Government agencies responsible for delivering climate change programs report abatement estimates/figures in annual reports and against program targets, where applicable; and
- (b) the Department of Climate Change and Energy Efficiency annually publish a consolidated report of all Government measures with estimates of current abatement and forecasts for five yearly intervals, and, where practicable, the net abatement of individual measures.

DCCEE response: *Agreed.*

Audit Findings and Conclusions

1 Background and Context

This chapter provides a national and international policy context for climate change and the initiatives being undertaken across all levels of government in response to climate change. The chapter also outlines the rationale for the audit, its objectives, scope and methodology.

Introduction

1.1 Climate change has been recognised as a global challenge. The impacts of climate change are expected to vary across the world, and include increases in average surface temperatures, sea level rise, increased climate variability and extreme weather events, such as prolonged drought and severe storms.²³

1.2 There is evidence in Australia that climate change, caused by increasing concentrations of greenhouse gases (GHG) emissions in the atmosphere, has already had an impact. The Australian Bureau of Meteorology has indicated that since the 1950s temperatures in Australia have, on average, risen by about one degree Celsius with an increase in the frequency of heatwaves and a decrease in the numbers of frosts and cold days.²⁴ Rainfall patterns have also changed. The northwest of Australia has seen an increase in rainfall over the last 50 years, while much of eastern Australia and the far southwest have experienced a decline in rainfall and prolonged drought conditions.

1.3 The United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992. It sets out an overall framework for intergovernmental efforts to address the challenges posed by climate change. Australia is among some 194 national signatories to the convention, which is the primary forum for designing global climate change strategies. In recognition of the risks presented by rising GHG emissions, the Kyoto Protocol was established under the convention in 1997. The protocol aims to foster national emission reductions through a binding international agreement. Forty countries, including Australia, have emission targets under the Kyoto Protocol designed to be achieved over the five year Kyoto period, 2008-12.

²³ M Parry; O Canziani and J Palutikof; World Meteorological Organization Bulletin 57 (1) April 2008; *Key IPCC Conclusions on Climate Change Impacts and Adaptation*, p. 4.

²⁴ Bureau of Meteorology, Monitoring Australia's Climate Change fact sheet, [internet] BOM available from <<http://www.bom.gov.au/climate/change/docs/FactSheet3.pdf>> [accessed 5 January 2010].

Greenhouse gas emissions

1.4 Greenhouse gases trap heat in the atmosphere and perform an essential role in maintaining the Earth's atmosphere at a temperature conducive to animal and plant life. The problem facing the world today is that human actions are increasing the concentration of GHG emissions that trap heat in the atmosphere. This is the enhanced greenhouse effect, which is contributing to a warming of the Earth's surface.²⁵ The three major GHGs are carbon dioxide, methane and nitrous oxide, with a number of less prevalent but very powerful GHGs, such as sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons.²⁶ Since 1750, concentrations of GHG emissions have risen considerably, principally from the burning of fossil fuels, such as coal, gas and petrol and the use of synthetic fertilisers and industrial chemicals.²⁷

1.5 National contributions of GHG emissions vary widely and have changed over time. In 2007, the two largest national emitters were China and the United States of America, which when combined contributed 40 per cent of global carbon dioxide emissions.²⁸ In the next two decades historical emission trends are expected to change, with the contribution made by developing countries anticipated to exceed that of developed nations.²⁹ This reflects the rapid industrialisation occurring in countries such as China and India. Figure 1.1 illustrates the total GHG emissions from the twelve largest emitting countries.

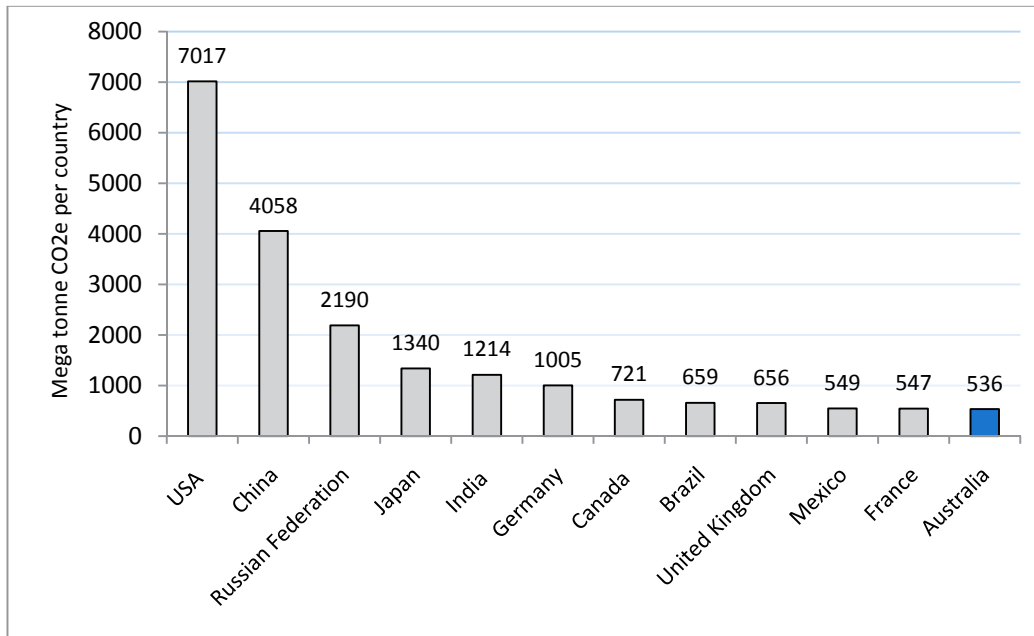
²⁵ Department of Climate Change and Energy Efficiency, What is Climate Change, [internet], DCCEE available from <<http://www.climatechange.gov.au/en/climate-change.aspx>> [accessed on 23 March 2010].

²⁶ Bureau of Meteorology, The Greenhouse Effect and Climate Change, [internet], BOM, available from <<http://www.bom.gov.au>> [accessed on 15 January 2010].

²⁷ United Nations Environment Programme, Climate Change Science Compendium 2009, [internet], UNEP, available from <<http://www.unep.org/>> [accessed on 17 January 2010].

²⁸ Energy Information Agency, United States Department of Energy, [internet] EIA, available from <www.eia.doe.gov> [accessed on 17 January 2010].

²⁹ Ibid.

Figure 1.1**Greenhouse gas emissions from the twelve largest emitting countries**

Note: These figures are for total GHG emissions excluding emissions from the land use, land use change and forestry sector.

Source: United Nations Statistics Division-Environment Statistics, UNFCCC Secretariat August 2009.³⁰

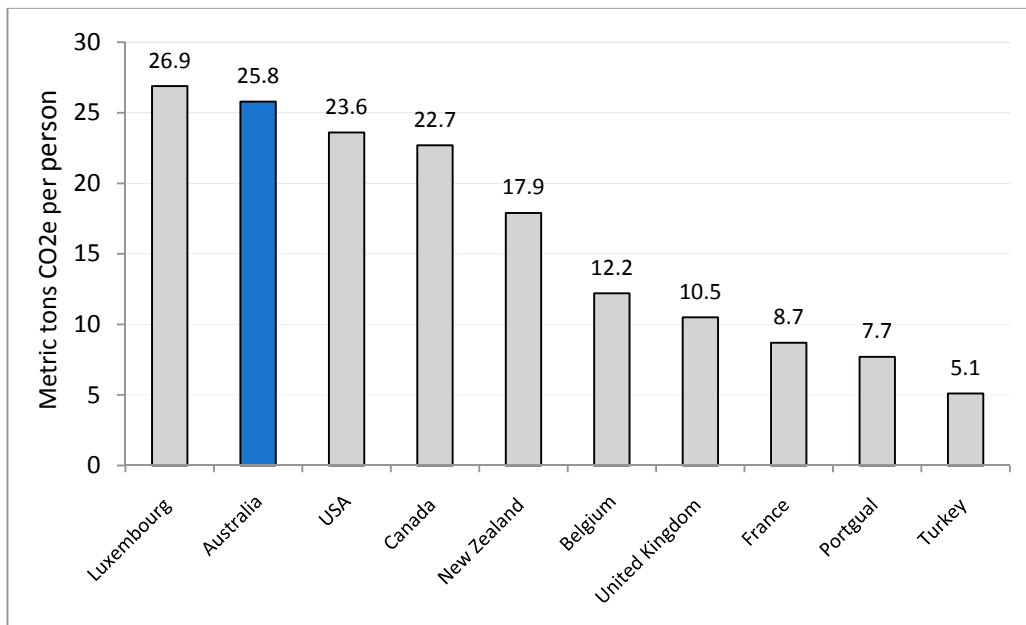
1.6 Australia produces approximately 1.5 per cent of global GHG emissions.³¹ Despite making a relatively small global contribution, Australia's per capita emissions are among the highest in the world when compared with other Organisation for Economic Co-operation and Development (OECD) countries. Figure 1.2 compares Australia's per capita emissions in 2008 with nine other OECD countries.

³⁰ These figures are based on the latest available data from respective countries. Comparisons are constrained by the delays in the data availability, particularly from developing countries. Data from India and China are likely to be an underestimate of current emissions as they were based on 1994 data, as opposed to 2006 data for most Organisation for Economic Co-operation and Development (OECD) countries. For example, in China, CO₂ emissions alone were over 6 000 mega tonnes in 2006.

³¹ Department of Climate Change, *Australia's Fifth National Communication on Climate Change*, A Report under the United Nations Framework Convention on Climate Change, 2010, p. 3.

Figure 1.2

Per person emissions for ten OECD countries including Australia in 2008



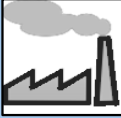






Note: These figures exclude emissions from the land use, land use change and the forestry sector.

Source: World Resources Institute, using United Nations Framework Convention on Climate Change data.

1.7 Greenhouse gas emissions can be tracked at the global, national and local levels, and are typically categorised and estimated according to seven major sources, also known as emission sectors. The sectors are a group of common emission sources and/or processes that produce GHG emissions. Figure 1.3 outlines these sectors and provides a brief description of the emission sources.

Figure 1.3

Emission sectors and definitions

Energy Sector	Stationary energy	Electricity generation and combustion of fuels consumed directly in the manufacturing, construction and commercial sectors and other sources such as domestic heating.	
	Transport	Direct combustion of fuels by road, rail, domestic air transport and domestic shipping.	
	Fugitive Emissions	As by-products, waste or loss in the process of fuel production, storage, or transport, such as methane given off during oil drilling and refining, or leakage from pipelines.	
Industrial Processes	Covers non-energy emissions from mineral processing, the chemical industry, metal production and other industrial processes such as refrigeration and air-conditioning.		
Waste	Primarily methane and nitrous oxide from solid waste disposed to landfill and from the treatment of domestic, commercial and industrial wastewater.		
Agriculture	Emissions from enteric fermentation in livestock, manure management, rice cultivation, agricultural soils, savanna burning and field burning of agricultural residues.		
Land use, land use change and forestry	Emissions and removals from the land based activities including, as forestry, deforestation and other land management issues, such as soil carbon, fire and drought.		

Source: ANAO

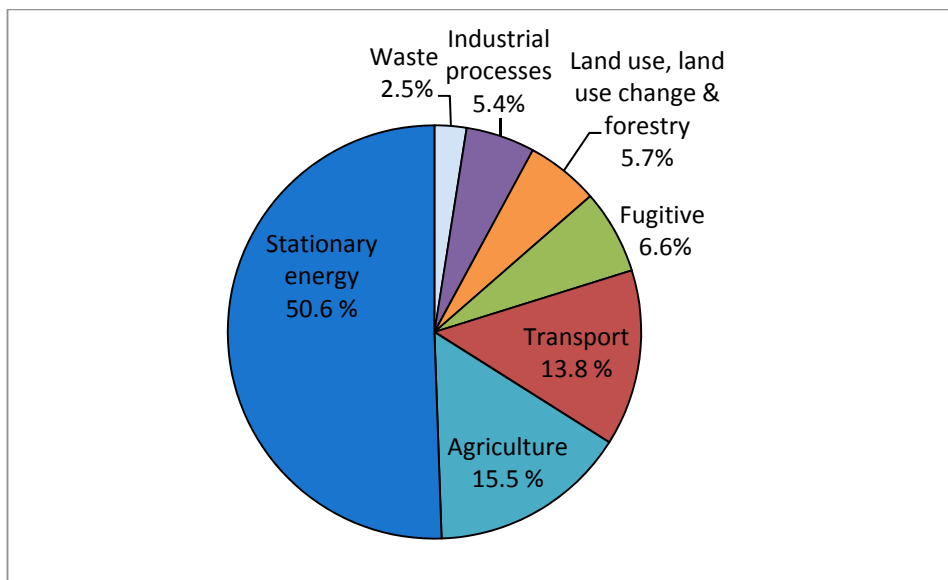
1.8 Australia's emissions profile is dominated by emission production from the energy sector, owing to the predominance of coal as a major source of fuel for the stationary energy sector. In 2007–08, coal accounted for 80.2 per cent of total fuel inputs to Australian electricity generation.³² Over 70 per cent of

³² Department of Climate Change, 2010, Australia's Fifth National Communication on Climate Change; p. 3.

Australia’s emissions are from the energy sector (including transport). However, agriculture is also a significant contributor to emissions of methane (from livestock) and nitrous oxide (from fertilizers and animal waste to agricultural soils). At 15 per cent of national emissions, agriculture has a major greenhouse impact. Figure 1.4 sets out the relative contribution made by each sector in 2008.

Figure 1.4

Australia’s sectoral contribution to national emissions in 2008



Note: Using Kyoto Protocol accounting rules. Does not add to 100 per cent due to rounding.

Source: Department of Climate Change, Tracking to Kyoto and 2020, 2009.

The climate change policy environment

International perspective

1.9 A key commitment under the UNFCCC is to establish and maintain a GHG emissions inventory. The inventory is a comprehensive record of annual national emissions, which are categorised according to internationally defined sectors.³³ Governments use GHG inventories to track emission trends, develop

³³ As well as the sectors outlined in Figure 1.3, emissions from the 'solvents and others products' sector are estimated but due to confidentiality reasons, they are included in the industrial processes sector.

emission mitigation strategies and assess progress towards climate change goals.

1.10 Reporting commitments under the UNFCCC require annual inventory reports to be submitted to the UNFCCC Secretariat, in accordance with prescribed methodology and reporting guidelines. Australia's inventory data will also be used to meet reporting requirements under the Kyoto Protocol, with the first mandatory inventory report due in April 2010.

1.11 The rules for preparing inventories under the Kyoto Protocol differ from the UNFCCC accounting approach in relation to the land use, land use change and forestry sector (LULUCF).³⁴ Under the UNFCCC, all carbon dioxide emissions from the human use of the land are accounted for in the LULUCF sector. In contrast, under the Kyoto Protocol accounting provisions, emissions from this sector for the commitment period 2008–12 are limited to afforestation, reforestation and deforestation since 1990. As a result, aggregate emissions are reported differently under the two regimes.

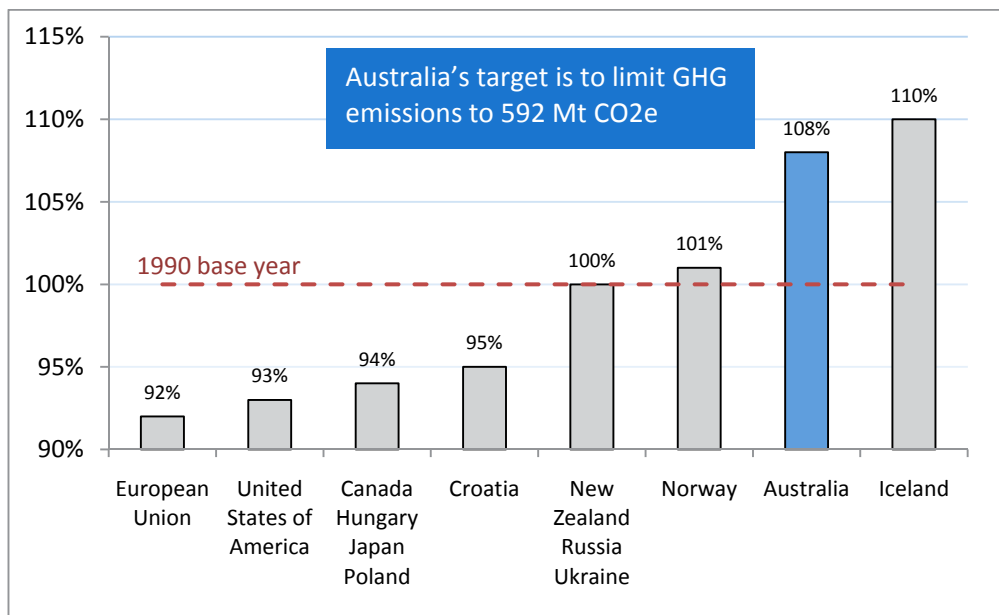
1.12 The national inventory is particularly important in tracking progress towards meeting the Kyoto Protocol emission target. The average target for Kyoto Protocol parties is 95 per cent of 1990 emission levels over the five-year Kyoto commitment period, 2008–12. Australia has a 108 per cent target under the Protocol (that is, eight per cent higher than the 1990 base year). Australia's Kyoto Protocol base year emissions for 1990 were 547.7 Mt CO₂e and under the Protocol it can emit, on average, 592 Mt CO₂e per year over the Kyoto period. Figure 1.5 lists the emission targets for parties to the Protocol.³⁵

³⁴ The rules for accounting emissions and reporting requirements are set out in the Kyoto Protocol and subsequent decisions, in particular the Marrakesh Accords.

³⁵ These countries have signed the Kyoto Protocol but not all have ratified it. For example, the USA has not ratified the Kyoto Protocol. Ratification, such as through national legislation, is required to create a legally binding commitment.

Figure 1.5

National emission targets under the Kyoto Protocol



Source: ANAO analysis of the UNFCCC Kyoto Manual, 2008.

1.13 Following ratification, the Kyoto Protocol carries a penalty if targets are not met. Failure to meet the agreed national target will lead to more stringent targets in the next round of Kyoto reductions, with the new targets carrying over the shortfall plus 30 per cent of the shortfall.

1.14 In December 2009, at the Copenhagen Conference of the Parties, an agreement was reached under the UNFCCC. Countries agreed to limit the global temperature rise to two degrees Celsius by committing to significant emission reductions and to raise finance to assist developing countries. No legally binding targets or timeframes have been agreed to reduce emissions. Consequently, there is uncertainty about the form and structure of a post-Kyoto agreement.

National policies and measures

1.15 The Australian Government’s policy on climate change is based on the following *Three Pillars* strategy:

- reducing emissions;
- adapting to unavoidable climate change; and
- helping to shape a global solution.

1.16 The Government has also committed to reducing Australia's GHG emissions to between five and 25 per cent below 2000 levels by 2020, with a longer term emissions reduction target of 60 per cent below 2000 levels by 2050.³⁶ The Government has indicated that addressing climate change is a high priority and has committed more than \$15 billion for climate change initiatives over nine years.³⁷

1.17 The suite of measures³⁸ to stimulate domestic action on climate change, achieve national emissions targets and meet international commitments includes a number of grant programs such as the:

- Carbon Capture and Storage Flagships Program at \$2.4 billion over nine years, to support the development and deployment of technologies that will reduce emissions from coal use; and
- the Solar Flagships Program which is designed to accelerate the commercialisation of solar power in Australia, (\$1.5 billion for the construction and demonstration of up to four large-scale solar power plants).

The Australian Government has also assisted homeowners through rebates for solar hot water systems and financial assistance for installing photovoltaic energy systems and home insulation. Scientific research into climate change adaptation has also been an important focus for Australian Government agencies such as the Department of Climate Change and Energy Efficiency, the Department of Innovation, Industry, Science and Research and the Commonwealth Scientific and Industrial Research Organisation, often in partnership with State, Territory and local governments.

State and Territory governments

1.18 State and Territory government agencies have also been directly involved in delivering of climate change mitigation measures. For example, in New South Wales, the Climate Action Grant Program provides \$310 million over five years (from 2007) to support households, businesses, communities and schools to save energy and water and reduce GHG emissions. The

³⁶ Department of Climate Change, August 2009, *Tracking to Kyoto and 2020, Australia's Greenhouse Emissions Trends 1990 to 2008-2012 and 2020*.

³⁷ Climate Change Budget Overview 2009-2010, p. 3.

³⁸ Measures can include grant programs, regulation, incentives, rebate schemes and voluntary initiatives.

Victorian Government committed \$370 million to an Energy Technology Innovation Strategy to support the research, development and demonstration of large scale low emissions energy technology. The Queensland Renewable Energy Plan (2009) aims to reduce GHG emissions through measures such as advancing geothermal technology and encouraging energy conservation and the uptake of renewable energy solutions in Queensland's growth hot spots.

Collaborative action through the Council of Australian Governments

1.19 Managing the risks associated with climate change is a shared responsibility of governments across Australia because the impacts are broadly distributed across the roles and responsibilities of all levels of government. In December 2007, the Council of Australian Government (COAG) agreed to establish a Working Group on Climate Change and Water, and 'acknowledged the benefits in reducing the confusion, overlap, duplication, and red-tape associated with the current proliferation of climate change programs across jurisdictions.'³⁹

1.20 The COAG Working Group developed a set of complementary principles to assist in rationalising the range of measures in place. Climate change programs received extensive scrutiny and review through the *Strategic Review of Australian Government Climate Change Programs* completed in July 2008. This review assessed whether climate change programs were efficient, effective, appropriate and complementary to the proposed emissions trading scheme. Sixty-two Australian Government climate change programs were assessed. The review also identified that there were in excess of 200 State and Territory measures running concurrently with Australian Government programs and highlighted the need for cooperative action between governments to ensure that responses to climate change are cost effective and integrated.

Measuring and reporting the impact of abatement measures

1.21 To assess the impact of Australia's climate change mitigation initiatives, reliable and accurate calculations of the amount of GHG emissions abated is necessary. Abatement is typically measured in units of carbon dioxide equivalents (CO₂e), and is measured in millions of tonnes (mega tonnes or Mt). Non-carbon dioxide GHGs are converted into these units using scientifically

³⁹ Department of Finance and Deregulation, '*Strategic Review of Australian Government Climate Change Programs*,' Final Report, July 2008, p. 42.

derived conversion factors.⁴⁰ Since 2003, the Australian Government has annually estimated the aggregate impact of government action to abate GHG emissions. The national aggregate is the sum of action undertaken at all levels of government through numerous individual abatement measures. Abatement estimates are undertaken by DCCEE to calculate the aggregate and likely future impact of government action. The department's estimates are used to track progress towards emission targets, including the Kyoto Protocol target.

1.22 The Australian Government also reports progress in implementing national action to address climate change in four yearly National Communication reports. These reports are submitted to the UNFCCC Secretariat in accordance with the requirements of the Convention and the Kyoto Protocol. Annual reports of Australia's progress towards the Kyoto Protocol target are also published.

Roles and responsibilities

1.23 The Department of Climate Change (DCC), which was established following the 2007 election, was responsible for the:

- coordination of climate change policy;
- measuring and reporting national GHG emissions towards national targets; and
- international reporting commitments under the UNFCCC and the Kyoto Protocol.

1.24 In March 2010, DCC became the Department of Climate Change and Energy Efficiency (DCCEE). The energy efficiency function of the Department of the Environment, Water, Heritage and the Arts was also transferred to the new department. DCCEE also administers the recently legislated mandatory 20 per cent renewable energy target and is scheduled to implement the CPRS being proposed by the Government.⁴¹

⁴⁰ The major non-carbon dioxide greenhouse gases include methane and nitrous oxide. One hundred year global warming potentials (GWP) are used to convert non-carbon dioxide greenhouse gases into units of CO₂e. GWPs used are: one for carbon dioxide, 21 for methane, and 310 for nitrous oxide.

⁴¹ The department has advised that it is establishing the Australian Climate Change Regulatory Authority to implement the CPRS.

1.25 The Department of the Prime Minister and Cabinet has overall responsibility for coordination with State and Territory Governments in relation to the Council of Australian Governments.

1.26 The Government's suite of measures to stimulate domestic action on climate change are administered by DCCEE and the:

- Department of Resources, Energy and Tourism, responsible for the administration of the clean energy initiatives that includes measures on renewable energy and low emissions technology; and
- Department of Innovation, Industry, Science and Research, responsible for the coordination and delivery of science and research relevant to climate change.

Audit objective, scope and methodology

Objective

1.27 The objective of this audit was to assess the coordination of Australian, State and Territory government climate change programs; and the integrity of measuring and reporting of Australia's greenhouse gas emissions and abatement. The audit followed three lines of inquiry:

- **Coordination of Australian Government and State/Territory climate change programs:** What progress has been made in streamlining the delivery of climate change programs, as agreed by the Council of Australian Governments?
- **The integrity of the national inventory to measure Australia's greenhouse gas emissions:** What progress is being made to improve the inventory in line with UNFCCC findings? What systems and processes support inventory preparation?
- **The integrity of measuring and reporting Australia's abatement measures:** How valid, accurate and consistent is the measurement and reporting of greenhouse gas abatement?

1.28 The administrative effectiveness of climate change programs is examined in ANAO Audit Report No.26, *Administration of Climate Change Programs*, which was tabled in conjunction with this report.

Scope

1.29 While the ANAO did not audit State or Territory government processes, State and Territory agencies were consulted on the coordination of climate change programs and the progress being made in reviewing existing programs. The ANAO reviewed the 2007 national inventory report, and UNFCCC expert review reports of the inventory for 2006-2008.

1.30 The following agencies were included in the audit:

- Department of Climate Change and Energy Efficiency;
- Department of the Environment, Water, Heritage and the Arts;
- Department of Innovation, Industry, Science and Research; and
- Department of Resources, Energy and Tourism.

Methodology

1.31 The audit was conducted in accordance with ANAO auditing standards at a cost of \$272 500. The methodology included:

- analysis of departmental documentation and files, annual reports, websites and other publications;
- interviews with Australian Government staff in relevant departments; and
- consultation with State government agencies in Queensland, Western Australia and Victoria.

1.32 To assess the integrity of the calculations underpinning the department's aggregate and individual estimates, the ANAO examined a sample of the nine largest government abatement measures during the Kyoto period, which contribute 85 per cent of the aggregate abatement during this period.

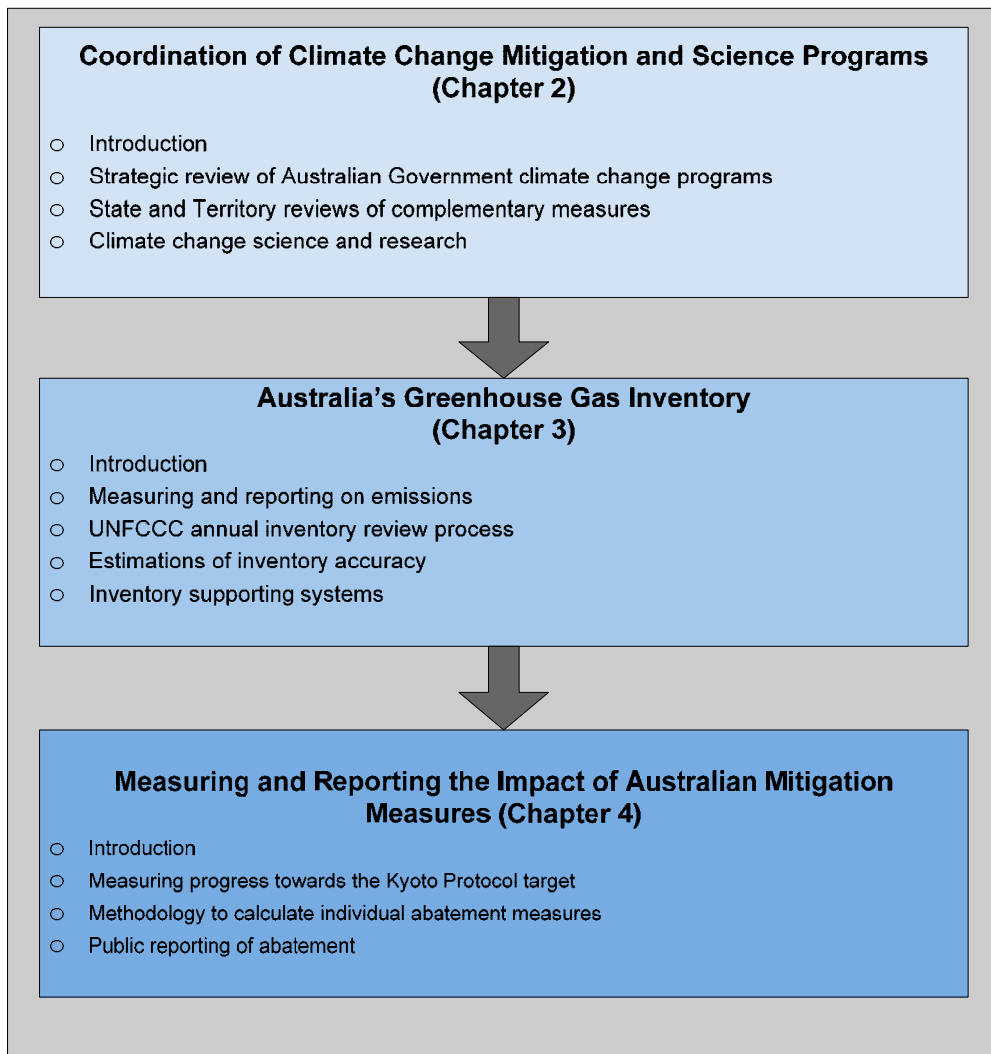
1.33 The audit was conducted in collaboration with 13 other international audit offices. While the confidentiality of information was strictly adhered to, liaison with international collaborative partners helped in framing the audit criteria. Partners were also able to share knowledge and experiences from audits already tabled and exchange comparative information on the methodologies used. A report, documenting key messages, findings and lessons learned is planned for completion by the end of June 2010 and will be made available through the International Organisation of Supreme Audit Institutions.

Report structure

1.34 The structure of the report is outlined in Figure 1.6.

Figure 1.6

Report structure



2. Coordination of Climate Change Mitigation and Science Programs

This chapter examines the coordination of climate change programs across Australian, State and Territory jurisdictions. The coordination of Australian Government climate change science and research programs is also discussed.

Introduction

2.1 Climate change has broad impacts that affect all levels of government whether in terms of reducing greenhouse gas emissions or adapting to consequences such as the rise in sea levels, more intense cyclones or prolonged drought.⁴² Cooperative action between governments is essential to ensure that responses to climate change are cost effective and coherent. In December 2007, the Council of Australian Government's (COAG):

acknowledged the benefits in reducing the confusion, overlap, duplication, and red-tape associated with the current proliferation of climate change programs across jurisdictions.⁴³

2.2 In March 2008, COAG agreed that each jurisdiction would review its climate change mitigation measures within the context of the proposed carbon pollution reduction scheme (CPRS).⁴⁴ All jurisdictions agreed to review their measures and to assess them against the COAG 'complementarity' principles.⁴⁵ The aim of the reviews was to achieve a coherent and streamlined set of climate change measures across jurisdictions by the end of 2009. Complementarity principles were developed to guide the assessment of emission reduction measures and to determine whether the measures effectively complemented the proposed CPRS. In summary, the principles were to focus programs on market failure, meet best practice regulatory principles and be targeted to manage the impacts of the proposed CPRS on

⁴² Council of Australian Governments Working Group on Climate Change and Water, documented guidance for jurisdictional reviews, 9 September 2008, p. 2.

⁴³ Department of Finance and Deregulation, 'Strategic Review of Australian Government Climate Change Programs,' Final Report, July 2008, p. 42.

⁴⁴ The CPRS is intended to be the primary tool to drive reductions in emissions of greenhouse gases. The objective is to reduce carbon pollution and to do so efficiently, by placing a cap on emissions. Australian Government, *Carbon Pollution Reduction Scheme, White Paper Vol. 1*. December 2008, p. xxv.

⁴⁵ These principles were subsequently endorsed by COAG in November 2008.

particular sectors of the economy. Where measures met these criteria, it was anticipated that they would be implemented by the level of government that was best able to deliver the measure.

2.3 The ANAO examined the role of Australian Government agencies and, in particular the then Department of Climate Change, in improving the coordination of climate change mitigation programs. The ANAO also consulted directly with officials from Victoria, Queensland and Western Australia to gain an understanding of State perspectives and priorities. As the Government requested the then DCC to develop a climate change science framework, the coordination of science and research programs was also examined as part of this audit.

Strategic review of Australian Government climate change programs

2.4 The Australian Government established the *Strategic Review of Australian Government Climate Change Programs* (the Wilkins Review) in February 2008, to assess the extent to which all existing climate change measures were complementary to the proposed CPRS. In addition to identifying duplicate and overlapping programs that could be rationalised, the review also identified phase-out options for less efficient abatement programs and initiatives that would compromise the abatement incentives arising from the carbon price signal provided by the CPRS.

2.5 The review considered a total of 62 climate change measures, including those administered by the previous Australian Government and those funded in the 2008–09 Budget.⁴⁶ The Wilkins Review was completed in July 2008. Of the 62 Australian Government programs reviewed, it was recommended that:

- 22 programs were agreed as complementary to the CPRS and were to continue;
- 14 programs were to continue (with some amendment) as transitional programs until the CPRS was fully functional;
- nine programs were to be referred to other processes for further consideration; and

⁴⁶ Four of the 62 programs were terminated during the course of the Wilkins Review.

- 13 programs were to be terminated or phased out as they were not complementary to the CPRS.

The Australian Government publicly released the Wilkins Review and its response in May 2009.

The Government's response to the Wilkins Review

2.6 In October 2008, the Australian Government broadly agreed with the findings of the Wilkins Review. Ministers noted that the COAG complementarity principles would form the primary guidance to the Australian, State and Territory governments in developing emissions reduction measures that were complementary to the proposed CPRS. This approach was to apply to both existing measures reviewed as part of the COAG review process and to new measures. Implementing agencies were to report to the then DCC on how they had implemented the Wilkins Review's recommendations and the COAG complementarity principles. In conjunction with the Department of the Prime Minister and Cabinet, the then DCC was required to keep the Government informed of any impact on overall climate change policy from new policy proposals in the budget. In addition, a new climate change science framework was to be developed by the then DCC in consultation with the Department of Innovation, Industry, Science and Research.

2.7 The Government's response to the Wilkins Review, and the Australian Government's 2009-10 Budget indicates that there has been a rationalisation and redesign of existing Commonwealth climate change mitigation programs so that they are more compatible with the COAG principles and the proposed CPRS. Some programs continued, and some existing programs were terminated or redesigned and new or continuing programs were to be modified to be consistent with the principles of complementarity.

State and Territory government reviews of complementary measures

2.8 The Wilkins Review found that there were in excess of 200 relevant climate change measures managed by the States and Territories. Many of these initiatives were considered to cut across Australian Government programs and had the potential to undermine the proposed CPRS. Prior to the release of the review findings, COAG established a Complementary Measures Sub-Group of

Australian, State and Territory government representatives, chaired by the then DCC to:

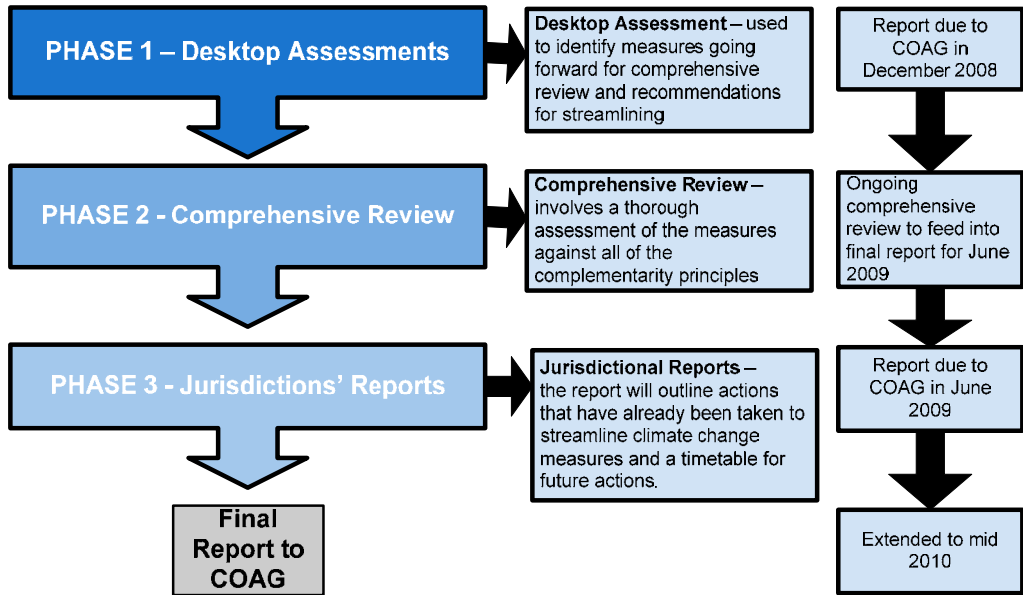
- review the process of streamlining measures across jurisdictions;
- assess the current and future range of emissions mitigation measures to ensure that they complement the proposed CPRS; and
- take appropriate action for those measures identified as non-complementary.

2.9 The review process was aided by COAG endorsed guidance material,⁴⁷ which encouraged alignment across the various jurisdictions. The reviews were to be completed and submitted by June 2009. This timeline was extended and the final reports are expected to be completed by mid 2010, over eight months after the original date for completion. Figure 2.1 outlines the three-phase review process for the complementarity reviews of climate change measures.

⁴⁷ The documented guidance was endorsed by the COAG Working Group on Climate Change and Water, chaired by the Minister for Climate Change and Water, in September 2008.

Figure 2.1

Original timeline and process for complementarity reviews of climate change measures



Source: ANAO analysis of information provided by the Department of Climate Change and Energy Efficiency.

2.10 The reviews focused on policies, programs and initiatives with emissions reduction objectives. The types of measures that were within the scope of the reviews included regulatory and quasi-regulatory measures, voluntary agreements, education and information strategies, subsidies or grants, market based instruments, and broader capacity building measures. Jurisdictions could also consider reviewing measures that were not directly climate change related, but had the potential to either impinge on the effectiveness of the proposed CPRS or Australia’s ability to effectively address greenhouse gas emissions over the longer term. Table 2.1 provides a summary of the status of the jurisdictional reviews to date.

Table 2.1**Status of State and Territory jurisdictional reviews of existing climate change mitigation measures**

State /Territory	No. of measures reviewed	Overall status
New South Wales	26	Publicly released July 2009
Queensland	85	Released in September 2009
Northern Territory	33	Completed but under consideration by the NT Government
Australian Capital Territory	60	To be finalised in early 2010
South Australia	130	Completed but under consideration by the SA Government
Victoria	83	Completed but under consideration by the Victorian Government
Western Australia	60	Completed and released to COAG
Tasmania	11	Completed but under consideration by the Tasmanian Government
TOTAL	488	Measures reviewed

Source: ANAO analysis compiled from information provided by the States and Territories to the Department of Climate Change and Energy Efficiency.

2.11 Table 2.1 is based on progress reports provided by representatives at a Commonwealth, State and Territory workshop held in September 2009, which was also attended by the ANAO. While the progress has been slower than originally anticipated, the review processes have been comprehensive and reflect, to a large extent, the commitments made by each jurisdiction to the COAG principles.⁴⁸ A national review of 488 State and Territory measures is a noteworthy achievement, and indicates a significantly higher number of programs than the 200 identified in the earlier Wilkins Review. When added to the 62 Australian Government programs there were some 550 measures in total aiming to address climate change in some way.

⁴⁸ The Department of the Prime Minister and Cabinet has advised that the consolidated report of the State and Territory reviews should be finalised and placed on the COAG website by the end of April 2010.

The initial results from State reviews to improve coordination on climate change programs

2.12 The published New South Wales (NSW) review⁴⁹ recommended that, of the 26 programs considered, seven programs be retained in full, three programs be terminated and the remaining 16 programs be redesigned, or partially terminated. The review supported the findings of the Wilkins Review in terms of the duplication and overlap between Australian Government and State programs. For example, the review highlighted the overlap between the Australian Government's subsidies for energy efficient hot water systems and those being offered in NSW. The review identified the risk that households could potentially be overcompensated by accessing both subsidies. The NSW Government response noted that it was putting appropriate systems in place to make sure households did not receive rebates exceeding the cost of installing a hot water system.⁵⁰

2.13 The review process in Queensland (Qld) included an assessment of 85 mitigation measures, and was completed in February 2009 prior to the announcement of the Qld Government's *ClimateQ* strategy on climate change. The review concluded that the vast majority of climate change mitigation measures in Qld were consistent with the COAG complementarity principles. The Queensland Government accepted the recommendations to address the four measures that were not complementary.

2.14 A particularly important consideration within the context of the COAG agenda was the removal of the Queensland Government's 10 per cent Renewable and Low Emission Energy Target for 2020. This program was discontinued in light of the introduction of the Australian Government's Renewable Energy Target (RET) to achieve a 20 per cent share of renewable energy in Australia's electricity mix by 2020-double the previous Qld target. More broadly, the Australian Government's RET scheme absorbs existing State and Territory renewable energy schemes into a single national scheme. This scheme will address an important coordination and streamlining challenge that is to build a renewable energy sector across Australia.

⁴⁹ NSW commissioned the Independent Pricing and Regulatory Tribunal to review their climate change mitigation measures.

⁵⁰ NSW Government Response to the report of the Independent Pricing and Regulatory Tribunal 2009, p. 12.

2.15 While there has been a significant effort to streamline programs in both NSW and Qld, some programs will continue in a transitional capacity until the full introduction of the proposed CPRS. For example, in NSW six programs were retained in their current form during the transition to the proposed CPRS. A further three programs were re-designed (fully or in part) as transitional only. One transitional program in NSW, the Greenhouse Gas Reduction Scheme has the potential to directly conflict with a national CPRS.⁵¹ The Qld Gas Scheme⁵² (along with three other programs) also has the potential to significantly overlap with the proposed CPRS. The Australian Government has been working with the Queensland Government to develop appropriate termination arrangements. DCCEE will need to carefully monitor these transitional programs and advise Ministers accordingly of any significant risks prior to the introduction of the proposed CPRS.

Conclusion

2.16 COAG has set a policy direction to achieve a coherent and streamlined set of climate change measures across jurisdictions prior to the introduction of the proposed CPRS. This policy was in recognition of the benefits that could be gained by reducing the confusion, overlap, duplication and red tape associated with the proliferation of climate change programs that was apparent in 2007.

2.17 Preliminary results from the State and Territory reviews suggest that there has been progress in implementing COAG commitments. In total, 488 measures were reviewed across all States and Territories. The program reviews by the Australian State/Territory Governments have resulted in some rationalisation and subsequent adjustment to programs to enhance complementarity and consistency with the proposed CPRS. However, progress has been slower than anticipated with the timeframes for completing the reviews extended by over eight months. There is still considerable scope for further rationalisation across jurisdictions particularly in regard to transitional measures that would directly overlap with the proposed CPRS.

2.18 Such an approach would give the Australian Government a reasonable level of assurance that the introduction of the proposed CPRS will not be

⁵¹ The New South Wales Government has advised that it will terminate the Greenhouse Gas Reduction Scheme when the proposed CPRS commences.

⁵² The Qld Gas Scheme requires electricity retailers and large users to source at least 13 per cent of their electricity from gas-fired generators (18 per cent by 2020).

impeded by the operation of State and Territory programs cutting across its objectives. Nevertheless, there are still a small number of transitional measures that will require possible realignment or amendment in conjunction with the introduction of the CPRS.

Climate change science and research

2.19 Actions on science and research are essential elements of the response to climate change as is the coordination of climate change science and research to avoid any overlap or duplication between agencies or levels of government. The Wilkins Review noted that the importance of scientific research and the cost to the Australian economy of ill-informed decisions and poor contingency or adaptation planning.⁵³ A subsequent Parliamentary review undertaken in 2009 also commented on the relatively fragmented way that research was conducted.⁵⁴

2.20 Across Australian, State and Territory Governments, there has been considerable investment made in climate change science. DCCEE has indicated that approximately \$466 million in Australian Government funding has been directed towards a National Framework for Climate Change Science. However, the ANAO has identified additional programs outside of this framework that are also focused on climate change science/research. These additional programs could bring funding to at least \$675.1 million.⁵⁵

2.21 Given that there are five Commonwealth agencies, numerous State and Territory agencies and universities all engaged in some form of climate change science or research, there is a compelling argument for coordination to ensure that resources are effectively targeted and that unintended overlaps are avoided in the delivery of science and research. A summary of agencies that are involved in climate change science and research is outlined in Figure 2.2.

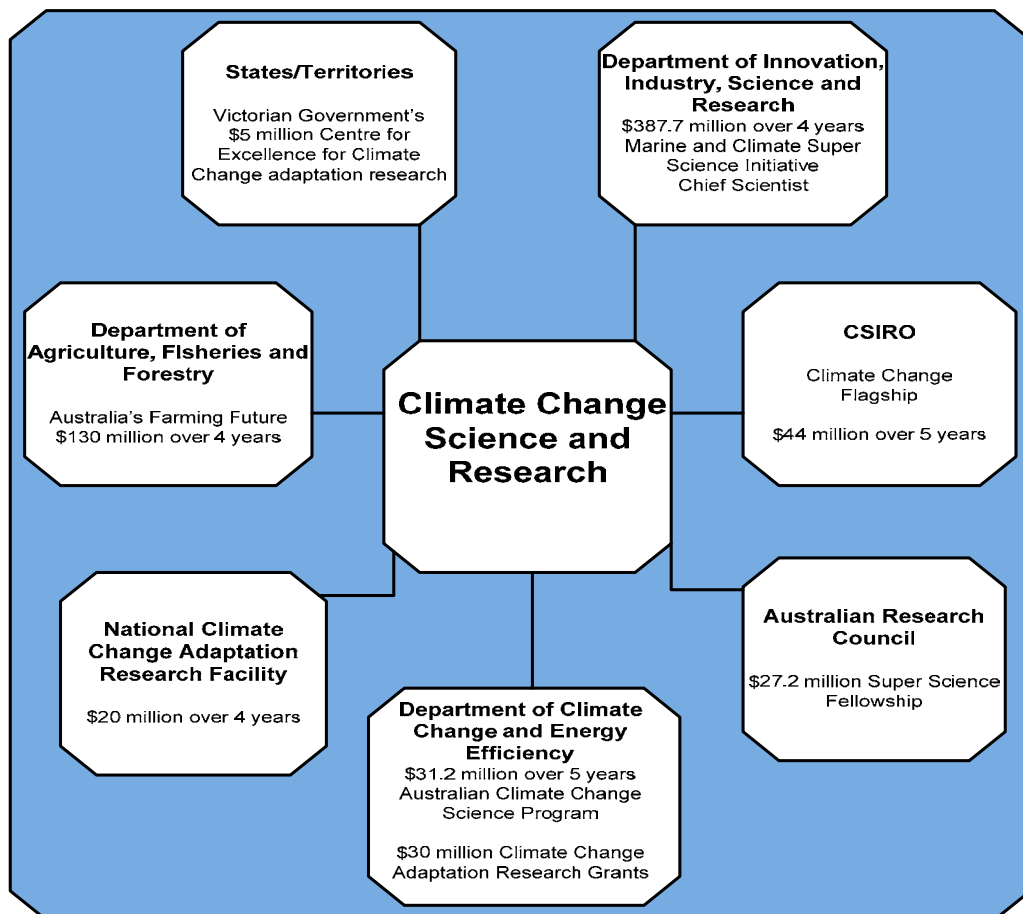
⁵³ Department of Finance and Deregulation, *Strategic Review of Australian Government Programs*, Final Report, July 2008, pp. 143-144.

⁵⁴ The House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts; October 2009; *Managing our coastal zone in a changing climate*; ACE CRC, Submission 46, p. 5. The Parliamentary report was particularly related to the specific and local effects of sea level rise and changes in ocean properties.

⁵⁵ Further, funding may also be provided through the States and Territories such as the \$24 million Greenhouse Innovation Fund, a \$340 million Climate Change Fund and a Climate Change Impacts and Adaptation Research Program in NSW. Both Queensland and South Australia also have climate change research and science-related programs.

Figure 2.2

Significant climate change science and research organisations



Note: The Chief Scientist reports to the Minister for Innovation, Industry, Science and Research.

Source: ANAO analysis of information provided from the Department of Climate Change and Energy Efficiency, the Wilkins Review of Climate Change programs (2008) and the 2009-10 Budget documentation.

The National Framework for Australian Climate Change Science

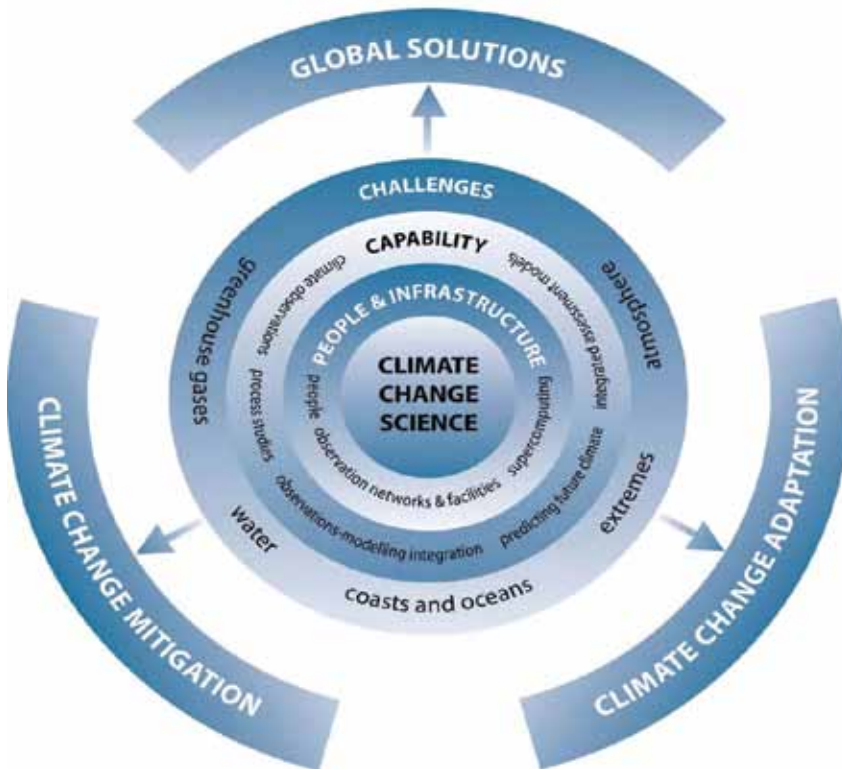
2.22 The National Framework for Australian Climate Change Science was released by the then DCC in May 2009. The framework identifies national climate change science priorities for the next decade and sets out ways to utilise science capacity to address them. The framework, which is illustrated in Figure 2.3, includes the following elements:

- the challenges (areas where climate change science must deliver information over the next decade such as better projections of rainfall);

- the capabilities Australia will need to maintain or develop to meet the challenges;
- people and infrastructure; and
- implementation.

Figure 2.3

Schematic representation of the climate change science framework



Source: Department of Climate Change, National Framework for Climate Change Science, May 2009.

2.23 The Minister for Innovation, Industry, Science and Research and the Minister for Climate Change and Water established a High Level Coordination Group to oversee the development of the implementation plan for the National Climate Change Science Framework.⁵⁶ The Group is chaired by the Chief

⁵⁶ The High Level Coordination Group includes major funding bodies, key research organisations and senior scientists and is chaired by the Australian Government’s Chief Scientist.

Scientist for Australia, whose role was established to provide advice to the Prime Minister, the Minister for Innovation, Industry, Science and Research and other areas of government as requested.⁵⁷ The first meeting was held in November 2009 and an implementation plan is expected to be finalised by the end of June 2010. Given the significant funding for climate change science and research, and the number of agencies (State as well as Australian Government) potentially involved, the implementation plan should include strategies to manage the risks of overlap and duplication as occurred for climate change mitigation programs.

2.24 DCCEE has also advised that it is planning to establish a mechanism for liaising with States and Territories and other stakeholders on climate change science and research, with a particular emphasis on ensuring that the national program delivers useful information about likely future climate change. The need for improved information on coordination in climate change science and research was also noted in the report of the United Nations in-depth review of Australia's *Fourth National Communication* report in January 2009.⁵⁸

Conclusion

2.25 The Government has noted the cost to the Australian economy as a result of ill-informed decisions and poor contingency or adaptation planning. The National Framework for Australian Climate Change Science is an important step forward in setting national climate change science priorities for the next decade. An implementation plan for the framework is expected to be completed by June 2010 and should include, as a high priority, measures to avoid unintended overlap in the conduct of research in climate change. Engaging relevant State agencies and other stakeholders both within and outside the framework will be an important part of this process to avoid any repetition of the overlaps that occurred in climate change mitigation and adaptation programs.

⁵⁷ The Chief Scientist is expected to report annually to the Minister for Climate Change and Water and the Minister for Innovation, Industry, Science and Research.

⁵⁸ United Nations Framework Convention on Climate Change; *Report of the in-depth review of the fourth national communication of Australia*, 20 January 2009, p. 28.

3. Australia's Greenhouse Gas Emissions Inventory

This chapter examines Australia's reporting of greenhouse gas emissions as required under the United Nations Framework Convention on Climate Change. It also examines the key systems and processes that support the preparation of the national inventory reports.

Introduction

3.1 Accurate, consistent and internationally comparable data on greenhouse gas (GHG) emissions are essential for the international community to measure emissions and consequently, to take the most appropriate action to mitigate climate change. National emissions data also underpins Australian Government initiatives to develop and implement GHG abatement programs.

3.2 To measure Australia's emissions, the Australian Government maintains a national emissions inventory, as required by the United Nations Framework Convention on Climate Change (UNFCCC). The inventory provides a national baseline of aggregate GHG emission levels and allows emission levels to be tracked over time as well as Australia's progress towards meeting domestic and international emission targets. Since 1994, Australia has submitted annual inventory reports to the UNFCCC, which are then subject to a coordinated review process by an international review team. The Department of Climate Change and Energy Efficiency (DCCEE) is responsible for compiling and maintaining Australia's greenhouse gas inventory.⁵⁹ The department is also responsible for data collection, emissions estimation and the preparation and submission of inventory reports to the UNFCCC.

3.3 In addition to UNFCCC reporting requirements, Australia's inventory data will be used to report under the Kyoto Protocol. The first mandatory inventory report is due in April 2010 and ongoing annual reports will be submitted until 2015, covering the Kyoto Protocol commitment period (2008-12). During this period, national inventory reports are to include

⁵⁹ Prior to 25 January 2008, the then Department of the Environment was responsible for the preparation and submission of the national inventory report.

supplementary information under the Kyoto Protocol.⁶⁰ As previously noted in Chapter 1 (paragraph 1.11), the rules for preparing inventories under the Kyoto Protocol differ from the UNFCCC accounting method, particularly in relation to the land use, land use change and forestry sector.⁶¹ As a result, aggregate emissions are treated and reported differently under the two reporting regimes.⁶² The basis for meeting both reporting requirements is discussed in this chapter.

Measuring and reporting Australia's emissions

3.4 GHG emissions are generated from a large number of commonplace activities, and from a variety of human managed sources. Australia's national GHG emissions are not measured directly in the atmosphere but are estimated from economic activity data and from sectoral processes and activities in line with the Intergovernmental Panel on Climate Change (IPCC) guidelines. This activity data includes items such as annual electricity generation, petroleum consumption and the volume of waste going to landfill. It is important to note that the inventory does not measure or report the impact of government abatement measures, but rather, the inventory estimates actual emissions through the following six IPCC defined sectors:

- (1) energy (including stationary energy, transport and fugitive emissions);
- (2) industrial processes;
- (3) solvent and other product use;⁶³
- (4) agriculture;
- (5) land use, land use change and forestry (LULUCF); and
- (6) waste.

⁶⁰ Kyoto Protocol accounting rules and reporting requirements are set out in the *Kyoto Protocol Reference Manual*, [internet] UNFCCC, 2008, available from <<http://unfccc.int/>> [accessed on 5 September 2009.]

⁶¹ Under the UNFCCC, all carbon dioxide emissions from the human use of the land are accounted for in the Land Use, Land Use Change and Forestry (LULUCF) sector. In contrast, under the Kyoto Protocol (Article 3.3) accounting provisions, emissions from this sector for the commitment period 2008-12 are limited to afforestation, reforestation and deforestation since 1990.

⁶² The reporting requirements and rules for accounting emissions are set out in the Kyoto Protocol and subsequent decisions, in particular the Marrakesh Accords.

⁶³ This sector includes emissions of nitrous oxide and non-methane volatile organic compounds from activities that use chemical solvents, such as surface cleaners, thinning solvents and coatings for decorative or protective purposes. For confidentiality reasons, nitrous oxide emissions from this sector are included in the industrial processes sector.

Australian Greenhouse Emissions Information System

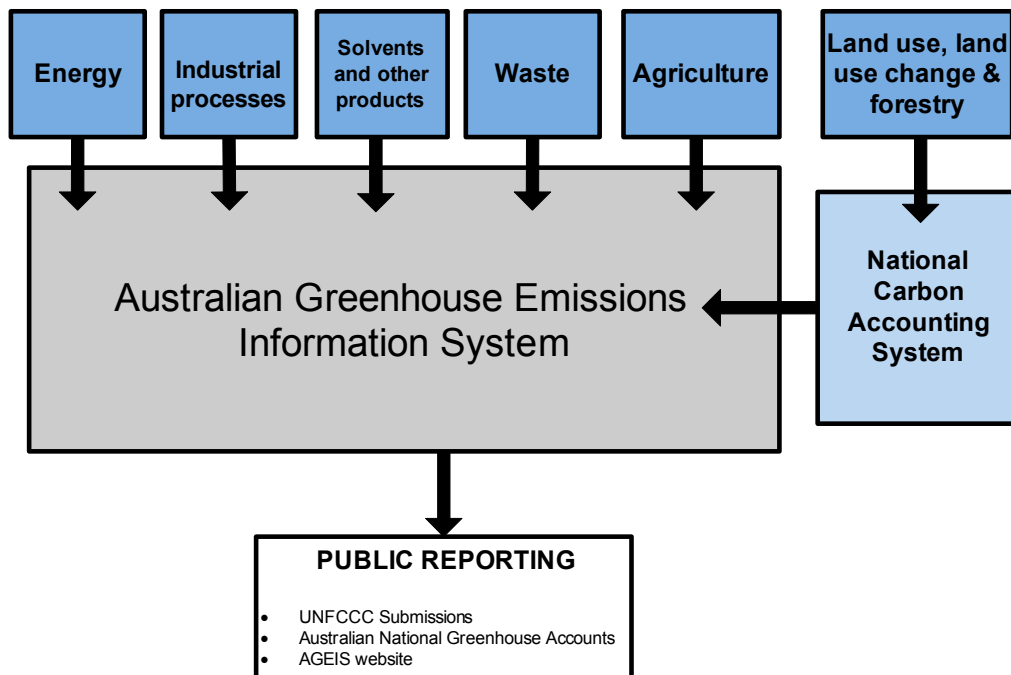
3.5 The Australian Greenhouse Emissions Information System (AGEIS) is a purpose-built database, which consolidates emissions estimation for all IPCC sectors, inventory compilation, reporting and data storage processes into a single system. AGEIS data is used to produce official UNFCCC submissions and various other public reports. Time series inventory data from the current inventory year back to 1990 is publicly available from the DCCEE website. The website also houses inventory data from the Australian National Greenhouse Accounts and includes:

- the UNFCCC inventory;
- the Kyoto Protocol inventory;
- State and Territory inventories;
- national inventory by economic sector; and
- quarterly inventory reports.

Figure 3.1 illustrates the sectoral inputs as well as the National Carbon Accounting System (NCAS).

Figure 3.1

Sectoral inputs into the Australian Greenhouse Emissions Information System



Source: ANAO analysis of Department of Climate Change and Energy Efficiency documents.

National Carbon Accounting System

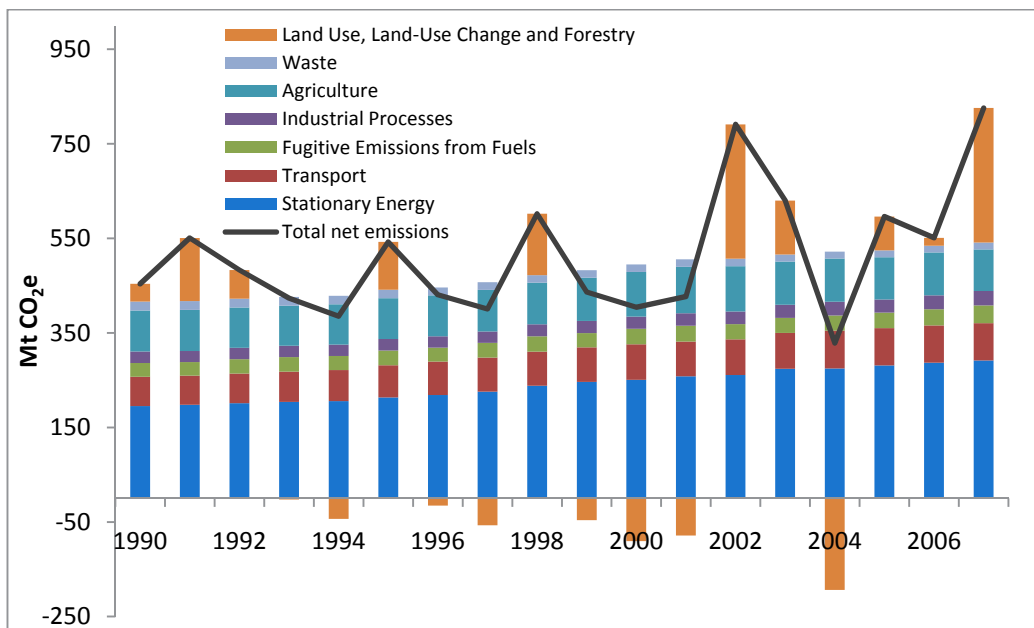
3.6 Australia has particular challenges in measuring its GHG emissions in the LULUCF sector, because of the large land mass, year to year climate variability and natural disturbances such as fires and drought conditions. As a consequence, the LULUCF sector can change from a net source to a net sink of emissions on a yearly basis.⁶⁴ In recognition of these complex fluctuations and

⁶⁴ This sector can be a source of GHG emissions due to activities such as deforestation, drought and fire that result in emissions of GHGs into the atmosphere. It can also be a sink of emissions, which refers to any process, activity or mechanism which removes a GHG, an aerosol or a precursor of a GHG from the atmosphere. Forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis.

the material significance of land use change to the overall national emissions, the National Carbon Accounting System (NCAS) was custom built to allow greater precision in the calculation and measurement of emissions from the LULUCF sector. NCAS is a self-contained inventory that inputs information of LULUCF emissions and removals data to AGEIS and is aggregated into the national emissions profile.⁶⁵ Figure 3.2 shows Australia's annual emissions and the relative contributions made by each sector, in addition to the year to year fluctuations of the LULUCF sector.

Figure 3.2

National and sectoral GHG emissions and removals 1990-2007



Note: UNFCCC accounting for emissions.

Source: Department of Climate Change and Energy Efficiency.

3.7 As shown in Figure 3.2, Australia's emissions are dominated by the energy sector, which includes stationary energy, transport and fugitive emissions.⁶⁶ The production of GHG emissions in these sectors largely

⁶⁵ NCAS uses digital map-based information and satellite data taken over consecutive years to track change in land use activities, such as the conversion of forest to cropland.

⁶⁶ Fugitive emissions are GHG emissions formed as a by-product, waste or loss in the process of fuel production, storage, or transport, such as methane given off during oil drilling and refining, or leakage from pipelines.

correlates with economic activity and is driven by key factors such as gross domestic production, population growth and increased household income. Emissions from the energy and industrial processes sectors have increased considerably since 1990. In particular, the stationary energy sector has increased by 50 per cent during this period. Emissions spikes from the LULUCF sector, in 2002 and 2007, are the result of fires and drought conditions. Conversely, this sector was a net sink with negative emissions (also known as removals) in 2000 and 2004, which was largely driven by plant re-growth and recovery from fire events in the preceding years.

UNFCCC reporting requirements

3.8 As previously noted, international requirements for the preparation of inventories and annual reports are set out in agreed guidelines published by the IPCC.⁶⁷ Inventory guidelines are based on principles of completeness, accuracy, transparency, comparability and consistency. Australia's national inventory is subject to annual review, which is coordinated by the UNFCCC Secretariat and includes periodic in-country reviews, undertaken by accredited international experts.

3.9 Under the UNFCCC reporting guidelines, annual inventory submissions report entire time series emissions from 1990 to the most current year. The national inventory report (NIR) provides a comprehensive record of aggregate and sectoral emissions, including a description of the methodologies used to compile the inventory, the data sources, the institutional structures and quality assurance and control procedures.

3.10 For the 2007 NIR, over 2.6 million data inputs were compiled for the non-LULUCF sectors alone. There is a lag period associated with inventory preparation and the final submission of reports. NIR reports are due for submission to the UNFCCC 16 months after the inventory year (that is, the inventory report for 2007 was submitted in April 2009).⁶⁸

⁶⁷ There are currently three IPCC guidelines that have been adopted by the UNFCCC, (1) the Revised 1996 Guidelines for National Greenhouse Gas Inventories, (IPCC, 2000); (2) the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Inventories* (IPCC, 2000); and (3) *Good Practice Guidance on Land Use, Land Use Change and Forestry* (IPCC, 2003). The *Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006) is awaiting formal approval by the UNFCCC.

⁶⁸ The majority of the Australian inventory is compiled on an Australian financial (statistical) year basis, which runs from July to June. The 2003 inventory refers to the period from 1 July 2002 to 30 June 2003.

3.11 Emissions estimation methodology is informed by the most up-to-date scientific understanding of the processes that produce and remove GHG emissions. Changes to estimation methodology can be made by DCCEE and may also be recommended by the UNFCCC review team. Improvements and adjustments to the methodology used to estimate GHG emissions and the inclusion of additional sources have necessitated recalculations to past emissions data, including the 1990 base year. As estimation methodology improves over time, revisions to the inventory will continue to be made, but the 1990 baseline has been fixed for the purpose of benchmarking performance. To ensure time series consistency and in accordance with IPCC guidelines, DCCEE applies adjustments to estimation methodology to all years of data back to 1990. The department considers that the estimation methodology is now bedded down and it is unlikely that any significant re-calculations of the 1990 base year will be necessary.

3.12 In assessing how the department measures and reports Australia's GHG emissions, the ANAO examined the:

- UNFCCC inventory review process, including the department's response to recommendations;
- department's approach to estimating inventory accuracy; and
- systems and processes supporting the inventory.

3.13 The ANAO did not examine the emission accounting rules, internationally agreed guidelines or seek to duplicate the UNFCCC review processes. The integrity of the inventory input data provided by numerous sources, including the Australian Bureau of Statistics, was also not examined.

UNFCCC annual inventory review process

3.14 National emissions inventories are subject to annual review, which is coordinated by the UNFCCC Secretariat.⁶⁹ The Secretariat's expert review team (ERT) undertakes an annual technical review of each member country's inventory report to ensure that inventory submissions are complete, accurate and conform to the agreed IPCC guidelines. National inventories are assessed

⁶⁹ 40 countries, known as Annex 1 countries, have emission reduction commitments under the Kyoto Protocol. Since the 1990s, these countries have annually submitted national inventory reports to the UNFCCC.

principally for consistency with agreed international guidelines and with the underlying objective of improving the quality of inventories.

3.15 The ERT reviews are conducted within an explicit framework of specified objectives and benchmarks and using a mix of standardised requirements, suggested procedures and expert judgment. National inventory reports are reviewed for cross cutting issues such as completeness, transparency, recalculations and time series consistency, uncertainty estimates, quality assurance/quality control practices, in addition to specific requirements for each of the six sectors. The annual reviews are conducted in two forms: either a centralised review or an in-depth in-country review. ERT reports are published on the UNFCCC website.

3.16 During an inventory review, the ERT may:

- request additional data or explanations of methodology; and
- instruct adjustments to methodology, which can result in the recalculation of emissions data.

Key improvements to the inventory are identified through ERT recommendations.⁷⁰ In principal, recommendations are made when the mandatory guidelines have not been followed or if the ERT has identified a problem relating to meeting methodological and reporting requirements.

ERT annual technical reviews of the Australian inventory

3.17 Australia's national inventory was the subject of three UNFCCC in-country reviews in 2002, 2005 and 2008. Centralised reviews were conducted in the intermittent years. Analysis of the last four published ERT reports⁷¹ indicate that the Australian inventory report has consistently been prepared in accordance with the relevant IPCC guidelines and the UNFCCC requirements for completeness, transparency, key category identification, uncertainty analysis, recalculations and time series consistency. ERT reports have noted areas where improvements have been made and cited examples of Australia's implementation of previous review team recommendations. The expert review reports have also noted that DCCEE has made a considerable

⁷⁰ Typically, recommendations are made towards specific sectors as well as cross cutting issues such as transparency and consistency.

⁷¹ This includes the two centralised reviews, an in-country review and the ERT review of the Australian Government's Initial Report under the Kyoto Protocol.

amount of information publicly available beyond the minimum reporting requirements through additional documents and the AGEIS website.

3.18 Although Australia's inventory generally conforms to UNFCCC requirements, the ERT has also identified opportunities for further improvement. In the last four published reports, the ERT made 70 recommendations across all sectors of the inventory.⁷² These recommendations covered a range of issues from minor presentational items, to providing additional explanatory information about methodology, and cross cutting issues that impact upon the overall completeness and transparency of the inventory. Just over one-third (38 per cent) of the recommendations were directed towards improvements in the LULUCF sector,⁷³ followed by the agriculture sector with 14 recommendations (20 per cent). In addition to these recommendations, the last four published ERT reports included 20 suggestions aimed at areas where Australia could improve its practices beyond the minimum standards.

Progress in implementing UNFCCC recommendations

3.19 The department annually records ERT recommendations and suggestions in order to track progress against identified issues. It has made considerable progress in addressing issues raised by the UNFCCC and has implemented the majority (74 per cent) of the ERT recommendations in the latest NIR submission for the 2007 inventory year. The ANAO reviewed the status of these recommendations.

3.20 The department indicated that, in the first instance, actions to address ERT recommendations are prioritised according to the materiality of the issue, followed by resourcing and other planned inventory improvements; and some recommendations (four per cent) will be implemented over the next three to four years in relation to new legislative requirements for large greenhouse gas emitting corporations and facilities. These requirements are set out in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), which is discussed in more detail in paragraph 3.35. Table 3.1 illustrates the

⁷² Comparison of seven other national inventories indicates that, on average, 40 recommendations were made per review. Australia averaged 42 recommendations in the last four ERT reviews, some of which overlapped in content due to the concurrent preparation of ERT reports.

⁷³ These recommendations were predominantly focussed on providing more explanatory information about methodology and assumptions. The ERT indicated that the implementation of these recommendations will contribute to improved transparency of inventory preparation.

implementation status of recommendations per sector, as made in the last four ERT reports.

Table 3.1

Status of UNFCCC expert review team recommendations

Sector/ Area	Implemented	NGER Act ⁽¹⁾	Disagree / not implemented	On going / future	Total
Cross cutting ⁽²⁾	3			3	6
Energy	6	1	1		8
IP ⁽³⁾	7	2			9
Agriculture	12			2	14
LULUCF	19		1	7	27
Waste	5			1	6
Total	52	3	2	13	70

Note: (1) Refers to the *National Greenhouse and Energy Reporting Act 2007*.

(2) Covers issues that have an impact on the overall quality of the inventory.

(3) Refers to the Industrial Processes and Solvents sector.

Source: Department of Climate Change and Energy Efficiency documents.

3.21 As shown in Table 3.1, the department has indicated that it does not agree with two ERT recommendations. The first of these recommendations relates to updating non-carbon dioxide emission factors for mobile equipment, such as forklifts.⁷⁴ The department considers that the proposed methodological change is not necessarily more accurate and has an immaterial impact on the energy sector (as it contributes less than one per cent towards this sector). The department indicated that there is also a significant cost of compliance associated with implementing this recommendation and for these reasons the implementation of this recommendation will not be considered in the short term. The second recommendation made towards the LULUCF sector proposes that Australia use annual data for forest areas burned rather than an average over three years. The department advised that, although it disagrees with the ERT’s interpretation of the guidelines, it will implement the recommendation in the next inventory submission for 2010.

⁷⁴ This refers to non-carbon dioxide emission factors for GHGs such as nitrous oxide for equipment other than road registered vehicles.

On-going/future recommendations

3.22 For the ongoing/future category of recommendations it is less clear as to how the department is dealing with these matters. The 13 recommendations within this category represent a mixture of actions currently in train and items planned for future review. By implication, these recommendations were considered by the department to be a lower priority. Just over half of these recommendations (seven of 13) were made towards the LULUCF sector with the aim of enhancing the completeness, transparency and comparability of this sector.⁷⁵ At the request of the ANAO, the department provided a broad and indicative timeframe for proposed actions to address the outstanding ERT recommendations and the issues raised. The department advised that just under half of the outstanding recommendations,⁷⁶ will be addressed in the next national inventory report to be submitted in April 2010 and the remaining recommendations will be addressed in the coming years. For reporting purposes and future ERT reviews, DCCEE could be more explicit as to when and how these recommendations are likely to be implemented.

Conclusion

3.23 Australia has numerous inventory and reporting commitments under the UNFCCC. These commitments are in accordance with agreed guidelines and timeframes. Australia's national emissions inventory submissions have been assessed by the UNFCCC as being broadly in line with IPCC guidelines and prepared to a relatively high level of quality. The majority of recommendations (74 per cent) made by the ERT have been addressed by the department and other issues raised by the review team have been included in the forward work plan. However, for the outstanding 13 agreed recommendations, it is less clear how the department plans to handle these matters.

3.24 The ANAO recognises that the department has finite resources and is not in a position to undertake all recommendations simultaneously. Nevertheless, given that ERT recommendations reflect both compliance and better practice in relation to Australia's international commitments,

⁷⁵ These recommendations included providing estimates from missing categories and parameters (such as soil carbon for forests remaining forests), and performing additional field studies to validate the model results for both forest areas as well as biomass changes.

⁷⁶ These recommendations are from the waste, agriculture and LULUCF sectors.

improvements could be made towards addressing these outstanding recommendations. For example, by monitoring progress and explicitly documenting required actions, resources and timeframes. This approach will be particularly important for those recommendations concerning the completeness and transparency of the LULUCF sector in meeting Kyoto Protocol reporting requirements.

Estimations of inventory accuracy

3.25 Uncertainty analysis is an estimate of the accuracy of a measurement or calculation. According to IPCC inventory guidelines, the underlying purpose of estimating the uncertainty associated with the emissions inventory is to provide information on where resources should be allocated to maximise future improvements to inventory quality. A formal UNFCCC requirement is to undertake a quantified uncertainty estimate for the inventory as a whole and estimates of the uncertainty in the trend between the 1990 base year and the most recent year.⁷⁷ In addition, uncertainty estimates are required for each greenhouse gas and each major source/sector.

3.26 The department complies with this requirement and has reported quantified uncertainty estimates from 2003 onwards. Using a Tier 1 or global default methodology,⁷⁸ the aggregate inventory uncertainty has decreased from ± 5 per cent in 2003 to ± 2.4 per cent in the 2007 inventory submission. This decrease is the result of the changing sectoral contribution to the aggregate inventory, in particular, the declining contribution of the LULUCF sector (with relatively high uncertainties) and the increasing contribution of the energy sector (with much lower uncertainties). The uncertainty in the trend has also decreased from ± 6 per cent in 2002 to ± 3 per cent in 2007 inventory reports. The department currently uses a mixture of Tier 1 and 2 approaches to estimate uncertainty at the sector and sub-sector level. The ERT noted that Australia's reported uncertainty estimates conform to agreed guidelines and are largely consistent with the typical uncertainty ranges expected for each sector.

⁷⁷ This estimate should have a 95 per cent confidence level.

⁷⁸ Tier 1 refers to a generic method or global default, which generally represents the minimum standard. Tier 2 methods are a nationally derived default that is generally more accurate than Tier 1 methods. Tier 3 methods are more refined again and refer to facility level approaches. Consequently, it is the most complex and accurate of the three approaches.

3.27 In the last three annual reviews, the ERT has encouraged Australia to adopt the use of Tier 2 methodology for estimating sectoral uncertainty through consecutive recommendations and commentary.⁷⁹ Tier 2 methodology is more refined and sophisticated than the Tier 1 method currently used and is capable of producing an asymmetric probability distribution.⁸⁰ The IPCC guidelines for uncertainty estimates indicate that the use of Tier 2 methodologies is good practice for countries that have sufficient resources and expertise.⁸¹

3.28 Since 2005 (and in every subsequent year), DCCEE has identified the expansion of Tier 2 uncertainty analyses as an item for future review in published NIR submissions and internal documents. In 2004, the CSIRO Atmospheric Research Division was engaged to independently review the uncertainty methodology and construct a Tier 2 methodology to be built into AGEIS.

3.29 The department advised that, while a Tier 2 methodology has not been employed comprehensively, resources are prioritised to maximise inventory quality, which is currently focused on preparing for the integration of NGER facility level data. In addition, Tier 2 methods have been employed, where feasible, for a limited number of sub-sectors such as transport, industrial processes and agriculture. The department considers that a Tier 2 analysis is a higher cost, resource intensive exercise that will not necessarily improve the accuracy of the inventory overall.

3.30 An international analysis of the last three national inventory submissions (for 2005–2007) indicates that 14 of the 40 reporting countries (35 per cent) have employed a Tier 2 methodology to estimate aggregate uncertainty at least once over this period.⁸² However, they do not necessarily apply this every year or across all sectors, and the LULUCF sector is typically

⁷⁹ Tier 2 sectoral uncertainty analysis leads to the application of Tier 2 methods to estimate uncertainty for the inventory as a whole.

⁸⁰ Tier 2 methodology for uncertainty utilises the Monte Carlo estimation methodology, which involves computational algorithms that rely on repeated random sampling to build up the overall probability density function.

⁸¹ IPCC, *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, [internet] IPCC, 2000, Section 6.1.3, available from <<http://www.ipcc.ch>> [accessed 8 October 2009.]

⁸² These countries are Austria, Canada, Finland, Germany, Ireland, Italy, Japan, Liechtenstein, Luxembourg, Netherlands, Norway, Switzerland, United Kingdom and the USA. Eight countries have not performed this analysis on an annual basis.

excluded. National inventory reports for these countries indicate that there are mixed views regarding the value of conducting a Tier 2 aggregate analysis. Canada and Italy have expressed reservations as to the merits of using this approach, while Liechtenstein, United States of America and the Netherlands have found it a valuable exercise.⁸³

Conclusion

3.31 The department currently uses a Tier 1 approach to estimate aggregate inventory uncertainty, and utilises a mixture of Tier 1 and 2 to estimate uncertainty at the sub-sectoral level. The department's uncertainty estimates conform to agreed guidelines and are largely consistent with the typical uncertainty ranges expected for each sector.

3.32 The application of a Tier 2 uncertainty analysis is one of international better practice rather than one of compliance with IPCC guidelines. The department's approach to implementing the recommendations raised by UNFCCC reviews is based on consideration of materiality and resource capacity. Consistent with this approach, the integration of NGER data is currently the key focus of inventory improvement. However, the department could reconsider the extent to which a Tier 2 uncertainty analysis could be used once the integration of NGER data has been addressed. DCCEE may also consider practical options such as undertaking the analysis on a periodic, rather than annual basis, for non-LULUCF sectors.

Inventory supporting systems

3.33 The national emissions inventory is required to meet a number of institutional, legal and procedural requirements as set out by UNFCCC provisions. These requirements are targeted at the systems and processes that support the inventory and its ongoing improvement. In 2008, the UNFCCC ERT examined Australia's implementation of prescribed general and specific functions, and noted that the national inventory system is prepared in accordance with guidelines and the necessary 'established procedures are working effectively and regularly.' Annual technical reviews assess aspects of the inventory system on a continuous basis. The ANAO examined the two key aspects that support the inventory:

⁸³ National inventory reports 2005-07, published in 2007-09, [internet] available from <<http://unfccc.int>> [accessed 6 December 2009.]

- the data collection responsibilities and arrangements; and
- the quality assurance/quality control plan and procedures.

Data collection responsibilities

3.34 DCCEE primarily relies on activity data published by Australia's principal economic statistic agencies, such as the Australian Bureau of Statistics (ABS) and the Australian Bureau of Agriculture Resource Economics (ABARE). The ABS has legislative backing for its collection powers and is the source of agricultural activity, some commodity and energy-related data. ABARE is used to provide energy consumption data, which it publishes from a survey in energy use, which has been in operation for some 30 years. This data is also used to fulfil Australia's reporting requirements to the International Energy Agency. In the LULUCF sector, contributors include the Commonwealth Scientific Industrial Research Organisation (CSIRO), the Cooperative Research Centre for Spatial Information, universities, State government research organisations and private sector providers. DCCEE has indicated that these contributors fulfil various roles from data generation to quality assurance and the validation of data. The majority of this information is publically available, however the department collects some confidential industry data. To manage relationships with data suppliers, the department largely relies on informal and voluntary arrangements for most sectors.⁸⁴

3.35 The inventory preparation process is currently undergoing a significant change following the introduction of the *National Greenhouse and Energy Reporting (NGER) Act 2007*.⁸⁵ The NGER Act legislates mandatory reporting for corporations whose energy production, energy use, or GHG emissions exceed defined thresholds.⁸⁶ This reporting is an important prerequisite for the proposed emissions trading scheme. The first annual emission data collected under the NGER Act was due in late October 2009 for the 2008–09 financial year.

⁸⁴ DCCEE has a memorandum of understanding with Geoscience Australia to collect specific data towards the LULUCF sector.

⁸⁵ This legislation was introduced to the Parliament in 15 August 2007 and received Royal Assent on 28 September 2007.

⁸⁶ In the first year the threshold is 125 kilotonnes of CO₂e and was collected from over 600 corporations. Each year the reporting threshold will reduce, thereby increasing the numbers of corporations that will be required to report annual emissions, and providing more data for the inventory.

3.36 The department estimates that, in the first year of reporting (2009), NGER data will contribute 39 per cent to the aggregate inventory, excluding the LULUCF sector. The contribution of NGER facility level activity data and emissions factors have the potential to increase by up to 63 per cent in 2013, depending upon the level of data that corporations report.⁸⁷ Although DCCEE does not expect the introduction of NGER data to change the aggregate emissions estimate, it is anticipated that this data will provide a more detailed profile of emissions at the sectoral level. For example, NGER data will enable the transition to more refined estimation methodology, known as Tier 3 methodologies,⁸⁸ for a range of significant sub-sectors including coal, oil, gas, industrial processes, waste and certain energy industries.

3.37 The emissions data collected under the NGER Act will supplement DCCEE's existing data collection arrangements towards the energy, industrial processes and solvent and waste sectors. Activity data for the industrial processes sector was previously collected through an industry survey conducted by DCCEE, and in the coming years NGERs data will replace the need for this survey.⁸⁹ However, existing data collection arrangements will still be required to fulfill reporting requirements for sectors outside the scope of the NGER Act.

Quality assurance/quality control plan and procedures

3.38 As previously noted, the ANAO did not verify the source data, but rather sought to determine the quality assurance and quality control processes the department had in place. These processes are also examined by the UNFCCC expert review teams.

3.39 Since AGEIS was implemented in mid-2005, quality control plans have been in place and have evolved to reflect the increasing complexity of, and improvements to, the inventory. The plan has been designed to contribute to the production of accurate inventories, in which uncertainties are reduced to the extent practicable. The quality assurance indicators are a mix of self-assessment and external assessment, in particular, by external consultants

⁸⁷ Corporations can choose between four reporting methods as set out National Greenhouse and Energy Reporting Determination 2008.

⁸⁸ Tier 3 methodology refers to facility level data. This data is more accurate than Tiers 1 or 2.

⁸⁹ Data towards this sector accounts for less than 10 per cent of inventory input data (excluding the LULUCF sector).

from the National Greenhouse Gas Inventory Committee and the UNFCCC expert review teams. Some of the key quality control/quality assurance procedures in place include:

- explicitly defined quality objectives for the national greenhouse accounts together with annual evaluations of the inventory against these objectives;
- automated and systematised quality control processes built within AGEIS for all data handling and emissions estimation procedures, principally aimed at ensuring time series consistency and accuracy;
- prioritisation of quality control processes, built within AGEIS to ensure effort is principally directed toward key categories; and
- reconciliation checks for emissions data with reference to Australia's national greenhouse accounts structure.

3.40 The ERT has noted that the quality assurance/ quality control plan has been developed in accordance with UNFCCC requirements and that the overall improvement to the inventory is linked to Australia's plan and its procedures. The ERT also noted during the in-country review of 2008, that AGEIS has been designed to easily facilitate the use of quality control processes but that available tools/processes could be applied to a larger extent during inventory preparation.

3.41 In response to ERT comments regarding the expansion of quality control tests, the department has continued to develop additional quality tests and currently utilises a mixture of 15 automated and manual checks as standard practice throughout the annual inventory preparation process. Some key checks include a data analysis of outliers or errors, and a time series consistency check of activity data and emission coefficients. DCCEE annually benchmarks Australian estimation coefficients against those employed by 40 other reporting countries for major sectors.⁹⁰

Conclusion

3.42 The department has effective systems and processes in place to support the inventory, which has been developed with a strong compliance focus and

⁹⁰ Statistical tests are undertaken of Australia's implied emission factors to test for significant statistical differences among other countries.

attention to better practice, where feasible. The ANAO recognises that the inventory is currently undergoing a significant change with regard to data collection arrangements and subsequent inventory preparation processes. The principal benefits for the inventory of collecting data under the NGER Act are improvements to the quality of facility level data, sectoral estimation and timeliness, in addition to streamlined data collection.⁹¹ Quality control tests and quality assurance mechanisms should continue to be developed to ensure that NGER data is smoothly integrated and that the inventory maintains a high quality standard.

⁹¹ NGER data will first begin to be incorporated into the 2009 inventory, which will be submitted in 2011.

4. Measuring and Reporting the Impact of Australian Abatement Measures

This chapter examines how abatement measures are calculated and reported. The impact of government abatement measures during the Kyoto Protocol period and progress towards meeting emission targets is also discussed.

Introduction

4.1 A range of initiatives have been put in place by the Australian, State and Territory governments to reduce greenhouse gas (GHG) emissions. These include some 550 climate change and abatement measures through regulation, grant programs and voluntary schemes.⁹²

4.2 The accurate measurement and consistent reporting of these initiatives is important to demonstrate the extent to which they are contributing to achieving national and international GHG emission targets. The individual and cumulative impact of abatement measures are periodically revised by DCCEE to reflect new performance data, changes to the delivery of the measure and to incorporate new policy measures, such as the recently legislated 20 per cent Renewable Energy Target.

4.3 Australia's individual and aggregate abatement measures are reported in a number of ways. The department reports the aggregate impact of abatement action annually through the publically available *Tracking to Kyoto* publication. In accordance with United Nations Framework Convention on Climate Change (UNFCCC), DCCEE also presents Australia's aggregate and per measure abatement figures in the four yearly *National Communications* progress report. As well, agencies that deliver climate change programs typically present abatement figures in their annual reports.

4.4 To assess the measuring and reporting of abatement measures, the ANAO examined the:

- integrity of estimates of the abatement achieved by individual and aggregate GHG measures during the Kyoto period;

⁹² The Wilkins Review of 2008 identified 62 Australian Government climate change programs, but noted that not of all them have abatement components. In 2008, State and Territory climate change reviews identified some 488 measures; however many of these initiatives have very small estimates of abatement, if any.

- methodology for calculating individual abatement measures; and
- reporting of abatement measures in domestic publications and in international submissions.

The ANAO examined the calculation methodology underpinning the nine largest abatement programs (representing some 85 per cent of total emissions abated in the Kyoto period) and progress towards meeting the Kyoto Protocol emission target. The ANAO did not verify the quality of source data used to estimate abatement measures or examine the methodologies employed by individual Australian Government delivery agencies.

Measuring progress towards the Kyoto Protocol target

4.5 Currently, estimates of how Australia is tracking towards meeting its Kyoto Protocol target are based on quantified forecasts of emissions for the Kyoto period using the most up to date inventory data of national GHG emission levels. Since 2003, the Australian Government has annually published progress reports that provide indicative projections of Australia's national GHG levels relative to the Kyoto Protocol target. The Kyoto Protocol sets out rules for accounting GHG emissions including how to calculate the base year emissions level, accounting emissions during the commitment period 2008-12 and flexible mechanisms that supplement domestic abatement action.⁹³ The rules for accounting national emission levels under the Kyoto Protocol differ from the UNFCCC accounting approach in relation to the land use change and forestry sector.⁹⁴ As previously discussed in Chapter 1, aggregate emissions are different under the two reporting regimes.

4.6 According to the department's most up-to-date emissions forecast, (shown in Figure 4.1), Australia's emissions are projected to reach an average of 581 Mt CO₂e per annum over the Kyoto period, which is 106 per cent of

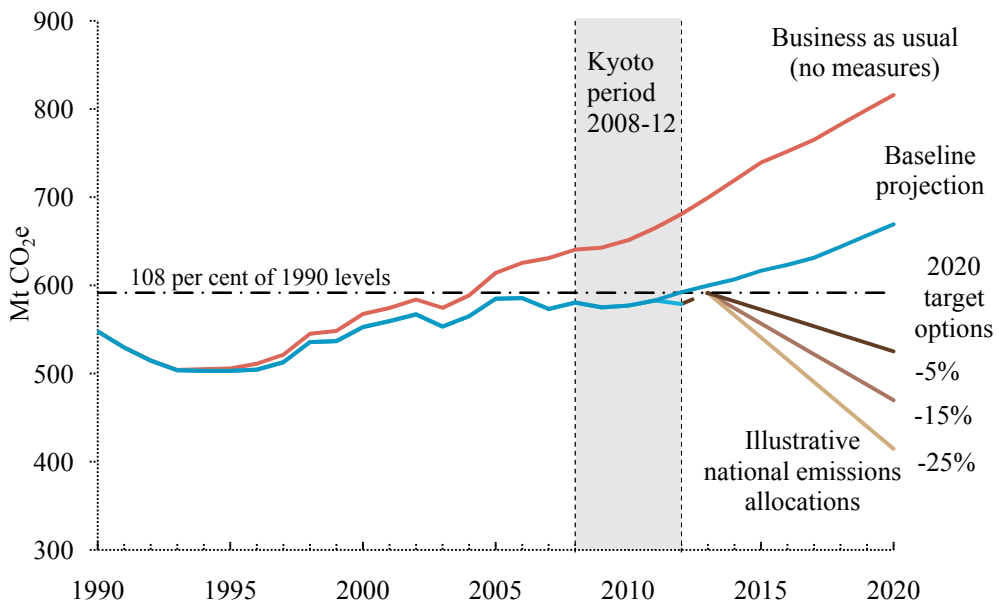
⁹³ The Kyoto Protocol establishes three 'flexibility mechanisms' to supplement domestic actions in meeting national emission targets: (1) Emissions trading allows countries that have emission units to spare to sell this excess capacity to countries that are over their targets. (2) The Clean Development Mechanism allows a country with an emission target under the Kyoto Protocol to implement an emission-reduction project in developing countries, and (3) Joint Implementation allows a country with an emission target commitment under the Protocol to earn emission reduction units from an emission-reduction project in with another country with a Protocol target.

⁹⁴ Under the UNFCCC, all carbon dioxide emissions from the human use of the land are accounted for in the Land Use, Land Use Change and Forestry (LULUCF) sector. In contrast, under the Kyoto Protocol (Article 3.3) accounting provisions, emissions from this sector for the commitment period 2008-12 are limited to afforestation, reforestation and deforestation activities since 1990.

1990 levels, and therefore on track to meet the Kyoto target. This forecast is known as the ‘with measures’ projection and reflects the likely net emissions, including the impact of government policies and abatement measures. Measures include abatement programs and initiatives implemented by the Australian, State and Territory Governments as well as collaborative measures. The department also provides a business as usual projection, which refers to the emission level that would have occurred in the absence of specific action to reduce GHG emissions.

Figure 4.1

National emissions projection to 2020



Note: This projection uses Kyoto Protocol accounting rules.

Source: Department of Climate Change, Australia’s Fifth National Communication on Climate Change, 2010.

4.7 As shown in Figure 4.1, DCCEE estimates that, without government emission abatement measures, Australia’s ‘business as usual’ emissions are projected to have reached 656 Mt CO₂e annually over the Kyoto Protocol period. This figure is 120 per cent of 1990 base year emissions, which is significantly above the Kyoto Protocol target of 108 per cent. The difference between the two scenarios is an indication of the estimated cumulative impact of government abatement measures.

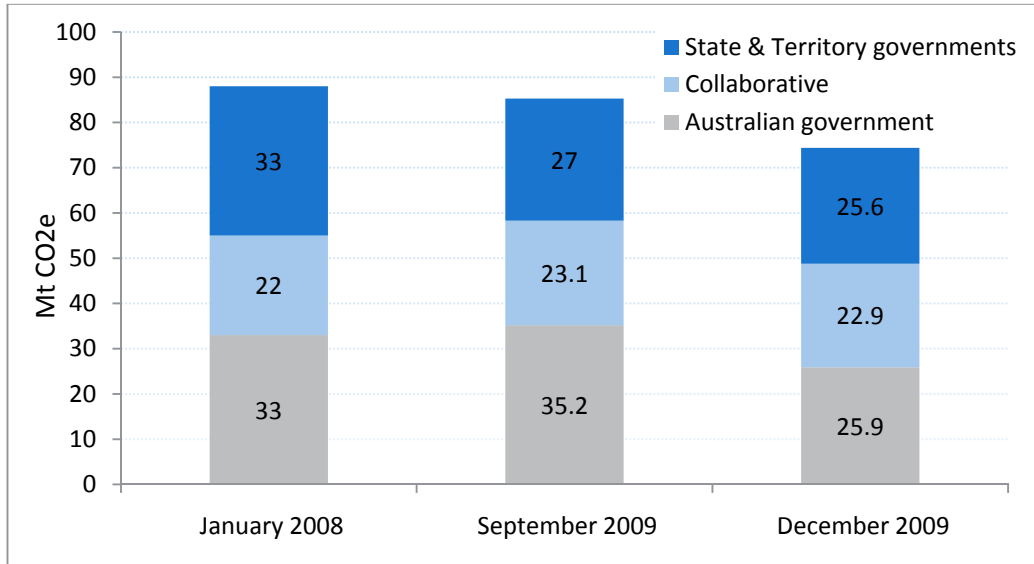
4.8 Successive governments have taken action to mitigate GHG emissions. As illustrated in Figure 4.1, in the early 1990s national emissions began to deviate from the business as usual scenario. There is often a lag of several years associated with the abatement impact of new policy initiatives, and abatement achieved in the Kyoto Protocol period is the result of many initiatives first implemented in the 1990s, as well as action taken for other reasons such as lowering operating costs for industry.

4.9 Australian mitigation actions have taken a variety of forms and generally conform to the UNFCCC definition of abatement measures as, 'measures that have been implemented or supported by regulation, fiscal incentive or other policy initiatives at the Australian, State and Territory or local government level.' This definition of abatement measures is very broad and, as a consequence, has resulted in the consideration of some 550 measures across all jurisdictions, as discussed in Chapter 2.⁹⁵ However, DCCEE only focuses on 35 abatement measures, as these measures are responsible for achieving abatement towards Australia's Kyoto target.

The cumulative impact of government abatement action in the Kyoto period

4.10 The department provided abatement estimates, both aggregate and for individual measures, for the Kyoto period. The department estimates that the cumulative impact of action undertaken by the State, Territory and Australian governments from 35 abatement measures will contribute (on average) 74.5 Mt CO₂e of abatement annually over the five year Kyoto Protocol period. This figure has been revised down by 15 per cent in the last two year period, from 88 Mt CO₂e in 2008. The contribution made by Australian governments and the periodic revision of the aggregate abatement impact is shown in Figure 4.2.

⁹⁵ The 550 measures refer to the 488 State and Territory measures reviewed as well as the 62 programs reviewed by the Australian Government.

Figure 4.2**Revisions of Australia's aggregate national abatement in 2008-12**

Note: Abatement measures were fully revised in January 2008 and partially revised in September and December 2009.

Source: ANAO analysis of Department of Climate Change and Energy Efficiency data.

4.11 Revisions to aggregate abatement estimates are the result of changes to the contribution made by individual abatement measures. These changes include updates to program performance and downward revisions of the contribution of individual measures. The number of primary abatement measures has remained relatively constant, fluctuating from 32 to 35 measures. The estimated contribution made by different levels of government has also fluctuated over this period, and is now shared equally between Australian and State/Territory initiatives.

Conclusion

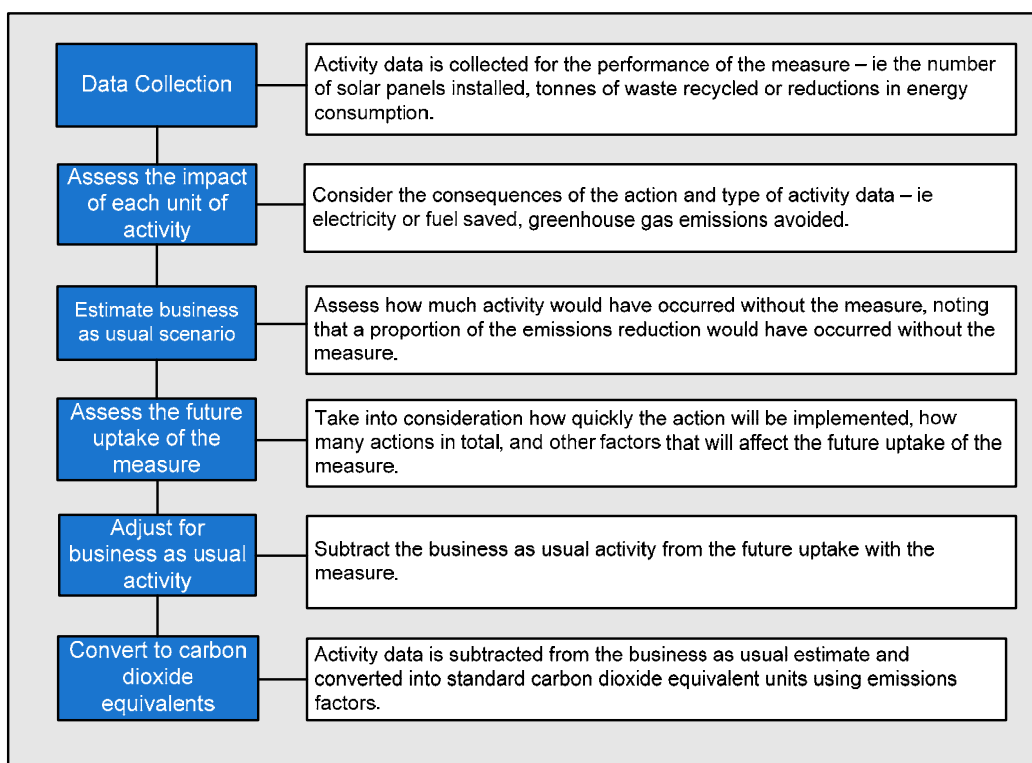
4.12 According to current departmental forecasts, Australia is likely to meet its Kyoto target of 108 per cent of 1990 emissions. Nevertheless, official emissions data of national performance throughout the five year Kyoto period (through Australia's greenhouse gas inventory) will not be available until 2015. Current departmental estimates indicate that the Australian Government is responsible for just over one third of government abatement (26 Mt CO₂e) on average, during the Kyoto period.

Methodology to calculate individual abatement measures

4.13 In calculating abatement, DCCEE consults with the delivery agencies to obtain program level data, and relevant program information. Agency consultation allows more informed judgements to be made in relation to the abatement impact, the future uptake of the measure and impact of overlaps with other programs. Typically, the estimation of abatement involves assessing the additional emission reduction over and above activities that would have occurred in the absence of the measure, also known as business as usual. Estimations involve the collection of performance data, such as energy consumption, which are converted into units of abatement, carbon dioxide equivalents and forecast into future years. Figure 4.3 illustrates the process undertaken by DCCEE for estimating and forecasting abatements measures.

Figure 4.3

Summary of the process undertaken by the Department of Climate Change and Energy Efficiency to estimate and forecast abatement measures



Source: ANAO analysis of Department of Climate Change and Energy Efficiency data.

Revisions to abatement estimates

4.14 The department periodically reviews abatement figures and the last two revisions were undertaken in 2007 and 2009, respectively. The 2009 revision was a strategic update of the comprehensive review undertaken in 2007. The 2007 review was undertaken by the then Australian Greenhouse Office (AGO) and included abatement figures as well as estimates of emission projections for each major sector to 2020.⁹⁶ Three independent consultants, including the Australian Bureau of Agricultural and Resource Economics, were engaged by the then AGO to estimate the impact of over 27 mitigation measures in the energy sector.⁹⁷ The consultant's results were then averaged to incorporate the different models, assumptions and uncertainties.⁹⁸ Consultants were also engaged in 2007 to estimate national abatement of the waste sector from collaborative action being taken across all jurisdictions.⁹⁹ In 2009, the then DCC used in-house expertise to update a sample of 13 larger programs that had changed, recently commenced or ceased.

4.15 To assess the integrity of calculating abatement measures, the ANAO reviewed nine of the largest measures, which contribute to over 85 per cent of the estimated total abatement, during the Kyoto period. A summary of the nine measures, including the type of measure, the delivery entity and the estimated abatement are outlined in Table 4.1.

⁹⁶ Emission projections were undertaken for eight sectors: (1) stationary energy, (2) transport, (3) fugitive emissions, (4) industrial processes, (5) waste, (6) agriculture, (7) land use change and (8) forestry.

⁹⁷ ACIL Tasman and McLennan Magasanik Associates in conjunction with the Monash Centre of Policy Studies were also engaged. Results from the consultants modelling were published in January 2008 in the *Stationary Energy Sector Greenhouse Gas Emissions Projections 2007* report.

⁹⁸ The projections and measures calculations were based on a composite of projections from three models, each combining top-down economy-wide and bottom-up energy sector models.

⁹⁹ Results from the Hyder Consulting review was published in January 2008 in the *Waste Sector Greenhouse Gas Emissions Projections 2007* report.

Table 4.1

Nine largest emission abatement measures for the Kyoto period 2008-12

Abatement measure	Entity	Type	Mt CO2e
Greenhouse Gas Abatement Program	Australian Government	Grant scheme	3.1
20% Renewable Energy Target		Regulation	8.9
Greenhouse Challenge Plus		Voluntary	10.4
Energy Efficiency Opportunities		Regulation	3.6
Waste sector strategies	Collaborative	Voluntary/ economic	9.3
Action on Energy Efficiency		Grants/ regulation	12.0
NSW /Qld land use change legislation	State Government	Regulation	18.0
NSW Greenhouse Gas Abatement Scheme		Regulation	4.7
Qld Cleaner Energy Strategy		Regulation	2.7
Remaining 26 measures ⁽¹⁾	Mixed	Mixed	8.1
Overlaps⁽²⁾			-3.6
Adjustments⁽³⁾			-2.7
TOTAL			74.5

Note: (1) The remaining 26 measures individually contribute less than 2.5 Mt CO2e each.
 (2) Abatement overlap among measures are subtracted from the aggregate figure.
 (3) Adjustment figures are also subtracted from the aggregate.

Source: ANAO analysis of Department of Climate Change and Energy Efficiency data.

4.16 The figures in Table 4.1 represent DCCEE’s most up to date estimates of the abatement contribution made by government initiatives during the Kyoto Protocol period. These nine initiatives are the most significant abatement measures among the 550 climate change measures implemented across all jurisdictions (as identified in Chapter 2).

4.17 The single largest measure is attributed to reduced rates of deforestation following the introduction of land clearing legislation in Queensland and New South Wales.¹⁰⁰ The calculation of this measure was undertaken using a projection model developed in conjunction with the in-house DCCEE National Carbon Accounting System, which was discussed in the previous chapter.

¹⁰⁰ *Vegetation Management and Other Legislation Amendment Act 2004* (Qld) and *Native Vegetation Regulation 2005* (NSW). These new laws were introduced in 2004 and 2005 respectively.

4.18 An examination of the nine measures listed in Table 4.1 indicates that the department uses the best available program level data, takes into account reasonable assumptions of future uptake and gives consideration to the overlap between programs that can result in double counting abatement. Forecasts of future economic parameters such as energy intensity¹⁰¹ were used to increase the accuracy of longer term estimates. Overall, this methodology provides a reasonable level of assurance as to the integrity of these *aggregate* calculations.

4.19 However, the following three issues have the potential to impact on the accurate calculation of *individual* measures:

- difficulty in distinguishing government induced abatement from business as usual operations;
- identification of overlaps between measures and the presentation of adjustment figures; and
- variability in the quality of source data.

Distinguishing abatement from business as usual operations

4.20 For two of the measures examined, Greenhouse Challenge Plus and the waste sector initiatives, it was difficult to determine whether the reported abatement was above and beyond business as usual activities. That is, the activities undertaken as part of normal business and economic conditions, and in the absence of government action. Business as usual should not necessarily imply a static situation and should take into account the dynamic improvements that would naturally occur within industry sectors, particularly in terms of improving energy efficiency and reducing operating costs for energy intensive industries.

Greenhouse Challenge Plus

4.21 The Greenhouse Challenge Plus¹⁰² program ran from 1995 to 2009. It was a voluntary partnership between industry and the Australian Government that identified and reported energy efficiency initiatives, with membership peaking at 770 corporations. DCCEE has revised down abatement estimates for

¹⁰¹ Emissions per unit of electricity generated and are expressed in units CO₂e per kilowatt. For example, natural gas and renewables energy sources have lower carbon intensities than coal and petrol combustion.

¹⁰² Formerly the Greenhouse Challenge program.

the program over time, but it is still estimated to be the third largest contributing measure (10.4 Mt CO₂e) in the Kyoto Protocol period. However, the actual impact of the program is difficult to discern. Two reviews of the program have also identified this issue. Reviews undertaken by the Senate Environment, Communications, Information Technology and the Arts Reference Committee in 2000,¹⁰³ and the then AGO in 2002 raised doubts about the level of abatement action achieved beyond business as usual. In response to the concerns raised in these reports, the program was amended to include more emphasis on the verification of data. However, the voluntary nature of the program and self reporting by members of their abatement, suggests that the reliability of total estimated abatement may be questionable.

Waste sector

4.22 According to the latest DCCEE figures, the waste sector is the fourth largest measure, responsible for abating 9.3 Mt CO₂e in the Kyoto period. Abatement is attributed to increased rates of solid waste diversion¹⁰⁴ and methane capture at the landfill sites.¹⁰⁵ These activities are the result of collaborative action undertaken by numerous State and local government initiatives and private sector bodies. Many of these practices are driven by considerations other than abatement. For example, the increased cost of waste collection and the management of landfill sites, and occupational health and safety concerns, such as flaring methane to avoid the accumulation of this flammable gas.¹⁰⁶ The 2007 waste sector consultant's report highlighted the potential impact of other abatement drivers, including four other government measures that may overlap with abatement in the waste sector.¹⁰⁷

4.23 The department's estimate of waste measures has attributed all abatement to government action and has not attempted to separate out or

¹⁰³ The Senate Environment, Communications, Information Technology and the Arts References Committee 'The Heat is On' report in 2000.

¹⁰⁴ Waste diversion reduces emissions through recycling, waste to energy and cleaner production, which aims to reduce the amount of waste created in manufacturing and production. GHG emissions from landfill are the result of the decomposition of waste in a low oxygen environment.

¹⁰⁵ This includes the capture of methane to generate power and methane flaring or burning off. Emission reductions can be achieved by burning methane to carbon dioxide as methane is 21 times more potent than carbon dioxide.

¹⁰⁶ Increased costs have led to greater levels of waste diversion mainly through recycling. Methane is flared to reduce the risk of dangerous pockets of methane gas igniting.

¹⁰⁷ The four programs are the Mandatory Renewable Energy Target, Green Power, Greenhouse Friendly and the NSW Greenhouse Gas Abatement Scheme.

revise down estimates based on an analysis of actual government driven abatement (be they local, state or federal). While the ANAO is not in a position to quantify this impact, factors other than climate change mitigation are likely to account for a proportion of the abatement claimed. A more comprehensive assessment of the waste sector at the State/Territory level that identifies and clearly distinguishes the full range of abatement drivers, (and their impacts) would enhance the integrity of this estimate.

4.24 For both initiatives, the estimates of abatement are likely to have included business as usual activities as well as actions undertaken for purposes other than mitigating climate change. The ANAO recognises that it can be difficult to distinguish between targeted mitigation activities and other actions as a range of factors can contribute to emission reductions, such as the cost of energy, economic activity and human behaviour. However, greater consideration of broader economic abatement drivers would assist in establishing a credible baseline and identifying the impact of government action.

Treatment of overlaps and adjustment figures

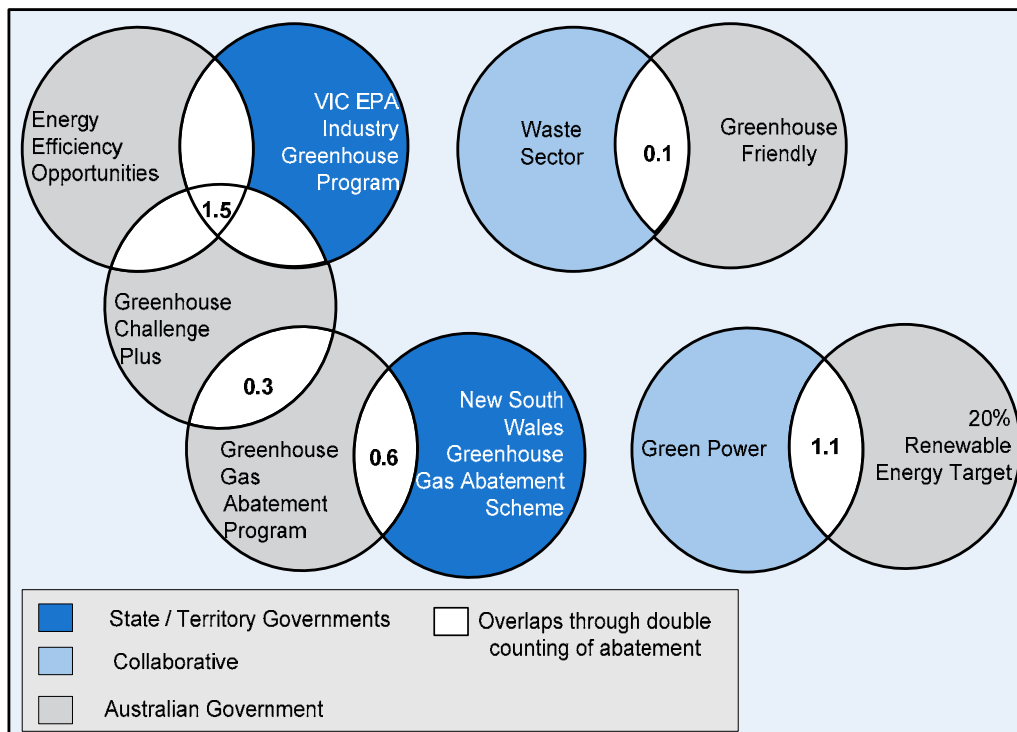
Overlaps across abatement measures

4.25 As discussed in Chapter 2, the Wilkins Review has noted that overlapping initiatives is a particular issue for Australia, given the combination of measures taken at national and state level. In these circumstances there is the potential to double count abatement achieved. For example, project level initiatives can be reported towards the Australian Government's Greenhouse Gas Abatement Program and also to the NSW Greenhouse Gas Abatement Scheme, which results in attribution of abatement from a single project to multiple programs. Double counting of abatement can potentially lead to the overstatement of government achievements.

4.26 In the 2009 revision, the department has attributed up to 3.6 Mt CO₂e to overlaps, primarily through the potential double counting of abatement from nine programs. Six of the nine largest measures are affected by overlaps with the majority of overlap occurring within the stationary energy sector. The department's identification of overlaps between measures, in mega tonnes of carbon dioxide equivalents, is illustrated in Figure 4.4.

Figure 4.4

Estimated abatement overlaps between nine measures



Note: VIC EPA refers to the Victorian Environment Protection Authority.

Source: ANAO analysis of Department of Climate Change and Energy Efficiency documents.

4.27 The estimate of overlap has been subtracted from the total abatement aggregate and has increased from the 2007 estimate of 2.9 Mt CO₂e. The department has indicated that the upward revision of the overlap was due to revised estimates for the Greenhouse Gas Abatement Program and Greenhouse Challenge Plus programs and a revision of the overlap between Green Power and the 20 per cent Renewable Energy Target. While the estimated overlap across all programs is relatively small compared with the aggregate abatement figure, the impact of program overlaps can substantially change the abatement estimates of individual measures. For example, assuming all potential overlap (1.5 plus 0.3 Mt CO₂e) is subtracted from the Greenhouse Challenge Plus abatement estimate it is some 17 per cent lower than the gross abatement estimate (10.4 Mt CO₂e).

4.28 These figures highlight the difficulties identified in the Wilkin’s Review concerning the coordination of policy initiatives between levels of government

and why streamlining of measures, as identified by COAG, is important. The lack of coordinated effort is a particular concern in the stationary energy sector,¹⁰⁸ where there are some 24 measures operating at national and State/Territory levels, which largely contribute to the identified overlap.

4.29 While the department has made progress in identifying sources of potential overlap and revising estimates over time, it has not attributed specific levels of double counting to each measure. Rather the overlap has been identified as an aggregate figure for each emissions sector. The estimates provided by the department, as presented in Table 4.1, are therefore a mixture of gross and net abatement figures.¹⁰⁹ The attribution of overlap to individual measures can be problematic and involves making qualitative judgements as to where the abatement actually resides. Nevertheless, the ANAO considers that the estimation of net abatement figures for each program, where feasible, is important in providing an accurate estimate of actual abatement and for advising the Government on the merits of its abatement measures.

4.30 In addition to revising the estimate of program overlaps in 2009, the department added an adjustment figure. This figure was to account for a partial revision of the Energy Efficiency Opportunities program. The adjustment factor of -2.7 Mt CO₂e reflects a conservative revision of the measure. The adjustment was added to the overlap estimate, which was then subtracted from the aggregate abatement figure. DCCEE advised that this occurred because the national abatement aggregate was determined before the estimate for EEO had been finalised with the delivery agency. While the department's approach does not affect the integrity of the aggregate abatement estimate, it can be misleading as to the abatement impact of individual measures.

Reliance on delivery agencies for source data

4.31 To calculate abatement estimates, DCCEE relies on the government agencies responsible for delivering climate change initiatives to provide

¹⁰⁸ The Stationary Energy sector includes emissions from electricity generation and direct combustion (fuels consumed directly in the manufacturing, construction and commercial sectors and other sources such as domestic heating).

¹⁰⁹ DCCEE has indicated that net figures have been provided for those measures that do not overlap- Action on Energy Efficiency, NSW/Qld land use change legislation and the Qld Cleaner Energy Strategy. The remaining six measures, which are affected by overlaps, are presented as gross figures in Table 4.1.

credible and verified program level data. As previously noted, source data forms a key component of abatement estimates. The department advised that, for the 2009 revision of abatement measures, agency data was not verified by the department.

4.32 The department advised that the data supplied was variable and the quality often depended upon the type of measure implemented. For example, regulatory initiatives that affect the level of consumption (or demand) are easier to model and thus estimate abatement because the performance requirements are explicit and legally supported. Therefore the data used to estimate abatement is generally, of a higher quality. However, measures such as energy efficiency initiatives and rebate schemes, are more difficult to estimate, and involve numerous assumptions about the quality of the installation, user behaviour and fluctuations in future uptake rates. Voluntary measures can also be problematic because of the difficulties in distinguishing business as usual activities in the performance data.

4.33 There is little doubt that improvements in the quality of source data will enhance the integrity of abatement estimates. However, it is the primary responsibility of delivery agencies to measure and record program level data. As discussed in Chapter 3 and 4 of Audit Report No.26 *Administration of Climate Change Programs* (tabled in conjunction with this report), the level and quality of project and program data currently collected by Australian Government agencies is variable and the audit has made suggestions for improvement.

4.34 Abatement estimates of individual measures are also calculated by some program areas within the delivery agencies.¹¹⁰ Currently there is no standardised methodology or guidelines for the estimation of abatement. DCCEE advised that abatement calculations undertaken by other government agencies vary considerably and, in many cases, the estimates are overstated, with an overly optimistic view of potential uptake or assumed savings from the measure. Abatement estimates undertaken by delivery agencies typically consider the program in isolation from other measures and do not have the capacity to consider potential overlaps with other programs, or accurately forecast future uptake rates. Therefore estimates of abatement undertaken by

¹¹⁰ Some abatement calculations are undertaken within areas of the Department of the Environment, Water, Heritage and the Arts, and the Department of Energy, Resources and Tourism. Typically, consultants are engaged to undertake these calculations.

delivery agencies and DCCEE are often different. For this reason, it is important that abatement estimates are prepared or endorsed by DCCEE to ensure consistent reporting and quality across government agencies.

Abatement costing and measurement methodology

4.35 In the Australian Government's response to the Wilkin's Review of 2008, the then DCC was directed to develop an abatement costing and measurement methodology for new climate change policy proposals. The methodology is intended to facilitate the consistent and systematic estimation of abatement and costs to the economy.

4.36 The department advised that a draft guidance document will be circulated to relevant departments for review in early 2010 and is expected to be published in mid-2010. Key features of the proposed methodology and guidelines include:

- a step by step approach to calculating emissions reductions from a policy or measure;
- advice on data integrity; and
- worked examples to demonstrate how to calculate emissions and costs.

4.37 A consistent and standardised approach to the measurement of program abatement will be essential if the Government is to make informed decisions about the most efficient and cost effective abatement policies. The costing and abatement methodology guidance will provide agencies with a standard approach to determining the actual and forecasted abatement as well as the economic costs of their programs. It will be important that the guidance also clearly sets out the roles and responsibilities of DCCEE in providing official abatement estimates per measure, the aggregate national figure and preparing or endorsing abatement calculations if undertaken by delivery agencies.

4.38 It will also be important that this guidance material has appropriate authority so that it is widely applied by public sector agencies responsible for delivering abatement programs. There would also be benefit in common guidelines being adopted by State and Territory governments to facilitate a more consistent national approach to estimating and forecasting measures. However, to be effective this will need to be supported by sound administrative practices such as the quality assurance of source data and program measuring and reporting systems.

Conclusion

4.39 The department employs a sound methodology to estimate the overall impact of Government measures. Over time, the methodology for calculating program level abatement and the aggregate impact of government action has been refined and improved. The department's most recent abatement revision builds upon and revises previous calculations, and is informed by more up-to-date program performance and attribution to the impact of program overlaps. The aggregate estimate of national abatement has been revised down by 15 per cent since 2007 to reflect a more realistic assessment of the Government's contribution during the Kyoto Protocol period. A clearer representation of overlaps between programs and adjustment figures would further improve the integrity of the individual estimates. Additional improvements could be achieved through a more comprehensive consideration of the business as usual component within programs and broader identification of abatement drivers, such as lower operational costs for energy intensive businesses and changes in the cost of energy.

4.40 In 2008 approximately 550 climate change related measures were identified across all jurisdictions. The primary focus for DCCEE is on 35 abatement measures that are responsible for government achieved abatement during the Kyoto Period. However only nine measures are expected to contribute to the significant majority (over 85 per cent) of abatement during this period. The limited number of measures that materially contribute to abatement would suggest that the definition of a measure lacks precision and could be refined to better focus on those key initiatives designed to achieve significant abatement. In particular, consideration could be given to operational criteria such as the abatement objective of the measure and the extent to which it can be differentiated from business as usual activities. Such an approach would also assist in the further rationalisation of climate change programs as discussed in Chapter 2.

4.41 The consistency/quality of source data provided by delivery agencies could also be improved and this will need to be a priority for all agencies delivering climate change programs. The costing and abatement guidance, currently being developed by DCCEE, will assist delivery agencies in measuring the abatement impact of existing and proposed policy measures.

Public reporting of abatement

4.42 Public reporting should allow the transparent and accountable presentation of government abatement activities. In particular, the publication of abatement achievements provides an assessment of the effectiveness of government mitigation measures. This information will also inform future policy decisions.

4.43 Abatement measures are reported by Australian Government delivery agencies and can take numerous forms, including annual reports, departmental websites, press releases and other public reports. There are three principal publications that present official abatement figures of government action:

- *Tracking to Kyoto* reports: annual public reports that identify an aggregate abatement figure for government action and progress towards the Kyoto Protocol Target;
- emission sector projection papers: a series of annual publications that accompany and support the *Tracking to Kyoto* reports; and
- *National Communications* reports: four yearly progress reports submitted to the UNFCCC detailing the abatement contribution of individual and aggregate measures.

4.44 The ANAO examined the reporting of abatement by Australian Government agencies in annual reports and other publications and DCCEE's reporting of abatement in domestic publications and international submissions.

Reporting on individual measures by delivery agencies

4.45 In examining the public reporting of abatement by Australian government agencies, the ANAO examined an indicative sample of six major Australian Government programs in annual reports since 1999-2000.¹¹¹ From this analysis, the level of public reporting on the impact of individual climate change programs has generally been poor. Typically, reporting of individual

¹¹¹ These include the Greenhouse Gas Abatement Program, Greenhouse Challenge Plus including Greenhouse Friendly, Solar Cities, Renewable Remote Power Generation Program, Solar Homes and Communities Plan and Action on Energy Efficiency. These programs were administered by the Department of Environment, Water, Heritage and the Arts until March 2010 when responsibility was transferred to DCCEE. Energy Efficiency Opportunities is administered by Department of Resources, Energy and Tourism.

programs by responsible agencies has been ad hoc and often activity based. Of the six government programs examined, reporting of abatement figures varied from year to year, with no program consistently reporting on abatement over the period examined. More broadly, the level of reporting of abatement has deteriorated in recent years. In particular, only two of the measures examined by the ANAO, Solar Cities and the Greenhouse Friendly program, reported an abatement figure in 2008-09.

4.46 In addition, when abatement figures for individual programs have been provided by agencies, the presentation of abatement figures has been variable. For example, for the reporting of the Greenhouse Friendly program¹¹² a variety of approaches have been taken over the life of the program. As illustrated in Table 4.2, in four of the eight potential reporting years, abatement was reported in three different formats, making any year on year comparisons very difficult.

Table 4.2

Extracts of Greenhouse Friendly annual reporting

Reporting Year	Program reporting
2001-2002	In 2001/02, expected to achieve abatement of at least 1 Mt CO2e over the 5 year certification period.
2002-2003	Over 2.5 Mt CO2e for the 5 year certification period.
2003-2004	Cumulative impact of 1.026 Mt CO2e (Nov 01 -30 June 2004).
2004-2005	<i>No reporting</i>
2005-2006	<i>No reporting</i>
2006-2007	Nearly 2 Mt CO2e.
2007-2008	<i>No reporting</i>
2008-2009	During 2008–09, the department approved six new abatement projects and 2.8 million tonnes of emissions abatement.

Source: The then Department of Environment, Annual reports, 2001-02 to 2007-08 and Department of Climate Change Annual Report, 2008-09.

4.47 These findings support conclusions made in the 2003-04 Audit Report No.34 *The Administration of Major Programs*, which identified reporting inconsistencies in annual reports and recommended that performance targets should be regularly reported against. The annual reporting of abatement has

¹¹² The Greenhouse Friendly initiative is a certification program that approves certain abatement activities that offer net emission reductions.

not improved, which would suggest that this recommendation has not been fully implemented.

4.48 DCCEE has indicated that, in many cases, press releases and websites also present abatement figures in different forms. These figures can include forecasts of cumulative impact over the life of the program, current abatement figures and abatement in the Kyoto period either on an average annual basis or as a cumulative five year abatement figure. A consistent approach to reporting abatement across agencies would enhance transparency and facilitate a clearer assessment of program achievements. It would also enable comparison between measures and across time periods.

Reporting by the Department of Climate Change and Energy Efficiency

Tracking to Kyoto reports

4.49 Since 2003, the Australian Government has published *Tracking to Kyoto* reports annually. These reports provide projections of national emissions during the Kyoto period and to 2020, including an aggregate abatement figure for 2008-12. Key government mitigation measures are listed in a commentary of sectoral emission projections and abatement figures for individual measures are not typically reported.

Sectoral publications and measures

4.50 From 2003 to 2007 the *Tracking to Kyoto* reports were accompanied by the publication of projection papers for each major emission sector, such as stationary energy, transport, agriculture and waste. These publications provide a comprehensive account of the projection methodology and assumptions that underpin the basis of the national emissions projection. The papers also detail the impact of individual abatement measures, per sector, and their corresponding abatement estimates. Abatement estimates in each sectoral paper were clearly presented and program overlaps were also identified. However, this reporting format fragments the results of the aggregate abatement estimates across the separate projection papers, making it difficult to examine the abatement achievements relative to the aggregate national figure. It is also difficult to assess the achievements of measures that are applied in a number of sectors, such as the Greenhouse Gas Abatement Program, which has projects in the stationary energy, industrial processes and fugitive emissions sectors. There would be benefit in amalgamating the

sectoral abatement results into a consolidated report that details the abatement figures, per measure and in aggregate.

4.51 Sectoral reports were not published with the 2009 *Tracking to Kyoto and 2020* report. The department indicated that plans to continue the publication of this reporting format are under consideration.

National Communications

4.52 A comprehensive and consolidated list of all significant Australian government measures and their estimated abatement is publicly reported through the National Communications report, as required by the UNFCCC. Mandatory UNFCCC guidelines set out the content and format of the report, including a standardised reporting table for all government abatement measures.¹¹³ The guidance indicates that reports may present abatement estimates for a number of years, and suggested years may include 2010, 2015 and 2020.

4.53 In Australia's National Communication reports for 2002 and 2005, abatement estimates for individual measures were presented for 2010, which is in the middle of the Kyoto commitment period and thus provides a useful indication of the impact of abatement during the Kyoto period. In Australia's most recent report submitted to the UNFCCC in February 2010, the department presented the aggregate abatement for the Kyoto period, however, individual abatement figures were presented for only one year, 2020. This does not provide comparable data with previous reports, such as abatement estimates for 2010.

4.54 The department's approach is in accordance with UNFCCC guidelines. However, the inclusion of abatement figures for individual measures in 2010 would have been particularly useful in providing government and the Parliament (and the public) with an indication of the impact of government action to date. Inconsistent program figures and a lack a comparable official data makes it difficult to identify the extent to which programs are on track to deliver their original abatement targets. This information is particularly important for those collaborative measures,¹¹⁴ such as abatement in the waste

¹¹³ The standardised table includes information about the type of measure, estimated abatement, the responsible delivery entity and the implementation status of the measure.

¹¹⁴ Those measures jointly implemented by the Australian and State/Territory Governments.

sector, which are not implemented or reported by a single delivery agency and, as a result, are not reported on an annual and public basis.

Conclusion

4.55 The level of public reporting among Australian Government delivery agencies on the impact of individual programs has been variable and is generally poor. Typically, the reporting of abatement for individual programs is activity based and ad hoc. Where abatement figures are published in annual reports, they are often not comparable across years or programs. A consistent approach to reporting abatement measures would enhance the transparency of government achievements.

4.56 The ANAO considers that as 2010 is the middle of the Kyoto Protocol period, it presents an opportune time to evaluate the actual impact of government abatement efforts. Given the absence and variability of abatement figures being reported by delivery agency reports, a consolidated picture of individual abatement measures and aggregate abatement is currently lacking. While the comprehensive public disclosure of the aggregate and per measure abatement achievements occurs in the four yearly National Communications report, the length of time between reports means that it is difficult to track results year to year and evaluate the progress of programs over time. For greater transparency, abatement figures for individual measures and in aggregate could be reported more regularly by the DCCEE in a domestic publication.

Recommendation No.1

4.57 To increase transparency and consistency of reporting the impact of climate change abatement measures, the ANAO recommends that:

- (a) Australian Government agencies responsible for delivering climate change programs report abatement estimates/figures in annual reports and against program targets, where applicable; and
- (b) the Department of Climate Change and Energy Efficiency annually publish a consolidated report of all Government measures with estimates of current abatement and forecasts for five yearly intervals, and, where practicable, the net abatement of individual measures .

DCCEE response:

Agreed.



Ian McPhee
Auditor-General

Canberra ACT
20 April 2010

Appendices

Appendix 1: Agency Responses



Australian Government
**Department of Climate Change
and Energy Efficiency**

| April 2010

Mr Matt Cahill
Group Executive Director
Performance Audit Services Group
Australian National Audit Office

Dear Mr Cahill

COORDINATION AND REPORTING OF AUSTRALIA'S CLIMATE CHANGE MEASURES

Thank you for your letter of 5 March 2010 to Dr Martin Parkinson concerning the audit report on the *Coordination and Reporting of Australia's Climate Change Measures*. The Department of Climate Change and Energy Efficiency (DCCEE) appreciates the opportunity to comment on the draft audit report and the Secretary has asked me to respond on his behalf.

The Department welcomes the overall conclusions of the audit report. The Department agrees with the single recommendation that all agencies should report abatement estimates using comparable agreed methods. The Department will continue to regularly publish detailed abatement estimates and information as part of the emissions projections.

At your request, we have broken up our comments into three parts (attached):

- Attachment 1 contains the formal DCCEE comments and our agreement with the single recommendation;
- Attachment 2 contains a short summary of the Department's comments to be included in the report summary and brochure; and
- Attachment 3 contains some suggested editorial and factual changes.

We would be happy to discuss any of these issues with you further. The contact officer in DCCEE is Helen Grinbergs, Assistant Secretary Coordination and Frameworks Branch (phone number: (02) 6159 7358, email: Helen.Grinbergs@climatechange.gov.au)

Yours sincerely

Geoff Leeper
Deputy Secretary
Department of Climate Change and Energy Efficiency



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Audit-In-Confidence

Response to Recommendations**Recommendation No. 1***Para. 4.57*

To increase transparency and consistency of reporting the impact of climate change abatement measures, the ANAO recommends that:

- a) Australian Government agencies responsible for delivering climate change programs report abatement estimates/figures in annual reports and against program targets, where applicable; and
- b) The Department of Climate Change annually publish a consolidated report of all Government measures with estimates of current abatement and forecasts for five yearly intervals, and, where practicable, the net abatement of individual measures.

Department of Climate Change response: *Agreed.*

The Department notes the report shows that the methods used to estimate abatement are rigorous and reliable. In particular, that the Department “employs a sound methodology to estimate the overall impact of Government measures”. DCCEE places a strong focus on quality assurance and consistency between and within estimates and the report provides a useful perspective on what refinements may further improve the transparency and understanding of estimates.

The Department agrees it would be desirable for Government agencies to report DCCEE approved estimates of abatement from climate change programs in their annual reports and against program targets where applicable. The Department of Climate Change and Energy Efficiency has a work program already in place to improve estimates of individual measures and, where feasible, to allocate overlaps to individual measures. Once this work program is complete, DCCEE intends to publish this data in a consolidated report to improve transparency and consistency.

The report also makes mention of the development of guidelines for abatement measurement and costing methodology for new climate change policy proposals. This guidance will be a crucial tool to improve abatement estimation across agencies. There is also a process underway through the Senior Officials Group on Energy Efficiency (SOG-EE) to provide information to the State and Territory Government officials on the Australian Government’s approach and methodologies for abatement and costing estimation.

Audit-In-Confidence

Attachment 2

DCCEE input for report summary and brochure

The Department welcomes the overall conclusions of the audit report, in particular that the methods used to estimate abatement are rigorous and reliable. The Department agrees that all agencies should report abatement estimates using comparable agreed methods. The Department will continue to regularly publish detailed abatement estimates and information as part of the emissions projections.



Acting Secretary

Australian Government

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Industry, Science and Research**

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Mr Matt Cahill
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Dear Mr Cahill

Coordination and Reporting of Australia's Climate Change Measures

Thank you for your letter dated 10 March 2010, seeking comment on the ANAO's proposed audit report on the *Coordination and Reporting of Australia's Climate Change Measures*. We appreciate the opportunity to comment on the extract of the report that you provided with your letter.

The Department of Innovation, Industry, Science and Research has a key role to play in implementing science and research measures to respond to climate change, including through the Super Science Initiative announced by the Australian Government in May 2009.

The Department agrees that it is critical that measures relating to climate change science and research are well coordinated across the Australian Government as well as between levels of government and across key stakeholders. In particular, we wish to endorse the expectation that the implementation of the National Framework for Australian Climate Change Science would promote a coordinated approach to climate science and research activities and of the resources and funding for climate change science.

You invited any additional commentary we may have on the report, and I include some specific remarks at **Attachment A** for your consideration.

Yours sincerely

Sue Weston

6 April 2010

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