Australian Government

Australia's Second Biennial Report

December 2015

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Contents

Joint Ministerial Foreword 1

1 Introduction 2

2 Information on Greenhouse gas emissions and trends 3

2.1 Overview of National Emissions 3

2.1.1 Emission Profile 3

2.1.2 Emission Trends 3

2.1.3 Emissions by greenhouse gas type 6

2.1.4 Australia's emissions per capita and emissions intensity 7

2.2 National Inventory System 7

2.2.1 Coverage 8

2.2.2 Data sources 8

2.2.3 Estimation methods 10

2.2.4 Supporting Inventory Systems 11

2.2.5 Quality assurance and quality control 13

2.2.6 Recalculation of previously submitted inventory data 14

3 Quantified Economy-wide Emission Reduction Target 15

3.1 Details of Australia's 2020 target 15

3.2 Approach to reporting progress under the QEERT 16

3.3 Carry-over and Market based mechanisms 16

4 Progress in achievement of the QEERT 17

4.1 Greenhouse gas emissions in relation to the QEERT 17

4.2 Mitigation actions and their effects 18

4.3 Overview of mitigation policies 18

4.3.1 Emissions Reduction Fund 18

4.3.2 Renewable Energy Target 23

4.3.3 Clean Energy Finance Corporation 24

4.3.4 Australian Renewable Energy Agency 25

4.3.5 Vehicle Fuel Efficiency 25

4.3.6 Energy Productivity and Efficiency programmes 27

4.3.7 20 Million Trees 30

4.3.8 Solar Towns Programme 30

4.3.9 Low Emissions Technology Roadmap 31

4.3.10 Low emission fossil fuel technology programmes 31

4.3.11 National Carbon Offset Standard 32

4.3.12 Carbon Neutral Program 32

4.4 Policy responsibility 33
4.4.1 Commonwealth agencies 33
4.4.2 Interaction between Commonwealth and State agencies on climate change 34
4.5 Domestic institutional arrangements relating to Australia's QEERT 34
4.5.1 The Role of the Clean Energy Regulator 34
4.5.2 The Role of the Climate Change Authority 34
4.6 Addressing adverse effects, economic and social consequences of response measures 35
4.7 Estimates of emission reductions and removals from **LULUCF** activities 36
4.7.1 Coverage 36

5 Projections 39
5.1 Projections methodologies 39
5.1.1 Modeling approach 39
5.1.2 Institutional arrangements and quality assurance process 40
5.2 Summary of projections 40
5.2.1 Cumulative abatement task to 2020 40
5.2.2 Revised annual projections 43
5.3 Projections by sector 46
5.3.1 Electricity 46
5.3.2 Direct Combustion 47
5.3.3 Transport 48
5.3.4 Fugitives 49
5.3.5 Industrial Processes and Product Use 50
5.3.6 Agriculture 50
5.3.7 Waste 51
5.3.8 Land Use, Land Use Change and Forestry 52
5.3.9 Projections of international bunker fuels emissions 52
5.4 Key assumptions 53
5.4.1 Electricity 53
5.4.2 Direct Combustion 53
5.4.3 Transport 54
5.4.4 Fugitives 54
5.4.5 Industrial Processes and Product Use 54
5.4.6 Agriculture 55
5.4.7 Waste 55
5.4.8 Land Use, Land Use Change and Forestry 56
5.5 Changes since Australia's First Biennial Report 56

6 Provision of financial, technological and capability-building support to developing countries 57

Lessons learned 57

6.1 Finance 58

6.1.1 Bilateral support 58

6.1.2 Multilateral support 59

6.1.3 Private sector 59

6.2 Technology development and transfer 60

6.3 Capacity Building 61

6.3.1 Meeting developing country needs 61

6.3.2 National approach to tracking and reporting provision of support 61

6.3.3 Multilateral contributions 62

6.3.4 Bilateral support 62

6.3.5 Other official flows 63

6.3.6 Mobilised private sector investment 63

7 Other reporting elements 64

7.1 Emissions measurement, reporting, and verification and emissions projections 64

7.2 Australia's self-assessment of emissions reduction compliance 64

8 Appendices: Common Tabular Format Tables 65

CTF Table 1.1 Emission trends: Summary 66

CTF Table 1.2 Emissions trends: CO_2 69

CTF Table 1.3 Emissions trends: CH_4 77

CTF Table 1.4 Emission trends: N_2O 84

CTF Table 1.5 Emissions trends: HFCs, PFCs, SF_6, NF_3 91

CTF Table 2(a) Description of Quantified Economy-wide Emission Reduction Target: Base year and target 95

CTF Table 2(b) Description of Quantified Economy-wide Emission Reduction Target: Gases covered 95

CTF Table 2(c) Description of Quantified Economy-wide Emission Reduction Target: Sectors covered 95

CTF Table 2(d) Description of Quantified Economy-wide Emission Reduction Target: Role of the LULUCF sector 96

CTF Table 2(e)I Description of Quantified Economy-wide Emission Reduction Target: Market-based mechanisms under the Convention 96

CTF Table 2(e)II Description of Quantified Economy-wide Emission Reduction Target: Other market-based mechanisms 97

CTF Table 2(f) Description of Quantified Economy-wide Emission Reduction Target: Any other information 97

CTF Table 3 Progress in achievement of the Quantified Economy-wide Emission Reduction Target: information on mitigation actions and their effects 98

CTF Table 4 Reporting on progress 105
CTF Table 4(a)I–1 Progress in achieving the Quantified Economy-wide Emission Reduction Target—further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector, 2013 106
SUPPLEMENT: Cancun 2020 target inventory: KP LULUCF classifications data against KP LULUCF classifications 109
CTF Table 4(a)I–2 Progress in achieving the Quantified Economy-wide Emission Reduction Target—further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector, 2014 110
CTF Table 4(b) Reporting on progress 113
CTF Table 5 Projections assumptions 114
CTF Table 6 Information on updated greenhouse gas projections 115
CTF Table 7 Provision of public financial support: summary information 117
CTF Table 7(a) Provision of public financial support: contribution through multilateral channels 119
CTF Table 7(b) Provision of public financial support: contribution through bilateral, regional and other channels 123
CTF Table 8 Provision of technology development and transfer support 134
CTF Table 9 Provision of capacity-building support 137

Glossary 139

Abbreviations and Acronyms 143

References 145

Joint Ministerial Foreword

In Paris this month, all countries agreed to work together to respond to the global challenge of climate change. The Australian Government played a constructive role in delivering an effective agreement that will set up a process to keep global warming well below 2°C and pursuing efforts towards 1.5°C. Australia is already playing its part by taking strong, credible and responsible action domestically, and cooperating with countries in our region to support climate change action.

The Hon Julie Bishop MP
Minister for Foreign Affairs

Australia has made considerable progress since we submitted our last Biennial Report in 2013.

We have implemented the Emissions Reduction Fund, and this innovative new policy approach has seen great success in its first year. Through the first two reverse auctions we have already contracted to purchase 92.8 million tonnes of abatement, providing strong incentives for industry and land managers to reduce emissions and sequester carbon. The Emissions Reduction Fund and our other policies have put us on track to meet our 2020 emissions reduction target.

In Paris, Australia announced we will ratify the second commitment period of the Kyoto Protocol.

We have set a strong 2030 target of a 26–28 per cent reduction on 2005 emissions. We will undertake a review in 2017 to look at how we can build on our existing policies, and take advantage of new technologies and innovation to meet this ambitious target, while considering a longer-term target.

Our Office of Climate Change and Renewables Innovation is promoting the role of innovation to support emerging renewable and low-emissions technologies that will drive down emissions. Under the National Energy Productivity Plan we will improve our energy productivity by 40 per cent between now and 2030. Our Renewable Energy Target will almost double our renewable energy generation by 2020.

The Hon Greg Hunt MP
Minister for the Environment

The Australian Government is proud of our work in helping developing countries in our region respond to climate change. We are implementing climate change initiatives in the Australian aid programme to ensure that our investments both promote economic growth to reduce poverty, and respond to developing country priorities to build resilience to climate change and natural disasters. Our support will continue and we have committed to provide at least A$1 billion over the next five years to build climate change resilience and reduce emissions. As a major contributor to the Green Climate Fund and current Co-Chair of the Board, Australia is helping to ensure this global fund delivers strong results in our region.

The Hon Julie Bishop MP
Minister for Foreign Affairs

The Hon Greg Hunt MP
Minister for the Environment

1 Introduction

Australia's second Biennial Report is a comprehensive summary of Australia's progress towards meeting its commitments under the United National Framework Convention on Climate Change (UNFCCC).

Australia is committed to providing transparent, accurate, complete, comparable and consistent information about its greenhouse gas emissions and trends. Chapter 2 shows Australia is reducing both its emissions per capita and its emissions intensity.

Australia is taking action to meet its unconditional 2020 target to reduce emissions by five per cent below 2000 levels by 2020. This is equivalent to a 13 per cent reduction on 2005 levels. Detail on the target is provided in Chapter 3.

Australia has implemented scalable and effective policies to address climate change. Australia is meeting its 2020 target through Direct Action policies that reduce emissions, increase productivity and improve the environment.

The centrepiece of the Australian Government's approach is the A$2.55 billion Emissions Reduction Fund (ERF). The Government has contracted to purchase 92.8 million tonnes of abatement under the ERF. The ERF operates alongside a range of complementary policies designed to grow the renewable energy sector and improve Australia's emissions intensity and productivity. Details of Australia's mitigation policies to reduce emissions and meet its target are discussed in Chapter 4.

Projections of future emissions, discussed in Chapter 5, show that Australia's cumulative abatement task has fallen compared to previous projections as a result of mitigation actions that Australia has implemented and the Australian economy becoming less emissions intensive.

Australia provides support to assist developing countries to address their specific climate change challenges. This includes finance, capacity building and technology transfer to help countries achieve low-carbon, sustainable and resilient economic development. Chapter 6 of this report details the support Australia provided in the 2012-13 and 2013-14 Australian financial years.

Australia's self-assessment of its compliance with emission reduction commitments is discussed in Chapter 7.

This report addresses recommendations made by the UNFCCC Expert Review Team during its assessment of Australia's First Biennial Report including: greater detail on sectoral policies to reduce emissions, information on the roles and responsibilities of Australia's government departments and institutions; and detailed information on the ERF.

2 Information on Greenhouse gas emissions and trends

In 2013, Australia's emissions per capita (23.3 t CO_2-e per person) and the emissions intensity of its economy (0.35 kg CO_2-e per dollar) were at their lowest levels since 1990. Over the period 1990–2013, on a UNFCCC accounting basis, energy-related emissions (*stationary energy, transport* and *fugitives emissions* from fuels) dominated Australia's emissions profile. The *energy* sector experienced the greatest increase in emissions, followed by emissions from the *industrial processes and product use* sector. The *Land-Use, Land-Use Change and Forestry* (LULUCF) sector experienced the greatest decline in emissions over 1990–2013, with emissions from *waste* and *agriculture* also falling.

Australia prepares, publishes and updates its national greenhouse gas inventory on an annual basis. Australia is committed to the continual improvement of its inventory. Emissions estimates are prepared using best available data and an integrated inventory system. They are subject to extensive and mature quality assurance and control processes with the aim of ensuring estimates meet the UNFCCC quality criteria of transparency, time series consistency, accuracy, completeness and comparability.

Unless otherwise stated, the greenhouse gas data in this report are consistent with Australia's *National Inventory Report 2013 (NIR 2015)*, submitted under the UNFCCC and the Kyoto Protocol (KP) in May 2015. In addition to the *National Inventory Report*, Australia publishes a range of supporting emissions estimates that provide further information on Australia's emissions on a regional and industry basis. Together, these products constitute the *Australian National Greenhouse Accounts*.

2.1 Overview of National Emissions

2.1.1 Emission Profile

In 2013, Australia's total greenhouse gas emissions—including the LULUCF sector—were 538.0 Mt CO_2-e under the UNFCCC accounting framework. Energy-related emissions (*stationary energy, transport* and *fugitives emissions* from fuels) dominate Australia's emissions profile, contributing 76.4 per cent of total emissions in 2013, while the *agriculture* sector contributes 15.8 per cent. Emissions from the *industrial processes and product use* (6.0 per cent) and *waste* (2.5 per cent) sectors are relatively minor. *LULUCF* sector emissions and removals accounted for -4.0 Mt CO_2-e in 2013. Australia's net greenhouse gas emissions excluding *LULUCF* were 541.9 Mt CO_2-e in 2013.

2.1.2 Emission Trends

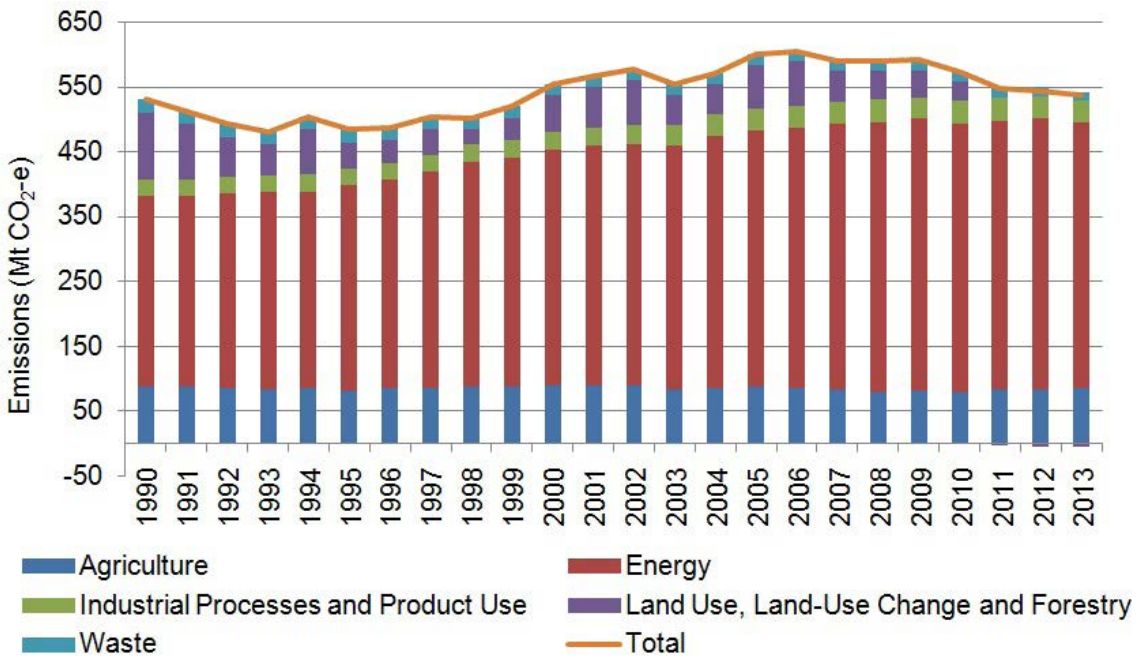
As shown in Table 2.1 and Figure 2.1, Australia's total greenhouse gas emissions increased by 1.2 per cent between 1990 and 2013. When the *LULUCF* sector emissions and removals are excluded, Australia's emissions in 2013 increased by 26.5 per cent compared with 1990.

Table 2.1 Australia's net greenhouse gas emissions by sector (UNFCCC inventory)

Sector and Subsector	Emissions Mt CO_2-e			Per cent change
	1990	2012	2013	1990–2013
1. Energy (combustion + fugitive)	292.8	418.8	411.0	40.4%
Stationary energy	195.4	287.8	280.1	43.4%
Transport	61.4	92.4	92.7	50.9%
Fugitive emissions from fuel	36.1	38.6	38.2	6.0%
2. Industrial processes and product use	26.1	33.1	32.5	24.6%
3. Agriculture	88.6	83.7	85.0	-4.0%
5. Waste	20.8	14.1	13.4	-35.7%
Total net emissions (excluding LULUCF)	428.3	549.8	541.9	26.5%
4. LULUCF	103.3	-5.1	-4.0	-103.8%
Total net emissions (including LULUCF) (a)	531.6	544.7	538.0	1.2%

(a) Totals and trend reflect Australia's emissions and removals under the UNFCCC accounting framework, not the KP accounting framework

Figure 2.1 Australia's net greenhouse gas emissions by sector (UNFCCC inventory)



The largest increase in emissions over 1990 to 2013 was from *energy* (40.4 per cent increase, 118.2 Mt CO_2-e), which comprises *stationary energy* (up 43.4 per cent, 84.8 Mt CO_2-e), *transport* (up 50.9 per cent, 31.3 Mt CO_2-e), and *Fugitive emissions* from fossil fuels (up 6 per cent, 2.1 Mt CO_2-e). *Industrial processes and product use emissions* increased by 24.6 per cent, or 6.4 Mt CO_2-e. Emissions declined in *agriculture* (-4.0 per cent, -3.6 Mt CO_2-e), *waste* (-35.7 per cent, -27.8 Mt CO_2-e) and *LULUCF* (-103.8 per cent, -107.3 Mt CO_2-e).

The principal drivers of these emission trends are as follows:

- **Energy**: Increases in emissions in the *stationary energy* sector have been driven in part by increases in population, household incomes, and exports from the resources sector. While emissions from the *stationary energy* sector have increased, on a per capita basis emissions have decreased (see discussion in section 2.1.4). The main drivers for the increase in transport emissions are continuing growth in the number of passenger vehicles and diesel consumption in heavy vehicles. *Fugitive emissions* have increased largely due to increased production from open cut coal mines.
- **Industrial processes and product use**: The increase in emissions since 1990 relates primarily to hydrofluorocarbon (HFC) emissions and chemical industries.
- **Agriculture**: Between 1990 and 2001 emissions increased due to increased fertiliser use and savanna wildfires. From 2002 until 2010 emissions declined due to prolonged and widespread drought conditions over southern and eastern Australia which contributed to reductions in livestock populations, crop production, fertiliser use, and associated emissions. With a return to wetter conditions emissions have begun to increase again as high levels of crop production have been achieved and livestock populations have increased as farmers rebuild their herd following the drought.
- **Waste**: Net emissions have decreased as increases associated with growing populations and industrial production have been offset by increased methane recovery.
- **LULUCF**: The decreasing trend in emissions since 1990 has been mainly driven by the decline in emissions from *forest land converted to cropland* and *grassland*.

Common Tabular Format (CTF) Tables 1.1-1.5. detail Australia's emissions by sector.

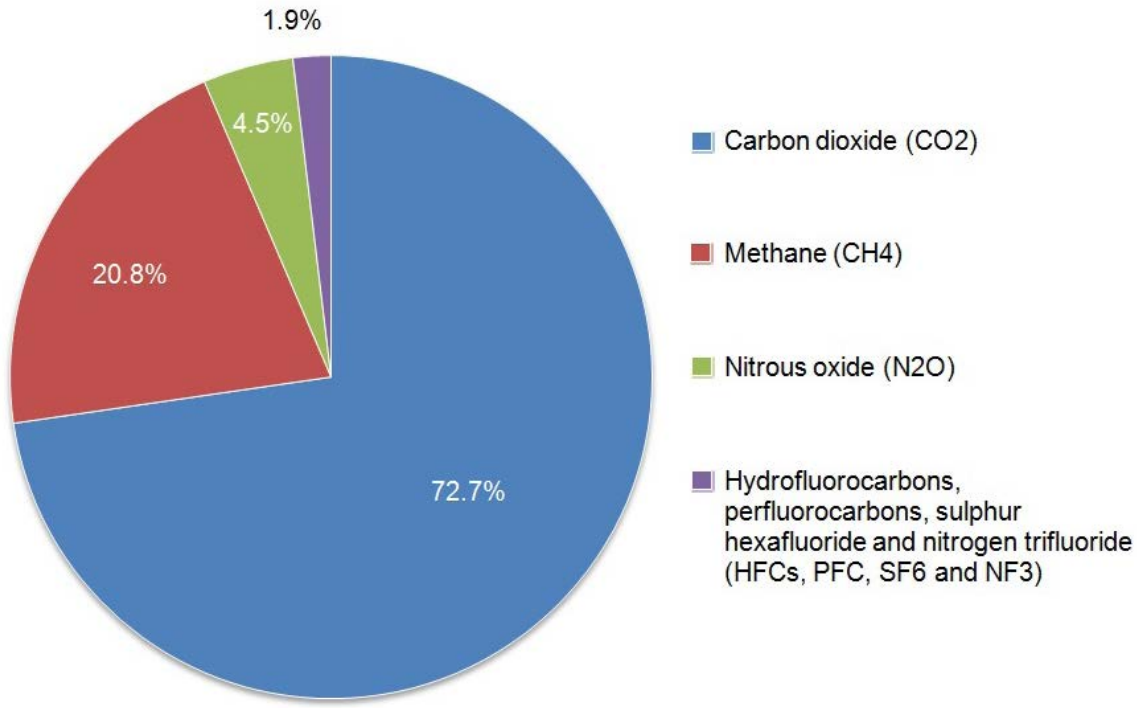
2.1.3 Emissions by greenhouse gas type

In 2013, carbon dioxide accounted for 72.7 per cent of Australia's total emissions (including *LULUCF*), followed by methane (20.8 per cent) and nitrous oxide (4.5 per cent). Other greenhouse gases made up the remaining 1.9 per cent of Australia's inventory.

Table 2.2 Australia's net greenhouse gas emissions by gas type (UNFCCC inventory)

	1990		2013		Change
Greenhouse gas	Mt CO_2-e	per cent of total	Mt CO_2-e	per cent of total	Mt CO_2-e
Carbon dioxide (CO_2)	371.9	70.0%	391.1	72.7%	19.2
Methane (CH_4)	132.0	24.8%	112.1	20.8%	-19.9
Nitrous oxide (N_2O)	21.5	4.0%	24.5	4.5%	3.0
Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)	6.2	1.2%	10.3	1.9%	4.0
Total CO_2-e emissions	531.6	100%	538.0	100%	6.4

Figure 2.2 Australia's net greenhouse gas emissions by gas type



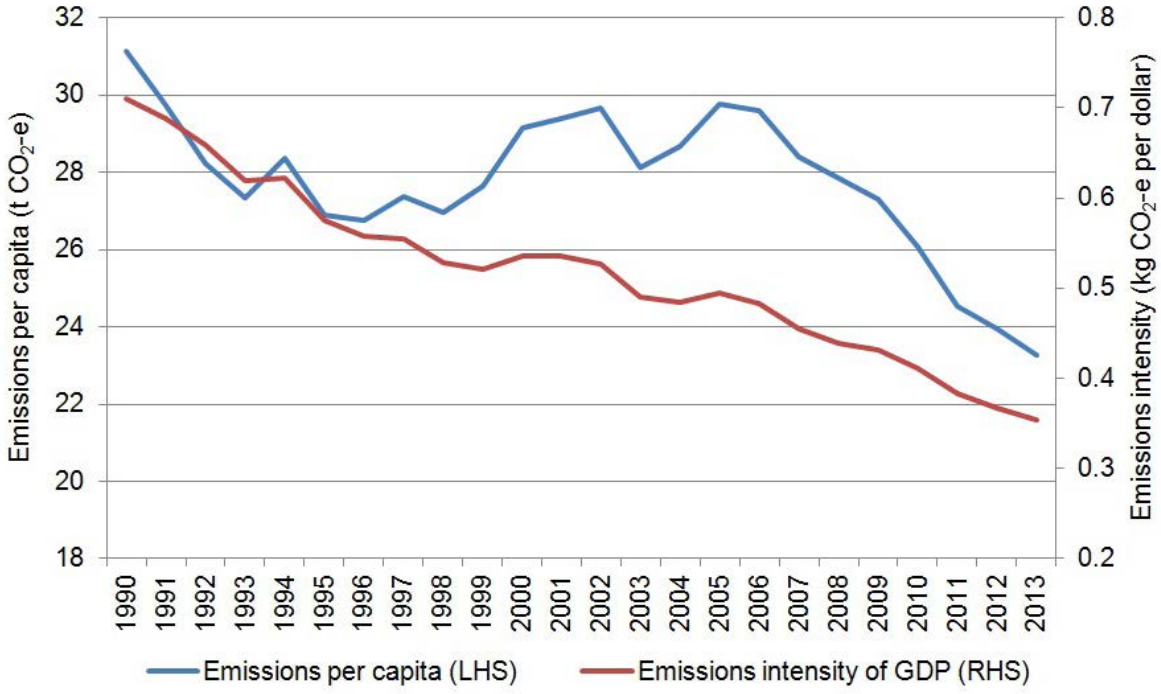
2.1.4 Australia's emissions per capita and emissions intensity

Australia's emissions per capita have declined over the last twenty years. These declines have resulted from specific emissions management actions across sectors, the large decline in land use change emissions over the period, and structural changes in the economy.

Australia's population grew strongly between 1990 and 2013, from 17.1 million in June 1990 to around 23.1 million in June 2013 (growth of 35.5 per cent). Emissions per capita are estimated to be 23.3 t CO_2-e per person in 2013, compared to 31.2 t CO_2-e in 1990, representing a 25.3 per cent decline.

Australia's gross domestic product (GDP) grew significantly over this period, from A$749 billion in 1990 to over A$1,521 billion in 2013 (2011–12 prices) equal to growth of 103 per cent. For the national inventory total (including *LULUCF*), emissions per unit of GDP were 0.35 kg CO_2-e per dollar in 2013 compared with 0.71 kg CO_2-e per dollar in 1990, which is a decline of 50.2 per cent.

Figure 2.3 Australia's emissions per capita and emissions intensity, 1990–2013



2.2 National Inventory System

The Australian Government Department of the Environment is responsible for all aspects of the National Inventory compilation including activity data coordination, emission estimation, quality control, improvement planning, preparation of reports, and submission of reports to the UNFCCC on behalf of the Australian Government. The responsibility is defined under the Administrative Arrangements Orders of the Australian Government.

Since the First Biennial Report submission, responsibility for the National Inventory was moved from the Department of Industry, Climate Change, Science, Research and Tertiary Education to the Department of the Environment.

2.2.1 Coverage

Australia's inventory covers sources of greenhouse gas emissions, and removals by sinks, resulting from human (anthropogenic) activities, grouped under the five sectors identified by the Intergovernmental Panel on Climate Change (IPCC):

- Energy (including *stationary energy*, *transport* and *Fugitive emissions from fuel*);
- Industrial Processes and Product Use;
- Agriculture;
- Land use, Land Use Change and Forestry; and
- Waste

The inventory covers the major greenhouse gases: CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3. Information on precursor gases: carbon monoxide (CO), nitrogen oxides (NO_X) and non-methane volatile organic compounds (NMVOCs), and sulphur oxides (SO_X) is also included.

Geographical coverage of the Australian inventory includes the states and mainland territories, associated coastal islands, and external territories (Norfolk Island, Christmas Island, Cocos Islands, Heard and McDonald Islands, Coral Sea Islands, and the Ashmore and Cartier Islands). Australia's Antarctic Program operations in the Antarctic are also covered.

2.2.2 Data sources

Data collection to support the preparation of Australia's inventory is managed centrally by the Department of the Environment using data from a range of government and non-government sources.

2.2.2.1 The National Greenhouse and Energy Reporting System (NGERS)

Australia has a mandatory reporting system for emissions from fuel combustion, *Fugitive emissions*, industrial processes, and waste. The legislative framework for this mandatory reporting system was established through the *National Greenhouse and Energy Reporting Act 2007*. An explicit objective of the Act is to collect information to meet Australia's international reporting obligations, including compilation of the national greenhouse gas inventory.

The Clean Energy Regulator manages the process of input data collection from companies and the dissemination of the information to data users including the Department of the Environment. NGERS is backed by a comprehensive audit and compliance system.

The Department of the Environment has formal policy and legislative oversight of the NGER Scheme and responsibility for tracking progress against Australia's target. The Department will fulfil this role by ensuring that NGER System legislation continues to support emissions reduction policies and by conducting research to inform policy makers and the public.

Input data to support the preparation of the national accounts for many sectors within *energy, industrial processes and products use* and *waste* are collected using NGERS. Annual reports have been submitted by companies under NGERS to cover the Australian financial years since 2008-09. This data has been used in the preparation of the national inventory.

Under NGERS, companies whose energy production, energy use, or greenhouse gas emissions meet a prescribed threshold must report facility-level data to the Clean Energy Regulator, an independent statutory authority. NGERS provides activity data inputs, such as fuel combustion, emission factors at facility level and, in some cases, directly measured emissions. Reporting is underpinned by *Australia's Measurement System*, and Australian and international standards.

The rules for the estimation of activity data, emission factors and emissions by companies are well specified and set out in legislation (the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*) by the Department of the Environment. The rules are reviewed and where necessary refined each year to align NGERs reporting with Australia's international reporting obligations, improve flexibility for reporters, and improve the consistency, cost effectiveness and accuracy of the methods available to estimate emissions. This process is part of Australia's *National Inventory Improvement Plan*.

Since the first Biennial Report, amendments to the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* have included;

- the incorporation of updated Global Warming Potentials (GWPs) adopted by the Parties to the UNFCCC and its KP, and in line with the mandatory application of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006 guidelines);
- updates in response to the repeal of the *Clean Energy Act (2011)*;
- provision of new methods for reporting of fugitive emissions associated with carbon capture and storage (CCS); and
- a number of routine corrections and minor updates to streamline reporting and reduce regulatory burden.

Four estimation methods are provided for under NGERS ranging from low cost simple default methods to higher order methods requiring direct sampling and analysis of inputs or direct monitoring of emissions.

The four NGERS estimation methods are set out below.

NGERS Method 1: the National Greenhouse Accounts default method. Method 1 specifies the use of designated emission factors in the estimation of emissions. These emission factors are national average factors determined by the Department of the Environment using the Australian Greenhouse Emissions Information System (AGEIS).

The national inventory only utilises activity data collected from companies that report using this method as no new information is collected in relation to emission factors or in relation to other key facility-specific parameters.

NGERS Method 2: a facility-specific method. Industry sampling and Australian or international standards listed in the Determination or equivalent are used for analysis of fuels and raw materials to provide more accurate estimates of emissions.

Method 2 enables corporations to undertake additional measurements—for example, the qualities of fuels consumed at a particular facility—in order to gain more accurate estimates for emissions for that particular facility. Method 2 draws on the large body of Australian and international documentary standards prepared by standards organisations in order to provide the benchmarks for procedures for the analysis of, typically, the critical chemical properties of the fuels being combusted.

Method 2 is based on technical guidelines used by reporters under the Generator Efficiency Standards program, which was in place from 1998 until it was superseded by NGERS in 2007.

The national inventory may utilise activity data and emission factors or other key facility-specific parameters collected by companies using this method, depending on the analysis of the quality of the data.

NGERS Method 3: a facility-specific method using Australian or international standards listed in the Determination or equivalent standards for both sampling and analysis of fuels and raw materials. Method 3 is very similar to method 2, except that it requires reporters to comply with Australian or equivalent documentary standards for sampling (of fuels or raw materials) as well as documentary standards for the analysis of fuels.

NGERS Method 4: direct monitoring of emission systems, either on a continuous or periodic basis. Method 4 provides for a different approach to the estimation of emissions. Rather than providing for the analysis of the chemical properties of inputs (or in some cases, products), this method aims to directly monitor greenhouse emissions arising from an activity.

This approach can provide a higher level of accuracy in certain circumstances, depending on the type of emission process. However, it is likely to be more data intensive than other approaches.

2.2.2.2 Other data sources

The collection process for other data is well-integrated with the objectives of other programs, with a strong reliance on data collected and published by Australia's principal economic statistics agencies; the Australian Bureau of Statistics (ABS) and the Department of Industry, Innovation and Science. The Department of Industry, Innovation and Science and its predecessors have collected energy statistics for over 40 years and use this data to meet Australia's reporting commitments to the International Energy Agency. The ABS is the national statistical agency with legislative backing for its collection powers. The ABS, in conjunction with the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), is the major source of agricultural activity data.

The Department of the Environment employs consultants to process the satellite imagery used to determine land cover change for the *LULUCF* sector. Satellite imagery is sourced from Geosciences Australia (Australia's principal satellite ground station and data processing facility). Data to support estimates of HFCs are sourced from compulsory reporting by importers under licensing arrangements under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 2003*, administered by the Department of the Environment. The collection of solid waste data from State and Territory Government agencies is supported by an exchange of letters between Australian and State Government agencies.

2.2.3 Estimation methods

The Australian methodology for estimating greenhouse gas emissions and sinks uses a combination of country-specific and IPCC methodologies and emission factors consistent with the IPCC 2006 guidelines and the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* (IPCC 2014 revised methods).

The full description of the methods used by Australia in emissions estimation is provided in the *NIR 2015*[1]. In general, Australia's national inventory uses a mix of tier 2 and tier 3 estimation methods.

The additional complexity in the methodology allows emissions to be estimated more accurately. The commencement of data collection under the *National Greenhouse and Energy Reporting Act 2007* provides the foundation for a progression of national inventory estimation approaches towards tier 3 or facility-specific estimation approaches within the *energy, industrial processes and product use* and *waste* sectors.

1 www.environment.gov.au/climate-change/greenhouse-gas-measurement/publications/national-inventory-report-2013

2.2.4 Supporting Inventory Systems

Estimation of emissions is conducted utilising the AGEIS (see Figure 2.4). The Department of the Environment introduced the AGEIS into the inventory production process in 2005. AGEIS centralises emissions estimation, inventory compilation and reporting, and data storage activities. It has been used to consolidate Australia's emissions estimation methodologies and fully integrates quality control procedures into the compilation process. The AGEIS supports high transparency levels for the set of inventory accounts, with emissions data publicly accessible through a dynamic web interface.

While the AGEIS is used for final preparation of the national inventory, Full Carbon Accounting Model (FullCAM) estimates emissions and removals from the *LULUCF* sector and *KPLULUCF* activities (see Figure 2.5). FullCAM has been substantially redeveloped to improve the fully spatially explicit, process-based ecosystems modelling capability through applying techniques described in the IPCC 2014 revised methods as well as significantly updated national datasets. To date, the modelling capability has been completed for conversion of forests to other land uses (e.g. cropping and grazing), conversion of lands to forest, *croplands remaining croplands*, *cropland management*, and the grassland component of *grasslands remaining grasslands* and *grazing land management*.

Figure 2.4 Department of the Environment inventory asset structures and relationships

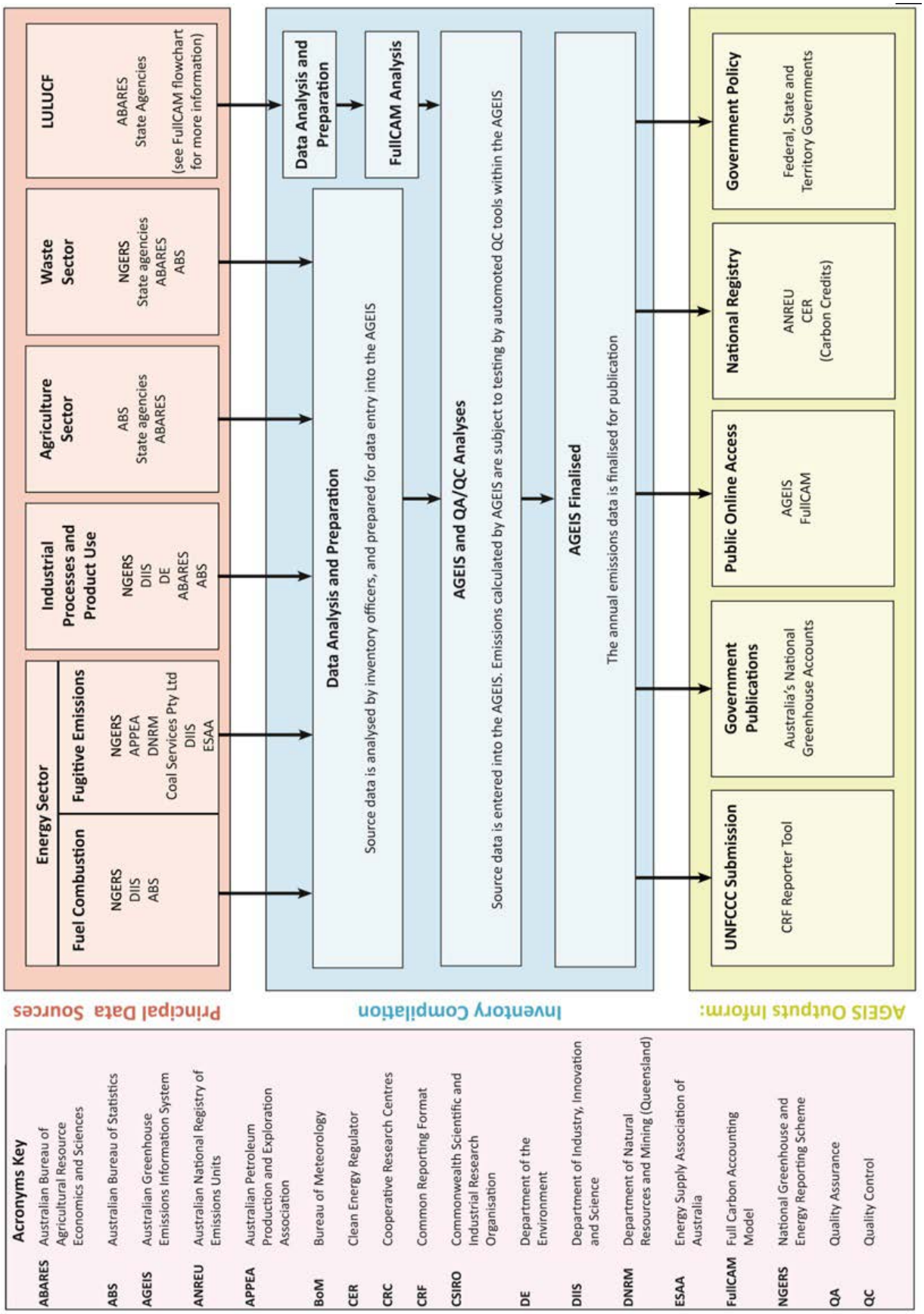
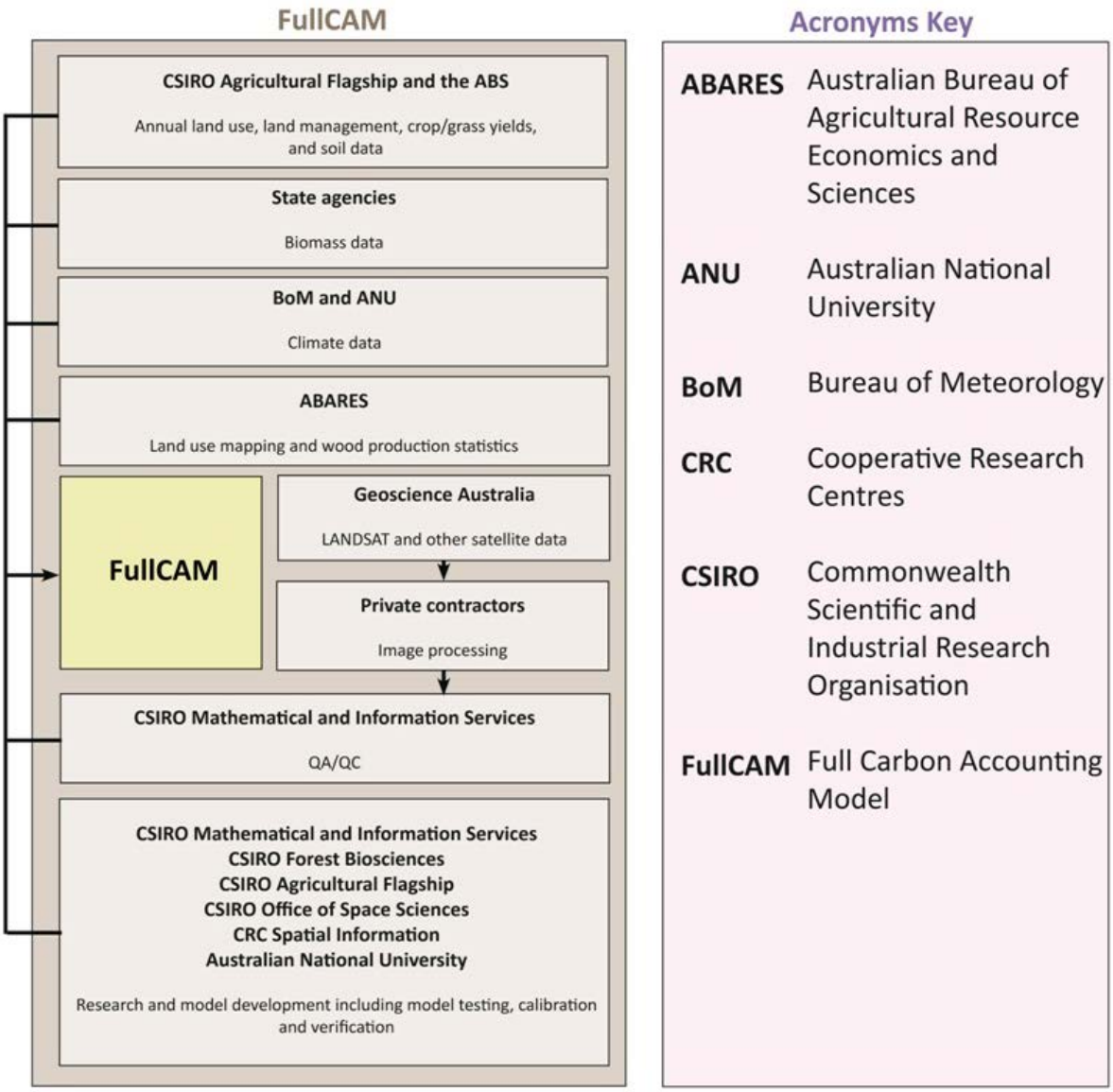


Figure 2.5 FullCAM institutional arrangements



2.2.5 Quality assurance and quality control

The quality assurance (QA) and quality control (QC) process deployed by Australia conforms to IPCC 2006 guidelines and the IPCC 2014 revised methods.

QA and QC processes for Australia's national inventory systems are outlined in full in the *National Inventory Systems: Quality Assurance-Quality Control Plan* and summarised in Australia's *NIR 2015*. These processes contribute to the production of accurate inventories, in which uncertainties are reduced to the extent practicable, and in which estimates are transparent, documented, consistent over time, complete and internationally comparable.

Australia's key QC controls have been systematically built in to the operation of AGEIS. Auditable checks are undertaken to reduce the risks of errors associated with the input of activity data, missing data, recalculations and the time series consistency of generated emission estimates. Input data and implied emission factors are also checked for recalculations and time series consistency prior to submission using AGEIS.

Since the first Biennial Report, additional QA/QC activities and procedures have been implemented as identified in Australia's *NIR 2015*. These include:

- review of confidential data handling practices by Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 2011[2];
- review of Agriculture, Cropland and Grassland methods undertaken by the FullCAM and agriculture inventory expert advisory panel in 2015;
- review of Forest Management by an international expert (S. Federici) from the UNFCCC reviewer roster in 2015;
- improvements made in the QC programmes within FullCAM.

2.2.6 Recalculation of previously submitted inventory data

Inventory estimates are periodically recalculated. This occurs for a number of reasons including updated UNFCCC reporting guidelines, revisions in key external data sources and revisions to data due to refinements in the estimate methodology or the inclusion of additional sources. To ensure the accuracy of the estimates, and to maintain consistency of the time series, recalculation of past emissions estimates are undertaken for all previous years. These recalculations are conducted in accordance with the IPCC 2006 guidelines.

Since its First Biennial Report and Sixth National Communication on Climate Change, Australia has:

- made updates for consistency with the revised UNFCCC reporting guidelines including the adoption of the IPCC 2006 guidelines;
- updated global warming potentials used to convert emissions into carbon dioxide equivalents to reflect the revised UNFCCC reporting guidelines;
- provided more accurate and comprehensive emissions estimates following the adoption of new data, methods and source/sink categories;
- applied higher tier data collected under NGERS and the latest science on emission processes in the agriculture sector; and

improved the national inventory system through strengthening of the planning and quality control systems.

The inventory has progressively incorporated more facility specific data obtained under NGERS. Recalculations flowing from the change are identified and incorporated in Australia's *National Inventory Report*s. Detailed descriptions of any recalculations are also included each year in those reports.

2 2011, *Review of Confidential Data Handling Practices l*. Commonwealth Scientific and Industrial Research Organisation Mathematics, Informatics and Statistics, Canberra.

3 Quantified Economy-wide Emission Reduction Target

The Australian Government is committed to an unconditional Quantified Economy-wide Emission Reduction Target (QEERT) of five per cent on 2000 levels by 2020 (see CTF Table 2(a)). Australia's target is equivalent to a 13 per cent reduction on 2005 levels and represents a substantial reduction from business-as-usual emissions on a range of indicators.

Australia is tracking progress in this report against its unconditional QEERT under the Convention. In tracking progress against the unconditional QEERT, Australia applies certain KP reporting and accounting approaches, as described below and in Chapters 2 and 5.

In 2015, the Australian Government reviewed its international emissions reduction targets and settings. The review was led by a taskforce in the Department of the Prime Minister and Cabinet. The taskforce consulted widely with stakeholders, including holding roundtables with businesses and NGOs, and modelled domestic and international impacts. The review determined that Australia would continue to strengthen its long-term climate action, building on the unconditional 2020 target, by setting a 2030 target to reduce emissions by 26 to 28 per cent below 2005 levels. These targets set the direction for Australia's emission reduction policies and measures, provide certainty for community and industry and drive investment and innovation.

3.1 Details of Australia's 2020 target

Australia's unconditional QEERT is a decrease of five per cent on 2000 levels by 2020 (see CTF Table 2(a)).

Australia assesses its progress towards the QEERT using a carbon budgeting approach. A trajectory to achieve the carbon budget is calculated by taking a linear decrease from 2009–10 to 2019–20, beginning from the KP first commitment period target level and finishing at five per cent below the emissions in 2020.

The cumulative abatement task for Australia's unconditional QEERT is the difference in cumulative emissions over the period 2013 to 2020 between projected emissions and the target trajectory. Australia's cumulative abatement task is discussed further in Chapter 5.

Australia's unconditional 2020 QEERT covers all sectors of Australia's economy and encompasses all greenhouse gases using global warming potentials (GWPs) from the IPCC Fourth Assessment Report prescribed in decision 15/CP.17 (see CTF Table 2(b)). Carbon dioxide equivalents (CO2-e) of these gases are calculated using the GWP for a 100-year time horizon (see CTF Table 2(c)). Australia's target represents net emissions.

3.2 Approach to reporting progress under the QEERT

Australia's First Biennial Report indicated Australia would report progress towards its unconditional 2020 target using estimates of net emissions according to KP classifications. This approach remains the same in this report.

Australia's approach to counting emissions and removals from the *LULUCF* sector is set out in CTF Table 2(d). The concordance between UNFCCC land classifications and KP land activity classifications used by Australia is given in Table 4.2 in section 4.7.1. In aggregate there is little difference in the trend estimates between the two approaches. In practice, the major difference in scope between the two classification systems concerns forest lands. Under the KP classifications, a narrow approach to Forest Management is used that restricts the inclusion of forests to those lands where forests are managed for timber production. Under the UNFCCC classification system all forest lands would be included.

Further detail on Australia's approach to land sector reporting and coverage is provided at section 4.7.1.

3.3 Carry-over and Market based mechanisms

Australia will carry-over overachievement from the first commitment period of the KP (represented by first commitment period Assigned Amount Units) into its Previous Period Surplus Reserve Account. An amount of these units will be used towards Australia's QEERT in accordance with KP accounting rules.

Australia is focusing on domestic action to meet its unconditional QEERT. This approach is consistent with the principle of supplementarity.

In accordance with KP rules, Australia will use Clean Development Mechanism units received though a voluntary Waste Industry Protocol towards its unconditional 2020 target. Further information on the voluntary Waste Industry Protocol is available at: www.environment.gov.au/climate-change/publications/voluntary-waste-industry-protocol

Further to this, the Government may consider the use of international units towards meeting its target as part of a review of Australia's climate policy scheduled to take place in 2017 (see section 4.3.1.2).

Further information on Australia's approach to market based mechanisms is set out in CTF Tables 2(e)I and 2(e)II in the Appendices at Chapter 8.

4 Progress in achievement of the QEERT

The Australian Government is committed to reducing Australia's emissions to meet its unconditional target of five per cent below 2000 levels by 2020. Australia has a strong record of meeting its commitments. Already Australia has achieved a 2 per cent reduction on its 2000 emissions when compared to emissions in 2013, and is well on track to meet its 2020 target.

Through its signature policy, the ERF, Australia will build on the reductions in per capita emissions and emission intensity it has already achieved. The ERF is Australia's main emissions reduction policy instrument to meet Australia's QEERT. It has already contracted to purchase 92.8 million tonnes of abatement. Australia has a broad suite of complementary mitigation policies, which are starting to transform the way Australia produces, stores, and uses energy.

4.1 Greenhouse gas emissions in relation to the QEERT

On the basis of the KP classification system, Australia's total net emissions were 549.4 Mt CO2-e in 2013, approximately two per cent below 2000 levels, as shown in the summary greenhouse gas emissions estimates for 2000 and 2013 in Table 4.1.

Table 4.1 Net emissions associated with Australia's QEERT, 2000 and 2013

KP Classification sector and subsector	2000 emissions Mt CO2-e	2013 emissions Mt CO2-e
1. Energy	362.8	411.0
2. Industrial Processes and Product Use	26.8	32.5
3. Agriculture	90.6	85.0
4. LULUCF activities	63.8	7.5
5. Waste	16.8	13.4
Total net emissions (including LULUCF)	560.8	549.4

The summary estimates in Table 4.1 include emissions and removals from *energy, industrial processes and product use, agriculture* and *waste* sectors and the following *KP-LULUCF* subclassifications: *deforestation, afforestation, reforestation, forest management, cropland management, grazing land management* and *revegetation*.

Australia's policies and measures that have contributed to the reductions of greenhouse gases in these sectors are described in this chapter and in CTF Table 3.

4.2 Mitigation actions and their effects

In Australia's assessment, the aggregated effect of its current mitigation actions, including the ERF and the Renewable Energy Target (RET), will be sufficient to meet Australia's 2020 target. This is discussed further in Chapter 5.

The successes of the ERF will be built on over time, and will operate in conjunction with other measures in the long term to achieve Australia's targets. Australia will undertake a comprehensive climate policy review in 2017 to examine whether further policy action or reform is needed.

Australia excels in the development and deployment of renewable energy technologies. The RET has encouraged the uptake of renewable energy in Australia's households and the deployment of large scale renewable electricity generation.

4.3 Overview of mitigation policies

4.3.1 Emissions Reduction Fund

Since its First Biennial Report and Sixth National Communication on Climate Change, the Australian Government has implemented the Direct Action plan which includes the A$2.55 billion ERF. The ERF will operate alongside existing programmes that are already working to reduce Australia's emissions growth, such as the RET and energy efficiency policies.

The ERF is the centrepiece of the Government's approach to reducing emissions in Australia. It supports Australian businesses and communities to enjoy the benefits of economic growth, increased productivity and a cleaner environment by offering incentives to seek out actions that are in their and the environment's interest.

The ERF builds on the former Carbon Farming Initiative (CFI), which was a voluntary scheme established in 2011 that allowed landholders to generate Australian Carbon Credit Units for abatement activities in the land sector. The ERF expands coverage of the CFI to incentivise abatement across the Australian economy.

4.3.1.1 Emission Reduction Fund key features

The ERF has three parts: crediting, purchasing and safeguarding.

Crediting The Clean Energy Regulator credits abatement that has been certified in accordance with approved methods. Projects are eligible to participate in the ERF if they use an approved method and pass other eligibility tests. Projects that existed under the CFI automatically transitioned to the ERF. Section 4.3.1.3 'Overview of Emission Reduction Fund Mitigation activities (Methods)' elaborates further on the broad range of sector-specific methods available under the ERF.

Purchasing abatement from approved projects can be purchased by the Clean Energy Regulator through reverse auctions. The Regulator conducts auctions in a single-round, sealed, pay-as-bid format. The lowest bids are bought first and subject to contracts for the future purchase of abatement, most commonly between seven to ten years. Payment under contract with the Australian Government is then tied to delivery of abatement. ERF auctions have a minimum bid threshold of 2000 tonnes of CO_2-e per annum, but aggregated projects and bids are possible to facilitate participation of smallscale projects.

Legislation to implement the crediting and purchasing parts of the ERF—the amended *Carbon Credits (Carbon Farming Initiative) Act 2011*—came into effect on 13 December 2014. This allowed the Clean Energy Regulator

to conduct a successful first auction over 1516 April 2015, following which the Government contracted to buy over 47 million tonnes of abatement from 144 projects at an average price of A$13.95 per tonne. Of this, 29.8 million tonnes of contracted reductions come from sequestration projects, 16.6 million tonnes from landfill and waste, and the remainder from savanna fire management, methane capture from piggeries and transport projects.

The second ERF auction was held over 4-5 November 2015, following which the Government contracted to buy over 45 million tonnes of abatement from 131 projects at an average price of A$12.25 per tonne. Of this, 25.6 million tonnes of contracted reductions come from vegetation projects, 6.6 million tonnes from savanna fire management projects, and 4.0 million from agriculture projects. The Government is confident that the results of these initial auctions will be built on in future auctions to help achieve Australia's targets.

Safeguard Mechanism. To ensure that abatement bought by the Government are not significantly offset by increases in emissions above business-as-usual levels elsewhere in the economy, the Government is implementing a safeguard mechanism. The safeguard mechanism will set an emissions limit (or baseline) on covered facilities that report under NGERS. Covered facilities are those that emit more than 100,000 tonnes CO2-e per annum of direct emissions. Legislation for the safeguard—contained in the amended *National Greenhouse and Energy Reporting Act 2007*—will come into force on 1 July 2016 and cover around 50 per cent of Australian emissions, applying to around 140 businesses in the electricity generation, mining, oil and gas, manufacturing, waste and transport sectors. To address the unique characteristics of the electricity sector, the safeguard establishes a 'sectoral' baseline for electricity generators.

The design of the ERF, its legislation and the safeguard mechanism have been the subject of extensive public consultation. This began with draft Terms of Reference and a Green Paper outlining policy options in 2013, in response to which hundreds of submissions were received. A large number of consultation meetings were held. A White Paper outlining the ERF's final design was released in 2014 and since that time, the Department of the Environment, the Clean Energy Regulator and AusIndustry (the Australian Government's business outreach arm) have run briefings and workshops around the country to facilitate participation in the ERF.

4.3.1.2 Review and evaluation of the Emission Reduction Fund

The Government has announced that it will consider the detailed design of Australia's post-2020 policy framework in detail in 2017, before the end of the current commitment period. This will incorporate a review of the ERF—including the operational elements of crediting and purchasing, as well as the safeguard mechanism. The Government has signalled that the ERF will remain at the core of Australia's climate change policy.

In addition, the Clean Energy Regulator has undertaken probity reviews of how it conducts ERF auctions. The Australian National Audit Office is currently auditing crediting and purchasing under the ERF. The Clean Energy Regulator has undertaken a review of its administrative processes for the ERF and an internal review of end-to-end operational controls.

4.3.1.3 Overview of Emission Reduction Fund Mitigation activities (Methods)

The ERF relies on a crediting mechanism where eligible abatement is certified in accordance with approved methods. ERF methods are designed to be consistent with the methods used to prepare Australia's national greenhouse gas inventory.

Methods set out the rules for the conduct of eligible ERF projects and are developed by the Department of the Environment in close consultation with technical experts, stakeholders and the community. They are assessed by an independent statutory Emissions Reduction Assurance Committee against 'offset integrity standards' (as set

out in s.133 of the *Carbon Credits (Carbon Farming Initiative) Act 2011*) to ensure they result in abatement that is unlikely to occur in the ordinary course of events. Following this, the Minister for the Environment must decide to make them into method determinations (legislative instruments), in the process of which the Minister must have regard to whether any adverse environmental, economic or social impacts are likely to arise from the proposed activity.

Sector coverage of ERF methods has continued to increase since the ERF commenced and now captures a range of abatement opportunities across the Australian economy including in the energy, transport, land, waste, agriculture and industrial sectors. A number of new methods are also under development, covering, for example, treatment of waste which has been separated at its point of origin.

Further information about available methods and registered projects under them is available at: www.environment.gov.au/climate-change/emissions-reduction-fund/methods and: www.cleanenergyregulator.gov.au/ERF/Emissions-Reduction-Fund-project-register. This information is regularly updated as new methods are made and projects are registered.

As of October 2015, over 530 projects had been registered under the ERF for activities ranging from forestry, savanna fire management and livestock management to landfill gas capture and transport.

4.3.1.3.1 Transport sector

The Aviation Method supports a broad range of activities to reduce emissions within the aviation sector, including modifying existing planes, changing energy sources or the mix of energy sources, and changing operational practices.

The Land and Sea Transport Method supports similar activities to the aviation method but applies to road, rail and sea transport. Eligible activities under the method include replacing existing vehicles, modifying existing vehicles, changing energy sources or mix of energy sources (fuel switching), and changing operational practices.

4.3.1.3.2 Energy sector

The Commercial and Public Lighting Method credits emissions reductions from projects that improve the energy performance of lighting systems in commercial and industrial buildings, as well as public areas, such as pedestrian, street, and traffic lighting.

The Aggregated Small Energy Users Method covers projects that reduce energy consumption by households and small businesses. Project proponents—for example energy retailers—offer energy saving goods and services to a large group of customers.

The Commercial Building Energy Efficiency Method incentivises energy efficiency activities in commercial buildings. The method makes use of the existing National Australian Built Environment Rating System (NABERS) to quantify emissions reductions.

The Industrial Electricity and Fuel Efficiency Method is a broad-based, technology-neutral method that covers a range of electricity and fuel efficiency activities including lighting upgrades, heating ventilation and cooling system upgrades, boiler upgrades, and variable speed drive installation.

The Refrigeration and Ventilation Fans Method supports fan installations and upgrades undertaken in refrigeration systems such as refrigerated display cabinets and cold storage warehouses, as well as fans ventilating commercial and industrial buildings.

The High Efficiency Commercial Appliances Method credits emissions reductions from projects that install high efficiency appliances in commercial operations.

4.3.1.3.3 Land sector

The Reforestation and Afforestation Method (2.0) sets out the detailed rules that landholders can use to sequester carbon by planting trees to grow forest on land that has been used for agriculture.

The Designated Verified Carbon Standards Projects Method allows the transition of these projects (which avoid the harvest of native forests) into the ERF. It applies only to forest management projects previously approved under the Verified Carbon Standard, a voluntary international carbon offsets program.

The Emissions Abatement through Savanna Fire Management Method reduces greenhouse gas emissions through improved fire management to increase the proportion of early dry season fires. Early dry season fires are lower in intensity and emit fewer emissions than late dry season fires. In addition, projects may generate socio-economic, cultural and biodiversity co-benefits.

The Avoided Deforestation Method (1.1) sets out the requirements for projects to reduce emissions by protecting native forest from being cleared.

The Avoided Clearing of Native Regrowth Method covers projects that protect native regrowth on agricultural land from further clearing. Projects using this method need to demonstrate that vegetation has been cleared at least twice and can legally be cleared again.

The Human-induced Regeneration of a Permanent Even-aged Native Forest Method (1.1) allows the transition of projects from the CFI to the ERF and involves the sequestration of carbon in permanent re-growth forests of native species.

The Measurement-based Method for New Farm Forestry Plantations allows the transition of projects registered from the CFI to the ERF. The method provides procedures for estimating abatement achieved through carbon sequestration from permanent plantings or for-harvest plantings on land previously managed for agricultural purposes and clear of forest.

The Native Forest from Managed Regrowth Method allows the transition of projects from the CFI to the ERF. The method estimates greenhouse gas abatement achieved by human-induced native forest re-growth. The principal carbon pools estimated are in the tissues of woody plants, and include coarse woody debris on the floor.

The Reforestation by Environmental or Mallee Plantings – FullCAM Method allows the transition of projects registered from the CFI to the ERF. The method credits abatement from the sequestration of carbon dioxide from the permanent plantings of native mixed species environmental plantings or mallee plantings.

Changes in emission levels are captured by the national greenhouse gas inventory through independent monitoring systems—for example, changes in land cover are assessed through analysis of Landsat satellite imagery as part of an annual national mapping exercise undertaken by the Department of the Environment. Emissions estimation models are aligned through the use of FullCAM at project level, where possible.

4.3.1.3.4 Agriculture sector

The Estimating Sequestration of Carbon in Soil using Default Values Method covers projects that sequester carbon in agricultural soils using certain types of management actions on project land and modelled estimates of sequestration.

The Fertiliser Use Efficiency in Irrigated Cotton Method provides for crediting emissions reductions by improving the efficiency of synthetic fertiliser use in irrigated cotton.

The Beef Cattle Herd Management Method provides for crediting of emissions reductions from pasture-fed beef cattle. Crediting is based on emissions reductions achieved through efficiency gains, where emissions are reduced while beef production is maintained or increased.

The Destruction of Methane from Piggeries Using Bioengineered Biodigesters Method involves the capture and combustion of methane generated by the decomposition of piggery manure by directing the waste stream into an engineered biodigester.

The Destruction of Methane Generated from Dairy Manure in Covered Anaerobic Ponds Method involves the capture and combustion of biogas generated by the decomposition of dairy manure in effluent ponds. The methane contained in the biogas is then burnt.

The Destruction of Methane Generated from Manure in Piggeries Method (1.1) involves the capture of biogas generated by the decomposition of the piggery manure waste in anaerobic lagoons, and the combustion of the methane component of the biogas.

The Reducing Greenhouse Gas Emissions in Beef Cattle through Feeding Nitrate Containing Supplements Method generates abatement by replacing urea lick blocks with nitrate lick blocks for pasture-fed beef cattle, which has the effect of reducing methane emissions from enteric fermentation.

The Reducing Greenhouse Gas Emissions in Milking Cows through Feeding Dietary Additives Method involves the reduction of greenhouse gas emissions from milking cows by feeding them a dietary supplement.

The Sequestering Carbon in Soils in Grazing Systems Method applies to soil carbon sequestration projects in grazing systems and relies upon direct measurement of soil carbon to estimate sequestration. It sets out instructions for undertaking projects and estimating the resulting abatement.

4.3.1.3.5 Waste sector

The Alternative Waste Treatment (AWT) Method supports ERF projects that treat mixed solid waste at an AWT facility rather than disposing of it in landfill. The method covers construction of new AWT facilities and expansion of existing facilities, and provides continued emissions reduction opportunities for AWT facilities that participated in the CFI.

The Landfill Gas Method covers projects to reduce emissions by combusting landfill gas, for example using a device such as a flare or internal combustion engine. Combusting the landfill gas converts methane into carbon dioxide.

The Wastewater Treatment Method covers projects which treat eligible domestic, commercial or industrial wastewater in an anaerobic digester. The resulting biogas is sent to a combustion device where a large proportion of the methane is destroyed.

The Coal Mine Waste Gas Method supports projects that destroy the methane component of coal mine waste gas by operating one or more methane destruction devices such as flares or combustion engines used to produce electricity.

The Oil and Gas Fugitives Method covers projects that reduce emissions through the capture and re-route of *Fugitive emissions*, which would otherwise be released to the atmosphere, to a flare for combustion.

Data to support estimates of changes in emission levels are generally captured by the national greenhouse gas inventory through NGERS. In some combustion of landfill gas projects, if project proponents are not required to report through NGERS because of their size or entity structure, the Inventory may use data collected through project-level reporting to the Clean Energy Regulator.

4.3.1.3.6 Industrial processes and product use sector

The Facilities Method credits projects that reduce a facility's emissions per unit of product, or in the case of a generator, displaces more emissions intensive electricity production elsewhere in the grid. It is designed to allow facilities that report under NGERS to use the same data and approach under the scheme to credit emissions reductions.

4.3.2 Renewable Energy Target

The RET is an Australian Government scheme designed to reduce greenhouse gas emissions in the electricity sector and encourage the additional generation of electricity from renewable sources. The scheme is established by three pieces of legislation: the Renewable Energy (Electricity) Act 2000, the *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000* and the *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010*.

This scheme creates a guaranteed market for additional renewable energy deployment using a mechanism of tradable certificates that are created by renewable energy generators (such as wind farms) and owners of small-scale renewable energy systems (such as solar PV). Demand for certificates is created by placing a legal obligation on entities that buy wholesale electricity (mainly electricity retailers) to source and surrender these certificates to the Clean Energy Regulator to demonstrate their compliance with annual obligations.

Since 1 January 2011, the RET has operated as two schemes—the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES). The LRET supports large-scale renewable energy projects by helping to bridge the cost between renewable and fossil fuel generation. The SRES assists households, small business and community groups with the upfront cost of installing small-scale renewable technology systems.

Since Australia's First Biennial Report, an expert panel and the Climate Change Authority conducted reviews of the RET. Following consideration of the recommendations of these reviews and further consultation, the Australian Government has put in place reforms to the RET.

The RET scheme was reformed in response to changing circumstances. Over the period 2008-09 to 2013, electricity demand has been declining and forecast demand in 2020 is lower than previously anticipated. Amending legislation to reform the RET was passed by the Australian Parliament on 23 June 2015. The package of reforms provides certainty to industry, encourages further investment in renewable energy, and better reflects market conditions. Key measures under the reform include:

- Adjusting the annual LRET from 41,000 GWh to 33,000 GWh in 2020;
- Increasing assistance to businesses carrying out emissions-intensive trade-exposed activities to 100 per cent exemption from RET liabilities;
- Removing the requirement for biennial reviews of the scheme; and
- Reinstating native forest wood waste as an eligible source of renewable energy, subject to the conditions that were in place prior to 2011.

To inform project investors and provide transparency to consumers, the Clean Energy Regulator will provide annual updates on progress towards the 2020 target.

The RET has encouraged significant new renewable electricity generation. The new target for large-scale generation of 33,000 GWh in 2020 is estimated to double the amount of large-scale renewable energy being delivered by the scheme and lift the share of renewables to around 23.5 per cent of Australia's electricity in 2020. Installations of small-scale systems have exceeded expectations. Already households have installed more than

2 million solar systems with the help of the RET and the cost of solar PV installation is less than a quarter of the price it used to be.

Data to support estimates of changes in emission levels are captured by the national greenhouse gas inventory through NGERS.

Further information on the RET is available at www.environment.gov.au/climate-change/renewable-energy-target-scheme

4.3.3 Clean Energy Finance Corporation

The Clean Energy Finance Corporation (CEFC) is an Australian Government statutory authority. It was established in 2012 under the *Clean Energy Finance Corporation Act 2012* to facilitate increased flows of finance into the low-emissions energy sector through investment in renewable energy, energy efficiency and low emissions technologies.

The CEFC is responsible for administering A$10 billion (until 2018) of legislated funding to help drive the commercial deployment of new technologies through addressing financing barriers in clean energy markets. The CEFC co-finances clean energy projects with the private sector, working with the market to build industry capacity.

A variety of funding tools are used to support projects, including loans on commercial or concessional terms and equity investments. The CEFC operates with the expectation of minimal budgetary assistance and makes its investment decisions independently of the Government, based on rigorous commercial assessments. Capital returned from the CEFC's investments is reinvested into other clean energy projects.

The CEFC is governed by a board of seven Directors with diverse business and government experience and an in-depth understanding of financing and clean energy. The Minister for the Environment and the Minister for Finance have joint responsibility for overseeing the CEFC, including setting an investment mandate which directs the CEFC towards particular types of investments or technologies and an expected rate of return on investment.

To date, the CEFC has committed more than A$1.4 billion to almost 100 projects or initiatives, and has catalysed a further A$2.2 billion of private investment. The CEFC has announced a A$250 million boost to the construction of large-scale solar developments in Australia.

Further information on the CEFC is available at www.cleanenergyfinancecorp.com.au/

Examples of CEFC projects

The CEFC is committing up to A$125 million in a A$400 million trust which will invest in older office buildings to upgrade their energy performance and reposition them in the market. A leading real estate fund manager will manage the trust which will buy, own, refurbish and introduce sustainability improvements in up to a dozen commercial office properties. The commercial property sector is a key area where energy efficiency investment can have a substantial and beneficial cross-economy impact.

The CEFC is providing up to A$120 million through the National Australia Bank for a programme to incentivise Australian businesses to cut their energy and operating costs and lift business performance. This initiative is designed to accelerate the switch to low emissions and cleaner vehicles, as well as help businesses upgrade industrial and agricultural equipment and increase their uptake of solar energy technology and battery storage. The programme is available across a broad commercial base, with a particular emphasis on agribusinesses and regional Australia.

A smaller, pilot investment fund (Low Carbon Australia Limited) discussed in the First Biennial Report was merged into the CEFC in 2013.

4.3.4 Australian Renewable Energy Agency

The Australian Renewable Energy Agency (ARENA) is an Australian Government statutory authority. The Authority was established in 2012 through the Australian Renewable Energy Agency Act 2011 with the aim of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

ARENA is responsible for administering around A$2.4 billion (until 2022) of legislated funding for:

- the research, development, demonstration, deployment and commercialisation of renewable energy and related technologies; and
- the storage and sharing of knowledge and information about renewable energy technologies.

ARENA produces a general funding strategy and an investment plan each year, which establish the strategic framework for funding. Priorities for new investment for 2015 were:

- Large-scale solar PV;
- Integrating renewables and grids;
- Renewable energy in industrial processes;
- Fringe-of-grid and network constrained areas; and
- Off-grid areas.

ARENA takes a technology-neutral approach in considering applications for its funds and has a mandate to capture and share knowledge from its projects

ARENA is governed by a 3-6 person Board whose members have expertise in renewable energy technology investment and commercialisation. An expert Advisory Panel provides advice on development and selection of projects and initiatives to be funded.

Data to support estimates of changes in emission levels are captured by the national greenhouse gas inventory through NGERS.

ARENA has completed 47 projects and is currently managing more than 200 renewable energy projects across a range of technologies. Two projects that are representative of ARENA's involvement are listed below:

In a remote Australian mining operation, DeGrussa Copper Mine in Western Australia, ARENA is working with its project partners to increase knowledge and confidence in the use of renewable energy to power off-grid mine sites. ARENA is contributing A$20.9 million support for a 10.6 MW solar PV installation with lithium ion battery storage. When this A$40 million project is completed it will be one of the world's largest integrated solar installations.

In western New South Wales, ARENA is involved in the AGL solar project, which will construct solar power stations at two sites. ARENA has contributed A$166.7 million to the A$440 million project which will have a generation capacity of up to 155 MW of electricity. In addition to supporting the development of the large-scale solar industry in Australia, the project also provides academic research infrastructure, with two universities conducting related academic research under the project.

Further information on ARENA is available at www.arena.gov.au.

4.3.5 Vehicle Fuel Efficiency

The Australian Government aims to reduce emissions from motor vehicles. Australia has had road vehicle emission standards for new vehicles in place since the early 1970s and these have been progressively tightened over the past

40 years. Australia already has in place a mandatory consumer information programme that mandates fuel efficiency labelling on new cars, as well as a voluntary programme through the Green Vehicle Guide that aims to assist consumers to make informed purchasing decisions.

4.3.5.1 Vehicle emissions standards and vehicle testing

In October 2015 a Ministerial Forum was established to examine vehicle emissions standards in Australia and vehicle testing arrangements. Under the terms of reference for the forum, the Minister for Major Projects, Territories and Local Government, the Minister for the Environment and the Minister for Resources, Energy and Northern Australia, will coordinate a whole-of-Australian-Government approach to addressing vehicle emissions, including testing and reporting arrangements.

The Ministerial Forum will be supported by an interdepartmental working group led by the Department of Infrastructure and Regional Development. The working group will consult broadly with industry stakeholders and coordinate work already underway through different government agencies to examine a range of issues including:

- implementation of Euro 6 or equivalent standards for new vehicles;
- fuel efficiency (CO2) measures for new light vehicles;
- fuel quality standards;
- emissions testing arrangements for vehicles in conjunction with international regulatory agencies to ensure robust testing;
- Australian Government measures under the National Clean Air Agreement;
- ERF and Safeguard Mechanism - transport measures;
- future infrastructure to support new vehicles, including funding available through the CEFC and ARENA; and
- the National Energy Productivity Plan (NEPP).

The working group will report by 30 June 2016 to the Ministerial Forum on measures including options for managing fuel quality standards, options for new measurement reporting standards for air pollutants under the National Clean Air Agreement and other measures.

The working group will report by 31 March 2017 to the Ministerial Forum on a draft implementation plan for new measures to meet Australia's climate change targets.

4.3.5.2 Incentives for fleet purchases of low emissions vehicles

In November 2015 the Australian Government announced that it will provide incentives for Australians to purchase low emissions vehicles, as part of a A$50 million programme funded through the CEFC.

The programme provides corporate and government fleet buyers, as well as not-for-profit organisations with access to favourable loan interest rates when choosing to purchase eligible low emissions passenger and light commercial vehicles. With an estimated 450,000 fleet vehicles on the road today, this represents a major share of the cars and vehicles on Australia's roads.

In order to be eligible for the CEFC finance, purchasers must ensure the vehicles meet a CO2 emissions threshold that is 20 per cent below the most recently published Australian averages for new passenger and light commercial vehicles.

Because of the number of vehicles within their operations, Australian fleet buyers and lessees can play a key role in increasing the proportion of low emissions vehicles on our roads, as well as the adoption of new solutions such as electric and fuel cell vehicles.

4.3.6 Energy Productivity and Efficiency programmes

Energy efficiency activities have already made a significant contribution to reduced electricity demand and improved energy productivity particularly through minimum standards for appliances and new buildings. The Australian Government recognises that there is more work to be done to improve Australia's energy productivity, reduce costs for businesses and households and reduce greenhouse gas emissions.

The Government's overarching policy framework for energy efficiency improvements will be delivered through the NEPP, which was announced as part of the Energy White Paper in April 2015.

Data to support estimates of changes in emission levels are captured by the national greenhouse gas inventory through NGERS.

4.3.6.1 National Energy Productivity Plan

The Government is committed to a new NEPP that will improve Australia's energy productivity by 40 per cent between 2015 and 2030.

Energy productivity is a measure of the economic value created for every unit of energy consumed. The definition of energy productivity Australia is using as part of the NEPP and target is GDP per petajoule of primary energy which is similar to the approach used by the United States.

The NEPP, to be developed with the Council of Australian Government's (COAG) Energy Council, will bring together a wide range of new measures such as options to improve vehicle efficiency, promote innovation and competitive energy markets, and provide better support for energy consumers in choosing efficient services.

The NEPP will support energy consumers (large and small) and service providers to make better decisions on energy and effectively manage energy costs. It will include a range of measures which:

- support consumers to make more productive decisions when selecting energy services, such as smart meters, cost-reflective prices, access to information and labels;
- support development of more productive energy services through innovation and competition, such as reducing barriers to entry in the market for new technologies and service options; and
- ensure effective protection including through standards for equipment, appliances and buildings.

In order to meet Australia's proposed 40 per cent by 2030 energy productivity target Australia will need to increase its annual energy productivity improvement from 1.5 per cent per annum to 2.3 per cent per annum.

Current research suggests that this can be achieved by implementing financially attractive initiatives. There are cost effective opportunities to improve energy productivity in the transport, manufacturing, commercial and services and residential buildings sectors.

The NEPP replaces the previous National Strategy on Energy Efficiency, but will also be broadened to consider all measures across energy market reform which can support energy consumers to manage their costs (such as pricing reform and fuel switching).

The Department of Industry, Innovation and Science is leading work on the NEPP and received agreement from COAG's Energy Council to a detailed workplan in early December 2015.

The workplan includes a number of measures to proceed with immediately (for example improved minimum standards on certain equipment) and other measures requiring further development (for example, residential building efficiency measures).

Further detail on the NEPP and its workplan is available at: scer.govspace.gov.au/workstreams/energy-market-reform/national-energy-productivity-plan/

4.3.6.2 Appliance Energy Efficiency

Mandatory Minimum Energy Performance Standards (MEPS) and mandatory Energy Rating Labels have been the main policy tools used to improve the energy efficiency of appliances and equipment in the residential, commercial and industrial sectors since 1986.

MEPS and labelling improve energy productivity and reduce energy consumed, thereby saving businesses and households money from their energy bills. Improved energy productivity and reduced energy consumption in turn reduces greenhouse emissions. Nationally consistent regulation for MEPS and labelling is delivered under the Commonwealth *Greenhouse and Energy Minimum Standards Act 2012*. This Act is administered by rhe Department of Industry, Innovation and Science.

MEPS have been set for 22 commonly used appliance lines. A detailed review of the Greenhouse and Energy Minimum Standards intergovernmental agreement and an evaluation of the success of the equipment energy efficiency programme was completed in June 2015. The review found that the programme is delivering significant savings for energy consumers, in a cost effective manner.

4.3.6.3 Buildings Energy Efficiency

Buildings are a core energy efficiency priority for Australia. The Department of Industry, Innovation and Science administers the range of different programs discussed below to increase the energy efficiency of buildings and reduce their greenhouse gas emissions.

Australia's National Construction Code (NCC) sets energy efficiency standards for new housing, multi-unit residential and non-residential buildings. Standards for housing have increased from a 3.5-4 star minimum rating in 2003 to a 6 star minimum rating in 2010.

The Nationwide House Energy Rating Scheme (NatHERS) provides the methodology to estimate and rate the potential thermal performance of residential buildings on a scale from 0 to 10. NatHERS is administered by the Department of Industry, Innovation and Science on behalf of all States and Territories. The NatHERS rating is one of three pathways by which residential buildings can achieve compliance with the NCC. Around 70 per cent of new houses and apartments are currently being rated.

There are three accredited NatHERS tools which all use the Chenath thermal calculation engine developed by CSIRO. The NatHERS tools are incorporating an upgraded version of Chenath during 2015. The NatHERS Administrator has developed a Strategic Plan for NatHERS to guide its work programme over the next four years.

The **Commercial Building Disclosure Program**, started in 2010, requires most office spaces of more than 2000 square metres to disclose their energy performance when selling or leasing. Since its introduction, the programme has captured around a third of Australia's large commercial office stock. The programme is well-supported by industry stakeholders.

Under the Building Energy Efficiency Disclosure Act (2010), offices and office spaces in Australia that are sold or leased must disclose their energy performance. Affected buildings must receive a Building Energy Efficiency Certificate, which includes the base building efficiency through a NABERS rating and a Tenancy Lighting Assessment.

The programme is providing a large, publicly available database of office building performance that encourages benchmarking and identifies business opportunities for energy efficiency service providers.

The **National Australian Built Environment Rating System** is a national rating system that measures the environmental performance of Australian buildings, tenancies and homes including energy efficiency, water usage, waste management and indoor environment quality. It is focused on commercial buildings, especially offices, retail and hotels.

NABERS rates buildings on a 0–6 star scale based on industry benchmarking. It was developed as a voluntary set of tools, but is now used in some regulatory functions. In 2013, NABERS released a new leading edge tool to rate data centres both for the energy used directly by the computing equipment, and the supporting heating ventilation and air conditioning systems.

Under the **Energy Efficiency in Government Operations** policy, wherever possible new office leases negotiated by Australian government agencies must incorporate a Green Lease Schedule stipulating achievement of a 4.5 star NABERS Energy rating.

The **Community Energy Efficiency Program** is providing A$101 million across 160 projects to co-fund energy efficiency upgrades to local council and community facilities. For example, over A$233,000 was provided to the Nunkuwarrin Yunti Aboriginal Community Controlled Health Service in South Australia. The grant was used to retrofit energy efficient Heating Ventilation and Air Conditioning units and lighting upgrades. The programme will close on 30 June 2016.

The **Low Income Energy Efficiency Program** is providing A$55 million across 20 projects, which are trialling approaches to reduce the energy costs of low-income households. Under the program, grants have been awarded to projects such as: the Northern Grampians Shire Council's Innovation and Opportunities in Energy Efficiency for Disadvantaged Members of Our Community, focused on barriers to people with an intellectual or aged disability improving their energy efficiency; and Sustainable Business Australia's Our Green Home project to trial delivery of energy efficiency information and real-time information about energy use and costs to low income households. The programme will close on 30 June 2016.

4.3.6.4 Energy Efficiency Information programmes

The Department of Industry, Innovation and Science manages a range of information, capacity building and knowledge sharing web resources including the Energy Efficiency Exchange (eex.gov.au), YourEnergySavings.gov.au and YourHome.gov.au websites.

The **Energy Efficiency Exchange** (EEX) supports energy management and energy efficiency strategies for industry, covering a range of sectors and technologies. Your Energy Savings provides consumers with information on how to save energy, save money and reduce environmental impacts at home, including information on all available government assistance. Your Home provides guidance on building and renovating homes in a sustainable manner.

The Department of Industry, Innovation and Science manages the COAG website for the Equipment Energy Efficiency Program (energyrating.gov.au) which is in the process of being redeveloped. The Department of Industry, Innovation and Science also developed a mobile app which allows consumers to compare the energy efficiency of labelled appliances using their smartphone.

4.3.6.5 Industrial Energy Efficiency

The Government's **energy efficiency grant programmes** are stimulating investment and learning in energy efficiency across Australia, making businesses more competitive and reducing energy costs for the community. Since 2011 the Australian Government has allocated approximately A$197 million for 440 energy efficiency projects across its four programmes.

For example, under the Energy Efficiency Information Grants Program over A$1 million was provided to develop a framework and provide support to facility owners, clubs and players to deliver information to improve energy efficiency, including energy audits of 45 facilities and behaviour change programs. The project used social media, training sessions, workshops, factsheets, case studies, mobile applications and a designated website.

4.3.7 20 Million Trees

The Australian Government has committed to planting 20 million trees by 2020 to re-establish green corridors and urban forests. The 20 Million Tree Programme projects will be undertaken in urban and regional Australia. Trees and other native plants will be planted on both public and private land, providing community and environmental benefit at the local level.

The 20 million Trees Programme will support local environmental outcomes by improving the extent, connectivity and condition of native vegetation that supports native species (including threatened species and threatened ecological communities), will involve cooperative work with the community, and will contribute to Australia reducing its greenhouse gas emissions.

The Programme will be delivered through a combination of competitive grants for individuals and organisations, and service providers who will deliver larger-scale tree planting projects.

As at September 2015, A$30.6 million has been announced across 92 projects to plant approximately 10 million trees.

More information is available at www.nrm.gov.au/20-million-trees.

4.3.8 Solar Towns Programme

Through the Government's Solar Towns Programme, the Government will provide A$2.1 million to community organisations to support the installation of solar photovoltaic panels and solar hot water systems to the buildings they utilise. 16 projects located in Tasmania and Victoria were identified to receive funding to install renewable energy systems.

The 2014–15 round of the Solar Towns Programme was open to community organisations operating within the Surf Coast Shire of Victoria. 20 projects were approved under the round to install solar photovoltaic panels or a solar hot water system on buildings utilised by community organisations.

The second round of the Solar Towns Programme provides A$300,000 to community organisations in the Cities of Playford and Salisbury, South Australia to install renewable energy systems.

Further information is available at www.environment.gov.au/climate-change/renewable-energy/solar-towns

Data to support estimates of changes in emission levels are captured by the national greenhouse gas inventory through NGERS.

4.3.9 Low Emissions Technology Roadmap

The Government will develop a low emissions technology roadmap. The roadmap will help identify opportunities and barriers to research, development and take-up of new and emerging low emissions technologies across Australia.

It is envisaged that development of the roadmap could be led by CSIRO, who would examine technological trends, markets and challenges for new technologies in the energy, industry and transport sectors.

Governance arrangements for the roadmap are yet to be finalised. It's likely that the CSIRO would work closely with a steering committee drawn from the Department of Industry, Innovation and Science and the Department of the Environment.

4.3.10 Low emission fossil fuel technology programmes

Australia supports technologies to develop low-emissions fossil fuel technologies, including CCS. The Department of Industry, Innovation and Science operates four programs which support low emission technology in Australia, described below.

The **Carbon Capture and Storage Flagships Program** promotes the dissemination of CCS technologies. The programme was created to develop commercial scale integrated CCS projects in Australia to operate from 2020. The CCS Flagships Program was established in 2009 and supports a small number of demonstration projects that will capture CO_2 emissions from industrial processes and safely store them underground in stable geological formations. CCS Flagships is the Australian Government's primary programme for large-scale CCS projects. A$175.6 million has been expended to date and A$100.4 million remains committed to the programme until 2018–19.

The **National Low Emissions Coal Initiative** (NLECI) helps to accelerate the development and deployment of low emission technologies and CO2 transport and storage infrastructure to achieve major cuts in greenhouse gas emissions from coal usage over time. To date, A$226.3 million has been expended on the Initiative and A$17.5 million remains committed to the programme until 2016-17. Most of the current projects under NLECI were completed by end of June 2015. A project funded under the initiative, the Callide Oxyfuel Project in Central Queensland, is the world's first industrial scale demonstration of oxyfuel combustion and carbon capture technology. The Callide Oxyfuel Project was completed in March 2015. It successfully tested oxyfuel technology and carbon dioxide capture under live power station conditions for more than two years.

The headline project supported by the **Low Emission Technology Demonstration Fund** is Chevron Australia's Gorgon CO2 Injection project. The project has been allocated A$60 million and is expected to commence CCS in the financial year 2015-16. CO_2 will be separated from the extracted natural gas, captured and injected into a saline aquifer at 2km depth. The project involves nine injection wells, and includes long term monitoring with a number of surveillance wells and seismic surveying.

For the Gorgon Liquefied Natural Gas (LNG) project and future commercial CCS projects, the Department of the Environment will derive estimates of *Fugitive emissions* of greenhouse gases associated with the capture, transport, injection and long term geological storage of greenhouse gases from NGERS.

The **Coal Mining Abatement Technology Support Package** of A$35.4 million is committed to six projects supporting industry research, development and demonstration activities to address coal methane abatement.

4.3.11 National Carbon Offset Standard

The National Carbon Offset Standard (NCOS), administered by the Department of the Environment, provides a benchmark for businesses and other organisations voluntarily seeking to be carbon neutral for their operations, products, services or events. The Standard sets out requirements for achieving carbon neutrality, based on a rigorous and transparent framework that is based on relevant international standards and tailored to the Australian context.

Carbon neutrality is achieved when net greenhouse gas emissions of an organisation, a product, service or event are equal to zero. This can be achieved by reducing emissions and then purchasing and retiring offset units to match or 'offset' the remaining emissions.

The Standard is designed to provide confidence in the environmental integrity of the carbon neutral claim for consumers and businesses alike. It helps businesses to determine their carbon account (also known as a carbon footprint) in line with consumer expectations, and ensures they back their carbon neutral claim through the cancellation of robust offset units. It also assists consumers to interpret carbon neutral claims and make informed choices.

Offsets can be purchased by individuals or companies in Australia and used to cancel out or 'offset' the emissions they generate during their normal course of business or day-to-day life, for example, by consuming electricity or catching a plane. Organisations seeking to voluntarily offset their emissions or achieve carbon neutrality under the Standard are able to purchase from a range of eligible offset units. A list of eligible offset units is provided under the Standard and is updated as new information becomes available.

The National Carbon Offset Standard and the Carbon Neutral Program were reviewed through a public consultation process in the first quarter of 2015.

In November 2015, the Department of the Environment released Version 4 of the National Carbon Offset Standard. This version incorporates the outcomes from the review.

4.3.12 Carbon Neutral Program

The Carbon Neutral Program, administered by the Department of the Environment, allows organisations, products, services and events to be certified as carbon neutral against the National Carbon Offset Standard.

Carbon neutral certification is based on an annual cycle of measuring, reducing, offsetting and reporting. The integrity of a carbon neutral claim largely relies on the transparency of measures taken to support the claim. The Carbon Neutral Program requires that all steps taken are made transparent so that any carbon neutral claim can be objectively assessed by the public. Organisations, products, services or events certified under the Carbon Neutral Program can utilise the carbon neutral certification trade mark for promotional and marketing purposes.

The National Carbon Offset Standard and the Carbon Neutral Program were reviewed through a public consultation process in the first quarter of 2015.

In November 2015, the Department of the Environment released Version 4 of the Carbon Neutral Program Guidelines. This version incorporates the outcomes from the review.

The Department has also entered into a partnership with the Carbon Market Institute for the purpose of increasing participation, enhancing recognition of the certification trade mark and boosting benefits for participants.

More information is available at www.environment.gov.au/carbon-neutral

4.4 Policy responsibility

Australia has a federal system of government with three levels: Commonwealth (the Australian Government), state and territory (New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania, the Australian Capital Territory and the Northern Territory) and local. The Australian Government has core functions set out under the Australian Constitution, for example foreign affairs and trade. Compliance with and the implementation of international agreements on the environment, such as the UNFCCC, are the responsibility of the Australian Government. States and territories are responsible for matters not assigned to the Commonwealth.

4.4.1 Commonwealth agencies

The Minister for the Environment is responsible for domestic climate change policy which includes:

- Australia's greenhouse emissions and energy consumption reporting;
- Policy and legislation concerning Australia's domestic approach to reducing emissions, including the ERF, RET, CEFC and ARENA; and
- Climate change adaptation strategy and co-ordination.

Since Australia's first Biennial Report, domestic climate change policy responsibilities were moved from the former Minister for Industry, Innovation, Climate Change, Science, Research and Tertiary Education to the Minister for the Environment as a result of a change of government and movement of portfolio responsibilities.

The Department of the Environment, through the Office of Climate Change and Renewables Innovation, advises the Minister on climate change issues. The Office brings together a number of government agencies, including:

- Clean Energy Regulator—which administers NGERS, RET and ERF;
- CEFC—a body which finances renewable, low emissions end energy efficiency projects;
- ARENA—a grants body which aims to commercialise renewable energy technologies;
- Climate Change Authority—an agency that provides independent expert advice on climate change mitigation initiatives; and
- the climate change and renewable energy functions from the Department of the Environment.

The Climate Change Authority, the CEFC and ARENA are also independent statutory agencies in the Environment Minister's portfolio, each with respective legislated mandates, as outlined in preceding sections of this report.

The Minister for Foreign Affairs is responsible for Australia's international climate change policy, including UNFCCC negotiations. This responsibility was moved to the Ministerof Foreign Affairs upon the change of Government in 2013. The Minister for Foreign Affairs also has responsibility for overseeing Australia's aid programme, which includes international climate finance, capacity building and technology transfer. The Australian Government Department of Foreign Affairs and Trade advises in relation to this.

The Minister for Industry, Innovation and Science is responsible for energy efficiency policy and legislation. The Minister is advised by the Department of Industry, Innovation and Science, which has responsibility for the development and implementation of the Australian Government's energy productivity and energy efficiency policies and programmes.

4.4.2 Interaction between Commonwealth and State agencies on climate change

The Commonwealth Government has lead responsibility for climate change policy in Australia. However, the Commonwealth Government works closely with States and territories on climate change through consultation and cooperation between Departments and the Meeting of Environment Ministers (MEM). The MEM is held on an ad hoc basis, most recently in February and July 2015, and deals with a range of environmental issues of environmental significance. Outcomes of the most recent meeting include:

- agreement to establish a National Clean Air Agreement by end 2015. The Agreement will deliver actions to reduce air pollution (from particulate matter, for example) and establish a new process for jurisdictions to work cooperatively to address emerging air quality issues, to ensure Australians continue to enjoy clean air into the future;
- establishing a climate change Adaptation Working Group to foster best practice approaches to adaptation and enable jurisdictions to collaborate and consult on priority matters of common interest.

A number of climate-related policies and measures are jointly implemented between Commonwealth, State and Territory Governments, as outlined in CTF Table 3.

4.5 Domestic institutional arrangements relating to Australia's QEERT

4.5.1 The Role of the Clean Energy Regulator

The Clean Energy Regulator was established on 2 April 2012 as an independent statutory authority by the *Clean Energy Regulator Act 2011*. The Regulator administers several pieces of legislation that underpin the Government's approach, including the RET and NGERS. These responsibilities have remained unchanged since the first Biennial Report. The Clean Energy Regulator also administers the crediting and purchasing of abatement under the ERF, and will administer the safeguard mechanism when it comes into effect on 1 July 2016.

The Clean Energy Regulator monitors compliance with climate change laws, including the ERF, to determine compliance levels, identify possible non-compliance and assess the education or enforcement action that may be required. The Regulator gathers information, conducts independent audits and undertakes inspections. It also holds enforcement powers which include:

- accepting enforceable undertakings from a regulated entity
- issuing infringement notices, or
- pursuing legal action for breaches of civil penalty provisions.

Criminal sanctions apply for persons or organisations found to have breached offence provisions contained in climate change laws, or if a person or organisation is found to have engaged in dishonest or fraudulent conduct in connection with schemes established by those laws.

4.5.2 The Role of the Climate Change Authority

The Climate Change Authority was established on 1 July 2012 as an independent statutory agency through the Climate Change Authority Act 2011. The Climate Change Authority conducts climate change research, conducts periodic reviews of climate change measures and reports on Australia's progress in meeting national emissions reductions targets.

During the period until the end of 2016, the Authority will undertake a special review examining the climate action being undertaken in five of Australia's major trading partners (the United States, the European Union, China, Japan and the Republic of Korea). In particular, the Authority will assess:

- whether Australia should have an emissions trading scheme;
- what conditions might trigger the introduction of such a scheme;
- how such a scheme might impact the international competitiveness of Australian businesses;
- what post-2020 emissions reduction targets Australia should set; and
- what actions Australia should take to implement outcomes flowing from the United Nations Framework Convention on Climate Change meeting in Paris in December 2015.

The Authority will issue a final report on its topics for special review by 30 June 2016.

Reports of the Climate Change Authority to the Australian Government are available here: climatechangeauthority.gov.au/reviews

4.6 Addressing adverse effects, economic and social consequences of response measures

Australia routinely considers the impacts of its climate change response measures. Overall, the economic cost of reducing emissions is lower than the cost of inaction on climate change (Stern 2006; Garnaut 2008 and 2011). Action on climate change has significant economic, social and environmental benefits, particularly for developing countries that are most vulnerable to climate impacts. This is why Australia is committed to reducing its emissions and supporting other countries' efforts. In developing its climate change response measures, Australia seeks to identify possible impacts and minimise any negative economic and social consequences.

Policy development in Australia is typically accompanied by consultation processes that enable those potentially affected to raise concerns and present ideas; for example, the ERF Green Paper and White Paper consultation processes considered adverse impacts of the policy on business and the community (see also the factors that the Minister must consider when setting methodologies under the ERF in 4.3.1.3).

Impact assessment is an integral part of Australia's policy development process. Any legislation introduced to the Australian parliament must be accompanied by a Regulatory Impact Statement that assesses the economic and social impacts of the measure.

Australia's bilateral consultations with other countries and engagement in international platforms such as the UNFCCC Forum on the Impact of the Implementation of Response Measures helps build understanding of positive and negative impacts and enables other countries to raise concerns and suggest ways to minimise adverse impacts.

Australia also helps developing countries prepare for the impacts of climate change response measures, by supporting their transition towards lower emissions and climate resilient economies. Examples of how Australia is supporting the development and deployment of low emissions technologies in developing countries and building countries' capacity to implement low emissions development strategies are provided in Chapter 6. Mandatory safeguards requirements apply to all of Australia's aid investments, including our bilateral climate finance program. These ensure potential adverse social and environmental impacts are identified and adequately addressed.

4.7 Estimates of emission reductions and removals from LULUCF activities

Australia has used the KP classification system for reporting estimates from the LULUCF sector, as discussed in section 3.2. For all *LULUCF* classifications, emission estimates in the reporting period may be compared with estimates in the base-year, which is 2000. In summary, the net emissions from the LULUCF sector were 7.5 Mt CO2-e in 2013, which were 56.3 Mt CO2-e less than net emissions in 2000. Information on the contribution of the LULUCF sector to Australia's progress towards its QEERT is provided in CTF Tables 4, 4(a)I and 4(b).

4.7.1 Coverage

Australia reported net emissions from the *Deforestation, Afforestation/reforestation, Forest Management, Cropland Management, Grazing land Management* and *Revegetation*. The concordance between the two classification systems is set out in Table 4.2.

Table 4.2 Reconciliation table between UNFCCC and KP classifications

UNFCCC	KP
Forest land	
Forest land – multiple use forests	*Forest Management*
Forest land – pre-1990 plantations	*Forest Management*
Forest land – private native forests	*Monitored for Forest Management activity*
Forest land – conservation reserves	*Monitored for Forest Management activity*
Forest land – other native forest	*Monitored for Forest Management activity*
Land converted to forest	
New plantations since 1990	*Afforestation / Reforestation*
Native regeneration since 1990 – direct human induced	*Afforestation / Reforestation*
Cropland	
Croplands – permanent	*Cropland management*
Forest converted to crops	*Deforestation*
Grassland converted to crops	*Cropland management*
Grassland	
Grasslands – permanent	*Grazing land management*
Forest converted to grass since 1990 – direct human induced	*Deforestation*
Forest converted to grass – pre-1990 conversion – direct human induced	*Grazing land management*
Crop converted to grass	*Grazing land management*
Settlements	*Revegetation*
Wetlands	*Revegetation*

4.7.1.1 Deforestation

The net emissions from *Deforestation* were 37.2 Mt CO_2-e in 2013, which was 31.7 Mt CO_2-e less than in 2000. The classification definitions and the methodologies used to derive the estimates are described in the *NIR 2015* Volume 3.

4.7.1.2 Afforestation / Reforestation

The net emissions from the *Afforestation / Reforestation* classification were -12.5 Mt CO_2-e in 2013, which was 2.7 Mt CO_2-e less than in 2000. The classification definitions and the methodologies used to derive the estimates are described in the *NIR 2015* Volume 3.

4.7.1.3 Forest Management

The net emissions from *Forest Management* classification were -20.3 Mt CO_2-e in 2013, which was 17.1 Mt CO_2-e less than in 2000. For *Forest Management*, reference level accounting, as is applicable under the KP, has not been applied. Instead, *Forest Management* is treated the same way as is any other sector, which simplifies the accounting approach for *Forest Management* with little impact on outcomes. (The corrected *Forest Management* Reference Level reported in the *NIR 2015* was 1.1 Mt CO_2-e compared with a 2000 base estimate for *Forest Management* of 3.1 Mt CO_2-e).

Harvested wood products are estimated using the IPCC production approach.

Natural disturbance (fire, cyclones) impacts are not excluded from the accounting but are subject to a national methodology approach that takes into account the IPCC method for treatment of natural disturbances as explained in the *NIR 2015* Volume 3.

Natural disturbance impacts are "beyond control" and "not materially influenced" by Australia, as they occur in spite of significant and costly efforts to manage disturbance. Australia engages in on-going efforts to prevent, manage and control natural disturbances to the extent practicable (and as reported in the *NIR 2015*).

Australia's national forest carbon monitoring system is used to estimate the emissions and is also used to identify any subsequent removals from the lands affected by natural disturbances, as well as to monitor lands affected by natural disturbances for salvage logging or subsequent land use change in order to account for any associated emissions.

Australia does not apply a cap in accounting for *Forest Management*.

4.7.1.4 Cropland Management

The net emissions from *Cropland Management* classification were -1.8 Mt CO_2-e in 2013, which was 5.8 Mt CO_2-e more than in 2000. The classification definitions and the methodologies used to derive the estimates are described in the *NIR 2015* Volume 3.

4.7.1.5 Grazing land Management

The net emissions from *Grazing land Management* were 4.9 Mt CO_2-e for 2013, which was 10.6 Mt CO_2-e less than in 2000. The classification definitions and the methodologies used to derive the estimates are described in the *NIR 2015* Volume 3.

4.7.1.6 Revegetation

The net emissions from revegetation are currently not estimated.

4.7.1.7 Other

Australia does not include estimates of emissions from Drainage and Re-wetting of organic soils.

5 Projections

This chapter presents projections of Australia's greenhouse gas emissions. Projections are reported for each National Greenhouse Gas Inventory sector, focusing on the KP second commitment period (2013 to 2020). Projections presented here are in accordance with the UNFCCC guidelines for national communications for UNFCCC parties.

Projections of net emissions according to KP classifications are also reported in order to track Australia's progress towards meeting its commitment of reducing greenhouse gas emissions to five per cent below 2000 levels by 2020.

Australia's projected cumulative abatement task from 2013 to 2020 has fallen every year. The revised projections to 2020 demonstrate that Australia is well placed to meet the 2020 emissions reduction target. Abatement from the ERF, legacy CFI and the RET have been included in the projections results. Relevant polices including HFC regulation, review of light vehicle emissions standards and the NEPP are currently being finalised by the Australian Government and it is expected that these will be included in future projections.

The following sections present a summary of Australia's approach to projections, a description of the projections modelling approach, a discussion of the institutional arrangements and quality assurance processes and an assessment of the cumulative abatement task to meet Australia's 2020 emissions reduction target. A sector-by-sector explanation of the projections is provided. This is followed by a section on sector specific key assumptions. The final section of this chapter describes changes since the last national communication.

5.1 Projections methodologies

5.1.1 Modeling approach

The projections for this Report were prepared by the Department of the Environment. These have been prepared at a sectoral level, consistent with international guidelines adopted by the UNFCCC for accounting under the KP. This includes projecting Australia's emissions for the KP greenhouse gases, expressed in terms of CO_2-e using the 100-year global warming potentials contained in the Intergovernmental Panel on Climate Change's (IPCC) *Fourth Assessment Report* (IPCC 2007).

The projections present a single baseline scenario that is developed on the basis of current policies and measures in place. This includes the LRET of 33,000 GWh by 2020, legacy CFI and the ERF. The projections use a combination of top-down and bottom-up modeling prepared by the Department's analysts and external consultants.

The preparation of the projections is based on macro assumptions for GDP, exchange rates, labour costs and population growth that is consistent with the Australian Government's 2015–16 Budget. In projecting results, the Department draws on publications and data from a number of government agencies including the Department of Industry, Innovation and Science, ABARES, and the Bureau of Infrastructure, Transport and Regional Economics.

5.1.2 Institutional arrangements and quality assurance process

The projections undergo an extensive quality assurance process. The methodologies employed and the results are reviewed by a technical working group comprised of representatives from Commonwealth agencies. Representatives from industry bodies, independent economic analysts and consultants are also consulted.

The Department of the Environment uses the best available data and expertise to analyse Australia's future emissions and cumulative abatement task. However, the projections represent a judgment about the future. Projections become more uncertain the further in to the future emissions are projected and it is not possible to predict all factors that may influence Australia's emissions — such as economic shocks, significant shifts in future technology development and changes in consumer preferences.

5.2 Summary of projections

The forthcoming publication, *Tracking to 2020*, is an interim update and provides revised emissions projections for Australia to the year 2019–20, updating *Australia's Emissions Projections 2014–15*, released in March 2015. The updated projections indicate that Australia will meet, in cumulative abatement terms, the Government's target of a five per cent reduction in emissions on year 2000 levels by 2020.

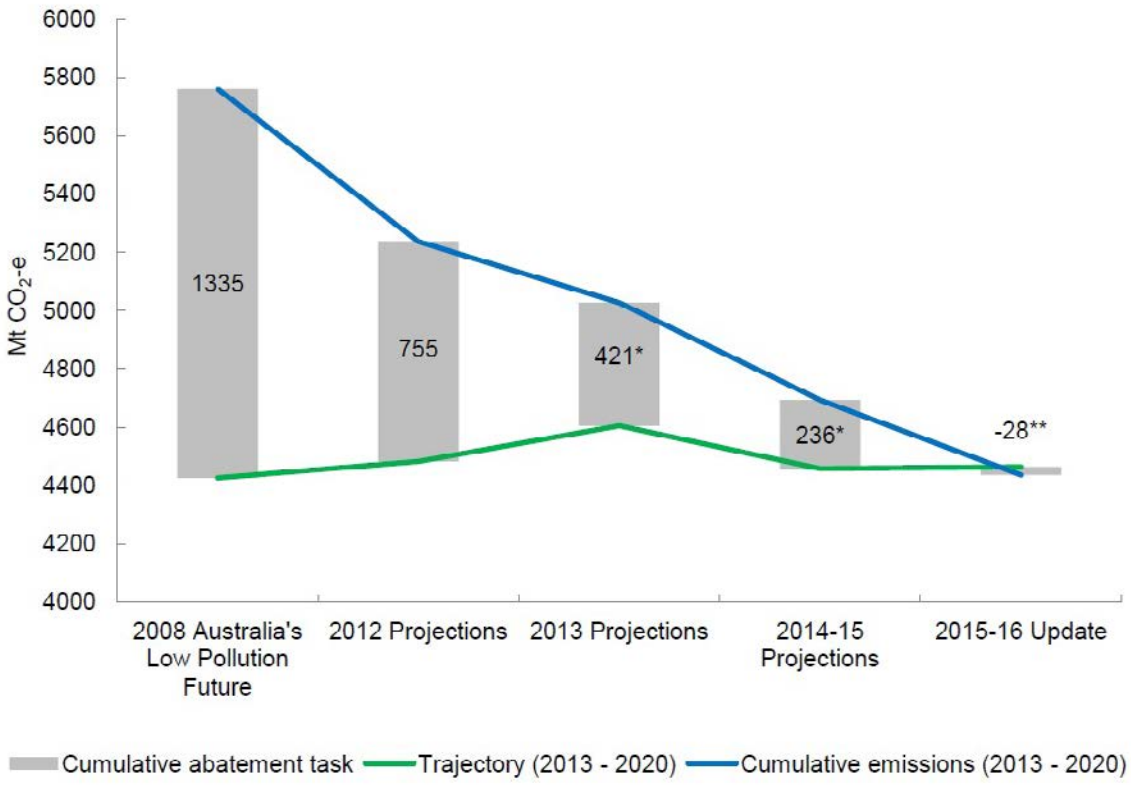
5.2.1 Cumulative abatement task to 2020

On current estimates the cumulative abatement task to 2020 is -28 Mt CO_2-e.[3] This compares with the cumulative abatement task of 236 Mt CO_2-e reported in *Australia's Emissions Projections 2014–15* which includes carryover of 129 Mt CO_2-e from the Kyoto Protcol first commitment period.

Australia's cumulative abatement task has steadily fallen as the Australian economy has become less emissions intensive, international carbon accounting rules have been revised to improve the measurement and recording of emissions, and the emissions outlook at the sectoral level have been updated with the latest data.

3 The carryover estimate has been updated from 129 Mt CO_2-e to 128 Mt CO_2-e as part of the finalisation of Australia's true-up for the first commitment period under the Kyoto Protocol. These estimates also take account of voluntary action of 8 Mt CO_2-e. Voluntary action refers to individuals and companies offsetting their emissions to become 'carbon-neural' and households buying GreenPower (a government-accredited program for energy retailers to purchase renewable energy on behalf of customers). Voluntary action achieves emissions reductions additional to—that is, above and beyond—national targets.

Figure 5.1 Cumulative abatement task over time

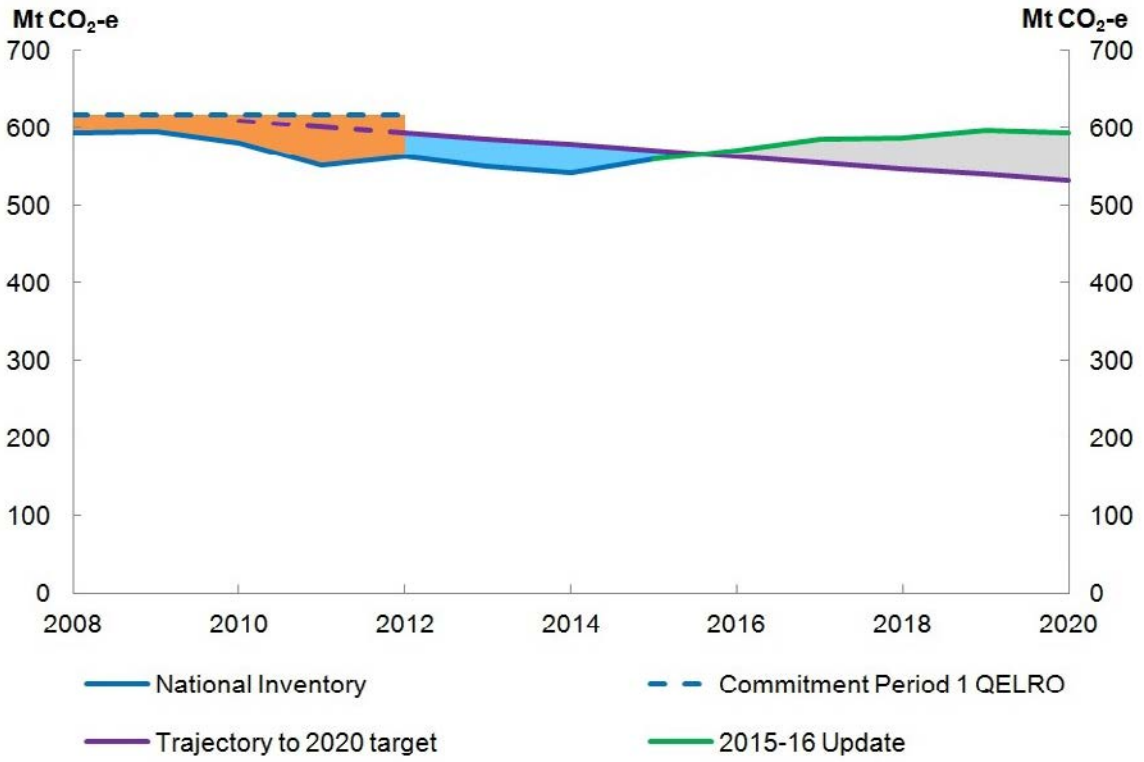


*Takes account of carryover and voluntary action. Voluntary action is additional to the abatement task.
**Takes account of carryover, ERF abatement, voluntary Waste Industry Protocol international units and voluntary action. Voluntary action is additional to the abatement task.

Note: The cumulative abatement task has been derived for the period 2013 to 2020 using the information available for each publication. It is important to note that year to year figures are not directly comparable as the underlying assumptions and policy measures differ. Emissions accounting approaches to comply with international reporting standards and target trajectories are also different between projections.

Figure 5.2 shows that in the period 2013 to 2020, Australia is below the target trajectory in some years. The area below the trajectory (blue area) counts as a reduction to the cumulative abatement task. The cumulative abatement task is -28 Mt CO_2-e (calculated as the grey area minus the blue area, minus the orange area, which represents the carryover from the KP first commitment period), taking account of international units under the voluntary Waste Industry Protocol.

Figure 5.2 Cumulative abatement task, 2013 to 2020



This update incorporates the changes in the LRET which is now 33,000 GWh (gigawatt hours), legislated in June 2015. The 2014–15 projections reflected a 'real 20 per cent' RET, implying a 27,000 GWh LRET.

Projections for emissions across all sectors in the period 2013 to 2020 are now lower with major revisions in

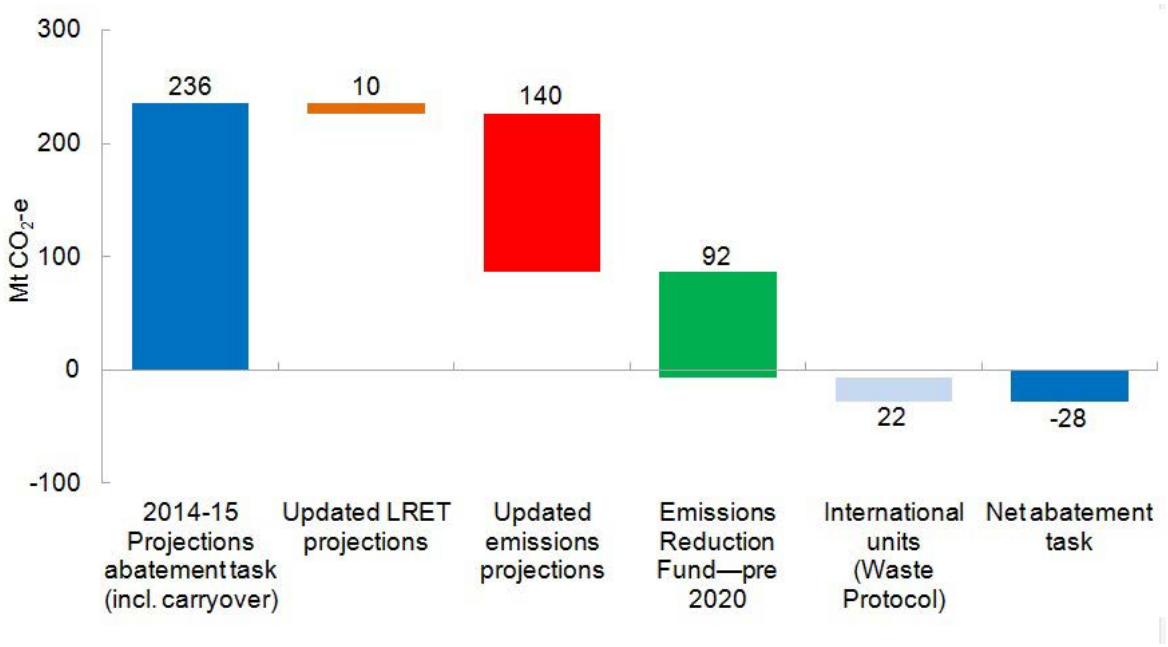
- the electricity sector where, in addition to the adjustment for the LRET, emissions in the electricity sector are lower as a result of announced closures of high emitting coal-fired power stations and as a result of gas generation largely maintaining its share of generation after 30 June 2014;
- the LULUCF sector, with lower forecast rates of harvesting in the Australian forests products industry; and
- the fugitives sector where slower growth is expected in the coal mining sector.

Estimates of abatement from the ERF have been incorporated in the projections for the first time and contribute 92 Mt CO_2-e to the cumulative abatement task. This takes into account the first two ERF auctions held in 2015 and estimates of abatement to be purchased with the A$1.3 billion available for future auctions. The ERF auctions and the Renewable Energy Target are the key Australian Government policies for reducing emissions to ensure the 2020 emissions reduction target is met.

International units representing around 22 Mt CO_2-e have been voluntarily transferred to the Commonwealth under the voluntary Waste Industry Protocol.[4]

4 Further information on the voluntary Waste Industry Protocol is available at: www.environment.gov.au/climate-change/publications/voluntary-waste-industry-protocol

Figure 5.3 Change in the cumulative abatement task, 2013 to 2020

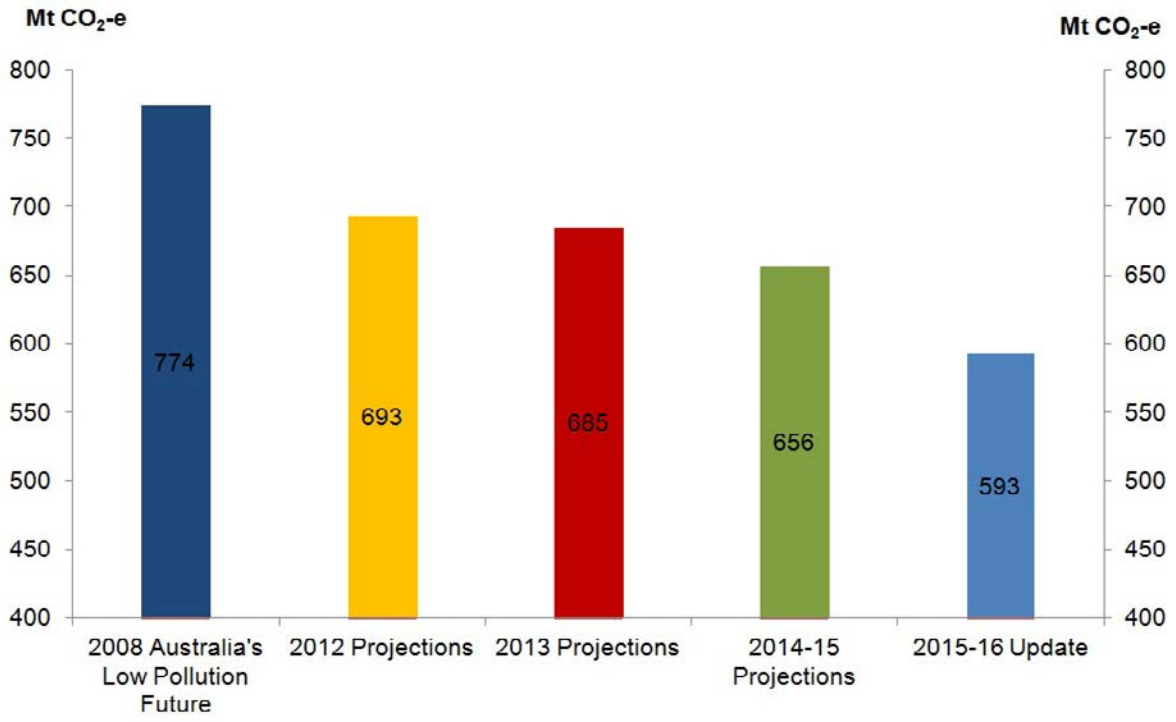


5.2.2 Revised annual projections

The updated projections show less growth in emissions compared with the 2014–15 projections. Emissions are rising from 560 Mt CO_2-e in 2014–15 to 593 Mt CO_2-e in 2019–20, which is 63 Mt CO2-e lower than the 2014–15 projections' estimate for 2019–20 of 656 Mt CO_2-e (figure 5.4). It is expected that estimated emissions in 2019–20 will be revised down in future projections once emissions reductions from additional policies and initiatives[5] are included.

5 For example the National Energy Productivity Plan, fuel efficiency standards for light vehicles and the phase-down of HFCs.

Figure 5.4 Change in projected emissions in 2020



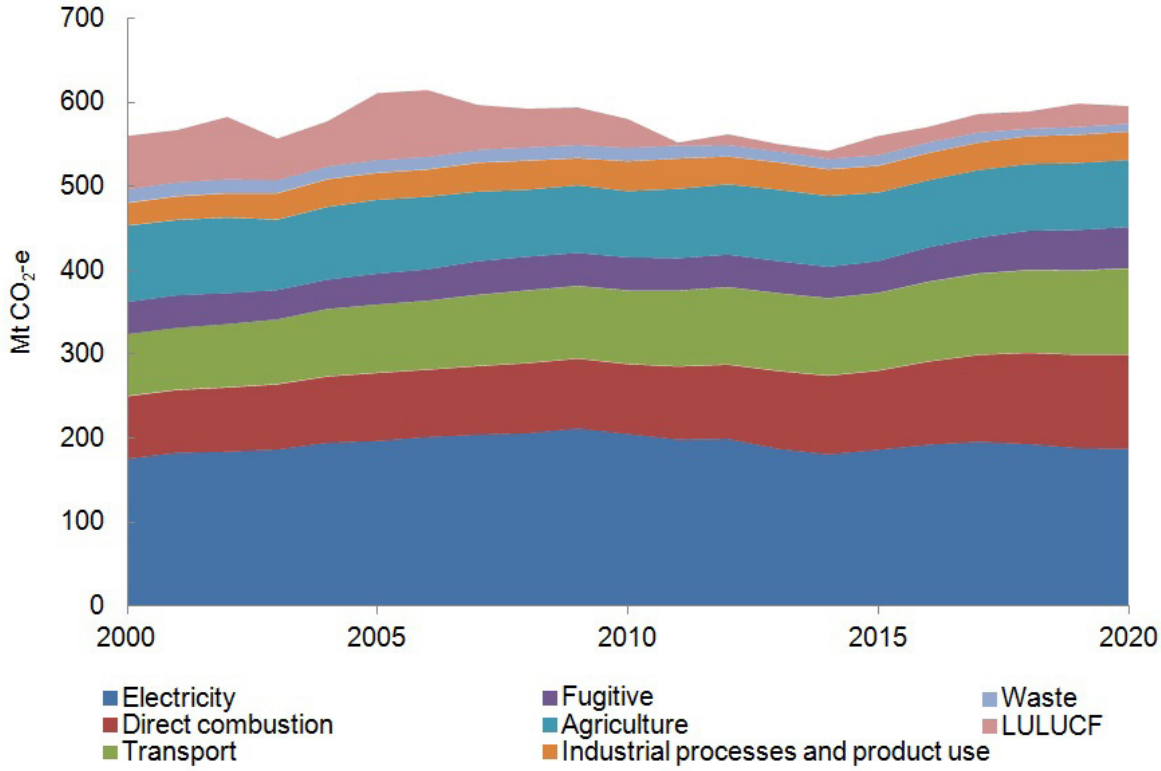
Note: Projected emissions in 2020 have been calculated using the information available in each publication. It is important to note that year to year figures are not directly comparable as the underlying assumptions and policy measures differ. Emissions accounting approaches to comply with international reporting standards and target trajectories are also different between projections.

Figure 5.5 shows domestic emissions by sector. The key changes expected in emissions by sector to 2019–20 are:

- expected growth in LNG production will result in emissions from this sub-sector increasing by over 27 Mt CO_2-e. This represents around three quarters of the expected increase in Australia's emissions in the electricity, direct combustion and fugitives sectors to 2019–20. LNG exported from Australia is generally used for gas-fired power generation which is considered an important fuel for many countries looking to reduce their energy-related emissions;
- emissions related to transport are expected to increase by around 10 Mt CO_2-e due to growth in passenger vehicle and the continuation of low oil prices. The finalisation of fuel efficiency standards will likely lead to a significant downward revision in the emissions outlook for this sector;
- emissions associated with growth in coal exports are expected to rise by over 4 Mt CO_2-e by 2019–20. This estimate will be reviewed in future projections as the impact of low international coal prices is further assessed; and
- emissions associated with HFCs and other synthetic gases are expected to rise by around 2 Mt CO_2-e and measures to phase-down HFCs would see this trend reverse.

Partially offsetting these increases are expected falls in emissions in the waste and LULUCF sectors. Emissions in the electricity and agriculture sectors are expected to be relatively stable.

Figure 5.5 Domestic emissions, 2000 to 2020



Indicators of the emissions intensity per unit of production in the economy have continued to decline. It is expected that the emissions intensity of GDP will have fallen by 42 per cent by 2019–20 compared to 1999–2000. Emissions per capita are also expected to continue to fall steadily by 22 per cent in 2019–20 compared to 1999–2000.

Figure 5.6 Emissions intensity of GDP, 2000 to 2020

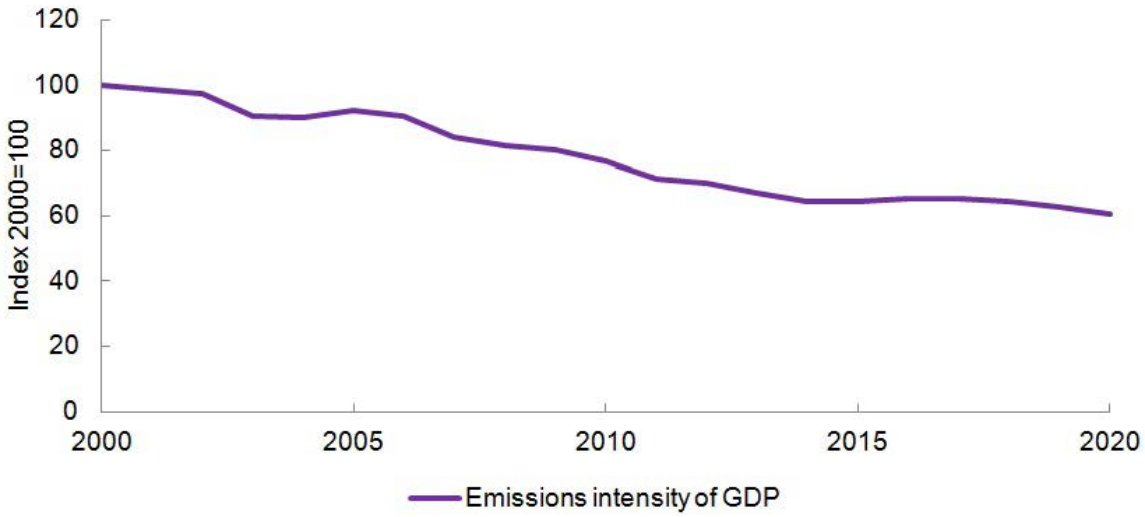
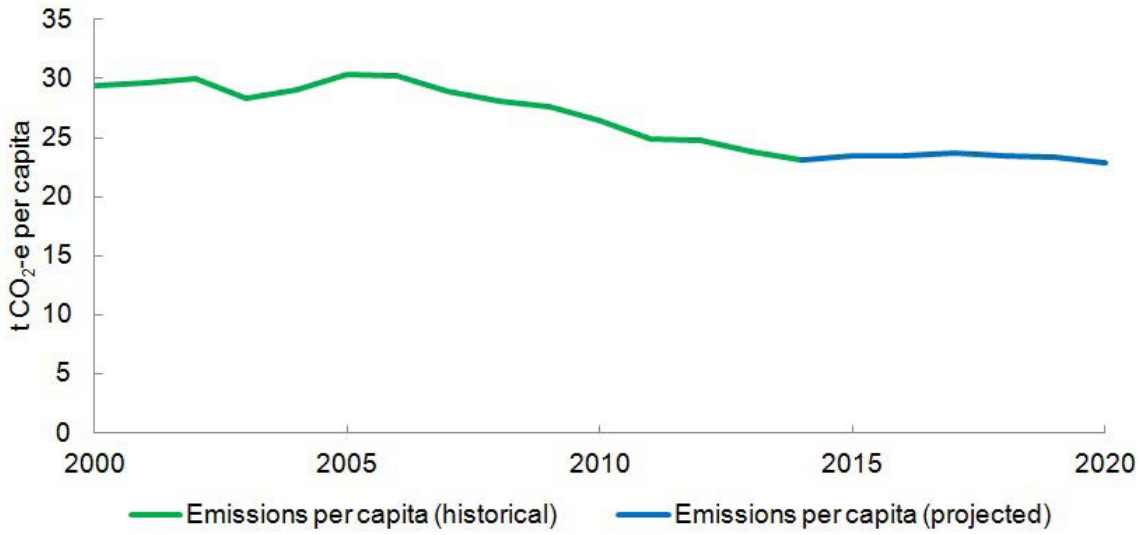


Figure 5.7 Emissions per capita, 2000 to 2020



5.3 Projections by sector

The following section presents a summary of the sectoral trends for each sector: electricity, direct combustion, transport, fugitives, industrial processes and product use, agriculture, waste and LULUCF.

5.3.1 Electricity

Emissions from electricity generation are the result of fuel combustion for the production of electricity on-grid and off-grid. Electricity generation represents the largest share of emissions in the national greenhouse gas inventory, accounting for 33 per cent of emissions in 2014–15.

Electricity emissions have increased by 11 Mt CO_2-e since 1999–2000, or 6 per cent in 2014–15. Emissions are projected to grow by 1 per cent from 186 Mt CO_2-e in 2014–15 to 187 Mt CO_2-e in 2020. This is approximately 32 per cent of Australia's emissions in 2020.

Electricity demand from general business and large industry, for example manufacturing and mining facilities, is expected to increase in line with economic growth, while residential energy demand is expected to rise with population growth. To 2019–20 electricity demand in Australia is expected to grow, largely from electricity demand from new LNG projects.

Since 2008–09 there has been a significant decrease (12 per cent) in emissions from electricity generation, driven by both demand and supply side factors, with electricity emissions reaching its lowest point in 2013–14. A number of drivers contributed to the drop in demand including a consumer response to an increase in retail electricity prices; energy efficiency improvements in buildings and technology; and structural change in the economy, including a reduction in output from some manufacturing sectors. On the supply side there was a shift towards less emission intensive sources like gas and wind power. Hydro electricity output was also above long term average levels over the period 1 July 2012 to 30 June 2014.

Electricity generation from renewables and black and brown coal has increased over 2014–15, while generation from gas and hydro fell.

The projections show electricity emissions continuing to rise until around 2017, when the effects of the LRET begin to play a noticeable part in lowering electricity emissions. In 2016–17 electricity emissions decrease before flat lining to 2019–20 as a result of increases in wind generation, particularly in the eastern states. Wind and solar PV generation is expected to dominate new capacity investment until the mid 2020s as a consequence of the LRET.

Also contributing to the decline in emissions to 2019–20 is a decrease in coal fired generation. The recent retirements of some aging coal power stations as well as slower than expected return to coal generation levels from before 1 July 2012, sees coal as a proportion of the generation fall from 69 per cent in 2015–16 to 60 per cent by 2019–20. Less emissions intensive gas generation continues to maintain its share of electricity generation over the projections period of around 14 per cent.

5.3.2 Direct Combustion

The direct combustion sector is broken down into six subsectors: energy, mining, manufacturing, buildings, primary industries and other. Emissions from direct combustion are from the burning of fuels for energy used directly, in the form of heat, steam or pressure (excluding for electricity generation and transport). Energy used in mobile equipment in mining, manufacturing, construction, agriculture, forestry and fishing is also included in direct combustion as opposed to transport.

Emissions in the direct combustion sector have increased by 27 per cent since 1999–2000, to be 94 Mt CO_2-e in 2014–15. Emissions are projected to be 112 Mt CO_2-e in 2019–20, an increase of 19 per cent above 2014–15 levels.

Over the period from 2014–15 to 2019–20, growth in direct combustion emissions is mostly driven by the expected increase in LNG production by over 200 per cent. This leads to direct combustion emissions from LNG increasing from 6 Mt CO_2-e to 19 Mt CO_2-e over the period. The other significant area of growth over the period to 2019–20 is the mining subsector, where direct combustion emissions are projected to increase by 25 per cent from 18 Mt CO_2-e to 22 Mt CO_2-e.

The majority of growth in the direct combustion sector over the projections period is driven by an expected growth in exports of Australian commodities. Increased production volumes of resources following a period of investment and Australia's proximity to emerging economies such as China and India means that export volumes are expected to increase, despite global commodity prices being expected to fall (Office of the Chief Economist 2015).

The Australian LNG industry is expected to continue its rapid expansion. Coal production is also expected to increase and this is expected to result in an increase in direct combustion coal emissions of 18 per cent over the projections period from 8 Mt CO_2-e to 9 Mt CO_2-e. The projected increase in coal exports is due to demand from developing economies, particularly from Asia.

Other mining, mostly driven by growth in iron and gold ore exports, is projected to increase by 31 per cent over the projections period from 10 Mt CO_2-e to 13 Mt CO_2-e. The projected increase in iron ore exports is due to a number of factors, including increased steel consumption in China in the medium term, as an oversupply of iron and low steel prices in the domestic Chinese market makes switching from highcost domestic iron ore to low-cost imported iron ore a more competitive option.

Gold ore production is expected to increase slowly but steadily over the projections period as existing mines increase their output.

Manufacturing of goods and commodities forms the largest subsector of direct combustion (40 per cent of direct combustion emissions in 2014–15), with most emissions resulting from the manufacture of basic nonferrous metals (such as alumina and nickel). Projected growth in the nonferrous metals, nonmetallic minerals and food and beverage processing subsectors, driven by export demand for Australian produce and commodities, is expected to lead to manufacturing emissions increasing by 4 per cent over the period 2014–15 to 2019–20.

Emissions from the buildings and other subsectors are projected to remain constant over the projections period, while direct combustion emissions from petroleum refining are projected to drop.

5.3.3 Transport

The transport sector includes emissions from the combustion of fuels in transportation by road, rail, domestic shipping, domestic aviation, off-road recreational vehicle activity and pipeline transport. Road transport includes private passenger vehicles (cars and motorcycles), light commercial vehicles, rigid trucks, articulated trucks and buses. Emissions from electricity used in electric vehicles and rail are accounted for under electricity generation. Emissions from the production and refining of oil-based fuels, including biofuels, are accounted for elsewhere in the inventory.

Emissions in the transport sector have increased by 25 per cent since 1999–2000, to be 93 Mt CO_2-e in 2014–15. Emissions are projected to be 103 Mt CO_2-e in 2019–20, an increase of 11 per cent above 2014–15 levels. Transport emissions are projected to grow as a result of projected increase in transport activity, largely reflecting economic and population growth.

Road transport is the dominant source of transport emissions accounting for 78 Mt CO_2-e in 2014–15. Road transport emissions are projected to be 85 Mt CO_2-e in 2019–20.

Cars are the largest contributor of road transport emissions, accounting for 43 Mt CO_2-e in 2014–15. Car emissions are projected to increase steadily due to continued growth in the number of passenger vehicles, recent drop in oil prices and increase in diesel consumption.

Freight transport (rigid trucks, articulated trucks and light commercial vehicles) has greater increase in emissions over the projections period due to increased activity and limited uptake of low emissions fuels. Freight task is projected to increase to 38 Mt CO_2-e in 2019–20 in line with economic growth and continued growth in coal and iron ore exports.

Road fuel mix is dominated by petrol and diesel, accounting for 95 per cent of fuel consumption in road transport in 2015. A similar trend is projected to continue in future due to relatively low oil prices resulting in subdued uptake of alternative fuels in the road sector.

Emissions from non-road transport were 15 Mt CO_2-e in 2014–15, contributing 16 per cent of transport emissions. Growth in emissions is largely driven by the domestic aviation and rail sectors.

Domestic aviation is expected to have the strongest growth driven by falling airfares due to increased competition, lower oil prices and increasing passenger preference for air travel over road or rail.

Growth in rail emissions is driven mainly by projected increase in freight activity. Freight rail activity is expected to increase slightly faster than passenger rail activity predominantly due to continued growth in iron ore exports.

Domestic shipping emissions are expected to grow more slowly than other sectors due to lower projected growth in petroleum oil, iron and steel production in Australia.

5.3.4 Fugitives

Fugitive emissions occur during the production, processing, transmission and distribution of fossil fuels. The major sources of Fugitive emissions are the intentional release or combustion of waste gases, and unintended leakage. These emissions sources are predominantly from underground coal mines. Fugitive emissions do not include emissions from fuel combusted to generate electricity, operate plant equipment, or transport fossil fuels by road, rail or sea.

Fugitive emissions from fossil fuels have decreased by 2 per cent since 1999–2000, to be 38 Mt CO_2-e in 2014–15. Total Fugitive emissions are projected to reach 46 Mt CO_2-e in 2019–20, an increase of 21 per cent on 2014–15 levels.

Over the projections period, 2014–15 to 2019–20 *Fugitive emissions* are expected to rise from all subsectors other than oil, which is stable. Emissions growth is dominated by expected increases in coal and LNG production. *Fugitive emissions* from coal are expected to rise by 3 Mt CO_2-e and *Fugitive emissions* from LNG are expected to rise by 4 Mt CO_2-e.

Coal mine Fugitive emissions were 25 Mt CO_2-e in 2014–15; 66 per cent of total Fugitive emissions. From 2014–15 to 2019–20, coal mine Fugitive emissions are projected to increase by 13 per cent to 29 Mt CO_2-e. Coal production is projected to increase to meet projected increases in export demand from China and India, for steel making and electricity generation.

Coal Fugitive emissions are projected to grow strongly between 2014–15 and 2019–20 reflecting the strong growth in production. Underground mines generally produce more Fugitive emissions than surface mines because they contain more methane. While significant growth in coal production is expected over the projections period much of this is expected to be from surface mines. Emissions are therefore not expected to grow as quickly as production. Fugitive emissions from mines producing brown coal are minimal, at <0.1 Mt CO_2-e in 2014–15.

Fugitive emissions from natural gas and oil are estimated to have been 13 Mt CO_2-e in 2014–15, 34 per cent of total Fugitive emissions. Natural gas and oil Fugitive emissions are projected to increase by 36 per cent from 2014–15 to 2019–20. Most of the projected increase in natural gas and oil Fugitive emissions is a result of the rapid expansion of Australia's LNG industry currently underway to meet expected demand from Asian markets. *Fugitive emissions* from LNG are estimated to have been 3 Mt CO_2-e in 2014–15, 8 per cent of total *Fugitive emissions*. In 2019–20 they are projected to more than double to reach 7 Mt CO_2-e.

The growth in projected fugitive LNG emissions is a result of a projected increase in Australian LNG production of more than 200 per cent over the projections period, reaching around 76 Mt LNG in 2019–20. This increase is largely driven by growing demand from China, South Korea and Japan and by 2019–20, Australia is projected to become the world's largest LNG exporter. A number of new LNG projects are expected to commence production from 2015–16 to 2017–18, which will see Australia's nameplate capacity increase to around 87 Mt LNG by 2019–20 (Office of the Chief Economist 2015).

Fugitive emissions from LNG are highly dependent on the carbon dioxide content of the raw gas, which varies between projects and gas fields. The carbon dioxide content of coal seam gas fields is generally much lower than conventional fields. The emissions intensity of Australian LNG production is projected to decline to 2017–18 due to the commencement of the major coal seam gas to LNG projects. From 2017–18, the emissions intensity of LNG production is projected to increase above 2014–15 levels as conventional gas fields with higher emissions intensity are expected to begin production.

Fugitive emissions from domestic gas are estimated to have been 9 Mt CO_2-e in 2014–15, 23 per cent of total Fugitive emissions. In 2019–20 they are projected to remain stable 9 Mt CO_2-e. The major end users of gas in Australia are the electricity generation, industry and residential and commercial sectors.

Fugitive emissions from oil production and refining were 1 Mt CO_2-e in 2014–15, 3 per cent of total Fugitive emissions. Over the projections period, Fugitive emissions from oil are projected to remain at 1 Mt CO_2-e.

5.3.5 Industrial Processes and Product Use

The industrial processes and product use sector includes emissions from non-energy related production processes involving the use of carbonates (such as limestone and dolomite), carbon when used as a chemical reductant (such as iron and steel or aluminium production), chemical industry processes (such as ammonia and nitric acid production), the production and use of synthetic gases such HFCs or sulphur hexafluoride, combustion of lubricant oils not used for fuel and carbon dioxide generated in food production. Emissions from nitrogen trifluoride (NF3) are negligible in Australia and, in accordance with reporting guidelines, are not estimated.

Industrial processes and product use emissions were 32 Mt CO_2-e in 2014–15, a 19 per cent increase above 1999–2000 levels. Emissions are projected to be 34 Mt CO_2-e in 2019–20, an increase of 6 per cent above 2014–15 levels.

The increase in industrial processes and product use emissions is primarily due to the increasing take up of equipment using HFCs, which leak gases gradually over their lifetime. The historically rapid growth in emissions from product uses as substitutes for ozone depleting substances is projected to slow by 2019–20 due to the almost complete replacement of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons with HFCs.

Emissions from iron and steel production, aluminium production and clinker production are projected to decline or remain steady throughout the projections period. A number of facility closures in 2014–15, such as Aloca's aluminium smelter at Point Henry, and Adelaide Brighton's Munster and Boral's Maldon clinker plants, will see projected emissions from metal and mineral production initially fall over the 2014–15 to 2019–20 period. Production from these subsectors has been affected by competition from low-cost producing countries, and low output prices resulting from excess world production capacity. Low prices and excess capacity are projected to continue throughout the period to 2019–20 (Office of the Chief Economist, 2015, IBISWorld 2015a and IBISWorld 2015b). Whilst emissions from metal production continue to decline out to 2019–20, emissions from the production of mineral products are projected to increase later in the period as lime production rises in response to growing demand from road construction and the agriculture sector, offsetting the decline in emissions from clinker production.

Emissions from the chemical industry are projected to grow between 2014–15 and 2019–20 as several new ammonium nitrate plants are expected to be established. These plants manufacture ammonium nitrate for use in explosives, primarily to supply the growing iron ore mining industry in Australia.

Emissions from the remaining subsectors: other product manufacture and use; non-energy products from fuels and solvents; and other production, constituted less than 2 per cent of industrial processes and product use emissions in 2014–15. Emissions were 0.6 Mt CO_2-e in 2014–15, a decrease of 8 per cent below 1999–2000 levels. Emissions are projected to remain around 0.6 Mt CO_2-e in 2019–20.

5.3.6 Agriculture

The agriculture sector includes emissions from enteric fermentation, manure management, rice cultivation, agricultural soils, prescribed burning of savanna and field burning of agricultural residues. It does not include emissions from electricity use or fuel combustion from operating equipment, which are included in the direct combustion sector. With the exception of carbon dioxide from the application of lime and urea, carbon dioxide emissions from agriculture are not counted because they are considered part of the natural carbon cycle.

Agriculture emissions have decreased by 10 per cent since 1999–2000, to be 81 Mt CO_2-e in 2014–15. Once abatement from the ERF has been taken into account, emissions from agriculture are projected to be 80 Mt CO_2-e in 2019–20, a 2 per cent decrease on 2014–15 levels.

Most agriculture emissions come from enteric fermentation and manure management associated with livestock production. Approximately 70 per cent of agriculture emissions in 2014–15 came from grazing beef cattle (42 per cent), sheep (16 per cent), and dairy (11 per cent). As a result, any variation in agricultural livestock production, particularly beef and lamb, has a significant impact on emissions in the sector.

From 1999–2000 to 2014–15, emissions from agriculture fell by 10 per cent, although emissions were highly variable. Periods of low rainfall, from which there was some relief in 2004–05 and 2010–11, have caused reductions in agricultural activity and emissions. Since 1989–90, significant restructuring of the sheep industry had also seen an ongoing decline in sheep numbers and emissions, which has stabilised since 2007–08.

In 2013–14 and 2014–15, beef and sheep producers reduced livestock numbers in response to ongoing dry conditions. A return to favourable seasonal conditions is now anticipated in late 2015–16. Based on an assumption that seasonal conditions will improve, stronger growth in emissions from grazing beef cattle and sheep are expected post 2015–16, with significant stock rebuilding expected as the carrying capacity of pastures improves.

Emissions from dairy are projected to fall slightly by 2019–20, but are expected to remain relatively unchanged throughout the projections period when compared with historical trends.

Crops contributed 11 per cent or 9 Mt CO_2-e of total agriculture emissions in 2014–15 and are projected to increase annually by 1 per cent to 2019–20. Projected increases in global crop production is expected to be greater than projected increases in consumption, and prices are expected to average lower over the period 2014–15 to 2019–20, compared with the five years before. Despite this, Australian crop production is expected to increase steadily over the projections period as a result of growth in world population and incomes.

Emissions from soil treatments, which include fertiliser, urea and liming, are assumed to grow with livestock and crop production. Emissions from soil treatments have been incorporated into the relevant subsectors.

5.3.7 Waste

The waste sector includes emissions from the anaerobic decomposition of organic materials in landfill (solid waste to landfill), decomposition and treatment of wastes in wastewater, anaerobic decomposition of organic materials in composting facilities, and the combustion of waste in controlled incineration facilities.

Waste emissions were 13 Mt CO_2-e in 2014–15, a 23 per cent decrease on 1999–2000 levels. Emissions are projected to be 10 Mt CO_2-e in 2019–20, a decrease of 25 per cent below 2014–15 levels.

The majority of waste emissions come from solid waste to landfill. Historically, landfill waste emissions have declined, in spite of increased waste generation per capita, due to increased recycling and methane capture. Projected solid waste emissions decline from 2014–15 to 2019–20, due to the commencement of emissions abatement projects which were successful in the first two auctions of the ERF. Waste generation is expected to grow as a result of population and economic growth but increased recycling rates and methane capture lead to an overall reduction in emissions.

Wastewater emissions are projected to increase gradually throughout the projections, as growth in population and industrial production are expected to outpace increases in abatement from ERF projects. Domestic and

commercial wastewater emissions are projected to grow in line with projected population growth. Industrial wastewater emissions are projected to grow as a result of projected increases in industrial activity.

Emissions associated with composting and incineration of solid waste are expected to remain low, with combined emissions less than 0.2 Mt CO2-e a year throughout the period 2014–15 to 2019–20.

5.3.8 Land Use, Land Use Change and Forestry

The Australian Government has indicated that it will use the KP classification system for tracking towards the 2020 emissions reduction target. Further detail on Australia's accounting approach for the LULUCF sector is provided in sections 3.2 and 4.7.

Preliminary estimates of emissions from LULUCF were 23 Mt CO_2-e in 2015, a 64 per cent decrease from 2000 levels. Emissions from LULUCF are projected to be 21 Mt CO_2-e in 2020, a decrease of 9 per cent from their 2015 levels.

From 2015, projected increases in land clearing (reported under *Deforestation*) and forest harvesting from plantations (*Afforestation/Reforestation* and *Forest Management*) are offset by low rates of native forest harvesting reported under *Forest Management*. Emissions from other activities are steady, as past management changes (e.g. adoption of no-till, stubble retention) have a declining impact on soil carbon stocks reported under *Cropland Management* and *Grazing land Management*.

Deforestation emissions are projected to increase in the short term, reflecting changes in regulatory arrangements in Queensland which have re-introduced permits for clearing for the purpose of broadscale agriculture, and in response to rising agricultural prices. Deforestation emissions estimates used the FullCAM modelling framework and forecast land clearing rates based on the relationship between land clearing activity and the farmers' terms of trade described in the Department of the Environment's *NIR 2015*.

Emissions from *Forest Management* and *Afforestation/Reforestation* activities reflect the trends in harvesting activity in the Australian forest products industry, including native forest harvesting and industrial plantations. Trends in log supply and harvesting from these sectors are connected and subject to long-term trends of substitution, primarily the shifting supply from native forest harvesting toward increased supply from plantations. For the 2015–16 emissions projections, log harvest forecasts were adopted from the 'business as usual' scenario published in the *Outlook Scenarios for Australia's Forestry Sector: Key Drivers and Opportunities* (ABARES 2015a). ABARES forecasts an increase in total harvest volumes to 2020, with the increases predominantly from short-rotation hardwood plantations. Softwood plantation harvest volumes are also forecast to increase, while native forest harvest volumes are predicted to be stable or declining. The projections utilised the FullCAM modelling framework to estimate emissions, in conjunction with the harvested wood products model as described in the *NIR 2015*.

5.3.9 Projections of international bunker fuels emissions

International bunker fuels are fuels used for the purpose of international trade and travel between Australia and other nations, and are dominated by aviation fuel. In line with UNFCCC accounting rules, emissions from international bunker fuels are not counted in the total emissions for Australia.

5.4 Key assumptions

Key assumptions specific to each sector are outlined below.

5.4.1 Electricity

The interim electricity generation emissions projections are an update of the previous electricity emissions projections. They have been prepared based on research and modelling commissioned by the Department of the Environment and undertaken by Jacobs Australia (2015). Abatement from the ERF has been adjusted separately.

Electricity demand is projected for each of the major electricity grids and large off-grid users. Electricity emissions are then calculated by taking into account a number additional factors including production of each power station, generation mix, technology costs, resource costs and assumptions of embedded (solar PV) generation. This is considered alongside existing Commonwealth and State and Territory energy policies and programmes.

The Department has used data from the Australian Energy Market Operator (AEMO 2015) and the Independent Market Operator (IMO 2015) to determine electricity demand forecasts for the National Electricity Market and Wholesale Electricity Market to inform the electricity projections. Department analysis of NGER data and data from the former Bureau of Resources and Energy Economics (BREE 2013) is used to calculate demand in the remaining regions of the North West Interconnected System, the Darwin Katherine Interconnected System, the Mt Isa system and off-grid demand.

5.4.2 Direct Combustion

The interim direct combustion projections updates the 2014–15 projections. Emissions were projected by economic sector and fuel type using Commonwealth or third party activity information including NGER data, Office of the Chief Economist (2015) commodity forecasts, IBISWorld (2015c) industry reports, Wood Mackenzie's (2015) LNG Tool and AME Group's (2015) coal industry analysis. These data were supplemented by a consultancy report by Core Energy Group (2014) to model residential and commercial gas activity levels and to provide advice on potential fuel switching in the industrial sector over the projections period.

For the interim direct combustion projections, historical emissions intensity trends were analysed for the mining and manufacturing subsectors. Where a strong relationship was found, a formula was applied to project the emissions intensity trend into the future. Where there was no trend, a fixed emissions intensity was used over the projections based on 2014–15 levels.

Historically, the majority of growth in direct combustion emissions has been driven by mining emissions. High coal and iron ore prices around 2009–10 lifted exploration investment in Australia, which has resulted in substantially higher output. Emissions from the energy subsector have fluctuated around 15 Mt CO_2-e from 1999–2000 to 2014–15. Emissions growth from the production of natural gas has outpaced the decline in refinery emissions. Recent closures of Australian petroleum refineries (including conversion to import terminals) have contributed to a decline in energy emissions from 2009–10 to 2014–15. Emissions from the manufacture of solid fuels rose from 1999–2000 to 2009–10 and have declined below 1999–2000 levels due to coke production closures in the Illawarra.

5.4.3 Transport

The interim transport projections update the results prepared by CSIRO, Transport Greenhouse Gas Emissions Projections 2014 to 2050 (Graham and Reedman 2014, 2015). These results have been updated by taking account of short term activity forecasts provided by Pekol Traffic and Transport for the Australian Transport Facts 2015 (CTEE 2015). These results incorporate historical emissions data from the national greenhouse gas inventory from 1989–90 to 2014–15.

Transport projections developed by CSIRO uses the Energy Sector Model which determines the least cost fuel and vehicle mix to meet given transport activity levels. The projections take into account current policies and measures that apply to transport.

5.4.4 Fugitives

The interim fugitive projections update the 2014–15 fugitive projections, incorporating the latest commodity production forecasts from AME Group's coal industry analysis (2015), commodity forecasts from the Office of the Chief Economist (2015) and Wood Mackenzie's LNG Tool (2015).

Assumed run of mine coal production and LNG production levels in the 2015-16 Projections are outlined for key years in Table 5.1.

Table 5.1 Coal production and LNG forecast in the 2015-16 Projections, key years

	2015	2020
Coal production – run of mine (Mt)	642	693
LNG production (Mt)	25	76

5.4.5 Industrial Processes and Product Use

Commodity assumption estimates were based on a range of sources, mainly the Office of the Chief Economist's September 2015 Resources and Energy Quarterly, IBISWorld reports 2015, AME Group's coal industry analysis and Wood Mackenzie's LNG Tool. These sources were cross checked against company statements about the timing and scale of new project commencements and facility closures.

The interim industrial processes and product use projections are produced from industry level modelling of emissions growth in the activities that make up the sector. These projections do not incorporate any phase-down proposal of HFCs, as currently being negotiated under the Montreal Protocol on Substances that Deplete the Ozone Layer.

New facilities and facility closures that are explicitly included in the industrial processes and product use sector are outlined in Tables 5.2 and 5.3.

Table 5.2 New facilities and expansions assumed to commence in the 2015-16 projections

Company and location	Facility type
Simcoa, Kemerton	Silicon
Orica, Burrup Peninsula	Nitric acid
Cockburn Cement, Munster	Lime

Table 5.3 Facilities assumed to close in the 2015–16 projections

Company and location	Facility type
Adelaide Brighton, Munster	Clinker
Boral, Maldon	Clinker
Glencore, Townsville	Copper

5.4.6 Agriculture

The interim agriculture projections have been updated based on the ABARES productivity forecasts to 2019–2020. Emissions are calculated as the product of agricultural activity and the relevant emissions factor, and converted to carbon dioxide equivalent. Emissions factors are assumed to be constant over the projections period.

Livestock production, particularly beef and lamb, is a key driver of emissions from agriculture. Projected beef cattle numbers from 2015–16 to 2018–19 are presented in Table 5.4.

Table 5.4 Beef cattle restocking rates assumed in 2016–17

2015–16 projections	2015–16	2016–17	2017–18	2018–19
Beef cattle (head)	23,662,000	25,157,215	25,594,704	25,897,663

Over the period 2014–15 to 2019–20, emissions from savanna burning are assumed to be the average of emissions from savanna fire management over the period 2003–04 to 2013–14 less abatement from the ERF. This assumption follows from the expectation of average seasonal conditions.

5.4.7 Waste

The interim waste projections are an update of the previous waste projections based on research by Hyder Consulting (Hyder 2014). New forecasts for the 2015–16 projections of population growth and industry output have been incorporated by the Department of the Environment. These results incorporate historical emissions data from the national greenhouse gas inventory to 2014–15.

The waste projections include the impact of projects that were successful in the first two auctions of the ERF.

Population growth is a key driver of emissions from waste. The projections use population forecasts that are consistent with the Australian Government's 2015–16 Budget (Australian Government 2015), and population forecasts consistent with ABS modelling thereafter (ABS 2013).

Over the period 2014–15 to 2019–20, per person waste generation is assumed to grow at 1.7 per cent a year; the rate of increase observed between 2007–08 and 2010–11.

The municipal solid waste diversion estimates for 2012–13 can be found in the *NIR 2015*. This includes the stated targets for each state and territory, the assumed waste diversion rates, and the year they will occur. Waste diversion rates are assumed to increase slowly after the target year. Further detail on diversion rates for construction and demolition waste, and commercial and industrial waste can be found in Hyder Consulting's report Waste sectoral modelling and analysis (Hyder 2014).

5.4.8 Land Use, Land Use Change and Forestry

The projections for *Forest Management* and *Afforestation/Reforestation* have been updated since the 2014–15 projections. Trends in harvesting activity in the Australian forest products industry, including native forest harvesting and industrial plantations are key drivers of emissions from *Forest Management* and *Afforestation/Reforestation* activities.

Projections for the remaining KP activities have not been updated and the 2014–15 projections results were adopted with corrections based on the published *NIR 2015*.

5.5 Changes since Australia's First Biennial Report

Since the Australia's First Biennial Report and Sixth National Communication, these projections take into account new inventory data, revised sectoral trends, and the current policies and measures in place to show that Australia remains on track to meet its commitment of reducing greenhouse gas emissions to five per cent below 2000 levels by 2020.

6 Provision of financial, technological and capability-building support to developing countries

Australia provides a range of financial, technological and capacity-building support to developing country Parties to help them to reduce greenhouse-gas emissions and adapt to climate change. Australia has provided an average of A$197 million per year in climate finance since 2010 through multilateral and bilateral channels. Australia provides its support to build local capacity to address climate change. We do this by helping our partners to access and develop climate friendly technologies, and bolster institutional and technical capacity to support their domestic climate change activities, especially in areas where we have specialist technical expertise.

CTF Table 7 in the Appendices gives a summary of the public support provided over the reporting period. The period covers two Australian financial years (2012-13 and 2013-14). Australia's financial years run from 1 July to 30 June. Tables 7(a) and 7(b) contain more detailed information on Australia's public support.

Funds are reported in AUD millions and USD millions. Currency conversion rates are based on the average annual rates published by the Australian Taxation Office for the relevant financial year.

For the purposes of this report, "provided" means funds have been transferred from the Australian Government to a recipient.

This reporting period straddles Australia's last year of fast start finance (FY 2012-13) and first year of post fast-start support (FY 2013-14). Different methodological approaches were used for tracking Australia's climate finance in these years. This change is reflected in the different approaches used in the reporting tables. More detail on Australia's fast-start and post fast-start methodology is below.

Lessons learned

Australia has learned a number of important lessons over the reporting period that can help make future investments more effective and sustainable. These include:

- Focus on results—designing investments with clear, realistic and tangible outcomes will increase effectiveness.
- Play to your strengths—some of Australia's most effective and best-received investments have been those designed to share knowledge and expertise from its own domestic programs, in areas such as renewable energy research, energy efficiency, science and adaptation, and measurement, reporting and verification.
- Ensure partner government national ownership—responding to national priorities, and engaging national governments in investment design, decision-making and implementation improves buy-in and sustainability.
- Promote donor coordination—coordinating investments helps to avoid duplication and increase collaboration between donors.

- Create enabling environments and policy levers—by helping partners establish supportive policy and institutional frameworks, investments can foster long-lasting results and activate the private sector.
- Support scalable and transferrable initiatives—investing in projects that can be scaled up or transferred to countries or sectors with similar needs allows results to be achieved beyond the scope of the initial investment.

6.1 Finance

Australia's climate finance is driven by our partner developing country priorities, targeted at those that need it most, and focused on delivering lasting results.

Our climate finance for the two reporting years was:

- entirely grant-based;
- prioritised towards adaptation (60%);
- prioritised towards countries most vulnerable to climate change, including over a third of bilateral support going to Small Island Developing States and Least Developed Countries; and
- provided through multilateral and bilateral channels.

Since 2010, Australia has contributed an average of A$197 million per year in climate support to developing countries. Australia's climate finance dipped in FY 2013-14 of the reporting period, as projects from the fast-start period concluded, but rebounded to A$229 million in 2014–15 as climate change activities were mainstreamed through Australia's aid programme and contributions were made to the Green Climate Fund (A$200 million over four years).

Australia takes a whole of government approach to providing support and building the capacity of partner governments. This engages a wide range of government agencies and non-government partners, including the Department of Foreign Affairs and Trade, Department of the Environment, Department of Industry, Bureau of Meteorology, CSIRO, non-government organisations, charities, and universities.

Australia sources its climate finance from new and additional aid budget appropriations passed by the Australian Parliament on an annual basis. This flows to developing country partners through targeted bilateral and multilateral climate investments. Mainstreaming climate considerations in our aid programme also allows us to identify and support climate related needs and opportunities above and beyond what would otherwise have been considered. Australia's climate finance contributes to the global effort, which has seen new and additional climate finance increase to an estimated USD 52 billion in 2013 and USD 62 billion in 2014 (Organisation for Economic Co-operation and Development (OECD)/Climate Policy Initiative report - Climate Finance in 2013-14 and the USD 100 billion goal).

Australia acknowledges the significant contribution to climate finance made by the Australian public through donations to philanthropic organisations, but does not report this towards public climate finance.

6.1.1 Bilateral support

Australia's bilateral support is focused on assisting countries within our region to adapt to the unavoidable impacts of climate change and build resilience to climate related shocks. This is consistent with the 'building resilience' pillar of Australia's aid programme strategic framework.

Though its investment in the Pacific Climate Change Science Program and Pacific Adaptation Strategies Assistance Program from 2008 to 2011, and the A$32 million Pacific-Australia Climate Change Science and Adaptation Planning Science Program from 2011 to 2015, Australia has worked with 14 Pacific Island countries to develop the capacity of Pacific island scientists, decision-makers and planners to identify and develop climate adaptation responses. This support for climate adaptation has spanned climate science and communications, water security, climate resilient infrastructure and climate resilient settlements. It has built the capacity of national meteorological services; formulated the first ever country-scale projections for the region for atmospheric and oceanic variables; and installed a climate database management system for national meteorological services. It has also informed water planning and investment at national and regional scales; safeguarded new and existing infrastructure investments; and supported partner countries to undertake coastal hazard risk assessments using high-resolution elevation data.

These investments have helped Pacific Island countries build resilience to current and future climate risks through improved science and data, increased awareness of climate change and its impacts, and better adaptation planning.

During the reporting period Australia also worked with non-government organisations to assist communities in the Pacific and South-East Asia to address climate change and development needs at the community level through our A$34 million Community-based Climate Change Action Grants. For example, in Timor-Leste, we are working with Care Australia and other partners to build the resilience of vulnerable households to the impacts of climate change through the protection of water sources.

6.1.2 Multilateral support

Over the reporting period, Australia provided over A$100 million in climate support through multilateral channels, including:

- A$15 million to the Least Developed Countries Fund;
- A$37 million through the Asian Development Bank;
- A$10 million through the Global Environment Facility;
- A$26 million through the World Bank; and
- A$5 million to the Global Green Growth Institute.

6.1.3 Private sector

Australia recognises that the private sector will be central to the global response to climate change. Australia has made working with the private sector a key focus of its aid programme—all new aid investments must now consider innovative ways to engage the private sector.

All countries, both developed and developing, can help mobilise climate friendly investment by creating enabling environments, including by helping investors manage risk, improving regulatory frameworks, and establishing supportive policy settings.

Australia is focused on using public funds to leverage far greater private sector flows to assist developing countries undertake mitigation and adaptation action. We are supporting business and industry in developing countries to take direct and practical action to reduce emissions in ways that create jobs and economic opportunities.

For example, during the reporting period we supported ten developing country governments to engage their private sectors in green initiatives that will reduce emissions and improve business productivity through our

A$4 million contribution to the United Nations Development Programme's (UNDP) Low Emissions Capacity Building Programme.

6.2 Technology development and transfer

Australia is committed to supporting developing countries to access and develop climate friendly technologies critical to sustainable development. We provide our support through both multilateral and bilateral channels.

Multilaterally, Australia delivers its support through its membership and participation in a number of technology development, transfer and cooperation initiatives, including:

- the Clean Energy Solutions Centre—an online knowledge sharing platform showcasing best practice clean energy policies, data and analysis, and fostering policy innovation;
- the International Energy Agencies' Climate Technology Initiative;
- the International Renewable Energy Agency; and
- the International Partnership for Energy Efficiency Cooperation.

In addition, Australia provides direct bilateral technology development and transfer support to a range of developing countries, focusing on areas in which Australia has specialist expertise.

Australia is home to some of the world's leading renewable energy research institutions, including the Australian Centre of Advanced Photovoltaics, based at the University of New South Wales, which has held the world record for silicon solar cell efficiency for 30 of the last 32 years. During the reporting period, Australia provided around A$9 million for students from developing countries to undertake renewable energy research at these institutions. This training is helping developing countries to build their endogenous clean technology capacity, ensuring they have the human resources necessary to support domestic clean technology innovation and development.

Recognising that the best technology development and innovation often comes from international collaboration in which countries play to their respective strengths, Australia has partnered with a Shanghai based investor to establish an A$120 million renewable energy venture capital fund to support the commercialisation of innovative renewable energy technologies.

Australia is also supporting the transfer of its innovative land-sector technologies and know-how to developing countries. For example, during the reporting period, Australia established the International Savanna Fire Management Initiative, designed to share Australia's unique savanna fire management emissions abatement methodology and project experience developed by the Australian Government and Indigenous communities in tropical north Australia with developing countries.

Australia has invested significantly in its measurement, reporting and verification (MRV) systems, and we are supporting the transfer of MRV technology and know-how to developing countries. Australia is a lead partner and donor to the Global Forest Observations Initiative (GFOI), an international partnership helping developing countries accurately estimate emissions from deforestation through the development of MRV technologies and guidance. Under the *Indonesia National Carbon Accounting System* program, technology and expertise developed by CSIRO has enabled Indonesia to generate national greenhouse gas emissions accounts. Enhanced MRV capacity has assisted in the development of effective climate change strategies, designing and tracking progress towards mitigation targets, and assisted development planning.

CTF Table 8 contains further detail on Australia's measures to support technology development and transfer. This is not an exhaustive list.

6.3 Capacity Building

Capacity building is central to developing a holistic response to climate change. Capacity-building plays a critical role in building countries' readiness for investment, guiding local development planning, creating conditions for domestic innovation, and implementing mitigation and adaptation action.

Australia has focused its efforts on bolstering institutional and technical capacity of countries in our region to support their domestic climate change activities. By sharing our specialist expertise and supporting local efforts, we are able to assist countries to create mitigation and adaptation policies and build systems to measure and report on emissions.

As part of our investment in building MRV capacity, during the reporting period, Australia supported South Africa, Kenya and Indonesia to establish their endogenous capacity to develop and maintain land sector emissions measurement, reporting and verification systems. In addition to helping these countries better understand their emissions profiles and meet international reporting requirements, these systems will support climate sensitive land-use planning and sustainable development.

Australia's climate science expertise is highly regarded. Through the Climate and Oceans Support Program in the Pacific (COSPPac), Australia helped regional national meteorological services by building capacity to generate seasonal forecasts and use climate science. This supports planning across a number of sectors, including agriculture, water security and health. For example, supported by many years of capacity building under COSPPac, the Samoa Meteorology Division and the Electricity Power Corporation are working together to produce a water storage outlook model which will maximise the efficient use of current and future water supplies, by combining key elements of Samoa's seasonal rainfall outlooks with projected energy generation.

CTF Table 9 details some of the capacity building measures undertaken in the reporting period. This is not an exhaustive list, but demonstrates the wide range of activities we support designed to build capacity.

6.3.1 Meeting developing country needs

Australia recognises that often the most important contribution donors can make is to support developing countries to take ownership of their mitigation and adaptation agendas by helping build domestic capacity and expertise. Australia takes a country driven approach to the delivery of support, acknowledging that climate finance investments are more sustainable and effective when owned by partner governments.

In line with this approach, our bilateral climate support relationships are administered through partnership agreements. Through this process, partner countries work with us to ensure our assistance supports their priorities and climate finance needs.

6.3.2 National approach to tracking and reporting provision of support

Australia's climate support is largely drawn from its development assistance program. Australia tracks its development assistance through the Department of Foreign Affairs and Trade's Aidworks tracking system. Aidworks tracks official development assistance (ODA) in line with OECD Development Assistance Committee guidelines. It integrates programme management and delivery with the enabling capabilities associated with financial, procurement, agreement, quality and performance management. Australia's climate support activities, like its other development assistance activities, are subject to mandatory quality and performance reporting requirements.

A portion of Australia's climate support is drawn from other official flows outside of its development assistance program. Australia's other official flows climate support is tracked on an investment-by-investment basis by the relevant administering agency (e.g. Department of Industry, Innovation and Science, ARENA).

During the fast-start period, Australia's multilateral and bilateral climate support came from distinct ODA budget measures, designed to provide scaled-up funds in the short-term to support developing countries' mitigation and adaptation efforts. The Aidworks tracking system was used to track these investments, and Australia counted 100 per cent of its contribution as climate finance.

Recognising the long-term importance of incorporating climate considerations into development assistance more broadly, Australia began mainstreaming climate support through its aid programme at the end of the fast-start period, while also maintaining climate-specific budget measures.

The Overseas Development Institute developed an independent methodology based on international best practice for Australia to track its climate finance in line with this approach. Australia began applying this methodology in FY2013-14.

Australia's post-fast start climate finance tracking methodology involves four main elements:

- Core contributions to climate change related multilateral funds;
- Core contributions to climate change related multilateral development banks and UN institutions;
- Bilateral support where climate change mitigation or adaptation is a principal or significant objective; and
- Climate change related other official flows.

6.3.3 Multilateral contributions

Where climate change is the primary focus of the institution (e.g. the Green Climate Fund, Climate Investment Funds), Australia counts 100 per cent of the core contribution as climate finance. Where climate change is one of several work areas of the institution (e.g. the World Bank, Asian Development Bank), Australia applies international standard coefficients to determine the climate change component of the core contribution. Where no coefficients have been established (e.g. UNDP), we use conservative best estimate coefficients.

6.3.4 Bilateral support

Where climate change is the principal objective of the investment, Australia counts 100 per cent as climate support. Where climate change is a significant objective, project-by-project assessment is undertaken to determine the climate change component, and that component is counted as climate support. Where it is not possible to disaggregate the climate change component, Australia uses a conservative average of the rest of the 'significant' portfolio percentages (30 per cent for 2013-14).

6.3.5 Other official flows

Where climate change is the principal objective of the non-ODA investment, Australia counts 100 per cent as climate support. Australia makes a significant investment through other official flows where climate change is not the principle objective. However, these are not currently counted towards Australia's climate finance. We will consider including other official flows where climate change is a significant objective as more robust methodologies become available.

6.3.6 Mobilised private sector investment

Given the difficulty of accurately capturing the mobilisation effect of capacity building, domestic policies, and the role of broader enabling environment, Australia does not currently count private sector investment leveraged by our public interventions towards our climate finance contribution.

However, Australia is continuing to work with developed country partners to improve our methodologies for tracking leveraged private sector investment, including through our A$100,000 contribution to the OECD Research Collaborative on Tracking Private Climate Finance in FY 2012-13. The joint OECD and Climate Policy Initiative report Climate Finance in 2013-14 and the USD 100 billion goal, built upon this work to show an average of USD 14 billion per year in private sector climate finance was mobilised by developed countries though bilateral and multilateral channels in 2013 and 2014.

7 Other reporting elements

7.1 Emissions measurement, reporting, and verification and emissions projections

Australia has comprehensive arrangements for national emissions inventory and emissions projections reporting.

Australia's *National Greenhouse Accounts* (see Chapter 2) and emissions projections reporting (see Chapter 5) enable the tracking of emissions at the national, state and territory levels and across different industry sectors. The accounts provide comprehensive, comparable and transparent information to underpin assessments of progress towards national emission reduction commitments. The accounts comprise the following key publications and systems:

- Quarterly Update of Australia's national greenhouse gas inventory, which provides estimates of emissions at the national level for the latest quarter;
- Australia's *National Inventory Report* submitted annually to the UNFCCC and reviewed by international experts under both the UNFCCC and the KP;
- Australia's National Inventory by Economic Sector, which reports emissions annually by Australia-New Zealand Standard Industry Classifications;
- State and Territory greenhouse gas inventories, which provides nationally consistent data for Australia's eight states and territories on an annual basis;
- The AGEIS, which enhances accessibility to Australian data is enhanced through a searchable database of emissions published on the Department of the Environment's website;
- Company emissions data published under NGERS, in place since 2008, which is used by Australian Corporations to report their emissions at a facility level; and
- *Australia's Emissions Projections* , which include projections of national and sectoral emissions under different policy scenarios, and an assessment of the abatement required to meet Australia's emission reduction targets.

7.2 Australia's self-assessment of emissions reduction compliance

The Government has announced that it will consider the design of Australia's post-2020 policy framework in detail in 2017, before the end of the current commitment period. This will incorporate a review of the ERF—including crediting, purchasing and the safeguard mechanism. The Government has signalled that the ERF will remain at the core of Australia's climate change policy.

8 Appendices: Common Tabular Format Tables

To the extent of any inconsistency between the numbers and information provided in the Common Tabular Format Tables in this document and those in the Biennial Report Common Tabular Format Application, the Australian Government considers that this document is authoritative.

CTF Table 1.1 Emission trends: Summary

Greenhouse Gas Emissions	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt CO_2 eq																									(%)
CO_2 emissions including net CO_2 from LULUCF	371 913	371 913	357 014	337 719	331 549	357 951	337 786	341 973	355 482	351 361	373 394	401 739	413 966	426 873	409 311	422 652	447 467	454 425	441 213	444 303	445 110	426 435	399 783	398 136	391 109	5%
CO_2 emissions excluding net CO_2 from LULUCF	278 220	278 220	279 718	284 758	289 141	293 829	304 925	311 914	320 438	334 330	343 713	349 884	357 652	361 862	368 035	380 942	384 741	390 464	399 053	403 864	407 013	404 774	404 866	405 836	398 528	43%
CH_4 emissions including net CH_4 from LULUCF	131 952	131 952	130 156	128 891	125 677	123 534	121 971	121 599	124 718	124 216	121 586	125 429	124 796	122 768	115 963	117 510	120 827	119 385	119 541	116 644	114 919	112 707	113 970	112 726	112 099	-15%
CH_4 emissions excluding net CH_4 from LULUCF	126 928	126 928	125 715	125 278	122 378	119 940	119 059	118 644	121 674	121 515	118 568	122 341	121 460	119 704	113 217	114 587	117 201	116 089	116 567	114 206	112 759	110 708	112 319	111 244	110 581	-13%
N_2O emissions including net N_2O from LULUCF	21 485	21 485	20 173	20 574	19 555	19 946	21 756	21 966	21 897	23 308	22 491	24 532	23 551	24 000	23 680	24 986	25 542	24 897	23 755	23 130	24 010	26 765	24 800	24 039	24 471	14%
N_2O emissions excluding net N_2O from LULUCF	16 900	16 900	16 420	16 913	17 122	17 679	17 686	18 820	19 529	20 241	20 670	21 666	21 814	22 432	21 239	22 530	22 903	22 767	21 442	21 364	22 087	22 330	22 623	22 900	22 529	33%
HFCs	1 425	1 425	1 425	1 333	1 830	1 027	1 004	414	705	998	1 374	1 613	2 306	2 927	3 578	4 267	5 002	5 457	6 144	6 832	7 469	8 166	8 838	9 353	9 965	599%

Greenhouse Gas Emissions	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt CO_2 eq																									(%)
PFCs	4 607	4 607	4 611	4 603	3 316	2 164	1 531	1 410	1 228	1 661	1 139	1 287	1 802	1 728	1 684	1 714	1 792	687	583	445	359	283	301	295	192	-96%
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
SF_6	211	211	229	247	265	283	302	270	248	223	196	191	197	202	206	208	182	173	162	151	137	139	128	128	128	-39%
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Total (without LULUCF)	428 291	428 291	428 117	433 133	434 051	434 922	444 506	451 472	463 824	478 967	485 661	496 982	505 230	508 855	507 961	524 248	531 822	535 637	543 951	546 861	549 823	546 400	549 075	549 756	541 924	27%
Total (with LULUCF)	531 592	531 592	513 607	493 367	482 191	504 905	484 350	487 632	504 278	501 767	520 181	554 791	566 617	578 499	554 423	571 336	600 812	605 023	591 398	591 506	592 004	574 495	547 819	544 676	537 964	1%
Total (without LULUCF, with indirect)	428 291	428 291	428 117	433 133	434 051	434 922	444 506	451 472	463 824	478 967	485 661	496 982	505 230	508 855	507 961	524 248	531 822	535 637	543 951	546 861	549 823	546 400	549 075	549 756	541 924	27%
Total (with LULUCF, with indirect)	531 592	531 592	513 607	493 367	482 191	504 905	484 350	487 632	504 278	501 767	520 181	554 791	566 617	578 499	554 423	571 336	600 812	605 023	591 398	591 506	592 004	574 495	547 819	544 676	537 964	1%
1. Energy	292 821	292 821	294 468	300 507	303 849	304 818	316 927	323 609	334 428	348 398	353 794	362 752	370 550	373 175	376 821	389 147	396 210	401 366	411 045	416 243	420 897	415 556	414 542	418 815	411 012	40%
2. Industrial processes and product use	26 109	26 109	25 366	25 986	25 702	25 599	25 261	24 822	25 130	26 429	26 860	26 752	27 936	28 624	31 239	32 759	32 035	32 385	34 391	34 559	32 348	35 538	36 031	33 110	32 528	25%

CTF Table 1.1

Greenhouse Gas Emissions	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt CO_2 eq																									(%)
3. Agriculture	88 569	88 569	87 558	86 098	84 061	84 712	82 522	84 801	86 227	86 856	87 603	90 643	89 679	89 868	83 783	86 609	87 979	86 517	82 824	79 906	80 502	78 898	82 702	83 719	85 024	-4%
4. Land use, land-use change forestryb	103 300	103 300	85 490	60 234	48 140	69 983	39 844	36 161	40 454	22 800	34 520	57 809	61 387	69 643	46 463	47 088	68 990	69 386	47 447	44 645	42 181	28 095	-1 256	-5 079	-3 959	-104%
5. Waste	20 793	20 793	20 724	20 542	20 439	19 793	19 796	18 239	18 040	17 284	17 404	16 836	17 065	17 188	16 117	15 734	15 597	15 369	15 690	16 153	16 075	16 408	15 801	14 111	13 360	-36%
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Total (including LULUCF)	531 592	531 592	513 607	493 367	482 191	504 905	484 350	487 632	504 278	501 767	520 181	554 791	566 617	578 499	554 423	571 336	600 812	605 023	591 398	591 506	592 004	574 495	547 819	544 676	537 964	1%

(1) Further detailed information could be found in the common reporting format tables of the Party's greenhouse gas inventory, namely "Emission trends (CO_2)", "Emission trends (CH_4)", "Emission trends (N_2O)" and "Emission trends (HFCs, PFCs and SF_6)", which is included in an annex to this biennial report.

(2) 2013 is the latest reported inventory year.

(3) 1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviation: LULUCF = land use, land-use change and forestry.

a The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

b Includes net CO2, CH4 and N2O from LULUCF.

CTF Table 1.2 Emissions trends: CO_2

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
1. Energy	258 841	258 841	260 849	265 391	269 496	272 243	282 990	289 835	298 008	311 229	319 768	326 338	334 359	338 451	342 932	354 925	360 483	365 290	372 565	378 075	383 750	378 856	378 546	382 925	376 220	45%
A. Fuel combustion (sectoral approach)	251 676	251 676	253 931	258 171	262 401	265 436	276 007	283 144	291 385	304 390	312 666	318 461	325 972	330 512	335 837	348 127	353 631	358 299	365 124	370 657	375 822	370 803	370 715	374 662	367 391	46%
1. Energy industries	142 551	142 551	145 799	149 114	150 857	151 679	157 481	162 066	168 676	181 228	188 415	191 301	198 481	200 599	203 371	211 777	214 656	219 371	222 643	223 880	230 424	224 656	219 467	219 785	208 066	46%
2. Manufacturing industries and construction	35 867	35 867	35 412	34 992	35 543	36 314	37 243	37 258	37 342	37 441	37 695	38 508	38 028	38 705	39 050	39 969	40 776	39 858	40 389	42 471	41 286	40 108	42 270	43 846	47 609	33%
3. Transport	59 816	59 816	59 158	60 082	61 556	62 991	65 989	68 032	69 277	69 394	70 157	71 712	71 659	73 057	74 691	77 672	78 995	79 725	82 402	84 264	84 174	85 622	88 360	90 147	90 528	51%
4. Other sectors	13 018	13 018	13 114	13 485	13 939	13 887	14 599	15 014	15 276	15 626	15 774	16 312	17 170	17 565	18 169	18 132	18 586	18 695	18 688	19 008	18 934	19 375	19 671	20 012	20 316	56%
5. Other	424	424	448	499	506	565	696	774	813	702	627	629	633	585	556	578	618	649	1 001	1 034	1 005	1 042	947	872	872	105%

CTF Table 1.2

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
B. Fugitive emissions from fuels	7 165	7 165	6 918	7 220	7 095	6 806	6 983	6 691	6 623	6 839	7 102	7 877	8 386	7 939	7 095	6 797	6 853	6 991	7 442	7 418	7 928	8 054	7 831	8 263	8 829	23%
1. Solid fuels	1 184	1 184	1 172	1 301	1 195	1 119	1 112	1 223	1 333	1 321	1 128	1 151	1 218	1 240	1 099	1 058	1 298	1 215	1 287	1 162	1 308	1 292	1 546	1 580	1 888	59%
2. Oil and natural gas	5 981	5 981	5 746	5 919	5 900	5 687	5 871	5 468	5 290	5 518	5 974	6 726	7 168	6 699	5 996	5 739	5 555	5 776	6 154	6 255	6 619	6 761	6 285	6 683	6 941	16%
2. Industrial processes and product use	18 770	18 770	18 185	18 612	18 806	20 645	20 937	21 076	21 249	21 745	22 404	21 818	21 447	21 453	23 170	23 996	22 298	23 336	24 653	23 929	21 290	23 699	24 090	20 836	20 239	8%
A. Mineral industry	5 490	5 490	5 153	4 967	5 196	5 997	5 827	5 738	5 977	6 357	6 440	6 232	6 239	6 292	6 429	6 390	6 479	6 669	6 986	6 899	6 409	6 304	6 440	6 414	6 100	11%
B. Chemical industry	1 114	1 114	1 125	1 183	1 255	1 291	1 463	1 486	1 466	1 648	1 647	1 803	2 070	2 106	2 469	2 722	2 881	3 581	4 087	3 605	3 342	3 721	3 506	3 341	3 255	192%
C. Metal industry	11 804	11 804	11 563	12 117	11 998	12 993	13 240	13 435	13 383	13 319	13 903	13 354	12 697	12 605	13 812	14 385	12 516	12 682	13 204	13 027	11 140	13 195	13 650	10 676	10 456	-11%
D. Non-energy products from fuel and solvent use	280	280	259	258	266	272	269	279	280	280	272	284	294	299	308	334	254	244	227	235	237	247	232	188	185	-34%
E. Electronics industry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
F. Products use as substitutes for ozone depleting substances	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
G. Other product manufacturing and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
H. Other	83	83	85	88	90	93	139	139	143	140	143	145	147	150	152	165	167	160	148	163	161	232	262	218	255	209%
3. Agriculture	537	537	611	682	766	867	918	944	1 153	1 328	1 512	1 700	1 819	1 931	1 905	1 993	1 932	1 809	1 806	1 830	1 943	2 189	2 201	2 046	2 039	280%
A. Enteric fermentation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B. Manure management	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
C. Rice cultivation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
D. Agricultural soils	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
E. Prescribed burning of savannas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

CTF Table 1.2

CTF Table 1.2

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
F. Field burning or agricultural residues	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
G. Liming	170	170	237	309	382	486	438	385	485	585	720	737	762	1 022	1 029	1 037	1 045	1 052	1 060	1 065	1 159	1 253	1 089	925	761	348%
H. Urea application	367	367	375	373	384	381	480	560	668	743	792	963	1 057	909	876	956	887	757	746	765	784	936	1 112	1 120	1 278	248%
I. Other carbon-containing fertilizers	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
4. Land use land-use change and forestry [b]	93 692	93 692	77 296	52 960	42 408	64 122	32 862	30 059	35 043	17 032	29 682	51 855	56 313	65 011	41 276	41 710	62 726	63 961	42 160	40 440	38 097	21 661	-5 084	-7 701	-7 418	-108%
A. Forest land	-28 355	-28 355	-30 707	-20 122	-22 765	-21 182	-26 693	-29 527	-33 478	-34 105	-31 025	-14 186	-12 029	-10 617	-11 592	-13 405	-20 684	-19 120	-17 180	-11 950	-13 390	-23 049	-31 481	-36 152	-38 731	37%
B. Cropland	9 110	9 110	7 906	-7 969	-7 809	-3 399	-6 547	-4 279	-1 922	-7 594	-4 540	-1 769	-6 379	- 47	4 144	-1 109	7 652	7 060	720	6 910	5 093	-1 381	5 035	468	1 318	-86%

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
C. Grassland	117 147	117 147	103 830	85 036	77 295	93 290	70 801	67 908	74 602	63 299	69 386	72 722	78 993	80 253	53 883	61 508	80 883	81 010	63 514	50 677	50 321	50 425	25 742	31 947	33 836	-71%
D. Wetlands	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
E. Settlements	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
G. Harvested wood products	-4 209	-4 209	-3 733	-3 984	-4 314	-4 588	-4 700	-4 042	-4 159	-4 569	-4 139	-4 913	-4 272	-4 579	-5 159	-5 284	-5 125	-4 990	-4 894	-5 197	-3 927	-4 334	-4 381	-3 964	-3 842	-9%
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
5. Waste	73	73	73	74	74	74	80	58	28	28	29	28	28	28	28	28	28	29	29	29	30	30	30	30	30	-59%
A. Solid waste disposal	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

CTF Table 1.2

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
B. Biological treatment of solid waste	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
C. Incineration and open burning of waste	73	73	73	74	74	74	80	58	28	28	29	28	28	28	28	28	28	29	29	29	30	30	30	30	30	-59%
D. Waste water treatment and discharge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
6. Other (as specified in the summary 1a in the latest submitted CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Memo items:																										
International bunkers	6 460	6 460	6 436	6 646	7 050	7 432	8 614	9 111	9 142	9 533	9 805	10 193	10 490	9 620	8 771	9 993	10 948	11 555	11 926	12 209	12 195	12 535	12 358	12 335	12 409	92%
Aviation	4 383	4 383	4 559	4 837	5 244	5 397	5 908	6 364	6 596	7 293	7 329	7 394	7 861	6 752	5 975	7 174	8 292	8 394	9 358	9 272	9 474	10 348	10 423	9 673	10 245	134%
Navigation	2 078	2 078	1 877	1 808	1 806	2 035	2 705	2 748	2 546	2 240	2 476	2 798	2 628	2 868	2 796	2 819	2 656	3 161	2 568	2 938	2 721	2 187	1 934	2 662	2 164	4%

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
CO_2 emissions from biomass	15 142	15 142	15 018	13 705	15 367	16 319	17 110	18 141	19 021	19 329	19 067	19 244	18 430	16 549	18 195	18 809	19 077	19 090	19 273	19 679	16 685	18 510	16 797	17 005	17 989	19%
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
Indirect N_2O	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Indirect CO_2 (3)	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	

CTF Table 1.2

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Total CO_2 emissions without LULUCF	278 220	278 220	279 718	284 758	289 141	293 829	304 925	311 914	320 438	334 330	343 713	349 884	357 652	361 862	368 035	380 942	384 741	390 464	399 053	403 864	407 013	404 774	404 866	405 836	398 528	43%
Total CO_2 emissions with LULUCF	371 913	371 913	357 014	337 719	331 549	357 951	337 786	341 973	355 482	351 361	373 394	401 739	413 966	426 873	409 311	422 652	447 467	454 425	441 213	444 303	445 110	426 435	399 783	398 136	391 109	5%
Total CO_2 emissions, including indirect CO_2, without LULUCF	278 220	278 220	279 718	284 758	289 141	293 829	304 925	311 914	320 438	334 330	343 713	349 884	357 652	361 862	368 035	380 942	384 741	390 464	399 053	403 864	407 013	404 774	404 866	405 836	398 528	43%
Total CO_2 emissions, including indirect CO_2, with LULUCF	371 913	371 913	357 014	337 719	331 549	357 951	337 786	341 973	355 482	351 361	373 394	401 739	413 966	426 873	409 311	422 652	447 467	454 425	441 213	444 303	445 110	426 435	399 783	398 136	391 109	5%

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

a The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

b Fill in net emissions/removals as reported in table Summary 1.A of the latest reported inventory year. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

CTF Table 1.3 Emissions trends: CH_4

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
1. Energy	1 283	1 283	1 265	1 323	1 287	1 212	1 262	1 251	1 352	1 375	1 245	1 335	1 321	1 254	1 211	1 219	1 278	1 294	1 388	1 377	1 337	1 322	1 290	1 287	1 246	-3%
A. Fuel combustion (sectoral approach)	128	128	131	134	135	133	130	128	125	119	112	107	104	91	90	87	83	80	85	76	82	78	70	73	72	-44%
1. Energy industries	2	2	2	2	2	2	2	2	2	4	4	6	7	6	6	7	6	7	14	8	16	15	11	14	13	685%
2. Manufacturing industries and construction	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	29%
3. Transport	28	28	27	28	29	30	31	31	31	31	30	29	28	27	27	26	23	22	21	20	19	19	18	17	17	-39%
4. Other sectors	97	97	100	103	102	99	95	92	89	82	75	69	68	55	55	53	51	49	47	46	44	42	39	39	39	-60%
5. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	20%
B. Fugitive emissions from fuels	1154	1154	1134	1188	1151	1079	1131	1123	1227	1256	1134	1229	1217	1163	1121	1132	1195	1214	1303	1301	1256	1244	1220	1214	1174	2%
1. Solid fuels	840	840	852	888	894	820	820	838	934	974	903	976	961	930	911	925	996	1028	1119	1106	1069	1033	1011	1007	973	16%

CTF Table 1.3

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
2. Oil and natural gas	314	314	282	301	257	259	311	285	293	281	230	253	256	233	210	207	199	186	184	195	187	212	210	207	200	-36%
2. Industrial processes and product use	3	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	3	4	4	4	3	4	4	3	3	-16%
A. Mineral products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B. Chemical industry	0.4	0.4	0.4	0.4	0.3	0.4	1	1	1	1	0.5	1	0.5	1	1	1	1	1	1	1	1	1	1	1	1	32%
C. Metal production	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	-24%
D. Non-energy products from fuel and solvent use	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
E. Electronics industry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
F. Products use as substitutes for ozone depleting substances	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Greenhouse Gas Source and Sink Categories	G. Other product manufacturing and use	H. Other	**3. Agriculture**	A. Enteric fermentation	B. Manure management	C. Rice cultivation	D. Agricultural soils	E. Prescribed burning of savannas
Base year[a]	NO	NA	2 975	2679	84	22	NE	178
1990	NO	NA	2 975	2679	84	22	NE	178
1991	NO	NA	2 947	2667	81	18	NE	170
1992	NO	NA	2 879	2575	82	24	NE	187
1993	NO	NA	2 804	2492	84	24	NE	191
1994	NO	NA	2 806	2471	88	26	NE	207
1995	NO	NA	2 721	2373	85	25	NE	229
1996	NO	NA	2 777	2415	83	29	NE	237
1997	NO	NA	2 804	2424	84	32	NE	247
1998	NO	NA	2 806	2415	90	28	NE	258
1999	NO	NA	2 813	2398	89	30	NE	280
2000	NO	NA	2 896	2494	90	26	NE	273
2001	NO	NA	2 866	2442	95	36	NE	279
2002	NO	NA	2 858	2432	100	29	NE	282
2003	NO	NA	2 686	2321	94	8	NE	256
2004	NO	NA	2 747	2384	93	13	NE	244
2005	NO	NA	2 799	2411	110	9	NE	261
2006	NO	NA	2 748	2344	107	21	NE	264
2007	NO	NA	2 659	2286	103	3	NE	262
2008	NO	NA	2 559	2200	95	0.4	NE	258
2009	NO	NA	2 543	2184	94	2	NE	256
2010	NO	NA	2 462	2084	98	4	NE	269
2011	NO	NA	2 583	2196	100	16	NE	261
2012	NO	NA	2 613	2235	100	20	NE	248
2013	NO	NA	2 658	2255	97	22	NE	275
Change from base to latest reported year (%)			-11%	-16%	16%	-1%		54%

kt

CTF Table 1.3

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
F. Field burning or agricultural residues	12	12	12	11	13	15	9	13	16	14	15	14	14	14	7	14	9	12	5	6	8	7	10	10	10	-19%
G. Liming	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
H. Urea application	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
I. Other carbon-containing fertilizers	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
4. Land use land-use change and forestry [b]	201	201	178	145	132	144	116	118	122	108	121	124	133	123	110	117	145	132	119	98	86	80	66	59	61	-70%
A. Forest land	28	28	31	24	25	30	29	28	32	23	25	28	25	25	28	28	25	20	22	24	23	24	20	17	21	-22%
B. Cropland	13	13	11	8	7	6	4	4	4	4	8	10	10	9	8	9	11	9	9	7	6	6	5	5	4	-67%
C. Grassland	160	160	136	112	100	108	84	86	86	81	88	86	98	88	74	80	109	102	88	66	57	50	41	37	35	-78%

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
D. Wetlands	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
G. Harvested wood products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
5. Waste	816	816	813	806	801	776	776	714	707	676	681	658	667	672	629	614	608	599	611	629	627	641	616	547	517	-37%
A. Solid waste disposal	651	651	651	647	646	623	629	573	570	543	550	543	545	553	515	498	492	480	491	507	504	515	498	445	416	-36%
B. Biological treatment of solid waste	0.4	0.4	0.5	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	4	4	4	1069%
C. Incineration and open burning of waste	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	

CTF Table 1.3

CTF Table 1.3

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
D. Wastewater treatment and discharge	165	165	161	158	155	152	146	140	136	132	130	114	120	118	112	113	114	116	118	119	120	122	114	97	97	-41%
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
6. Other (as specified in the summary 1a in the latest submitted CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Total CH_4 emissions without CH_4 from LULUCF	5 077	5 077	5 029	5 011	4 895	4 798	4 762	4 746	4 867	4 861	4 743	4 894	4 858	4 788	4 529	4 583	4 688	4 644	4 663	4 568	4 510	4 428	4 493	4 450	4 423	-13%
Total CH_4 emissions with CH_4 from LULUCF	5 278	5 278	5 206	5 156	5 027	4 941	4 879	4 864	4 989	4 969	4 863	5 017	4 992	4 911	4 639	4 700	4 833	4 775	4 782	4 666	4 597	4 508	4 559	4 509	4 484	-15%
Memo items:																										
International bunkers	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0%
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Navigation	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0%
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
CO_2 emissions from biomass	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
Indirect N_2O	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Indirect CO_2 (3)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

a The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

CTF Table 1.3

CTF Table 1.4 Emission trends: N_2O

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
1. Energy	6	6	7	7	7	8	8	8	9	9	10	10	11	11	12	13	13	13	13	13	12	12	13	12	12	91%
A. Fuel combustion (sectoral approach)	6	6	7	7	7	8	8	8	9	9	10	10	10	11	12	12	13	12	13	13	12	12	12	12	12	92%
1. Energy industries	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	4	4	4	4	4	4	4	4	4	157%
2. Manufacturing industries and construction	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	39%
3. Transport	3	3	3	4	4	4	4	5	5	5	5	6	6	6	7	7	7	7	7	7	6	6	6	6	6	90%
4. Other sectors	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24%
5. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	119%
B. Fugitive emissions from fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	7%
1. Solid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	203650%
2. Oil and natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	7%

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
2. Industrial processes and product use	3	3	3	4	5	5	5	5	5	6	6	6	7	7	8	8	9	9	9	10	10	11	9	8	6	91%
A. Mineral products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B. Chemical industry	3	3	3	4	5	5	5	5	5	6	5	6	7	7	8	8	9	9	9	10	10	11	9	8	6	93%
C. Metal production	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-21%
D. Non-energy products from fuels and solvent use	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	
E. Electronic industry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
F. Product uses as substitutes for ODS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
G. Other product manufacture and use	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO	
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

CTF Table 1.4

CTF Table 1.4

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
3. Agriculture	46	46	45	45	44	46	46	48	50	52	53	55	54	55	49	53	54	54	49	47	50	51	53	55	55	21%
A. Enteric fermentation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B. Manure management	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	119%
C. Rice cultivation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
D. Agricultural soils	40	40	39	39	37	38	37	40	41	42	42	45	43	44	39	44	43	43	38	38	40	40	43	44	44	11%
E. Prescribed burning of savannas	4	4	4	4	5	5	6	6	6	7	8	8	8	8	7	6	7	7	7	7	7	8	7	7	8	93%
F. Field burning or agricultural residues	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.4	1	1	1	0.4	0.4	0.4	0.4	1	1	0.5	-28%
G. Liming	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
H. Urea application	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
I. Other carbon-continuing fertilizers	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
4. Land use land-use change and forestry [b]	15	15	13	12	8	8	14	11	8	10	6	10	6	5	8	8	9	7	8	6	6	15	7	4	7	-58%
A. Forest land	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7%
B. Cropland	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	-52%
C. Grassland	11	11	8	8	5	5	9	7	5	7	4	6	3	3	5	5	6	5	5	4	4	10	4	2	4	-66%
D. Wetlands	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
E. Settlements	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

CTF Table 1.4

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
G. Harvested wood products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
5. Waste	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.2	1.3	1.4	1.4	32%
A. Solid waste disposal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B. Biological treatment of solid waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1069%
C. Incineration and open burning of waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	
D. Wastewater treatment and discharge	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34%
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
6. Other (as specified in the summary 1a in the latest submitted CRF)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Total direct N_2O emissions without N_2O from LULUCF	57	57	55	57	57	59	59	63	66	68	69	73	73	75	71	76	77	76	72	72	74	75	76	77	76	33%
Total direct N_2O emissions with N_2O from LULUCF	72	72	68	69	66	67	73	74	73	78	75	82	79	81	79	84	86	84	80	78	81	90	83	81	82	14%
Memo items:																										
International bunkers	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-2%
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Navigation	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-2%
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
CO_2 emissions from biomass	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

CTF Table 1.4

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
Indirect N_2O	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	
Indirect CO_2 (3)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

a The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

CTF Table 1.5 Emissions trends: HFCs, PFCs, SF_6, NF_3

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Emissions of HFCs and PFCs[c] ($kt CO_2$ eq)	6 032	6 032	6 035	5 936	5 145	3 192	2 535	1 825	1 933	2 659	2 513	2 900	4 108	4 654	5 262	5 981	6 794	6 144	6 726	7 277	7 828	8 449	9 139	9 648	10 157	68%
Emissions of HFCs[c] ($kt CO_2$ eq)	1 425	1 425	1 425	1 333	1 830	1 027	1 004	414	705	998	1 374	1 613	2 306	2 927	3 578	4 267	5 002	5 457	6 144	6 832	7 469	8 166	8 838	9 353	9 965	599%
HFC-23	0.10	0.10	0.10	0.09	0.12	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-99.55
HFC-32	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.07	
HFC-41	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-43-10mee	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HFC-125	NO	NO	NO	NO	NO	0.00	0.01	0.05	0.09	0.12	0.17	0.20	0.28	0.36	0.44	0.52	0.61	0.67	0.75	0.84	0.91	1.00	1.08	1.14	1.22	
HFC-134	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HFC-134a	NO	NO	NO	NO	NO	0.00	0.03	0.14	0.25	0.35	0.48	0.56	0.81	1.02	1.25	1.49	1.75	1.91	2.15	2.39	2.61	2.86	3.09	3.27	3.49	
HFC-143	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-143a	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.10	0.11	0.12	

CTF Table 1.5

CTF Table 1.5

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
HFC-152	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-152a	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-161	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-227ea	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	
HFC-236cb	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-236ea	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-236fa	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HFC-245ca	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-245fa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
HFC-365mfc	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Unspecified mix of listed HFCs[d] (kt CO_2 eq)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Emissions of PFCs[c] (kt CO_2 eq)	**4 607**	**4 607**	**4 611**	**4 603**	**3 316**	**2 164**	**1 531**	**1 410**	**1 228**	**1 661**	**1 139**	**1 287**	**1 802**	**1 728**	**1 684**	**1 714**	**1 792**	**687**	**583**	**445**	**359**	**283**	**301**	**295**	**192**	**-96%**
CF_4	0.51	0.51	0.51	0.51	0.37	0.24	0.17	0.16	0.14	0.19	0.13	0.14	0.20	0.19	0.19	0.19	0.20	0.08	0.06	0.05	0.04	0.03	0.03	0.03	0.02	-95.71
$C2F_6$	0.07	0.07	0.07	0.07	0.05	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-96.42
C_3F_8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
C_4F_{10}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
$C\text{-}C_4F_8$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
C_5F_{12}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
C_6F_{14}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
$C_{10}F_{13}$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
$C\text{-}C_3F_6$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Unspecified mix of listed PFCs[d] (kt CO_2 eq)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

CTF Table 1.5

Greenhouse Gas Source and Sink Categories	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change from base to latest reported year
	kt																									(%)
Emissions of SF_6[c] (kt CO_2 eq)																										
SF_6	211	211	229	247	265	283	302	270	248	223	196	191	197	202	206	208	182	173	162	151	137	139	128	128	128	-39%
Emissions of NF_3[c] (kt CO_2 eq)																										
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

a The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

c Enter actual emissions estimates. If only potential emissions estimates are available, these should be reported in this table and an indication for this be provided in the documentation box. Only in these rows are the emissions expressed as CO_2 equivalent emissions.

d In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", HFC and PFC emissions should be reported for each relevant chemical. However, if it is not possible to report values for each chemical (i.e. mixtures, confidential data, lack of disaggregation), this row could be used for reporting aggregate figures for HFCs and PFCs, respectively. Note that the unit used for this row is kt of CO_2 equivalent and that appropriate notation keys should be entered in the cells for the individual chemicals.

CTF Table 2(a) Description of Quantified Economy-wide Emission Reduction Target: Base year and target

Base year/ base period	2000
Emission reductions target (% of base year/base period)	5.00%
Emission reductions target (% of 1990)[b]	3.30%
Period for reaching target	2013–2020

b Optional

CTF Table 2(b) Description of Quantified Economy-wide Emission Reduction Target: Gases covered

Australia's 2020 target range is based on the 100 year GWP values consistent with the *Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention* contained in decision 15/CP.17, and as set out below.

Gases covered	Covered	Base Year	GWP reference source
CO_2	Yes	2000	IPCC Fourth Assessment Report
CH_4	Yes	2000	
N_2O	Yes	2000	
HFCs	Yes	2000	
PFCs	Yes	2000	
SF_6	Yes	2000	
NF_3	Yes	2000	
Other gases (specify)			

CTF Table 2(c) Description of Quantified Economy-wide Emission Reduction Target: Sectors covered

Sectors covered	Covered
Energy	Yes
Transport[f]	Yes
Industrial processes[g]	Yes
Agriculture	Yes
LULUCF	Yes
Waste	Yes
Other sectors (specify)[h]	

f Transport is reported as a subsector of the energy sector.

g Industrial processes refer to the industrial processes and product use sectors.

h Specify other sectors

CTF Table 2(d) Description of Quantified Economy-wide Emission Reduction Target: Role of the LULUCF sector

LULUCF in base year level and target	Included
Contribution of LULUCF is calculated using	Based on KP-LULUCF classification system: *deforestation, afforestation, reforestation, Forest Management, Cropland Management, Grazing land Management* and *revegetation*

CTF Table 2(e)I Description of Quantified Economy-wide Emission Reduction Target: Market-based mechanisms under the Convention[a]

Units	
Possible scale of contributions of market-based mechanisms under the convention (estimated kt CO_2 eq)	149,419.06
CERs	-
ERUs	-
AAUs[i]	-
Carry-over units[j] ❶	149,419.06
Other mechanism units under the Convention (specify)[k]	-

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

i AAUs issued to or purchased by a Party.

j Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision 1 /CMP.8.

k As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17.

❶ Australia will carry-over 127,650.77 kt CO_2 eq overachievement from the first commitment period of the Kyoto Protocol (represented by CP1 AAUs) into the Previous Period Surplus Reserve Account. An amount of these units will be used towards Australia's QEERT in accordance with Kyoto Protocol rules.

In addition, Australia will carry-over 21,768.29 kt CO_2 eq of CP1 CERs to use towards our QEERT.

CTF Table 2(e)II Description of Quantified Economy-wide Emission Reduction Target: Other market-based mechanisms[a]

Units	Possible scale of contributions (estimated kt CO_2 eq)
-	-

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

CTF Table 2(f) Description of Quantified Economy-wide Emission Reduction Target: Any other information

Any other information[l]	Australia's quantified economy-wide emission reduction target is unconditional. Under the voluntary Waste Industry Protocol the Australian Government has been gifted 21,768,290 first commitment period CERs by landfill operators. Australia will use units received though the voluntary Waste Industry Protocol to contribute to its unconditional 2020 target.

l This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

CTF Table 3 Progress in achievement of the Quantified Economy-wide Emission Reduction Target: information on mitigation actions and their effects

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
Emission Reduction Fund (Crediting and Purchasing) ❶	Yes	Cross-cutting	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To help meet Australia's emissions reduction targets.	Other (Voluntary Agreement)	Implemented	The ERF purchases abatement from eligible projects that are estimated using approved methods. Funds are allocated through reverse auctions, following which the Government contracts with successful bidders for the delivery of abatement.	2014	Clean Energy Regulator	Mitigation impact not estimated
Emission Reduction Fund (Safeguards)	No	Cross cutting	CH4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To protect taxpayer funds spent under the ERF by ensuring purchased abatement is not offset by significant increases in emissions above business-as-usual levels elsewhere in the economy.	Regulatory	Adopted	The safeguard mechanism achieves its objective by placing an emissions limit on Australia's largest emitting facilities.	2016	Clean Energy Regulator	Mitigation impact not estimated
Renewable Energy Target	Yes	Energy	CO_2	To reduce greenhouse gas emissions in the electricity sector and encourage greater electricity generation from renewable sources.	Other (Regulatory)	Implemented	This scheme creates a guaranteed market for additional renewable energy deployment using a mechanism of tradable certificates that are created by renewable energy generators (such as wind farms) and owners of small-scale renewable energy systems (such as solar PV).	2000	Clean Energy Regulator	17900

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
Clean Energy Finance Corporation	No	Cross-cutting	CH_4, CO_2, HFCs, NF_3, PFCs, SF_6	To facilitate increased flows of finance into the low-emissions energy sector	Fiscal	Implemented	The Corporation administers AUD 10 billion of legislated funding to drive the commercial deployment of new low-emissions technologies through addressing financing barriers in clean energy markets. The CEFC co-finances clean energy projects with the private sector, working with the market to build industry capacity	2012	Clean Energy Finance Corporation	Mitigation impact not estimated
Australian Renewable Energy Agency	No	Energy, Industry/ industrial processes	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To improve the competitiveness of renewable energy technologies and increase the supply of renewable energy in Australia.	Other (Research)	Implemented	The Agency is responsible for administering around AUD 2.4 billion of funding for: the research, development, demonstration, deployment and commercialisation of renewable energy and related technologies; and the storage and sharing of knowledge and information about renewable energy technologies.	2012	Australian Renewable Energy Agency	Mitigation impact not estimated
Ministerial Forum on Vehicle Emissions	No	Transport	CO_2, CH_4, N_2O	To reduce emissions from the transport sector by examining vehicle emissions standards and vechicle testing arrangements in Australia.	Other (Other (Co-ordination))	Adopted	The Minister for Major Projects, Territories and Local Government, the Minister for the Environment and the Minister for Resources, Energy and Northern Australia, will coordinate a whole-of-Australian-government approach to address vehicle emissions, including testing and reporting arrangements.	2015	Interdepart-mental working group led by the Department of Infrastructure and Regional Development.	Mitigation impact not estimated

CTF Table 3

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
National Energy Productivity Plan	No	Cross-cutting	CH4, HFCs, N2O, CO2, NF3, PFCs, SF6	To improve Australia's energy productivity by 40 per cent between 2015 and 2030.	Economic Fiscal Regulatory Information	Adopted	The Plan will bring together a range of new options to improve energy productivity in the transport, manufacturing, commercial and services and residential buildings sectors. The Plan will also support both large and small energy consumers and service providers to make better decisions on energy and effectively manage energy costs.	2015	Department of Industry, Innovation and Science.	Mitigation impact not estimated
Appliance Energy Efficiency	Yes	Energy	CO_2, HFCs	To improve the energy efficiency of appliances and equipment in the residential, commercial and industrial sectors.	Education Information Regulatory	Implemented	Mandatory Minimum Energy Performance Standards (MEPS) and mandatory Energy Rating Labels improve energy productivity and reduce energy consumed, thereby saving businesses and households money from their energy bills. Improved energy productivity and reduced energy consumption in turn reduces greenhouse emissions.	1986	Department of Industry, Innovation and Science.	Mitigation impact not estimated
Australia's National Construction Code	Yes	Other (Construction), Energy	CO_2	To reduce energy usage in new housing, multi-unit residential and non-residential buildings.	Other (Regulatory)	Implemented	The National Construction Code sets energy efficiency standards for new housing, multi-unit residential and non-residential buildings.	2003 (amended in 2010)	Department of Industry, Innovation and Science.	Mitigation impact not estimated
Nationwide House Energy Rating Scheme	Yes	Other (Residential buildings), Energy	CO_2	To incluence energy consumption by educating consumers about the energy efficiency of homes.	Information	Implemented	Provides the methodology to estimate and rate the potential thermal performance of residential buildings	2010 (updated in 2015)	Department of Industry, Innovation and Science, in cooperation with States and Territories	Mitigation impact not estimated

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
Commercial Building Disclosure Program	Yes	Energy	CO_2	To allow commercial building purchasers, lessors or tenants to compare the energy performance of commercial office stock.	Other (Regulatory)	Implemented	The Commercial Buildings Disclosure Programme provides a large, publicly available database of office building performance that encourages benchmarking and identifies opportunities for energy efficiency services.	2010	Department of Industry, Innovation and Science.	Mitigation impact not estimated
National Australian Built Environment Rating System (NABERS)	Yes	Other (Commercial buildings)		To provide better information of environmental performance of commercial buildings	Other (Regulatory)	Implemented	A rating system that measures the environmental performance of Australian buildings, tenancies and homes including energy efficiency, water usage, waste management and indoor environment quality.	1998	New South Wales Office of Environment and Heritage on behalf of Federal, State and Territory governments	Mitigation impact not estimated
Energy Efficiency in Government Operations	Yes	Other (Government Buildings)	CO_2	To improve the Energy Efficiency of Government buildings	Fiscal	Implemented	Under the Policy, new office leases negotiated by Australian government agencies must incorporate a Green Lease Schedule stipulating achievement of a 4.5 star NABERS Energy rating wherever possible.	2007	Department of Industry, Innovation and Science	Mitigation impact not estimated
Community Energy Efficiency Program	Yes	Other (Council and community buildings), Energy	CO_2	To assist local councils and community facilities to improve energy efficiency.	Fiscal	Implemented	The programme is providing AUD 101 million across 160 projects to co-fund energy efficiency upgrades to local council and community facilities.	2011	Department of Industry, Innovation and Science	Mitigation impact not estimated
Low Income Energy Efficiency Program	Yes	Other (Low-income households), Energy	CO_2	To assist low-income households to improve energy efficiency.	Fiscal	Implemented	The programme is providing AUD 55 million across 20 projects, which are trialing approaches to reduce the energy costs of low-income households.	2011	Department of Industry, Innovation and Science	Mitigation impact not estimated

CTF Table 3

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
Energy efficiency information programmes	Yes	Industry/ industrial processes, Energy	CO_2	To improve energy efficiency through better information for industry and consumers.	Information	Implemented	A range of information, capacity building and knowledge sharing web resources and a smartphone app assists industry and consumers to be more energy efficient.	Various	Department of Industry, Innovation and Science	Mitigation impact not estimated
Energy efficiency grant programmes	Yes	Energy	CO_2	To stimulate investment and learning in energy efficiency.	Fiscal	Implemented	Approximately AUD 197 million for 440 energy efficiency projects across four programmes	2011	Department of Industry, Innovation and Science	Mitigation impact not estimated
20 million Trees Programme	Yes	Other (Environment protection)	CO_2	To improve the extent, connectivity and condition of native vegetation	Fiscal	Implemented	20 million trees planted by 2020 to re-establish green corridors and urban forests. Delivered through both grants and service providers.	2015	Department of the Environment	Mitigation impact not estimated
Solar towns Programme	Yes	Other (Community), Energy	CO_2	To assist community organisations to shift to solar power	Fiscal	Implemented	AUD 2.1 million funding for community organisations to support the installation of solar photovoltaic panels and solar hot water systems	2014	Department of the Environment	Mitigation impact not estimated
Low Emissions Technology Roadmap	No	Cross-cutting	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To identify opportunities and barriers to research, development and take-up of new and emerging low emissions technologies.	Information	Planned	The Roadmap will examine technological trends, markets and challenges for new technologies in the energy, industry and transport sectors	2016	CSIRO (governance arrangements yet to be finalised)	Mitigation impact not estimated

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
Carbon Capture and Storage Flagships Program	Yes	Energy, Industry/ industrial processes	CO_2	To improve the viability of Carbon Capture and Storage technology	Other (Fiscal)	Implemented	Support for a small number of demonstration projects that will capture carbon dioxide emissions from industrial processes and safely store them underground in stable geological formations.	2009	Department of Industry, Innovation and Science	Mitigation impact not estimated
National Low Emissions Coal Initiative	Yes	Energy	CO_2	To reduce emissions from coal usage through the development and deployment of low emission technologies and CO2 transport and storage infrastructure.	Research	Implemented	The Initiative provides funding to support a range of research and demonstration projects.	2008	Department of Industry, Innovation and Science	Mitigation impact not estimated
Emission Technology Demonstration Fund	Yes	Cross-cutting	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To support projects that demonstrate low-emission technologies	Other (Fiscal)	Implemented	The Fund provides funding for demonstration projects, including Chevron Australia's Gorgon CO2 Injection project.	2011	Department of Industry, Innovation and Science	Mitigation impact not estimated
Coal Mining Abatement Technology Support Package	Yes	Energy	CH_4	To support industry research, development and demonstration activities to address coal methane abatement	Other (Fiscal)	Implemented	The package provides grants to support coal methane abatement projects.	2012	Department of Industry, Innovation and Science	Mitigation impact not estimated

CTF Table 3

Name of mitigation action[a]	Included in with measures GHG projection scenario	Sectors affected[b]	GHGs affected	Objective and/or activity affected	Type of instrument[c]	Status of implement-ation[d]	Brief description[e]	Start year of implement-ation	Implementing entity or entities	Mitigation impact[f] Estimate of mitigation impact in 2020 (not cumulative) (kt CO_2 eq)
National Carbon Offset Standard	Yes	Cross-cutting	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To improve information for industry and consumers about the voluntary carbon market and how to calculate their carbon footprint	Information	Implemented	NCOS provides guidance on what is a genuine voluntary carbon emissions offset and sets minimum requirements for calculating, auditing and offsetting the carbon footprint of an organisation, product or event. A criterion for offsets included under the standard is that they are additional to Parties' international commitments.	2010	Department of the Environment	Mitigation impact not estimated
Carbon Neutral Program	Yes	Cross-cutting	CH_4, CO_2, HFCs, N_2O, NF_3, PFCs, SF_6	To assist consumers to identify carbon neutral suppliers and products.	Other (Voluntary Agreement)	Implemented	Allows organisations, products and events to be certified by the Australian Government as carbon neutral, by reporting and offsetting their emissisons. Eligible offsets are defined under the National Carbon Offset Standard.	2010	Department of the Environment	Mitigation impact not estimated

Note: The two final columns specify the year identified by the Party for estimating impacts (based on the status of the measure and whether an ex post or ex ante estimation is available).

Abbreviations: GHG = greenhouse gas; LULUCF = land use, land-use change and forestry.

a Parties should use an asterisk (*) to indicate that a mitigation action is included in the 'with measures' projection.

b To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors, cross-cutting, as appropriate.

c To the extent possible, the following types of instrument should be used: economic, fiscal, voluntary agreement, regulatory, information, education, research, other.

d To the extent possible, the following descriptive terms should be used to report on the status of implementation: implemented, adopted, planned.

e Additional information may be provided on the cost of the mitigation actions and the relevant timescale.

f Optional year or years deemed relevant by the Party.

❶ The annual abatement from the Emissions Reduction Fund for the year 2020 is not publicly available so as not to disclose commercially sensitive information that could impact delivery schedules and future auctions. However the cumulative abatement estimate for the Emissions Reduction Fund for the period to 2020 is 92 Mt CO_2-e as outlined in the fact sheet available at www.environment.gov.au/climate-change/publications/factsheet-emissions-projections-2015-16.

CTF Table 4 Reporting on progress[a, b]

	Unit	Base Year/Base period					
		2000	2010	2011	2012	2013	2014 ❶
Total emissions without LULUCF ❶	kt CO_2 eq	496,990.79	546,399.98	549,075.37	549,755.54	541,923.59	-
Contribution from LULUCF[c]	kt CO_2 eq	63,798.74	34,498.84	3,624.76	12,943.77	7,522.25	-
Market based mechanisms under the Convention ❷	Number of units	0	0	0	0	0	-
	kt CO_2 eq	0	0	0	0	0	-
Other market based mechanisms	Number of units	0	0	0	0	0	-
	kt CO_2 eq	-	0	0	0	0	-

Note: Parties may add additional columns for years other than those specified below.

Abbreviation: GHG – greenhouse gas, LULUCF = land use, land use change and forestry.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b For the base year, information reported on the emission reduction target shall include the following : (a) total GHG emissions, excluding emissions and removals from the LULUCF sector: (b) emissions and/or removals from the LULUCF sector based on the accounting approach identified taking into consideration any relevant decisions of the Conference of Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a-c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based mechanisms.

c Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

❶ For this table, data for the year 2013 are consistent with *Australia's National Inventory Report 2013.* Data for the year 2014 can be made available upon finalisation of *Australia's National Inventory Report 2013*

❷ Australia understands surrender as distinct from holding. Surrender is when an entity or Party retires a unit for compliance purposes. No units have been surrendered by end 2014.

CTF Table 4(a)I–1 Progress in achieving the Quantified Economy-wide Emission Reduction Target—further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector, 2013[a, b]

Cancun 2020 target inventory: KP LULUCF classifications data against UNFCCC LULUCF classifications

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2013						
Total LULUCF ❶	kt CO_2 eq	7,522.25	63,798.74	-56,276.49	NA	Other (See section 4.7 of BR for more details)
A. Forest land	kt CO_2 eq	-32,798.76	-13,014.06	-19,784.70	NA	Other (See section 4.7 of BR for more details)
1. Forest land remaining forest land ❷	kt CO_2 eq	-20,254.16	-3,137.88	-17,116.28	NA	Other (See section 4.7 of BR for more details)
2. Land converted to forest land ❸	kt CO_2 eq	-12,544.60	-9,876.18	-2,668.42	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
B. Cropland	kt CO_2 eq	1,466.29	-1,459.06	2,925.35	NA	Other (See section 4.7 of BR for more details)
1. Cropland remaining cropland	kt CO_2 eq	-1,754.65	-7,583.11	5,828.46	NA	Other (See section 4.7 of BR for more details)
2. Land converted to cropland	kt CO_2 eq	3,220.94	6,124.05	-2,903.11	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2013						
C. Grassland	kt CO_2 eq	38,854.72	78,271.86	-39,417.14	NA	Other (See section 4.7 of BR for more details)
1. Grassland remaining grassland	kt CO_2 eq	4,885.93	15,471.48	-10,585.55	NA	Other (See section 4.7 of BR for more details)
2. Land converted to grassland	kt CO_2 eq	33,968.79	62,800.38	-28,831.59	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
D. Wetlands	kt CO_2 eq	NE, IE	NE, IE	NE, IE	NA	Other (See section 4.7 of BR for more details)
1. Wetland remaining wetland	kt CO_2 eq	NE	NE	NE	NA	Other (See section 4.7 of BR for more details)
2. Land converted to wetland	kt CO_2 eq	IE	IE	IE	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
E. Settlements	kt CO_2 eq	NE, IE	NE, IE	NE, IE	NA	Other (See section 4.7 of BR for more details)
1. Settlements remaining settlements	kt CO_2 eq	NE	NE	NE	NA	Other (See section 4.7 of BR for more details)
2. Land converted to settlements	kt CO_2 eq	IE	IE	IE	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)

CTF Table 4(a)I–1

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2013						
F. Other land	kt CO_2 eq	NA, NO	NA, NO	NA, NO	NA	Other (See section 4.7 of BR for more details)
1. Other land remaining other land	kt CO_2 eq	NA	NA	NA	NA	Other (See section 4.7 of BR for more details)
2. Land converted to other land	kt CO_2 eq	NO	NO	NO	NA	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
Harvested wood products	kt CO_2 eq	IE	IE	IE	IE	Other (See section 4.7 of BR for more details)

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

c For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting under the Convention or its Kyoto Protocol, explain in the biennial report how the value was derived.

d Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

e If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

f Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e. natural disturbances, caps).

g Specify what was used for the category "other". Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

❶ This table presents KP LULUCF classifications data against UNFCCC LULUCF classifications to demonstrate progress against Australia's 2020 QEERT. Data for the year 2013 are consistent with Australia's *National Inventory Report 2013* (2015).

❷ Forest land remaining forest land includes forest lands managed for timber production.

❸ Land converted to forest land includes land converted to forest since 1990.

SUPPLEMENT: Cancun 2020 target inventory: KP LULUCF classifications data against KP LULUCF classifications

	Unit	Net GHG emissions/removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2013						
This table presents KP LULUCF classifications data against KP LULUCF classifications to demonstrate progress against Australia's 2020 QEERT						
Total KP LULUCF	kt CO_2 eq	7,522	63,799	-56,276	–	Other (See section 4.7 of BR for more details)
A. Article 3.3 Activities	kt CO_2 eq	24,645	59,048	-34,403	–	Other (See section 4.7 of BR for more details)
A.1. Deforestation	kt CO_2 eq	37,190	68,924	-31,735	–	Other (See section 4.7 of BR for more details)
A.2. Afforestation/Reforestation	kt CO_2 eq	-12,545	-9,876	-2,668	–	Other (See section 4.7 of BR for more details)
B. Article 3.4 Activities	kt CO_2 eq	-17,123	4,750	-21,873	–	Other (See section 4.7 of BR for more details)
B.1. Forest Management	kt CO_2 eq	-20,254	-3,138	-17,116	–	Other (See section 4.7 of BR for more details)
B.2. Cropland Management	kt CO_2 eq	-1,755	-7,583	5,828	–	Other (See section 4.7 of BR for more details)
B.3. Grazing land Management	kt CO_2 eq	4,886	15,471	-10,586	–	Other (See section 4.7 of BR for more details)
B.4. Revegetation	kt CO_2 eq	NE	NE	NE	–	NE
B.5. Wetland drainage and rewetting[(h)] Australia did not elect this non-mandatory activity for reporting	kt CO_2 eq	NA	NA	NA	–	NA

CTF Table 4(a)I–2 Progress in achieving the Quantified Economy-wide Emission Reduction Target—further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector, 2014[a, b]

Cancun 2020 target inventory: KP *LULUCF* classifications data against UNFCCC *LULUCF* classifications. Data for the year 2014 can be made available upon finalisation of Australia's *National Inventory Report* 2014.

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2014						
Total LULUCF ❹	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
A. Forest land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Forest land remaining forest land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to forest land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
B. Cropland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Cropland remaining cropland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to cropland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2014						
C. Grassland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Grassland remaining grassland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to grassland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other g	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
D. Wetlands	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Wetland remaining wetland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to wetland	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other g	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
E. Settlements	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Settlements remaining settlements	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to settlements	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)

CTF Table 4(a)I–2

	Unit	Net GHG emissions/ removals from LULUCF categories [c]	Base year/period or reference level value [d]	Contribution from LULUCF for reported year	Cumulative contribution from LULUCF [e]	Accounting approach [f]
2014						
F. Other land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
1. Other land remaining other land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
2. Land converted to other land	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
3. Other [g]	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)
Harvested wood products	kt CO_2 eq	–	–	–	–	Other (See section 4.7 of BR for more details)

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

c For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting under the Convention or its Kyoto Protocol, explain in the biennial report how the value was derived.

d Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

e If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

f Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e. natural disturbances, caps).

g Specify what was used for the category "other". Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

❹ Data for the year 2014 can be made available upon finalisation of Australia's National Inventory Report 2014.

CTF Table 4(b) Reporting on progress[a, b, c, f]

	Quantity of units	kt CO_2 eq
2013		
Kyoto Protocol units[d]	**0**	**0**
AAUs	0	0
ERUs	0	0
CERs	0	0
tCERs	0	0
lCERs	0	0
Units from market-based mechanisms under the Convention[d,e]	**0**	**0**
Units from other market-based mechanisms[d,e]	**0**	**0**
Total	**0**	**0**
2014		
Kyoto Protocol units[d]	**0**	**0**
AAUs	0	0
ERUs	0	0
CERs	0	0
tCERs	0	0
lCERs	0	0
Units from market-based mechanisms under the Convention[d,e]	**0**	**0**
Units from other market-based mechanisms[d,e]	**0**	**0**
Total	**0**	**0**

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, lCERs = long-term certified emission reductions, tCERs = temporary certified emission reductions.

Note: 2013 is the latest reporting year.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b For each reported year, information reported on progress made towards the emission reduction target shall include, in addition to the information noted in paragraphs 9(a-c) of the reporting guidelines, on the use of units from market-based mechanisms.

c Parties may use this information, as appropriate and if relevant to their target.

d Units surrendered by that Party for that year that have not been previously surrendered by that or any other party

e Additional rows for each market-based mechanisms should be added, if applicable

Note: Australia understands surrender as distinct from holding. Surrender is when an entity or Party retires a unit for compliance purposes. No units had been surrendered by end 2014.

CTF Table 5 Projections assumptions[a]

Key underlying assumptions	Unit	Historical [b]								Projected			
		1990	1995	2000	2005	2010	2011	2012	2013	2015	2020	2025	2030
Population growth	thousands	17,065	18,005	19,029	20,177	22,032	22,340	22,722	23,119	23,889	26,037	not estimated	not estimated
GDP growth rate ❶	%	-	2.6%	4.1%	3.4%	2.7%	0.5%	0.7%	0.4%	1.1%	3.3%	not estimated	not estimated
Exchange rates	USD/AUD	0.78	0.74	0.58	0.76	0.92	1.03	1.04	0.97	0.78	0.78	not estimated	not estimated
Labour costs	Index	NE	NE	73	87	105	109	113	116	122	142	not estimated	not estimated

a Parties should include key underlying assumptions as appropriate.

b Parties should include historical data used to develop the greenhouse gas projections reported.

❶ The GDP growth rate in this table is the average annual growth rate over the period between the years in that column and the adjacent column to its left. For instance, the growth rate presented in 1995 is the average annual growth over the period 1990 to 1995, while the growth rate presented in 2013 is the growth from 2012 to 2013.

CTF Table 6 Information on updated greenhouse gas projections[a]

GHG emissions projections	Unit	GHG emissions and removals[b] Base year (2000)	1990	1995	2000	2005	2010	2013	GHG emission projections – Scenarios With measures 2020	2030
Sector[d,e]										
Energy	kt CO_2 eq	288,595.25	231,402.84	248,876.89	288,595.25	314,551.75	327,581.81	318,329.66	345,582.69	Not estimated
Transport	kt CO_2 eq	74,165.25	61,417.89	68,050.05	74,165.25	81,658.67	87,974.25	92,682.35	103,002.95	Not estimated
Industry/industrial processes	kt CO_2 eq	26,751.98	26,108.52	25,261.35	26,751.98	32,035.03	35,537.81	32,528.21	33,904.42	Not estimated
Agriculture	kt CO_2 eq	90,642.72	88,569.10	82,522.14	90,642.72	87,979.31	78,897.66	85,023.74	79,594.97	Not estimated
Forestry/LULUCF	kt CO_2 eq	63,798.74	122,486.27	55,906.72	63,798.74	80,112.27	34,498.84	7,522.25	21,167.07	Not estimated
Waste management/waste	kt CO_2 eq	16,835.58	20,793.15	19,795.73	16,835.58	15,597.50	16,408.44	13,359.64	9,539.26	Not estimated
Other Sectors	-	-	-	-	-	-	-	-	-	-
Gases										
CO_2 emissions including net CO_2 from LULUCF	kt CO_2 eq	408,728.19	392,532.18	355,377.88	408,728.19	459,454.69	434,246.93	403,519.43	444,961.74	Not estimated
CO_2 emissions excluding net CO_2 from LULUCF	kt CO_2 eq	349,884.01	278,220.35	304,924.64	349,884.01	384,741.34	404,773.91	398,527.89	430,915.92	Not estimated
CH_4 emissions including CH_4 from LULUCF	kt CO_2 eq	125,264.69	131,685.03	121,688.79	125,264.69	120,602.60	112,439.09	111,810.78	109,931.16	Not estimated
CH_4 emissions excluding CH_4 from LULUCF	kt CO_2 eq	122,384.29	126,928.48	119,058.79	122,384.29	117,201.27	110,707.69	110,581.50	106,472.05	Not estimated
N_2O emissions including N_2O from LULUCF	kt CO_2 eq	23,705.74	20,317.84	20,509.04	23,705.74	24,900.99	25,624.90	23,830.90	25,125.17	Not estimated
N_2O emissions excluding N_2O from LULUCF	kt CO_2 eq	21,631.57	16,899.94	17,685.56	21,631.57	22,903.40	22,330.49	22,529.47	21,463.04	Not estimated
HFCs	kt CO_2 eq	1,613.20	1,424.68	1,004.03	1,613.20	5,002.48	8,166.07	9,964.79	12,483.09	Not estimated

GHG emissions projections	Unit	GHG emissions and removals[b] Base year (2000)	1990	1995	2000	2005	2010	2013	GHG emission projections – Scenarios With measures 2020	2030
PFCs	kt CO_2 eq	1,287.06	4,607.01	1,530.84	1,287.06	1,791.70	283.32	192.00	149.37	Not estimated
SF_6	kt CO_2 eq	190.65	211.02	302.31	190.65	182.06	138.50	127.94	140.33	Not estimated
Other gases	-	-	-	-	-	-	-	-	-	-
Total with LULUCF [f] ❶	kt CO_2 eq	560,789.53	550,777.76	500,412.89	560,789.53	611,934.52	580,898.81	549,445.84	592,790.86	
Total without LULUCF	kt CO_2 eq	496990.78	428,291.48	444,506.17	496,990.78	531,822.25	546,399.98	541,923.59	571,623.79	

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

a In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

b Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

d In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

e To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

f Parties may choose to report total emissions with or without LULUCF, as appropriate.

❶ Data for the years 1990–2013 supports Chapter 3 of the Biennial Report, which demonstrates Australia's progress against its 2020 target.

Note: An interim update to Australia's emissions projections has been prepared however these projections only go to 2019–20. Therefore an up-to-date estimate for Australia's emissions in 2030 is not available. Australia will consider developing further projections in 2016

CTF Table 7 Provision of public financial support: summary information[a]

Allocation channels	Australian dollar - AUD					USD [b]				
	Core/ general [c]	Climate-specific [d]				Core/ general [c]	Climate-specific [d]			
		Mitigation	Adaptation	Cross-cutting [e]	Other		Mitigation	Adaptation	Cross-cutting [e]	Other
2013										
Total contributions through multilateral channels	293.41	11.58	18.50	5.48	NA	310.44	12.26	19.58	5.80	NA
Multilateral climate change funds [g]	20.08	5.08	16.50	5.00		21.25	5.38	17.46	5.29	
Other multilateral climate change funds [h]		5.08		5.00			5.38		5.29	
Multilateral financial institutions, including regional development banks	273.33			-	NA	289.19				NA
Specialized United Nations bodies		6.50	2.00	0.48			6.88	2.12	0.51	
Total contributions through bilateral, regional and other channels		36.23	42.13	109.49			38.32	44.56	115.83	
Total	***293.41***	***47.81***	***60.63***	***114.97***	***NA***	***310.44***	***50.58***	***64.14***	***121.63***	***NA***

Allocation channels	Australian dollar - AUD					USD [b]				
	Core/ general [c]	Climate-specific [d]				Core/ general [c]	Climate-specific [d]			
		Mitigation	Adaptation	Cross-cutting [e]	Other		Mitigation	Adaptation	Cross-cutting [e]	Other
2014										
Total contributions through multilateral channels	342.49	3.18		68.21		325.59	3.02		64.84	
Multilateral climate change funds [g]	19.41			10.68		18.45			10.15	
Other multilateral climate change funds [h]										
Multilateral financial institutions, including regional development banks	302.42			56.50		287.50			53.71	
Specialized United Nations bodies	20.66	3.18		1.03		19.64	3.02		0.98	
Total contributions through bilateral, regional and other channels			40.53	37.57				38.52	35.71	
Total	***342.49***	***3.18***	***40.53***	***105.78***		***325.59***	***3.02***	***38.52***	***100.55***	

Abbreviation: USD = United States dollars.

a Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

b Parties should provide an explanation on methodology used for currency exchange for the information provided in table 7, 7(a) and 7(b) in the box below.

c This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

d Parties should explain in their biennial reports how they define funds as being climate-specific.

e This refers to funding for activities which are cross-cutting across mitigation and adaptation.

f Please specify.

g Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

h Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Figures in millions.

Note: Australia sources its climate finance from new and additional aid budget appropriations passed by the Australian Parliament on an annual basis.

CTF Table 7(a) Provision of public financial support: contribution through multilateral channels

Donor funding	Total Amount				Status [b]	Funding source [f]	Financial instrument [f]	Type of support [f,g]	Sector [c]
	Core/general [d]		Climate-specific [e]						
	Australian Dollar - AUD	USD	Australian Dollar - AUD	USD					
2013									
Total contributions through multilateral channels	293.41	310.43	35.56	37.64					
Multilateral climate change funds [g]	20.08	21.25	26.58	28.13					
1. Global Environment Facility ❶	20.08	21.25	NA	NA	Provided	ODA	Grant	Cross-cutting	Not applicable
2. Least Developed Countries Fund			15.00	15.87	Provided	ODA	Grant	Adaptation	Cross-cutting
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund									
6. UNFCCC Trust Fund for Supplementary Activities			1.50	1.59	Provided	ODA	Grant	Adaptation	Cross-cutting
7. Other multilateral climate change funds			10.08	10.67					
Global Green Growth Institute			5.00	5.29	Provided	ODA	Grant	Cross-cutting	Cross-cutting
World Bank Partnership for Market Readiness			2.50	2.65	Provided	ODA	Grant	Mitigation	Cross-cutting
Climate Investment Funds - Scaling-Up Renewable Energy Program			2.58	2.73	Provided	ODA	Grant	Mitigation	Energy
Multilateral financial institutions, including regional development banks	273.33	289.19	NA	NA					
1. World Bank ❷	190.25	201.29	NA	NA					
2. International Finance Corporation									
3. African Development Bank									

CTF Table 7(a)

Donor funding	Total Amount				Status [b]	Funding source [f]	Financial instrument [f]	Type of support [f,g]	Sector [c]
	Core/general [d]		Climate-specific [e]						
	Australian Dollar - AUD	USD	Australian Dollar - AUD	USD					
4. Asian Development Bank ❸	83.08	87.90	NA	NA					
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other									
Specialized United Nations bodies			8.98	9.51					
1. United Nations Development Programme			8.50	9.00					
Small Island Developing States Community-based Adaptation Program			2.00	2.12	Provided	ODA	Grant	Adaptation	Cross-cutting
Low Emissions Capacity Building Programme			4.00	4.23	Provided	ODA	Grant	Mitigation	Cross-cutting
MDG Carbon Facility			2.50	2.65	Provided	ODA	Grant	Mitigation	Cross-cutting
2. United Nations Environment Programme									
3. Other			0.48	0.51					
Intergovernmental Panel on Climate Change			0.12	0.13	Provided	ODA	Grant	Cross-cutting	Not applicable
United Nations Framework Convention on Climate Change			0.36	0.38	Provided	ODA	Grant	Cross-cutting	Not applicable
2014									
Total contributions through multilateral channels	342.49	325.59	71.39	67.86					
Multilateral climate change funds [g]	19.41	18.45	10.68	10.15					
1. Global Environment Facility	19.41	18.45	10.68	10.15	Provided	ODA	Grant	Cross-cutting	Cross-cutting
2. Least Developed Countries Fund									

Donor funding	Total Amount				Status [b]	Funding source [f]	Financial instrument [f]	Type of support [f,g]	Sector [c]
	Core/general [d]		Climate-specific [e]						
	Australian Dollar - AUD	USD	Australian Dollar - AUD	USD					
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund									
6. UNFCCC Trust Fund for Supplementary Activities									
7. Other multilateral climate change funds									
Multilateral financial institutions, including regional development banks	302.42	287.50	56.50	53.71					
1. World Bank	201.33	191.40	26.17	24.88	Provided	ODA	Grant	Cross-cutting	Not applicable
2. International Finance Corporation									
3. African Development Bank									
4. Asian Development Bank	101.09	96.10	30.33	28.83	Provided	ODA	Grant	Cross-cutting	Not applicable
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other									
Specialized United Nations bodies	20.66	19.64	4.21	4.00					
1. United Nations Development Programme	20.66	19.64	1.03	0.98					
United Nations Development Programme	20.66	19.64	1.03	0.98	Provided	ODA	Grant	Cross-cutting	Not applicable
2. United Nations Environment Programme									
3. Other			3.18	3.02					
Montreal Protocol			3.18	3.02	Provided	ODA		Mitigation	Cross-cutting

CTF Table 7(a)

Abbreviations: ODA = official development assistance, OOF = other official flows.

a Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

b Parties should explain, in their biennial reports, the methodologies used to specify the funds as provided, committed and/or pledged. Parties will provide the information for as many status categories as appropriate in the following order of priority: provided, committed, pledged.

c Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

d This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

e Parties should explain in their biennial reports how they define funds as being climate-specific.

f Please specify.

g Cross-cutting type of support refers to funding for activities which are cross-cutting across mitigation and adaptation.

AUD and USD are in millions of dollars

USD exchange rate based on annual average conversion rates for the relevant financial year as published by the Australian Taxation Office (FY 2012/13 1:1.0580, FY 2013/14 1:0.9507).

The Australian financial year runs from 1 July to 30 of June. Therefore, the figures for 2013 are for the period 1 July 2012 - 30 June 2013, and for 2014 are for the period 1 July 2013 - 30 June 2014.

Australia sources its climate finance from new and additional aid budget appropriations passed by the Australian Parliament on an annual basis.

❶ Australia's core and climate specific contribution to the GEF in FY2012/13 was not reflected in Australia's fast-start climate finance reporting (FY 2010/11 - FY 2012/13). To maintain consistency, the climate specific component of Australia's core contribution to the GEF (AUD 10.68m) is not reflected in this report.

❷ Australia's core and climate specific contribution to the World Bank in FY2012/13 was not reflected in Australia's fast-start climate finance reporting (FY 2010/11 - FY 2012/13). To maintain consistency, the climate specific component of Australia's core contribution to the World Bank (AUD 51m) is not reflected in this report.

❸ Australia's core and climate specific contribution to the Asian Development Bank in FY2012/13 was not reflected in Australia's fast-start climate finance reporting (FY 2010/11 - FY 2012/13).

To maintain consistency, the climate specific component of Australia's core contribution to the Asian Development Bank (AUD 62m) is not reflected in this report.

CTF Table 7(b) Provision of public financial support: contribution through bilateral, regional and other channels[a]

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian Dollar - AUD	USD						
2013								
Total contributions through bilateral, regional and other channels	187.85	198.71						
Pacific /	38.84	41.09	Provided	ODA	Grant	Cross-cutting	Cross-cutting, Industry	Pacific Adaptation Community-Based Climate Change Action Grants Pacific Climate Change Science and Adaptation Planning Program (PACCSAP) Support for the Secretariat of the Pacific Community (SPC) Adaptation Activities Support for Secretariat of the Pacific Regional Environment Programme (SPREP) Adaptation Work Program Pacific Risk Resilience Program Climate and Oceans Support Program in the Pacific (COSPPac) Australia-Pacific Climate Adaptation Platform Pacific Appliance Labelling and Standards Program (PALS)
Cook Islands /	0.69	0.73	Provided	ODA	Grant	Adaptation	Water and sanitation	Cook Islands Water Resource Management (climate resilience component)

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian Dollar - AUD	USD						
2013								
Federated States of Micronesia, Republic of the Marshall Islands /	0.70	0.74	Provided	ODA	Grant	Adaptation	Cross-cutting	Climate Adaptation and Disaster Risk Reduction and Education Project (CADRE)
Fiji /	1.00	1.06	Provided	ODA	Grant	Adaptation	Cross-cutting	Fiji Community Development Program (climate resilience component) Fiji Health Sector Support Program (climate resilience and climate change impact on disease profiles analysis) Access to Quality Education Program Fiji (climate resilience component)
Kiribati /	1.44	1.52	Provided	ODA	Grant	Adaptation	Cross-cutting, Water and sanitation	South Tarawa Sanitation Improvement Program (climate resilience component) Kiribati Climate Change Initiative
Maldives /	0.56	0.59	Provided	ODA	Grant	Adaptation	Cross-cutting	Maldives Climate Change Trust Fund
Nauru /	0.50	0.53	Provided	ODA	Grant	Adaptation	Cross-cutting	Household Water Tanks in Nauru (climate resilience component)
Niue & Tokelau /	0.50	0.53	Provided	ODA	Grant	Adaptation	Cross-cutting	Niue School Infrastructure Project (climate resilience component)
Papua New Guinea /	4.10	4.34	Provided	ODA	Grant	Cross-cutting	Agriculture, Forestry, Cross-cutting	PNG Climate Change Adaptation Initiative Food Security Project (climate resilience component) Climate Change Vulnerability Assessment PNG-Australia Forest Carbon Partnership

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian Dollar - AUD	USD						
2013								
Republic of the Marshall Islands /	0.24	0.25	Provided	ODA	Grant	Adaptation	Water and sanitation	Marshall Islands Drought Response (climate resilience component)
Samoa /	1.60	1.69	Provided	ODA	Grant	Adaptation	Cross-cutting	Civil Society Strengthening Program (climate resilience component)
Tuvalu /	1.00	1.06	Provided	ODA	Grant	Adaptation	Water and sanitation	Increasing Resilience to Water Shortages (climate resilience component)
Philippines /	7.70	8.15	Provided	ODA	Grant	Adaptation	Cross-cutting	BRACE Program (Building the Resilience and Awareness of Metro Manila Communities to Natural Disasters and Climate Change Impacts) Philippines Disaster and Climate Risk Management
South East Asia /	11.70	12.38	Provided	ODA	Grant	Adaptation	Cross-cutting	South East Asia Adaptation Community-Based Climate Change Action Grants
Timor-Leste /	0.25	0.26	Provided	ODA	Grant	Adaptation	Agriculture	Seeds of Life Program (climate resilience component)
Vietnam /	16.86	17.84	Provided	ODA	Grant	Cross-cutting	Energy, Industry, Cross-cutting	Climate Change & Coastal Ecosystems Program Flood and Drought Risk Management and Mitigation Project Vietnam Climate Innovation Centre Vietnam Energy Efficiency Standards and Labelling Vietnam Mitigation Community-Based Climate Change Action Grants Energy Distribution Efficiency Project

CTF Table 7(b)

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian Dollar - AUD	USD						
2013								
Asia /	7.28	7.70	Provided	ODA	Grant	Cross-cutting	Industry, Cross-cutting	ICIMOD Water Resources Management - Koshi Basin Program (climate resilience component) South Asia Water Initiative Phase II (climate resilience component) CSIRO Research for Development Alliance UNEP En.lighten Energy Efficiency Initiative
Bangladesh /	8.00	8.46	Provided	ODA	Grant	Adaptation	Cross-cutting	Comprehensive Disaster Management Program Phase 2 Bangladesh Climate Change Resilience Fund Strategic Partnership Arrangement with Bangladesh Rural Advancement Committee (BRAC)
Southern Africa /	5.00	5.29	Provided	ODA	Grant	Adaptation	Water and sanitation	Transboundary Water Management in Southern African Development Community (climate resilience component)
Caribbean /	1.25	1.32	Provided	ODA	Grant	Adaptation	Cross-cutting	Climate Change Adaptation Capacity Building Programme Sustainable cities and Human settlements in SIDS Management of Coral Reefs in a Changing Climate Program

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian Dollar - AUD	USD						
2013								
Global /	41.89	44.31	Provided	ODA	Grant	Cross-cutting	Cross-cutting, Forestry	Least Developed Countries Fund Small Island Developing States Community-based Adaptation Program (SIDS-CBA) MRV Capacity Building Workshops Centre for International Forestry Research (CIFOR) Partnership Global and Regional Measurement Reporting and Verification International Savanna Fire Management Initiative REDD+ Skills and Capacity Building (Volunteers and Fellowships) MDG Carbon Facility for Sustainable Development World Bank WAVES partnership SIDS Negotiator Training Helping to Shape a Global Climate Change Solution - Special Climate Visitors Program
Indonesia /	20.98	22.19	Provided	ODA	Grant	Mitigation	Forestry, Cross-cutting	REDD+ Technical Support and Satellite Data Provision Indonesia-Australia Forest Carbon Partnership REDD+ Law Project in Indonesia Climate Change (Low Carbon) Bilateral Partnership
Asia Pacific /	0.25	0.26	Provided	ODA	Grant	Mitigation	Industry	lites.asia (Lighting Information and Technical Exchange for Standards)

CTF Table 7(b)

Recipient Country/ region/project/ programme [b]	Total Amount Climate-specific[f]		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Australian Dollar - AUD	USD						
2013								
South Asia /	2.50	2.65	Provided	ODA	Grant	Mitigation	Cross-cutting	South Asia Infrastructure for Growth Initiative (climate resilience component)
Kenya /	12.50	13.22	Provided	ODA	Grant	Mitigation	Agriculture, Forestry	System for Land Emissions Estimation in Kenya
South Africa /	0.52	0.55	Provided	ODA	Grant	Cross-cutting	Cross-cutting	South African Bilateral Partnership - Cato Manor Green Street Phase 2 Energy Efficiency Program & Land Sector MRV Capacity Building Project Sponsorship of Climate Law and Governance in the Global South Conference

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian dollar - AUD	USD						
2014								
Total contributions through bilateral, regional and other channels	78.10	74.23						
Asia /	0.22	0.21	Provided	ODA	Grant	Cross-cutting	Cross-cutting, Industry	Asian Disaster Preparedness Centre 2012–2015 Asia Low Emissions Development Strategy Partnership Forum 2013
Asia Pacific /	0.42	0.40	Provided	ODA	Grant	Cross-cutting	Forestry, Cross-cutting	Support for CTI second phase Community-based Climate Change Action Grants Knowledge and Learning Workshop Phase 3 of the RAFT Programme
East Asia /	1.19	1.13	Provided	ODA	Grant	Cross-cutting	Energy, Cross-cutting	AusAID-CSIRO Research For Development Alliance Phase 3 International Finance Corporation Sustainable Hydropower in the Mekong
Global /	16.29	15.48	Provided	ODA	Grant	Cross-cutting	Energy, Cross-cutting	Australian Renewable Energy Agency scholarships, fellowships, projects DFAT Sustainability and Climate Change Branch Administered FFund Australian Centre for International Agricultural Research Australia Awards Volunteer programmes
Indonesia /	7.45	7.08	Provided	ODA	Grant	Cross-cutting	Cross-cutting, Forestry	Kalimantan Forests and Climate Partnership Indonesia-Australia Forest Carbon Partnership Low Carbon Growth Support Green Economic Development

CTF Table 7(b)

Recipient Country/ region/project/ programme [b]	Total Amount Climate-specific[f]		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Australian dollar - AUD	USD						
2014								
Kiribati /	4.04	3.84	Provided	ODA	Grant	Adaptation	Cross-cutting, Water and sanitation, Energy, Other (Infrastructure)	Christmas Island Climate Change Consultation Kiribati Road Rehabilitation (additional finance) Kiribati Grid Connected Solar South Tarawa Sanitation Improvement Project
Nauru /	0.06	0.06	Provided	ODA	Grant	Adaptation	Cross-cutting, Other (Infrastructure)	Nauru Infrastructure and Services Placement of Environmental Adviser in Nauru Prescribed Recruitment of an Environmental Adviser in Nauru
Pacific /	15.11	14.36	Provided	ODA	Grant	Adaptation	Cross-cutting, Agriculture	Secretariat of the Pacific Community (SPC) Climate Change Activities Climate and Oceans Support Program in the Pacific Independent Progress Review Fisheries for Food Security Program South Pacific Regional Environment Program Core Funding South Pacific Regional Environment Program Specific Support Program Inception and Implementation Application of the Pacific Climate Futures Tool CADRE Program Climate Change Specialists Pacific Australia CC Science &Adaptation Planning Review of Pacific Climate Change Activities Review of Pacific Climate Change Activities 13/14 Pacific Media Assistance Scheme (PACMAS) 2 Supporting the Regional Management of Climate Change Information in the Pacific (Pacific ICLIM)

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian dollar - AUD	USD						
2014								
Pakistan /	1.40	1.33	Provided	ODA	Grant	Adaptation	Water and sanitation	CSIRO - Water Resource Management
Philippines /	7.45	7.08	Provided	ODA	Grant	Adaptation	Cross-cutting, Transport	Australia-Philippines Agency Linkages Manila Post Disaster Response Facility Enhancing Risk Analysis for Metro Manila BRACE Program Technical Assistance to the Philipphines Department of the Interior and Local Government for the Securing Safety of Informal Settler Families (ISF) in Metro Manila Program
Papua New Guinea /	0.12	0.12	Provided	ODA	Grant	Cross-cutting	Cross-cutting	Natural Hazard Risk Assessment Mapping Activity Monitoring and review of PNG CBA activities
Samoa /	1.60	1.52	Provided	ODA	Grant	Adaptation	Cross-cutting, Forestry, Other (Infrastructure)	Samoa Agro-Forestry and Tree Farming Program Cyclone Evan Emergency Response & Recovery Samoa Climate Change Adaptation Initiative Samoa Parliament Complex Redevelopment Samoa Civil Society Support Program
Solomon Islands /	3.83	3.64	Provided	ODA	Grant	Adaptation	Agriculture, Transport, Water and sanitation, Other (Infrastructure)	UNICEF Water Sanitation and Hygiene program Solomon Islands Urban Water Supply Solomon Islands Transport Sector Based Approach Kastom Gaden Association (KGA)

CTF Table 7(b)

Recipient Country/ region/project/ programme [b]	Total Amount Climate-specific[f]		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Australian dollar - AUD	USD						
2014								
South Asia /	4.38	4.16	Provided	ODA	Grant	Adaptation	Agriculture, Water and sanitation, Cross-cutting, Energy	Climate-resilient Farming Systems – Australian Centre for International Agricultural Research Water Resources Mgt (Koshi Basin Program) – International Centre for Integrated Mountain Development Capacity Building for Water Resource Management – International Centre of Excellence in Water Resources Management International Finance Corporation – Increasing access to & cooperation on energy South Asia Water Initiative (SAWI) – World Bank Research, monitoring and evaluation – Consumer Unity and Trust Society
Timor-Leste /	0.15	0.14	Provided	ODA	Grant	Adaptation	Agriculture, Cross-cutting	Seeds of Life 3 Climate Change Adaptation East Timor
Tonga /	0.94	0.89	Provided	ODA	Grant	Cross-cutting	Energy, Cross-cutting	Tonga Disaster Preparedness and Response Outer Island Renewable Energy Project
Tuvalu /	0.11	0.11	Provided	ODA	Grant	Adaptation	Cross-cutting	Tuvalu Drought Response
Vanuatu /	2.40	2.28	Provided	ODA	Grant	Adaptation	Transport, Other (Infrastructure)	Port Vila Urban Development Project Vanuatu Transport Sector Support Program Phase 2

Recipient Country/ region/project/ programme [b]	Total Amount		Status [c]	Funding source [g]	Financial instrument [g]	Type of support [g,h]	Sector [d]	Additional Information [e]
	Climate-specific[f]							
	Australian dollar - AUD	USD						
2014								
Vietnam /	10.94	10.40	Provided	ODA	Grant	Cross-cutting	Agriculture, Cross-cutting	Support Program to Respond to Climate Change and Climate Change and Coastal Ecosystems Progam Enhancing Community Based Disaster Risk Management under Enhanced Humanitarian Response Initiative Equitable Resilience to Impacts of Climate Change Community Climate Smart Disaster Risk Reduction in the Mekong Vietnam Low Carbon Rice Cultivation Project Sowing the Seeds of Change Integrated Community-based Adaptation Child-centred Climate Resilience Program

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

a Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

b Parties should report, to the extent possible, on details contained in this table.

c Parties should explain, in their biennial reports, the methodologies used to specify the funds as provided, committed and/or pledged. Parties will provide the information for as many status categories as appropriate in the following order of priority: provided, committed, pledged.

d Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

e Parties should report, as appropriate, on project details and the implementing agency.

f Parties should explain in their biennial reports how they define funds as being climate-specific.

g Please specify.

h Cross-cutting type of support refers to funding for activities which are cross-cutting across mitigation and adaptation.

AUD and USD are in millions of dollars

USD exchange rate based on annual average conversion rates for the relevant financial year as published by the Australian Taxation Office (FY 2012/13 1:1.0580, FY 2013/14 1:0.9507).

The Australian financial year runs from 1 July to 30 of June. Therefore, the figures for 2013 are for the period 1 July 2012 - 30 June 2013, and for 2014 are for the period 1 July 2013 - 30 June 2014.

Note: Australia sources its climate finance from new and additional aid budget appropriations passed by the Australian Parliament on an annual basis.

CTF Table 7(b)

CTF Table 8 Provision of technology development and transfer support [a,b]

Measures and activities related to technology transfer	Recipient country and/or region	Targeted area	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
Climate and Oceans Support Program in the Pacific (AUD 16.6 million)	Cook Islands, Federated States of Micronesia, Fiji, Marshall Islands, Niue, Nauru, Papua New Guinea, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu	Adaptation	Other (Cross-cutting)	Public	Public	Implemented	Transferring climate, ocean and weather monitoring technology developed by Australia's Bureau of Meteorology to fourteen Pacific National Meteorological Services. Information provided by the technology allows partner governments to improve planning and decision-making in key sectors, such as agriculture, fisheries, marine services, tourism, transport and infrastructure
Australian Renewable Energy Agency solar technologies research fellowships and scholarships (AUD 9 million)	Chile, China, India, Indonesia, South Korea, Thailand, Malaysia, Pakistan, Singapore, Sri Lanka, Vietnam	Mitigation	Energy	Public	Public	Implemented	Supporting students from developing countries to undertake solar technology research at Australia's world leading universities and research institutions. Research areas include solar cell efficiency, thin-film materials, multi-junction silicon solar cells, low cost manufacturing techniques, solar cell testing equipment, and solar resource forecasting and mapping.
International Savanna Fire Management Initiative (AUD 2.5 million)	Global	Mitigation and Adaptation	Agriculture	Public	Private and Public	Implemented	Sharing methodologies and technology developed by the Australian Government and Indigenous communities in tropical north Australia to reduce emissions from savanna fires with developing countries. The methodology uses strategic early dry season fire management practices to reduce the scope and intensity of late dry season fires, which decreases emissions and helps build resilience as temperatures increase and savanna fires become more intense.

Measures and activities related to technology transfer	Recipient country and/or region	Targeted area	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
Vietnam Climate Innovation Centre (AUD 3 million)	Vietnam	Mitigation	Industry	Public	Private and Public	Implemented	An initiative of the World Bank's Climate Technology Program helping Vietnamese entrepreneurs commercialise innovative mitigation and adaptation technologies through business mentoring, grant financing, and technology access support. Over four years, the Centre aims to support to 48 local clean-tech businesses, give 1,700 household access to new and improved products and services, and avoid 1,000 tons of CO2 emissions.
Global Forest Observations Initiative (AUD 10.1 million)	Global	Mitigation	Other (Forestry)	Public	Public	Implemented	An international partnership helping developing countries accurately estimate emissions from deforestation through the development of measurement, reporting and verification technologies. Australia is a lead partner of the Global Forest Observation Initiative with Norway, the United States, the Committee on Earth Observation Satellites (CEOS) and the Food and Agriculture Organization (FAO) of the United Nations.
Indonesia National Carbon Accounting System (AUD 2 million)	Indonesia	Mitigation	Agriculture, Other (Forestry)	Public	Public	Implemented	Transferred technology and expertise developed by the Australian Government's Commonwealth Scientific and Industrial Research Organisation (CSIRO) to enable Indonesia to generate national greenhouse gas emissions accounts. The technology transferred to Indonesia has been adapted to Indonesia's unique circumstances by Indonesia's national space agency (LAPAN) and the Ministry of Environment and Forestry.

CTF Table 8

Measures and activities related to technology transfer	Recipient country and/or region	Targeted area	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
System for Land Emissions Estimation in Kenya (AUD 12.5 million)	Kenya	Mitigation and Adaptation	Agriculture, Other (Forestry)	Public	Public	Implemented	Transferring technology and expertise to help Kenya establish a state of the art land sector measurement reporting and verification (MRV) system. Once in place, the system will allow Kenya to accurately report on its land sector greenhouse gas emissions and help achieve other domestic priorities in areas such as sustainable agriculture and water security. The centrepiece of the investment is open source software that can be tailored to other countries' circumstances and be used as a basis of their own land sector MRV systems. The activity is also supporting Kenya to share this technology with the broader east-African community.

a To be reported to the extent possible.

b The tables should include measures and activities since the last national communication or biennial report.

c Parties may report sectoral disaggregation, as appropriate.

d Additional information may include, for example, funding for technology development and transfer provided, a short description of the measure or activity and co-financing arrangements.

Note: Figures reported are for BR years only (FY 2012/13 and 2013/14). Total activity investment may be larger.

Note: This table is not exhaustive. It is intended to show a cross section of Australia's technology development and transfer support activities during the reporting period only.

CTF Table 9 Provision of capacity-building support [a]

Programme or project title	Recipient country / region	Targeted area	Description of programme or project [b,c]
Green Economic Development Program (AUD 0.6 million)	Indonesia	Mitigation	The Green Economic Development Program supports Indonesia's transition to a low carbon economy. The Program assists partner agencies to formulate policies that increase incentives and reduce barriers for green economic development; collaborate on policy development and implementation; and align institutions to support implementation.
Climate Adaptation and Disaster Risk Reduction (AUD 1.5 million)	Micronesia (Federated States of), Marshall Islands	Adaptation	The Climate Adaptation and Disaster Risk Reduction and Education (CADRE) program educates schoolchildren and communities about climate change and disaster risks, helping them determine appropriate responses and implement activities in their local communities.
Indonesia-Australia Forest Carbon Partnership (AUD 13.5 million)	Indonesia	Mitigation	The Indonesia-Australia Forest Carbon Partnership (IAFCP) builds on the long-term practical cooperation between Australia and Indonesia on REDD+ to support strategic policy dialogue on climate change; development of Indonesia's National Carbon Accounting System; and implementation of an incentive-based REDD+ demonstration activity in Central Kalimantan.
Community Based Disaster Risk Management (AUD 2.8 million)	Viet Nam	Adaptation	Australia actively contributes to the Government of Vietnam's Community Based Disaster Risk Management (CBDRM) program, supporting the development of guidelines and criteria.
Pacific Australia Climate Change Science and Adaptation Planning Program (AUD 19 million)	Pacific	Adaptation	The Pacific Australia Climate Change Science and Adaptation Planning Program (PACCSAPP) aims to improve the capacity of National Meteorological Services to use climate science; develop awareness-raising materials linking specific projections and planning information are communicated to key stakeholders; improve understanding of climate variability and extreme events; and ensure adaption planning is informed by climate science.
UNDP Low Emission Capacity Building Programme (AUD 4 million)	Argentina, Bhutan, Chile, China, Colombia, Costa Rica, Democratic Republic of the Congo, Equador, Egypt, Ghana, Indonesia, Kenya, Lebanon, Malaysia, Mexico, Morocco, Peru, Philippines, Tanzania, Thailand, Trinidad and Tobago, Uganda, Zambia	Mitigation	The Low Emission Capacity Building Programme (LECB) supports 25 countries to strengthen their institutional and technical capacity to plan and undertake mitigation actions, through the formulation of Low Emissions Development Strategies and Nationally Appropriate Mitigation Actions. The programme also assists countries to establish national greenhouse gas inventory and MRV systems.

Programme or project title	Recipient country / region	Targeted area	Description of programme or project [b,c]
World Bank Partnership for Market Readiness (AUD 2.5 million)	Brazil, Chile, China, Colombia, Costa Rica, India, Indonesia, Jordan, Mexico, Morocco, Peru, South Africa, Thailand, Tunisia, Turkey, Ukraine, Vietnam	Mitigation	Australia is working with other governments through the World Bank Partnership for Market Readiness (PMR) to build the capacity of countries to develop domestic carbon market instruments to scale up emission reduction efforts and support low carbon development.
South Africa Land Sector Measurement, Reporting and Verification Capacity Building Project (AUD 0.875 million)	South Africa	Mitigation	This AUD 0.875 million project enhances South Africa's ability to monitor and measure emissions from land use, which improves the country's ability to meet international reporting requirements and gain accreditation for climate finance.
Measurement Reporting and Verification Capacity Building in Africa and South East Asia (AUD 1.5 million)	Asia Pacific, Africa	Mitigation	Provided technical capacity support to developing countries in Africa and South East Asia to develop sustainable national greenhouse gas inventory management systems.
En.lighten & lites.asia (AUD 3.25 million)	Philippines, Indonesia, Vietnam, Laos, Cambodia, Thailand, Myanmar, Asia Pacific	Mitigation	Australia is working with the United Nations Environment Programme to build domestic capacities of partner countries to develop and enforce lighting efficiency standards that will reduce energy use and emissions.

a To be reported to the extent possible.

b Each Party included in Annex II to the Convention shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by Parties not included in Annex I to the Convention in the areas of mitigation, adaptation and technology development and transfer.

c Additional information may be provided on, for example, the measure or activity and co-financing arrangements.

Note: Figures reported are for BR years only (FY 2012/13 and 2013/14). Total activity investment may be larger.

Note: This table is not exhaustive. It is intended to show a cross section of Australia's capacity building support activities during the reporting period only.

Glossary

Term	Description
Abatement	Emissions reductions, removals or avoidance. When referring to a particular policy or measure it refers to the emissions reductions and/or removals that would not have occurred without that policy or measure.
Adaptation	Adjusting natural or human social or economic systems in response to actual or expected impacts of climate change that moderates harm or takes advantage of beneficial opportunities.
Afforestation	*Afforestation* is a subset of *land converted to forest land* and includes only those forests established since 1 January 1990 on land that was clear of forest on 31 December 1989. Forests under *land converted to forest land* may be established through planting events either for commercial timber or for other reasons, known as 'environmental plantings', or by regeneration from natural seed sources on lands regulated for the protection of forests.
Australian Carbon Credit Unit	Units issued by the Australian Government under the ERF or the former CFI for abatement from registered project activities. Each unit represents 1 tonne of CO_2-e.
Australian Greenhouse Emissions Information System (AGEIS)	AGEIS centralises Australia's emissions estimation, inventory compilation and reporting, and data storage activities. Further information is available on the AGEIS website at ageis.climatechange.gov.au.
Carbon capture and storage	Technology to capture and store greenhouse gas emissions from energy production or industrial processes. Captured greenhouse gases have the potential to be stored in a variety of geological sites
Carbon budget	A method of accounting towards a target that sets the total amount of emissions allowed over multiple years.
Carbon-dioxide (CO_2)	A naturally occurring gas; it is also a by-product of human activities such as burning fossil fuels and biomass, land-use changes and some industrial processes.
Carbon-dioxide equivalent (CO_2-e)	A standard measure of emissions that expresses the amount of a greenhouse gas in terms of the amount of CO_2 that would trap the same amount of heat in the atmosphere. It is calculated by multiplying the amount of emissions of a gas by that gas's GWP. Total emissions are calculated by adding the CO_2-e emissions of each greenhouse gas.
Carbon Farming Initiative (CFI)	A voluntary scheme established in 2011 that allowed landholders to generate Australian Carbon Credit Units for abatement activities in the land sector. The CFI was replaced by the ERF in 2014, which expanded the model to incentivise abatement across the Australian economy.
Carbon Tax	Australia's former emissions trading policy established by in 2011. The measure was repealed and replaced by the ERF in 2014.
Covered sectors	Economic sectors that are covered by a particular policy or measure.
Climate finance	Financial assistance provided to developing countries that assists in climate change mitigation and/or adaptation.
Cumulative abatement task	The cumulative amount of abatement required to meet a given target, compared to current estimates of future emissions.

Term	Description
Deforestation	Converting forested land to an alternative, non-forest use. *Deforestation* under KP classifications is a subset of *forest conversion* and includes only lands where there has been direct humaninduced conversion of forest to alternative land uses since 1 January 1990.
Emissions	Greenhouse gases released into the atmosphere.
Emissions Reduction Fund (ERF)	Australia's central mechanism for achieving emission targets. The ERF consists of three elements: • crediting abatement by issuing Australian Carbon Credit Units to registered projects; • purchasing abatement through reverse auctions; and • safeguarding purchased abatement to ensure it is not offset by significant increases in emissions above business-as-usual levels elsewhere in the economy.
Energy Efficiency	Outputs relative to energy used. Improved energy efficiency means you can increase output from the same amount of energy, or reduce the amount of energy used for the same outcome. This can reduce both energy input costs and emissions.
Energy Productivity	Energy efficiency as it relates to economic activity. Improved energy productivity means increasing economic output relative to the energy used.
Fast-start finance	Climate finance provided to meet a collective pledge made by developed countries during the 15th Conference of the Parties held in December 2009 in Copenhagen. Countries pledged to provide new and additional resources approaching USD 30 billion for the period 2010 - 2012, including forestry and investments, and balanced between mitigation and adaptation.
Full Carbon Accounting Model (FullCAM)	FullCAM estimates emissions and removals from the LULUCF sector and KP LULUCF activities It applies techniques described in the IPCC 2014 revised methods.
Fugitive emissions	Emissions that are released in connection with, or as a consequence of, the extraction, processing, storage or delivery of fossil fuel. Fugitive emissions do not include emissions released from the combustion of fuel for the production of useable heat or electricity.
Global Warming Potentials (GWP)	Represents the relative warming effect of a unit mass of a gas compared with the same mass of CO_2 over a specific period. Multiplying the actual amount of gas emitted by the GWP gives the CO_2-equivalent emissions.
Greenhouse gases	Gases that contribute to global warming, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF_3). In addition, the photochemically important gases—NMVOCs, oxides of nitrogen (NOx) and carbon monoxide (CO)—are also considered. NMVOC, NOx and CO are not direct greenhouse gases. However, they contribute indirectly to the greenhouse effect by influencing the rate at which ozone and other greenhouse gases are produced and destroyed in the atmosphere.
Kyoto Protocol (KP)	An international treaty created under the UNFCCC in 1997. It entered into force in 2005. The KP sets binding targets for the reduction of greenhouse gas emissions by developed country Parties (defined as KP Parties that are listed in Annex I to the UNFCCC) and establishes rules for measurement, reporting and accounting of emissions and progress towards targets.
KP First Commitment period	The period (2008–2012) in which developed country Parties (defined as KP Parties that are listed in Annex I to the UNFCCC are required to meet the first round of their emissions reduction obligations under the KP.

Term	Description
KP Second Commitment period	The period (2013–2020) in which Parties that have taken on a second round of commitments under the KP are required to meet these commitments. These commitments are inscribed in the Doha Amendments to the KP, which is yet to enter into force.
Target	An emissions goal set by a Party to the UNFCCC and/or the KP. Targets may aim to reduce emissions or limit growth in emissions. Targets may be expressed as a point target (by reference to an emission level at a point in time) or a carbon budget.
Units	Sometimes referred to as carbon or emissions units, these typically exist as electronic records. Each unit represents 1 tonne of CO_2-e. A unit may represent an allowance to emit where emissions are regulated, or abatement that has been achieved under a particular programme. They may be issued for use to meet international targets, or under domestic schemes. The most common units used towards international targets are accounting units issued under the KP, namely: assigned unit amounts (AAUs), emissions reduction units (ERUs), certified emissions reductions (CERs), and removal units (RMUs). There is provision for other types of units to be issued under the UNFCCC, although none exist at present. Parties may also establish their own mechanisms to issue units that can be used towards international targets. Units issued for domestic mechanisms are not used towards international targets. For example, Australia cannot use Australian Carbon Credit Units issued under the ERF to help meet its targets.
Measures	Past, current or committed Australian, state or territory, or local government policy actions that reduce greenhouse gas emissions.
Mitigation	Human intervention to reduce or avoid emissions or to remove greenhouse gases from the atmosphere.
Montreal Protocol on Substances that Deplete the Ozone Layer	An international agreement, adopted in 1987, that controls the consumption and production of chemicals that destroy stratospheric ozone, such as chlorofluorocarbons.
Trajectory	The pathway of emissions over time.
National Inventory Report	Detailed information on Australia's greenhouse gas emissions and removals from 1990 to the present. Prepared in accordance with international rules as part of Australia's National Greenhouse Accounts and used by the Australian Government to meet its international reporting obligations, track progress towards its international emission reduction commitments, and inform and monitor the effectiveness of domestic climate policy.
Projections	Anticipated future emissions. The Australian Government publishes projections each year.
Quantified Economy-wide Emissions Reduction Target (QEERT)	2020 targets set by developed country Parties under the UNFCCC. QEERTs are expressed as a point target. However, Parties can take different approaches to account towards their target. Australia's QEERT is a five per cent reduction on 2000 emissions. Australia accounts towards its QEERT by reference to a carbon budget.
Quantified Emission Limitation or Reduction Objective (QELRO)	Targets set by developed country Parties for the KP second commitment period (2013–2012) inscribed the Doha amendment. QELROs are expressed as average annual emissions over the period, as a percentage of base year emissions. This establishes a carbon budget for cumulative emissions over the eight year commitment period.

Term	Description
Reforestation	*Reforestation* is a subset of *land converted to forest land* and includes only those forests established since 1 January 1990 on land that was clear of forest on 31 December 1989. Forests under *land converted to forest land* may be established through planting events either for commercial timber or for other reasons, known as 'environmental plantings', or by regeneration from natural seed sources on lands regulated for the protection of forests.
Stationary energy emissions	Emissions from the generation of electricity by combustion of fuels and emissions from the direct combustion of fuels, predominantly in the manufacturing, construction and commercial sectors.
United Nations Framework Convention on Climate Change (UNFCCC)	An international environmental treaty, adopted in 1992 and entered into force in 1994, aimed at achieving the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
Voluntary action	Individuals and companies offsetting their emissions to become 'carbon-neutral' and households buying GreenPower (a government-accredited programme for energy retailers to purchase renewable energy on behalf of customers). Voluntary action achieves emissions reductions additional to—that is, above and beyond—national targets.

Abbreviations and Acronyms

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AGEIS	Australian Greenhouse Emissions Information System
ANREU	Australian National Registry of Emissions Units
ARENA	Australian Renewable Energy Agency
BREE	Bureau of Resources and Energy Economics
CBD	Commercial Building Disclosure
CCS	carbon capture and storage
CEFC	Clean Energy Finance Corporation
CFI	Carbon Farming Initiative
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
FullCAM	Full Carbon Accounting Model
GDP	gross domestic product
GEMS	Greenhouse and Energy Minimum Standards
IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LNG	liquefied natural gas
LRET	Large-scale Renewable Energy Target
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NABERS	National Australian Built Environment Rating System
NatHERS	Nationwide House Energy Rating Scheme
NCC	National Construction Code
NEPP	National Energy Productivity Plan
NGERS	National Greenhouse and Energy Reporting System
NLECI	National Low Emissions Coal Initiative
ODA	Overseas Development Assistance
OECD	Organisation for Economic Co-operation and Development
QA	quality assurance
QC	quality control
QEERT	Quantified Economy-wide Emission Reduction Target
QELRO	Quantified Emission Limitation or Reduction Objective
RET	Renewable Energy Target
SRES	Small-scale Renewable Energy Scheme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Gases

CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
HFCs	Hydrofluorocarbons
NMVOC	Non-methane volatile organic compounds
N_2O	Nitrous oxide
NO_x	Nitrogen oxides
PFCs	Perfluorocarbons
SF_6	Sulphur hexafluoride
SO_x	Sulphur oxides

Units

CO_2-e	carbon dioxide equivalent
kg	kilograms
kt	kilotonnes (thousand tonnes)
Mt	megatonnes (million tonnes)
t	tonnes

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