Report on the operation of the *Climate Change and Greenhouse Emissions Reduction Act 2007* (South Australia)

Prepared under **Section 7** of the
Climate Change and Greenhouse Emissions Reduction Act 2007 (South Australia)

December 2019

Government of South Australia
Department for Environment and Water

Department for Environment and Water

GPO Box 1047, Adelaide SA 5001

Telephone National (08) 8463 6946

International +61 8 8463 6946

Fax National (08) 8463 6999

International +61 8 8463 6999

Website www.environment.sa.gov.au

Report prepared by

Climate Change, Coast and Marine Branch, Environment, Heritage and Sustainability Division
Report on the operation of the *Climate Change and Greenhouse Emissions Reduction Act 2007* – November 2019, Government of South Australia, through Department for Environment and Water, Adelaide

Contents

List of Figures

List of Tables

Executive Summary

Net greenhouse gas emissions have reduced by 39 percent in South Australia between 1989-1990 and 2016-2017. This is significant progress towards South Australia's legislative target "to reduce by 31 December 2050 greenhouse gas emissions within the state by at least 60 percent to an amount that is equal to or less than 40 percent of 1990 levels" stated in South Australia's *Climate Change and Greenhouse Emissions Reduction Act 2007*. South Australia is also aiming for net zero emissions by 2050.

The *Climate Change and Greenhouse Emissions Reduction Act 2007* sets a framework for government to work with business and the community to reduce emissions and build resilience to the impacts of climate change.

This Section 7 report relates to the 2018 and 2019 financial year. Since the previous Section 7 report, multiple factors have influenced South Australia's progress towards reducing greenhouse gas emissions, in particular:

- the introduction and continuation of a range of initiatives to increase the generation of renewable electricity;
- strengthened land-based sinks and reductions in land-based sources of emissions;
- decreases in electricity consumption due to increased residential and commercial uptake of solar PV and energy efficiency measures; and
- reductions in petroleum gas and in coal extraction and/or processing.

1 Introduction

This report has been prepared in accordance with Section 7 of the *Climate Change and Greenhouse Emissions Reduction Act 2007* [1] (the Act). Under Section 7(1) Minister must, on a two-yearly basis, prepare a report on the operation of this Act. This is the sixth report on the operation of the Act, and provides information about the reporting period for the 2018 and 2019 calendar years. To meet the reporting requirements of Section 7 (Appendix A), this report:

1. provides information about levels of greenhouse gas emissions in South Australia
2. reports on progress to achieve the renewable electricity targets
3. assesses the effectiveness of South Australia's climate change initiatives in achieving the SA target
4. describes targets and determinations
5. reports on progress against sector based or interim targets
6. describes climate change agreements
7. provides an overview of offset programs and the national emission trading scheme
8. describes inter-governmental agreements
9. describes significant national or international commitments
10. describes impacts of climate change.

The first five progress reports were completed in 2009, 2011, 2013, 2015 and 2018. They are available from the Department for Environment and Water website[2].

[1] http://www.legislation.sa.gov.au/LZ/C/A/CLIMATE%20CHANGE%20AND%20GREENHOUSE%20EMISSIONS%20REDUCTION%20ACT%202007.aspx

[2] https://www.environment.sa.gov.au/topics/climate-change

2 Greenhouse gas emissions

This section presents an assessment of the progress being made to achieve the greenhouse gas emissions target.

2.1 2016-17 greenhouse gas emissions

The 2016-17 financial year is the latest South Australian greenhouse gas data provided by the Commonwealth Government. In 2016-17, South Australia emitted 22 million tonnes of carbon dioxide equivalent (CO_2-e). Total net emissions are now at their lowest point since the base year of 1990.

Sources of emissions include the following sectors: energy; industrial processes and product use (IPPU); agriculture; waste; and land use, land use change and forestry (LULUCF).

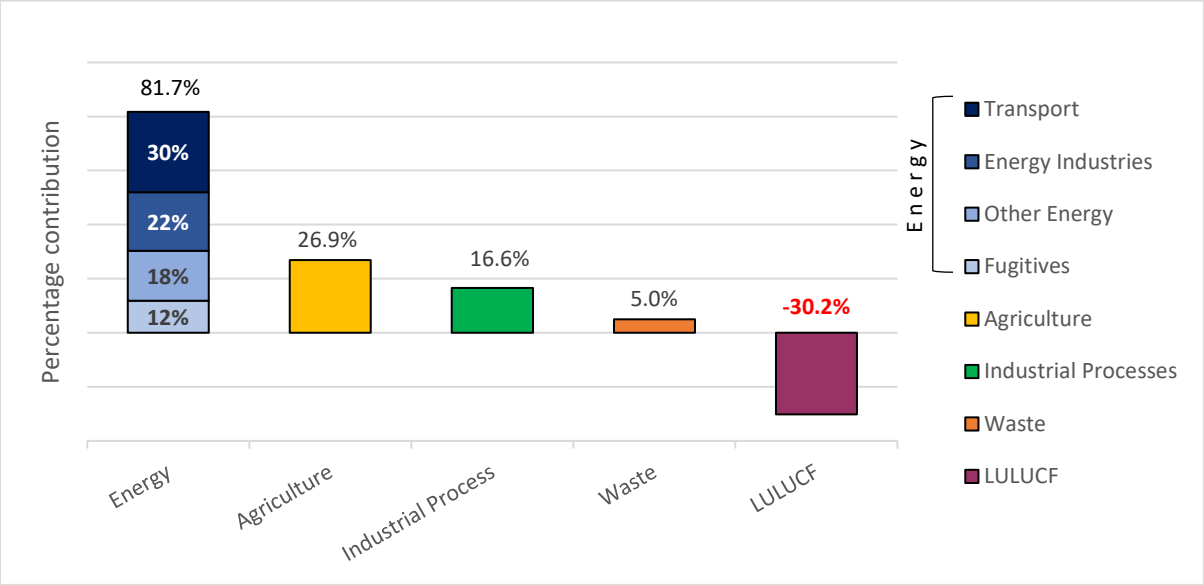

Figure 1: South Australian greenhouse gas emissions percent contribution to total net emissions by sector in 2016-17[3].

[3] https://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications/state-and-territory-greenhouse-gas-inventories-2017

The **energy sector** contributed 81.7 percent to total net state emissions. This is comprised of 30 percent from transport fuels, 22 percent from energy industries with the majority from electricity generation, 18 percent from other energy sources including manufacturing industries and construction, and 12 percent from fugitive emissions from fuels such as from the oil and gas and solid fuels industries (see Figure 1).

The **agriculture sector** contributed 26.9 percent to total net state emissions. This includes emissions from livestock industries and agricultural soils and soil applications, such as fertiliser use. Emissions trends for this sector are impacted by many factors, including market conditions and seasonal climatic conditions such as drought.

Industrial processes and product use (IPPU) contributed 16.6 percent to total net state emissions. This includes emissions from the food and beverage industry and the minerals processing industry (including cement and lime production). Emissions from the consumption of halocarbons in air-conditioning and sulphur hexafluoride in electricity supply and distribution have increased steadily since 1990. Hydro-fluorocarbon refrigerants were first used in Australia in 1994, as other ozone depleting refrigerants were phased out under the Montreal Protocol, and their use has steadily increased since.

The **waste sector** contributed 5.0 percent to total net state emissions. The majority of emissions from this sector are from municipal solid waste disposal and wastewater treatment and discharge. Emissions from solid waste disposal are influenced by methane recovery and recycling rates and alternative waste treatment options. Changes in estimates for wastewater treatment and discharge emissions are largely driven by changes in industry production, population loads on centralised treatment systems and the amount of methane recovered for combustion or flaring.

The **land use, land use change and forestry (LULUCF) sector** includes both emissions sources and sinks (that is, carbon sequestration). Combined, the LULUCF emissions sources and sinks contributed a net emissions sink of 30.2 percent of total net state emissions. The emissions sources include deforestation activities. The sinks include plantations and natural regeneration, regrowth on deforested land, activities on cropland and a small amount from harvested wood products and wetlands.

See Appendix B for a detailed breakdown of emissions by sector.

See Appendix D for the technical aspects of the greenhouse gas inventory analysis.

2.2 Change in emissions since the 1990 base year to 2016-17

This report uses the inventory published in the State and Territory Greenhouse Gas Inventories (STGGI) 2017, which was published in June 2019. Note that the greenhouse gas emissions presented in this report are not comparable to those published in previous Section 7 reports as the whole inventory time series is revised every year.

The Commonwealth Government regularly revises inventory emission factors and methodologies when new information or more accurate methodologies become available. Under the United Nations Framework Convention on Climate Change rules, the government is required to revise figures back to 1990 to ensure time series consistency. As such, the estimates in the current South Australian inventory supersede all previously published estimates. These revisions can lead to substantial reinterpretations of progress, and each inventory's estimate of progress is not comparable with previous inventories.

The profile of South Australia's net greenhouse gas emissions from the 1990 base year to 2016-17 is one of peaks and troughs. Net emissions peaked in 2006-07 and were lowest in 2016-17.

In 2016-17, South Australian emissions per capita were 13 tonnes of CO_2-e, which is lower than the national average of 22 tonnes of CO_2-e. Even with an increasing population in South Australia over the past 10 years to 2017, per capita emissions have fallen by an annual average of 6 percent.

Figure 2 shows the change in South Australian gross state product (GSP) since 1990, alongside change in net emissions. Since 2006-07, net emissions have reduced while the GSP has continued to increase.

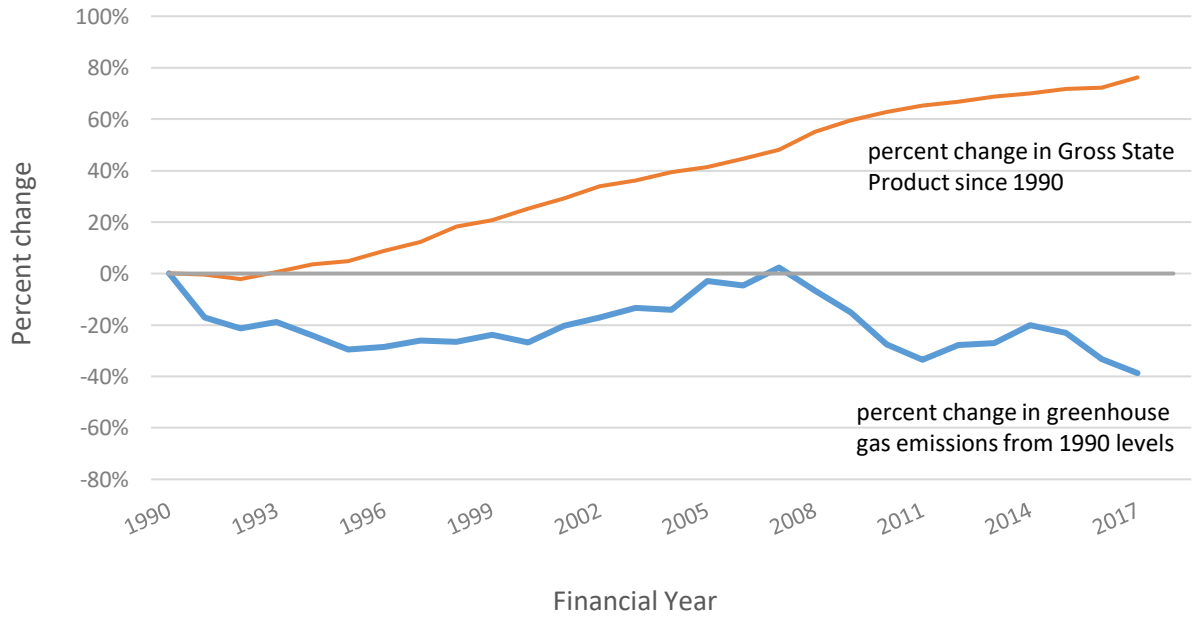

Figure 2: Percent change in GSP and greenhouse gas emissions, since 1990 – South Australia [4]

2.3 Change in emissions since 2018 Section 7 report

The previous Section 7 report was published in 2018 and referred to data from the 1990 base year until 2015-16.

Since 2015-16, South Australia's net emissions decreased by 8 percent. There were reductions in emissions from energy generation, as well as reductions in the minerals industry and fuel combustion in the product manufacturing industries. Within the agriculture sector, there were minor reductions in emissions from manure management.

[4] State and Territory Greenhouse Gas Inventory and Australian Bureau of Statistics Catalogue 3101.0 Estimated Resident Population

There was a small decrease in the emissions from waste water treatment and discharge. Sinks in the LULUCF sector increased which helped reduce net emissions over the year.

2.4 Summary of increases and decreases in emissions

Progress towards net emissions targets is achieved through a combination of reducing emissions and preventing increases. The increases and decreases in emissions over two periods (base year to peak emissions and peak emissions to 2016-17) are illustrated in Figure 3. Net emissions were at their peak in 2006-07. Since this time, emission sources have declined by 22 percent while emission sinks have more than trebled. This has led to an overall decline in net emissions by 40 percent over the 10 years to 2016-17.

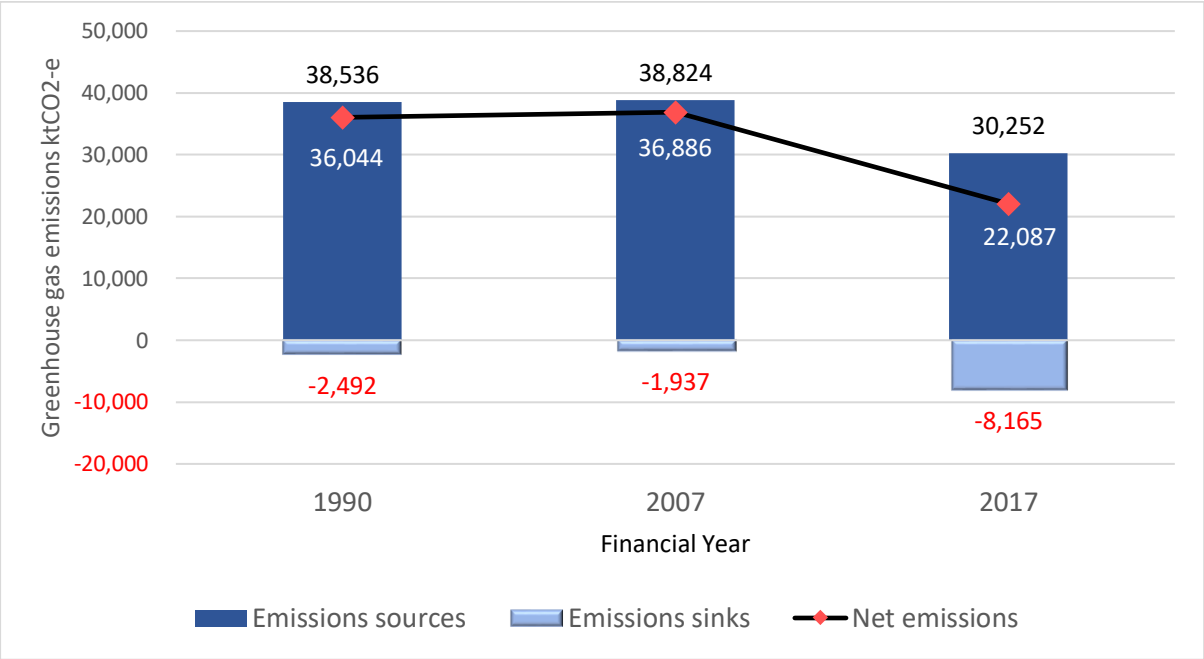

Figure 3: Emission sources and sinks, 1989-90, 2006-07 and 2016-17

2.5 Progress towards the SA target

South Australia's legislated target (SA target) is to reduce greenhouse gas emissions to an amount that is equal to or less than 40 percent of the 1990 level, by the end of 2050. This means that a reduction of 60 percent or more will be required from levels in the 1990 base year to 2050.

Between the 1990 base year and 2016-17, net emissions decreased by 39 percent. A further 21 percent reduction from 1990 base year levels is needed to reach the legislated SA target. South Australia is also aiming for net zero emissions by 2050.

2.6 Drivers of change by source of emissions from 1990 base year to 2016-17

Different sources of emissions exhibit different profiles over time. Some sources increased consistently over the period (for example, transport and agricultural soils). Some decreased over the time period (for example, enteric fermentation and fugitive emissions from fuels). Other sources increased then decreased (for example, electricity generation). The changes observed over any period are the net effect of increases and decreases in subcategories. The analysis of drivers of change reports on decreasing and increasing sources separately.

The change in sources and sinks and their contribution to the increase or decrease in emissions from the base year to 2016-17 is provided in Table 1. Appendix B describes the emission sources in detail and presents the change in sectoral emissions from the 1990 base year to 2016-17.

Table 1: Changes in sources of emissions and sinks and their contribution to change from 1989-90 to 2016-17[5].

Source of emissions	Greenhouse gas emissions (kilo tonnes CO_2-e)			Contribution to increase or decrease	% change in GHG emissions
	1989-90	2016-17	Change	%	1989-90 to 2016-17
Energy industries	8,066	4,774	-3,292	-24%	-41%
Manufacturing and construction	2,007	2,248	241	2%	12%
Transport	5,377	6,573	1,196	9%	22%
Fugitive emissions from fuels	4,301	2,623	-1,678	-12%	-39%
Other combustion energy	1,273	1,834	561	4%	44%
ENERGY	21,025	18,053	-2,972	-21%	-14%
Minerals industry	1,092	974	-117	-1%	-11%
Products uses as ODS substitutes	-	855	855	6%	n/a
Other industrial processes	1,683	1,837	155	1%	9%
IPPU	2,774	3,666	892	6%	32%
Enteric fermentation	4,773	3,591	-1,183	-8%	-25%
Agricultural soils	1,387	1,704	317	2%	23%
Manure management	284	369	85	1%	30%
Other agriculture	111	269	159	1%	143%
AGRICULTURE	6,555	5,934	-621	-4%	-9%
Solid waste disposal	1,028	846	-182	-1%	-18%
Waste water treatment and discharge	354	230	-124	-1%	-35%
Other waste	3	21	18	0%	511%
WASTE	1,386	1,097	-288	-2%	-21%
LULUCF sources	6,796	1,501	-5,295	-38%	-78%
LULUCF sinks	-2,492	-8,165	-5,673	-41%	228%
LULUCF	4,304	-6,664	-10,968	-79%	-255%
Total	**36,044**	**22,087**	**-13,957**	**100%**	**-39%**

Drivers of reduced emissions 1989-90 to 2016-17

The top sector contributors to reductions in net greenhouse gas emissions since 1989-90 are:

1. Land use, land use change and forestry (LULUCF), with an increase in sinks contributing 41 percent of total emissions reduction. This is mainly due to plantations and natural regeneration of forest land, regrowth on deforested land, as well as cropland and grassland.
2. Fuel combustion in energy industries, contributing 24 percent of total emissions reduction. This was mainly due to the increase in renewables and the reduced emissions intensity of non-renewables.
3. Fugitive emissions from fuels, contributing 12 percent of total emission reduction. This is likely to have been driven by a combination of changes in technology as well as the reduction in coal mining, crude oil extraction and natural gas extraction in South Australia[6]; and

[6] Australian Energy Statistics Table I6 Production of primary fuels in South Australia, physical units (2018)

4. Enteric Fermentation, contributing 8 percent of total emission reduction. This is likely to be driven by reductions in the numbers of livestock over this period[7]. Reductions in livestock numbers has occurred as a result of drought conditions in SA, however it is envisaged stock numbers will recover once drought conditions ease.

Drivers of increased emissions 1989-90 to 2016-17

The top contributors to increases in emissions over this period are:

1. Transport, contributing 9 percent of the increase in emissions. The increase is due to increases in emissions from heavy-duty trucks and buses and light commercial vehicles. Since 1989-90, the emissions from cars have declined as a share of total road transportation emissions, despite a small overall increase in total emissions from cars over this period.
2. Products used as substitutes for ozone depleting substances (ODS) had no emissions in 1989-90, however, use of substitutes have increased, causing emissions to also rise. Products used as substitutes for ODS contributed 6 percent of total increases in emissions.

[7] ABS Catalogue 7121.0

3 Renewable electricity targets

This section presents an assessment of the progress being made to achieve renewable electricity targets.

3.1 About the renewable energy targets

Three renewable energy targets are relevant to the Act and to this reporting period. They refer to the proportion of South Australia's electricity that is generated using renewables or renewable energy consumed (Table 2).

Table 2: Summary of renewable generation targets.

Detailed target	Commentary
To increase the proportion of renewable electricity generated so that it comprises at least 20% of electricity generated in the state by 31 December 2014. To increase the proportion of renewable electricity consumed so that it comprises at least 20% of electricity consumed in the state by 31 December 2014.	South Australia's 20% generation and consumption targets in the Act were achieved during 2010-11 when the result was 22%. (Source: 2015 Section 7 report[8]).
33% of South Australia's electricity generation to come from renewable energy by 2020.[9]	The electricity generation target was exceeded in 2013-14 when the result was 39%. (Source: 2015 Section 7 report[10]).

3.2 The renewable energy statistic and progress against targets

The proportion of South Australia's electricity that was generated using renewables in 2018-19 was 52 percent (Figure 4). This result exceeds the target of 33 percent renewable energy generated by 2020. Renewables include rooftop solar, wind generation and other types of renewables, as described in Appendix D.

[8] https://www.environment.sa.gov.au/about-us/our-reports/climate-change-greenhouse-emissions-reduction-reports

[9] Tabled under section 5 of Act, 2009; referenced in 2009 Section 7 Report: https://www.environment.sa.gov.au/about-us/our-reports/climate-change-greenhouse-emissions-reduction-reports

[10] https://www.environment.sa.gov.au/about-us/our-reports/climate-change-greenhouse-emissions-reduction-reports

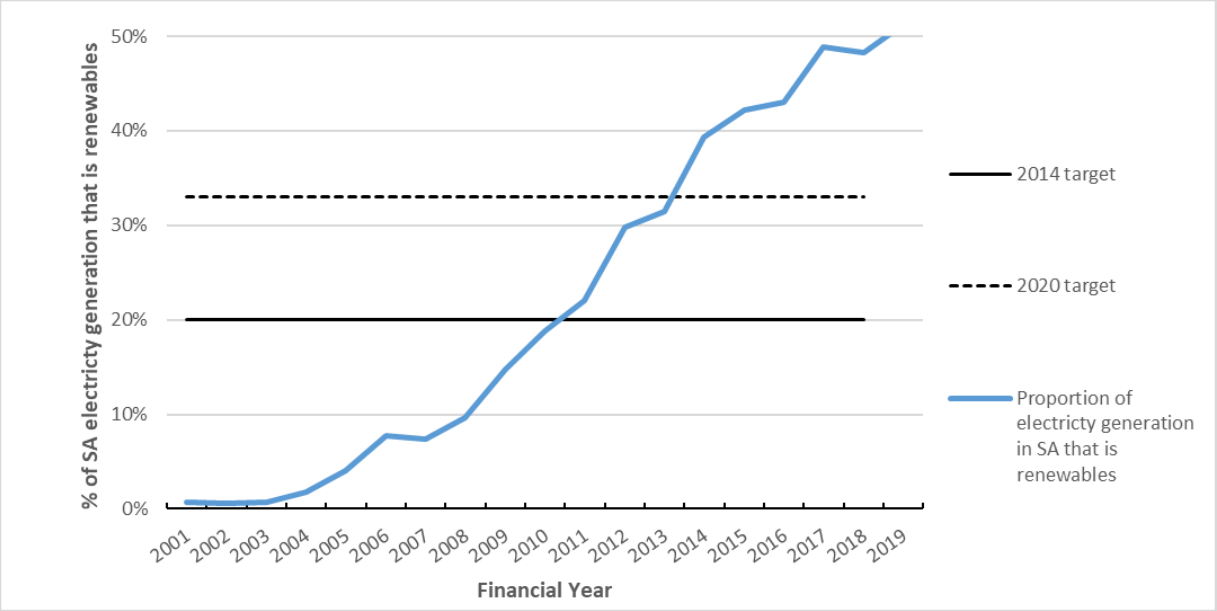

Figure 4: The proportion of electricity in SA that is generated using renewables, 2000-01 to 2018-19[11].

3.3 Assessment of progress towards the 2020 renewable energy target

There are a range of factors that contribute to achieving and exceeding the renewable energy target. Two factors were considered in the assessment of progress toward the renewable energy target from the previous Section 7 report: structural drivers of progress, and the sensitivity of these drivers to changes in context.

Structural drivers are the mechanics of change, not the cause. The structural drivers include:

- increased renewable energy generation;
- increased electricity generation from non-renewables;
- reduced South Australian electricity demand;
- reduced electricity imports; and
- South Australia is a net exporter of electricity.

Contextual drivers include:

- relative market prices of electricity;
- commercial decisions to invest in gas and renewable power plants;
- National schemes (for example, Renewable Energy Target schemes);
- increased capacity of the interconnector;
- incentives provided by the Government of South Australia (for example, planning approvals for wind generators and solar feed-in tariff legislation); and
- changes in costs of technology.

South Australia's aspiration is to be a net 100 per cent renewable energy producer in the 2030s.

[11] Graphic generated from data provided by the South Australian Department for Energy and Mining

3.4 Renewable energy generation in 2018-19

Renewable energy generation figures for 2018-19 are provided in Table 3. The renewable energy generation in South Australia for 2018-19 was 7,443 GWh[12]. This includes information provided by the Department for Energy and Mining not represented in Table 3 below, which is further explained in Appendix D.

Table 3: 2018-19 South Australian capacity and generation by fuel type.

Fuel Type	Registered capacity (MW)	Generation (GWh)
Gas*	2,673	6,877
Wind	2,142	5,725
Diesel + small non-scheduled generation (SNSG)**	674	184
Rooftop PV***	1,078	1,374
Solar	378	303
Storage - Battery	130	41
Total	7,075	14,504

Notes[13]

* Gas comprises Scheduled gas generation only.

** Diesel + SNSG comprises Scheduled diesel and Temporary Generation North & South, other non-scheduled generation (ONSG) as indicated in Table 4.16 and PV non-scheduled generation (PVNSG).

PVNSG (and hence SNSG) generation data has changed from what was previously reported in the 2018 SAER due to improvements in capacity estimates from CER data and better modelling, in line with the 2019 ESOO. The data here also uses more up-to-date capacity (and hence generation) estimates for 2018-19 than was available for the 2019 ESOO.

*** Rooftop PV installations are not registered with AEMO but are included here given their material contribution to generation. Rooftop PV capacity and generation estimates as listed come from 2019 ESOO with some further updates to capacity estimates for 2018-19.

[12] Department for Energy and Mining

[13] Department for Energy and Mining

4 Effectiveness of South Australia's climate change initiatives in achieving the SA target

4.1 Key findings

The main contributors to the net greenhouse gas emissions reduction of 39 percent from the 1990 base year to 2016-2017 included:

- increases in the generation of renewables and reductions in the emission intensity of non-renewables, both of which contributed to the reduced emissions intensity of public electricity generation;
- strengthening of land-based sinks (increased forest growth) and reduction in land-based emissions sources (reduced deforestation rates);
- decreases in South Australia's electricity consumption and increases in imports, which explained the reduction in South Australian electricity generation, which in turn contributed to the reduction in greenhouse gas emissions from public electricity generation in the state;
- reductions in livestock numbers has occurred as a result of drought conditions in SA, this has resulted in a reduction in greenhouse gas emissions from enteric fermentation (agriculture sector), however it envisaged stock numbers will recover once drought conditions ease; and
- reduced petroleum gas and coal extraction and/or processing, including the closure of Port Stanvac in 2003, which reduced fugitive emissions from fuel.

Incentives related to renewables were important in working with other markets along with Australian Government incentives to increase the generation of electricity from renewables.

Examples of the initiatives and actions adopted by the South Australian Government included the Renewable Energy Fund; planning approvals for wind power generators; legislation for a premium feed-in tariff for small solar photovoltaic (PV) systems which increased the rate of uptake of solar; the Residential Energy Efficiency Scheme; government building improvements such as building energy efficiency; solar panels and public transport electrification.

Other contributors to reductions in emissions since the 1990 base year included:

- emissions intensive manufacturing and electricity, gas and water supply sectors reduced their contribution to the economy over the period and economic growth was driven largely by services sectors, which have a low emissions intensity;
- market drivers influencing commercial decisions to invest in renewable power plants;
- technological developments, which improved the options available to industry (for example, to improve efficiency of electricity generation using non-renewables and of renewable energy generation in general);
- South Australian Government initiatives in the area of afforestation and reforestation; and
- Australian Government policy, for example the Renewable Energy Target, to generate financial incentives for investment in renewable energy generation.

4.2 Greenhouse gas emissions reduction initiatives in 2018 and 2019 calendar years

Initiatives were introduced, or continued, during the 2018 and 2019 calendar years which are likely to contribute to ongoing greenhouse gas emissions reductions. These include:

Investment in renewable energy and storage infrastructure

- The Renewable Technology Fund provided $150 million in grants and loans to support private companies to deliver large scale renewable energy projects, including the Hornsdale Power Reserve. The Hornsdale Power Reserve is a 100MW lithium-ion battery in Jamestown that delivers power to the National Electricity Market and provides system security services.
- Demand management trials - a $30 million grant program to support integration of distributed generation, demand response and demand aggregation assets to increase grid efficiency and incentivise consumers to manage their own electricity demand.
- The Grid Scale Storage Fund is a $50 million fund supporting development of grid-scale energy storage infrastructure.
- SA Water is reducing emissions and electricity costs through the Zero Energy Future Project. SA Water has set a goal of zero net electricity costs by 2020 by increasing renewable energy generation and energy storage capacity at water utility sites. This includes the installation of 154MW of solar PV and 34MWh of energy storage across more than 70 water utility sites.
- Home Battery Scheme provides $100 million in subsidies and low interest loans to install battery systems on up to 40,000 households.
- Virtual Power Plant is a partnership pilot project with Tesla to establish a Virtual Power Plant, with a current focus on installing home energy systems on 1,100 public housing properties.

Energy efficiency

- SA Retailer Energy Efficiency Scheme requires energy retailers to help households and businesses save on energy use and costs, and lower their greenhouse gas emissions by offering free or discounted energy efficiency activities.
- The Energy Partners Program works with around 100 organisations across the state, with projects focused on improving energy education and information to help South Australians manage their energy use and costs.
- The government has a contract for the supply of 100 percent of the government's energy supply from renewable sources in 2019. The government has commenced an open market tender process for the longer-term supply of 100 percent of the government's electricity needs from 2020.

Other initiatives

- The Government has met its target to achieve 30 percent low emission vehicles in its own passenger and light commercial vehicle fleet by 2019.

5 Targets and determinations

This section reports on any determination or target made or set under section 5 during the reporting period.

There were no determinations or targets made or set under section 5 of the Act during the reporting period.

6 Sector based or interim targets

This section presents an assessment of the progress being made to achieve any sector based or interim target under this Act, including a target set for the State Government, or any government agency or instrumentality.

There were no sector based or interim targets in place during the reporting period.

7 Climate change sector agreements

This section reports on any sector agreements between the Minister and any other person or entity entered into under this Act during the reporting period.

The South Australian Government has entered into more than 25 sector agreements with a range of organisations to improve energy efficiency, reduce energy consumption, promote renewable energy, identify adaptation pathways, and support innovation in technologies and practices.

One sector-based agreement was entered into in the reporting period:

- Resilient South (Table 4)

Appendix C presents a background to Sector Agreements and their purpose and includes a list of Agreements.

Table 4: Resilient South Sector Agreement for the Southern Adelaide Region (2018).

Partners to agreement	Objectives and activities

• City of Holdfast Bay Council
• City of Marion Council
• City of Mitcham Council
• City of Onkaparinga Council
	• Focus on adapting and responding to the impacts, risks and opportunities arising from climate change
	• Support the implementation of the:
	  o Resilient South Regional Climate Change Adaptation Plan
	  o Southern Region Local Government Implementation Plan
	  o Local action plans and policies for each partner council
	  o Climate Change Adaptation Action Plan for South Australia
	• Identify and promote economic and employment opportunities with the region that may be affected by climate change
	• Facilitate community engagement and participation in programs designed to promote adaptation actions.

8 Offset programs and national emission trading scheme

This section reports on any emissions offset programs established or recognised under the Act during the reporting period, and on progress in establishing a national emissions trading scheme.

There were no offset programs or emissions trading in place during the reporting period.

9 Intergovernmental agreements

This section presents a report on any intergovernmental agreements relevant to climate change entered into by the Government of South Australia during the reporting period.

There were no intergovernmental agreements relevant to climate change entered into by the Government of South Australia during the reporting period.

10 International commitments

This section presents a report on any significant national or international commitments or agreements relevant to climate change made or entered into during the reporting period.

10.1 Under2 Coalition

The States & Regions Alliance, a forerunner to the Under2 Coalition was created in 2005. Members of the States and Regions Alliance signed the Montreal Declaration of Federated States and Regions. The Government of South Australia was an inaugural signatory to the Montreal Declaration and a founding co-chair of the Alliance.

The coalition is made up of more than 220 governments who represent over 1.3 billion people and 43 percent of the global economy. Governments share expertise on innovative policy, report on measurable climate actions, and drive emission reduction initiatives.

The Government of South Australia is currently an Under2 Coalition Steering Group Member.

10.2 States and Regions Compact

In 2014, several state and regional government coalitions for climate change were created including: the Climate Group States and Regions Alliance; Network of Regional Governments for Sustainable Development (nrg4SD); R20-Regions of Climate Action (R20); and the CDP (formerly the Carbon Disclosure Project).

The coalitions report annual progress against commitments made by state and regional governments. The States and Regions Compact is a mechanism for regional governments to report on and demonstrate their support for the Paris Agreement.

10.3 Under2MOU

South Australia signed on to the Global Climate Leadership Memorandum of Understanding (the Under2MOU) on 6 December 2015. The Under2MOU aims for sub-national governments to reduce their greenhouse gas emissions towards net zero by 2050. This includes reducing greenhouse gas emissions by 80 to 95 percent on 1990 levels, or to 2 metric tons of carbon dioxide-equivalent per capita, by 2050. These are the levels needed to limit global warming to below 2 degrees Celsius recommended by the Intergovernmental Panel on Climate Change.

Currently, 220 jurisdictions which represent 43 countries have signed or endorsed the Under2MOU. Signatories are requested to: establish mid-term targets to support long-term reduction goals; share technology, scientific research, and best practices to promote energy efficiency and renewable energy; work towards consistent monitoring, reporting and verification of their emissions; and assess the projected impacts of climate change on communities.

South Australia contributes to the Annual Disclosure Report to provide a transparent, global picture of the impact, progress and climate action driven by state and regional governments.

10.4 Asia Pacific Climate Leaders' Declaration

On 4 June 2019, South Australia signed the Asia Pacific Climate Leader's Declaration, along with eight other governments pledging their support. The Declaration included protecting marine life, cutting emissions from the land sector and strengthening international cooperation and dialogue on climate action, in line with the goals of the Paris Agreement.

10.5 EU World Cities Programme

In 2017, Adelaide commenced a partnership under the EU World Cities Program, with Manchester in the United Kingdom. World Cities is a project of the European Union managed by the European Commission's Directorate-General for Regional and Urban Policy. The project promotes the exchange of experience and best practice between EU and non-EU countries in sustainable urban development. During the year-long partnership, the organising teams have established pilot projects under three themes: Governance and policy structures for smart cities; financing; and sustainable growth.

10.6 RegionsAdapt

In 2015, South Australia joined RegionsAdapt, a cooperative framework to exchange experiences and best practices on adapting to climate change. Regional governments collaborate, exchange knowledge and share best practice on adaptation and resilience to climate change. The practices include: developing a sub-regional plan or strategy on adaptation; concrete actions; and reporting data on the progress of the adaptation annually through the States and Regions Compact reporting platform.

11 Impacts of climate change

This section presents information on any relevant rates, trends or impacts associated with climate change, with particular reference to any identified or assessed impacts of climate change on South Australia or any expected future impacts of climate change that have emerged or become increasingly relevant during the reporting period.

11.1 Climate projections in South Australia

The national *Climate Change in Australia* website and the South Australian Climate Ready projections developed by the Goyder Institute for Water Research remain the key sources of information in relation to climate impacts in South Australia over the reporting period. The two complementary sources of information were launched in 2015.

Based on this climate data, projections for South Australia include:

- continued increases in average temperatures across all seasons
- slightly larger increases in the maximum temperature for the spring season
- more hot days and heatwaves of longer duration, and fewer frosts
- decreases in annual rainfall amounts, with decreasing rainfall in the cooler months
- increases in the intensity of extreme rainfall events
- increases in the time spent in drought
- continued mean sea level rise and an accompanying increase in the height of extreme sea level events and coastal erosion
- a continued trend towards a harsher fire weather climate.

The Climate Change in Australia website is available at www.climatechangeinaustralia.gov.au.

The Goyder Institute for Water Research has developed projections for individual weather stations across the state's natural resources management regions that extend to 2100, for 'intermediate' and 'high' emissions pathways. This information can be accessed through the Goyder Institute for Water Research website[14] and the Government of South Australia's Enviro Data SA website[15].

11.2 Impacts of Climate Change in South Australia

Changes to South Australia's climate such as warmer temperatures, rising sea levels, changes to rainfall patterns and more frequent and intense extreme weather events are likely to impact on agricultural production, public health, community wellbeing, natural landscapes and wildlife habitats, and public and private infrastructure, particularly in coastal areas.

In 2018, the Department for Environment and Water prepared trend and condition report cards that include information on the condition of rainfall, temperatures and sea levels and projected trends under a changing climate. The report cards can be accessed on the Department's website at https://www.environment.sa.gov.au/about-us/our-progress/state-report-cards .

[14] http://www.goyderinstitute.org/

[15] https://data.environment.sa.gov.au

Appendix A : Section 7 of the Climate Change and Greenhouse Emissions Reduction Act 2007 (SA)

7—Two-yearly reports

(1) The Minister must, on a two-yearly basis, prepare a report on the operation of this Act.

(2) The report must include—

(a) an assessment of the effectiveness of the initiatives that are being adopted in order to achieve the SA target; and

(b) a report on any determination or target made or set under section 5 during the reporting period; and

(c) an assessment of the progress being made to achieve the renewable electricity target; and

(d) an assessment of the progress being made to achieve any sector-based or interim target under this Act, including a target set for the State Government, or any government agency or instrumentality; and

(e) a report on any sector agreement between the Minister and any other person or entity entered into under this Act during the reporting period; and

(f) a summary of—

(i) the levels of greenhouse gas emissions, and of the use of renewable energy, within the State (as determined or estimated at the time of reporting); and

(ii) the development of technologies to reduce greenhouse gas emissions or to remove greenhouse gases from the atmosphere; and

(g) a report on any emissions offset programs established or recognised under this Act during the reporting period, and on progress in establishing a national emissions trading scheme; and

(h) a report on any inter-governmental agreements relevant to climate change entered into by the South Australian Government during the reporting period; and

(i) a report on any significant national or international commitments or agreements relevant to climate change made or entered into during the reporting periods; and

(j) information on any relevant rates, trends or impacts associated with climate change, with particular reference to any identified or assessed impacts of climate change on South Australia or any expected future impacts of climate change that have emerged or become increasingly relevant during the reporting period.

(3) The Minister must cause a copy of the report to be laid before both Houses of Parliament within 6 sitting days after the report is prepared.

(4) The first report under this section must be completed and tabled in Parliament by the end of 2009.

(5) The first report under this section, and thereafter every alternate report, must incorporate a report from—

(a) the CSIRO; or

(b) if the CSIRO is unwilling or unable to provide a report—an independent entity designated by the Minister by notice in the Gazette,

that assesses the extent to which any determination or target made or set under section 5 is being achieved and, if it appears relevant, should be revised.

(6) In this section—

CSIRO means the Commonwealth Scientific and Industrial Research Organisation.

Appendix B : Review of sources of greenhouse gas emissions by sector

This Appendix presents the 2016-17 South Australian greenhouse gas inventory by sector. It presents the 1989-90 to 2016-17 inventory, the changes from 1989-90 to 2016-17, and graphics, data and summary statistics for each of the sectoral categories.

B.1 All emissions

The South Australian inventory from 1989-90 to 2016-17 is presented in Figure 5 by sectoral source, separating the subcategories in land use, land use change and forestry (LULUCF) that are net sources in a given year from those that are net sinks. The categories with the greatest annual variability are LULUCF sources and sinks and the category with the largest range over the period is Energy. The black line shows net greenhouse gas emissions.

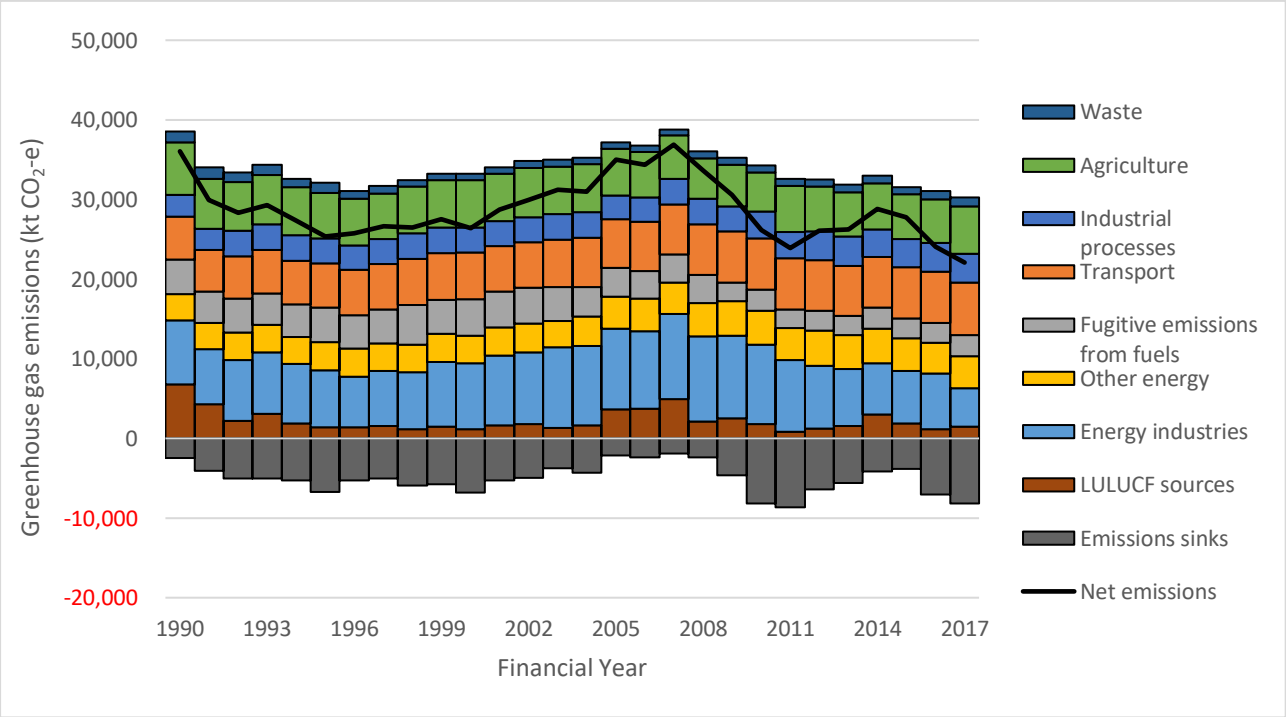

Figure 5: South Australian greenhouse gas inventory, 1989-90 to 2016-17, by source of emissions[16].

Table 5 summarises these categories by their absolute values at two points in time and the change in that category from base year to 2016-17.

[16] https://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications/state-and-territory-greenhouse-gas-inventories-2017

Table 5: SA inventory by source of emissions, percent change from 1990 base year to 2016-17[17].

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
Energy	*21,025*	*18,053*	*-14%*
Industrial processes	*2,774*	*3,666*	*32%*
Agriculture	*6,555*	*5,934*	*-9%*
Waste	*1,386*	*1,097*	*-21%*
LULUCF sources	*6,796*	*1,501*	*-78%*
Gross emissions	***38,536***	***30,252***	***-21%***
LULUCF sinks	*-2,492*	*-8,165*	*228%*
Net emissions	***36,044***	***22,087***	***-39%***

The following sections in this Appendix provide detailed graphics, data and summary statistics about each of the categories. All data is sourced from the South Australian Greenhouse Gas Inventory 2017[18].

B.2 Energy

Energy sector emissions are presented in Figure 6 and Figure 7 and are broken down into the following components:

- *Energy industries* – the combustion of fuel in electricity generation, petroleum refining, gas production and solid fuel manufacture.
- *Manufacturing industries and construction* – direct emissions from fuel combustion in manufacturing industries, ferrous and non-ferrous metals production, plastics production, construction and non-energy mining.
- *Transport* – road transportation (passenger cars, trucks, and buses), domestic aviation, domestic navigation and pipeline transport.
- *Other combustion energy* – direct fuel combustion in the residential, commercial and institutional sectors, including energy used in mobile equipment in agriculture, forestry, fishing and military sectors.
- *Fugitive emissions from fuels* – emissions other than energy use including in mining activities and oil and gas sector operations (including venting, flaring, exploration, extraction, production, processing and transmission).

[17] https://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications/state-and-territory-greenhouse-gas-inventories-2017

[18] https://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications/state-and-territory-greenhouse-gas-inventories-2017

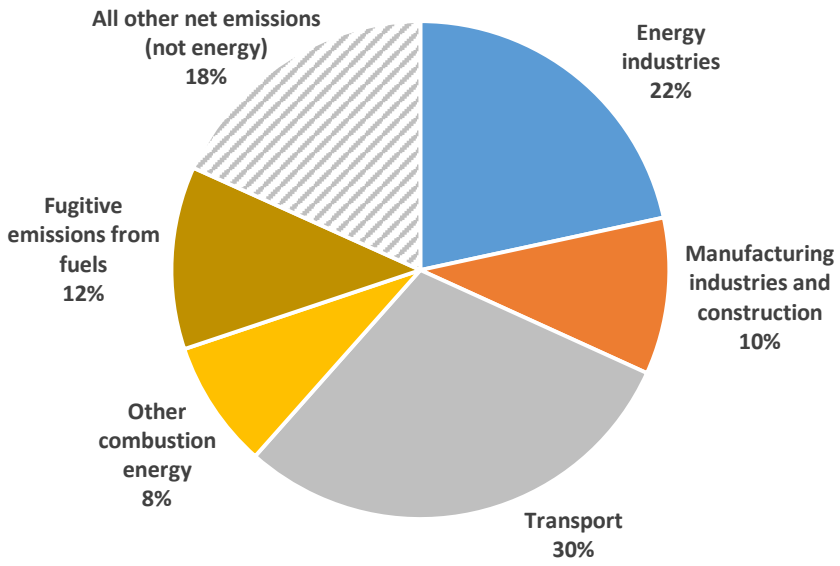

Figure 6: Energy sector greenhouse gas emissions relative to all other net emissions, 2016-17, South Australia.

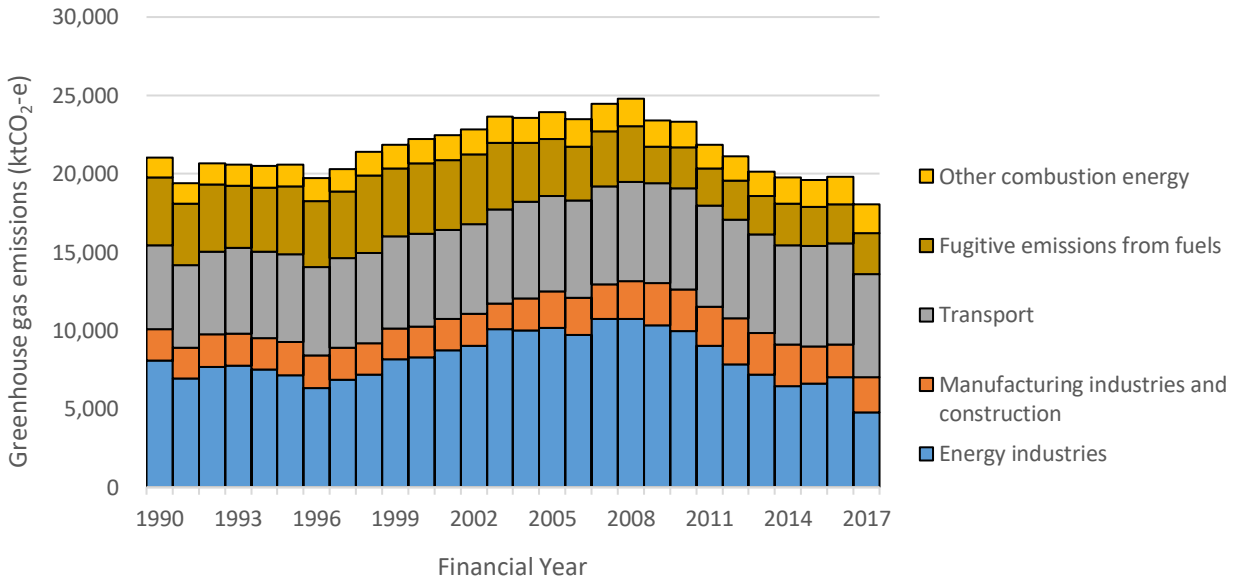

Figure 7: Energy greenhouse gas emissions kilotonnes CO_2-e, by selected subcategory, 1989-90 to 2016-17, South Australia.

Table 6 presents the change in emissions from the 1990 base year to the most recent reporting year of 2016-17.

Table 6: Energy sector by source of emissions, percent change from 1990 base year to 2016-17.

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
Energy industries	8,066	4,774	-41%
Manufacturing industries and construction	2,007	2,248	12%
Transport	5,377	6,573	22%
Other combustion energy	1,273	1,834	44%
Fugitive emissions from fuel	4,301	2,623	-39%
Energy	**21,025**	**18,053**	**-14%**

B.3 Industrial processes

Emissions from industrial processes are presented in Figure 8 and Figure 9 and are broken down into the following components:

- *Mineral industry* – carbon dioxide (CO_2) from cement clinker and lime production, the use of limestone, dolomite and other carbonates in industrial smelting and other processes, soda ash production and use and magnesia production.
- *Product uses as ODS (ozone depleting substances) substitutes* – hydrofluorocarbons, refrigerating and air conditioning equipment, foam blowing, metered dose inhalers, fire extinguishers and solvent use.
- *Other industrial processes* – CO_2 from the consumption of CO_2 in the food and beverage industry, the use of sodium bicarbonate and SF6 from electrical equipment, and CO_2 produced by oxidation of lubricating oils and greases.

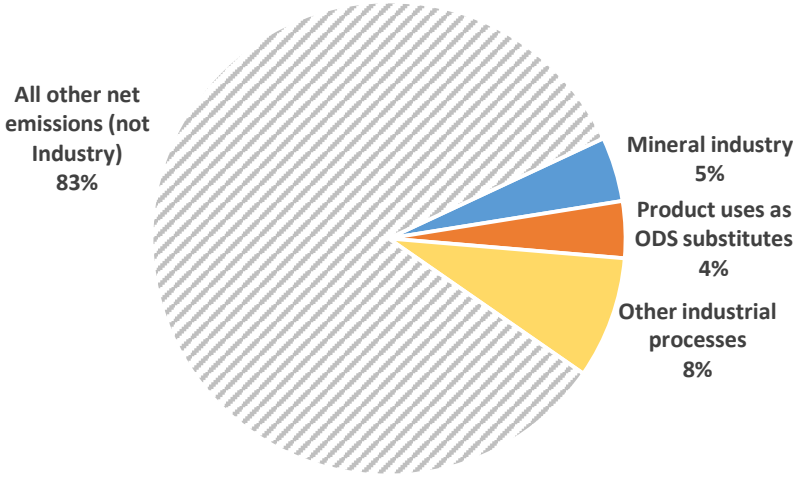

Figure 8: Industrial processes sector greenhouse gas emissions relative to all other net emissions, 2016-17, South Australia.

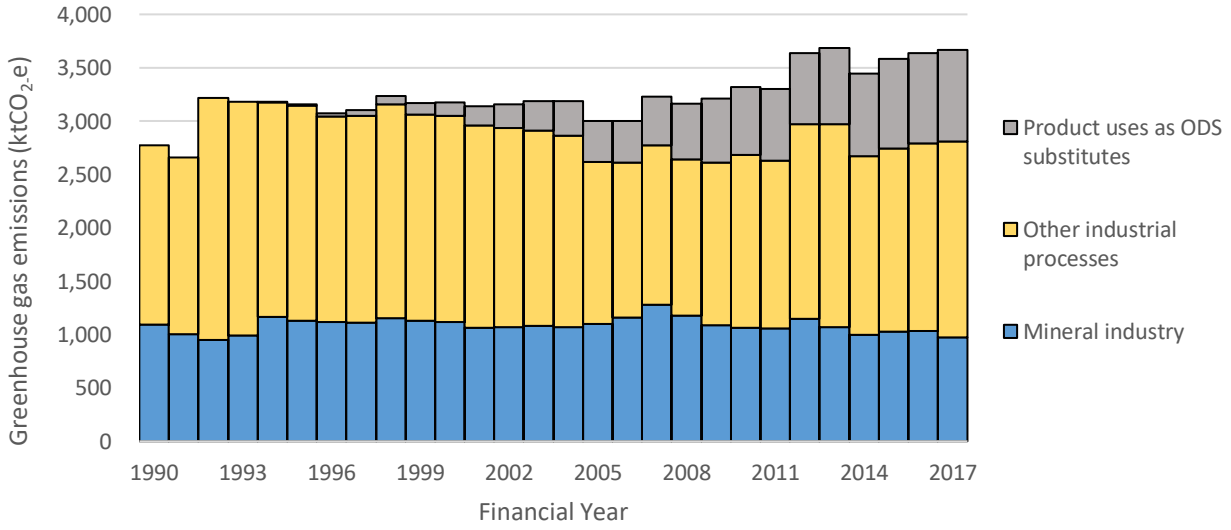

Figure 9: Industrial processes greenhouse gas emissions kilotonnes CO_2-e, by selected subcategory, 1989-90 to 2016-17, South Australia.

Table 7 presents the change in emissions from the 1990 base year to the most recent reporting year of 2016-17. A comparison from the previous Section 7 report (2012-2013 greenhouse gas inventory data) is also provided.

Table 7: Industrial processes sector by source of emissions, percent change from 1990 base year to 2016-17.

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
Mineral industry	1,092	974	-11%
Product uses as ODS substitutes	0	855	n/a
Other industrial processes	1,683	1,837	9%
Industrial processes	**2,774**	**3,666**	**32%**

B.4 Agriculture

Agriculture sector emissions are presented in Figure 10 and Figure 11, broken down into the following components:

- *Enteric fermentation* – emissions associated with microbial fermentation during digestion of feed by ruminant (mostly cattle and sheep) and some non-ruminant domestic livestock.
- *Manure management* – emissions are produced from the decomposition of the organic matter remaining in manure under anaerobic conditions. These conditions occur when large numbers of animals are managed in a confined area where manure is typically stored in large piles or lagoons.
- *Agricultural soils* – emissions associated with the application of fertilisers, crop residues and animal wastes to agricultural lands and the use of biological nitrogen fixing crops and pastures.
- *Other agriculture* – emissions burning of savanna and temperate grasslands, field burning of agricultural residues and CO_2 from the application of urea and lime.

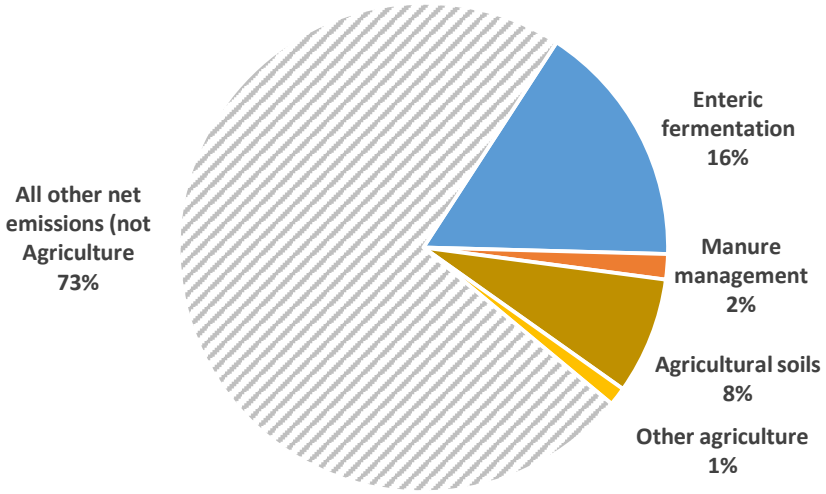

Figure 10: Agriculture sector greenhouse gas emissions relative to all other net emissions, 2016-17, South Australia.

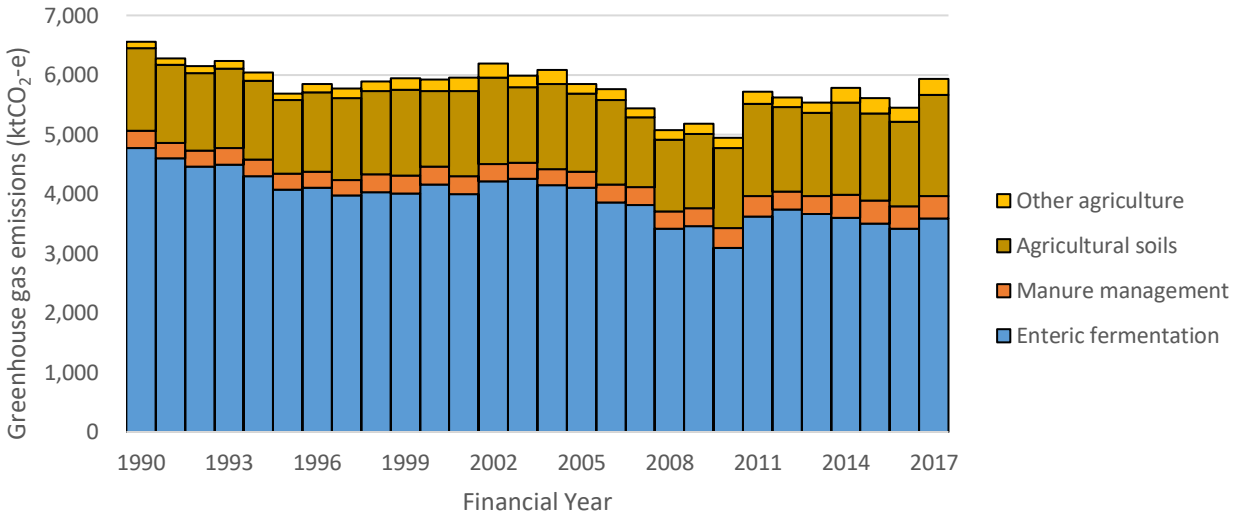

Figure 11: Agriculture greenhouse gas emissions kilotonnes CO_2-e, by selected subcategory, 1989-90 to 2016-17, South Australia.

Table 8 presents the change in emissions from the 1990 base year to the most recent reporting year of 2016-17. A comparison from the previous Section 7 report (2012-2013 greenhouse gas inventory data) is also provided.

Table 8: Agriculture sector by source of emissions, percent change from 1990 base year to 2016-17

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
Enteric fermentation	4,773	3,591	-25%
Manure management	284	369	30%
Agricultural soils	1,387	1,704	23%
Other agriculture	111	269	143%
Agriculture	**6,555**	**5,934**	**-9%**

B.5 Land Use, Land Use Change and Forestry (LULUCF)

Emissions and sinks from land use, land use change and forestry (LULUCF) are presented in Figure 12 including each of the subcategories separated by sinks and sources. The principal drivers of change in carbon fluxes across the landscape relate to losses and gains of woody vegetation. *Land converted to forest land* and *harvested wood products* are always sinks while *land converted to cropland* and *grassland* are always sources (deforestation). However, all of the remaining categories can have both sinks and sources contributing in any one year. For example, *forest land remaining forest land* was primarily a sink until 2005, only featuring as a source in 1998 and 2000, however since then it has been both a source and a sink.

The LULUCF subcategories are as follows:

- *Forest land* includes all lands with a tree height of at least 2 metres and crown canopy cover of 20 percent or more, and lands with systems with a woody biomass vegetation structure that currently falls below but which, in situ, could reach the threshold values of the definition of forest land. *Forest land remaining forest land* includes plantations, harvested native forests and other native forests (regeneration after harvest). Emissions from fuelwood consumption and biomass burning in forests (controlled burning and wildfire) are also included

as well as the removals associated with post-fire recovery. *Land converted to forest land* includes grassland, croplands, settlements and wetlands (tidal marsh) on which forest is identified to emerge. These changes include plantations and forest regrowth on land previously cleared for other uses, environmental plantings and the regeneration of forest from natural seed sources. Permanent losses of woody vegetation that have been classed as *forest land* are reported under *forest conversion to other land use* classifications.

- *Cropland* includes all land that is used for continuous cropping and those lands managed as crop-pasture (grassland) rotations. Non-CO_2 emissions from cropland remaining cropland are reported in the Agriculture sector. This sector comprises emissions and removals from *cropland remaining cropland* and *forest land converted to cropland* and *wetlands converted to cropland*. Since 1990, there has been no significant consistent trend in emissions, with transient variations driven by fluctuations in climatic conditions and shifts in management practices.
- The *grassland* category represents a diverse range of climate, management and vegetation cover. It also includes increases and decreases in sub-forest forms of woody vegetation (shrubs). This sector comprises emissions and removals from *grassland remaining grassland* and *forest land* and *wetlands converted to grassland*. Changes in carbon stocks in *grassland remaining grassland* are largely affected by changes in land management practice and climatic factors.
- For the sub-sectors *forest land converted to cropland* and *forest land converted to grassland*, the total emissions associated with the transition from forest to non-forest land use include the immediate loss of carbon as trees are cleared and burned, as well as an ongoing loss of soil carbon as it decays to a new equilibrium stock level and other ongoing emissions and removals associated with the new land use.
- *Settlements* are areas of residential and industrial infrastructure, including cities and towns, and transport networks. This sector comprises emissions and removals from *settlements remaining settlements* and *forest land* and *wetlands converted to settlements*. The *land converted to settlements* subcategory comprises mangrove and other forest land converted to settlements and wetlands (tidal marsh) converted to settlements. Conversion of tidal marsh is assumed to occur along with any clearing of mangroves for settlements – as such the trends are identical. The key drivers of variation over the time period have been urbanisation and population growth.
- *Wetlands* include areas of perennial lakes, reservoirs, swamps and major water course areas. Land areas that meet the definition of forest land, such as mangroves, are reported under the forest land category. *Wetlands remaining wetlands* include tidal marshes and seagrass meadows. Estimates include net changes in sparse vegetation, loss of seagrass beds due to capital dredging and nitrous oxide emissions from aquaculture operations.

The subcategories *wetland remaining wetland, land converted to wetland and settlements remaining settlements* have been omitted from Figure 12 due to insignificant contributions from 1989-90 to 2016-17.

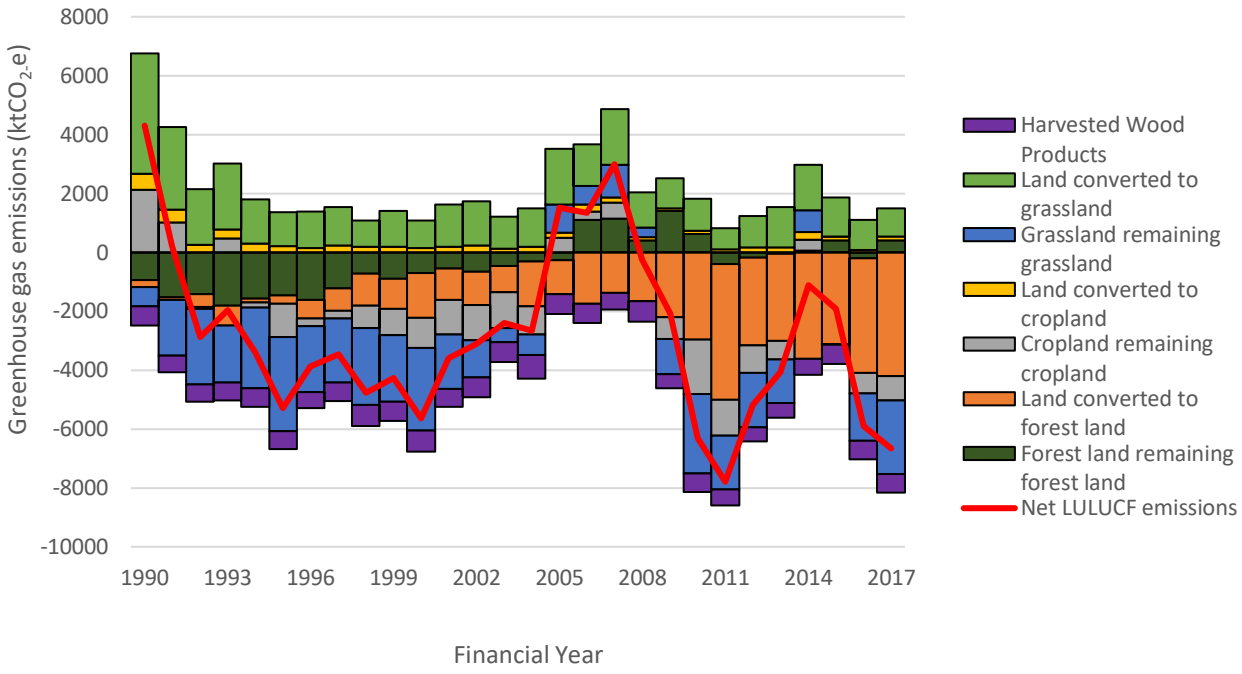

Figure 12: Land use, land use change and forestry by sources and sinks for subcategories, 1989-90 to 2016-17, South Australia.

Table 9 presents the change in emissions from the 1990 base year to the most recent reporting year of 2016-17.

Table 9: Land use, land use change and forestry sector by source or sink, change from 1990 base year to 2016-17.

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
LULUCF sources	6,796	1,501	-78%
LULUCF sinks	-2,492	-8,165	228%
Net LULUCF	**4,304**	**-6.664**	**-255%**

B.6 Waste

Waste sector emissions are presented in Figure 13 and Figure 14 and are broken down into the following components:

- *Solid waste disposal* – emissions resulting from anaerobic decomposition of organic matter in landfills.
- *Waste water treatment and discharge* – emissions resulting from anaerobic decomposition of organic matter in sewerage facilities (including on-site systems such as septic tanks) during treatment and disposal of wastewater.
- *Other waste* – emissions resulting from incineration of solvents and clinical waste and the anaerobic decomposition of organic material in composting and anaerobic digester facilities.

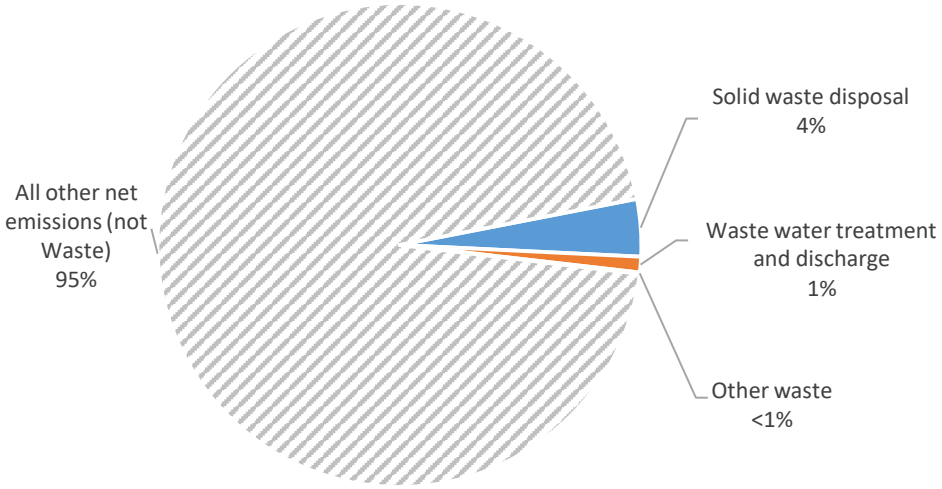

Figure 13: Waste sector greenhouse gas emissions relative to all other net emissions, 2016-17, South Australia.

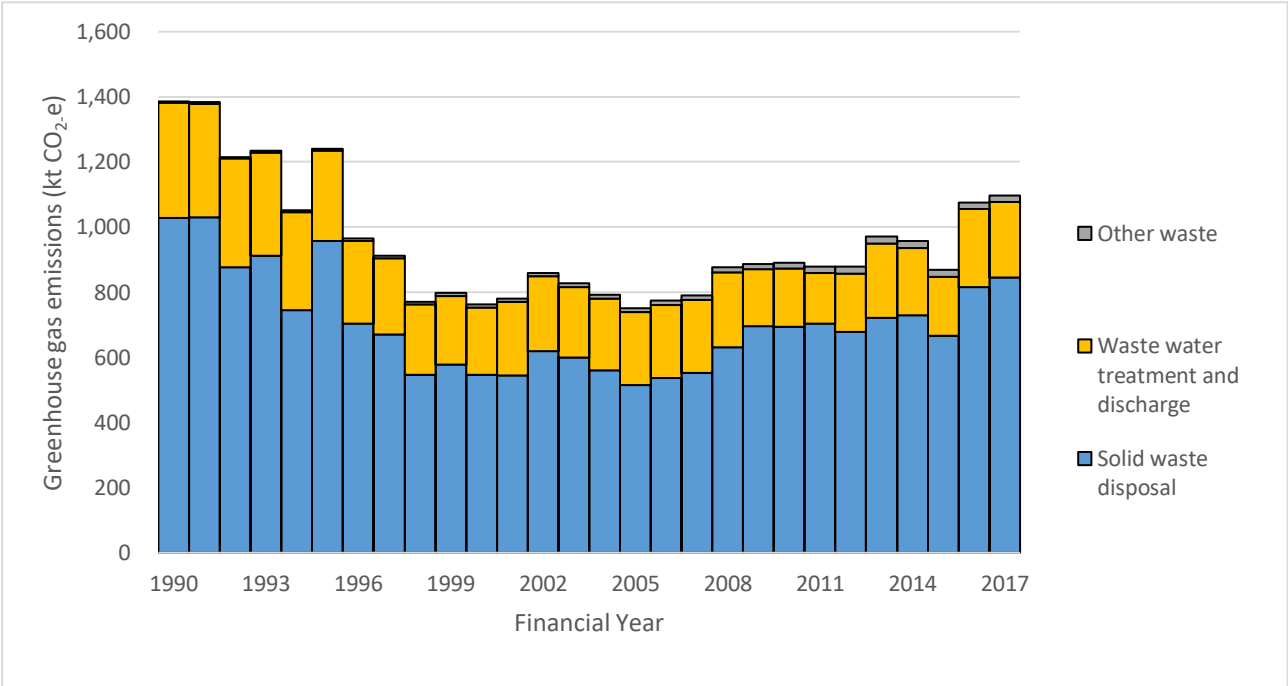

Figure 14: Waste greenhouse gas emissions kilotonnes CO_2-e, by selected subcategory, 1989-90 to 2016-17, South Australia.

Table 10 presents the change in emissions from the 1990 base year to the most recent reporting year of 2016-17.

Table 10: Waste sector by source of emissions, percent change from 1990 base year to 2016-17.

Source of emissions	Greenhouse gas emissions (kt CO_2-e)		% Change to 2016-17
	1989-90	*2016-17*	*1989-90 to 2016-17*
Solid waste disposal	1,028	846	-18%
Waste water treatment and discharge	354	230	-35%
Other waste	3	21	511%
Waste	**1,386**	**1097**	**-21%**

Appendix C : Sector agreements

C.1 Sector agreements

The *Climate Change and Emissions Reduction Act 2007 (SA)* (the Act) provides for the government to enter into sector agreements with people, organisations, and industry or business groups to further any strategies to meet targets set under this Act. A sector agreement may include such matters as:

- reduction or limitation or mitigation of the effects of greenhouse gas emissions for a particular enterprise or industry, or a particular sector of the state's economy
- strategies to achieve objectives or reductions in energy use, or to maximise efficiencies in energy use or to promote the use of renewable energy
- strategies to promote or support research, innovation and development to reduce greenhouse gas emissions or to adapt to climate change.

Sector agreements are entered into on a voluntary basis for the purpose of recognising, promoting or facilitating strategies to meet any target set under the Act.

Sector agreements operate under guiding principles and seek to formalise the joint aspiration of the signatories to achieve the aims of the agreement in a non-legally binding way. Typically the agreements will commit the parties to collaborate and work in partnership with a range of stakeholders to deliver the objectives of the agreement. These objectives may include developing and implementing climate change adaptation measures, empowering the community, businesses and institutions to take action in support of such measures, and demonstrating climate change action leadership locally, nationally and globally.

C.2 Sector agreements in operation during the reporting period (commenced prior to the reporting period)

The following sector agreements (Table 11) continued in operation during the reporting period:

- Yorke and Mid North
- Resilient Hills and Coasts
- Resilient East
- Adapting Northern Adelaide
- Carbon Neutral Adelaide (City of Adelaide)

Table 11: Sector agreements that commenced prior to 2018 and are still active in 2018 and 2019

SECTOR AGREEMENT TITLE	KEY AIMS
Yorke and Mid North 2017 *Expires 30 June 2020*	• Adaptation and response to the impacts, risks and opportunities of climate change in the region - to be implemented as per the identified priorities from the Yorke and Mid North Regional Climate Change Action Plan (the Plan), including: • set agreed objectives • cooperatively identifying and progressing partnership opportunities across sectors within the region • commitment by each of the local government partners to produce a local action plan, and • cooperate in the implementation of the Plan, and its ongoing evaluation and review.
Resilient Hills and Coasts *Expires 30 June 2020*	• Resilient Hills and Coasts Project (RH&C Project) • Improve the resilience of community assets and infrastructure, local economies and the natural environment to cope with the inevitable impacts and challenges of climate change. • Do so through the implementation of the Climate Change Adaptation Plan for the Adelaide Hills, Fleurieu Peninsula and Kangaroo Island Region. • Promote the RH&C Project objectives. • Prioritise opportunities to implement the Adaptation Plan on a regional scale.
Resilient East *Expires 30 January 2020*	• Develop strategies to support research and innovative planning. • Identify and progress partnership opportunities. • Implement the Resilient East Climate Change Adaptation Plan. • Deliver initiatives and community engagement activities to deliver the Adaptation Plan. • Facilitate geographically specific responses to climate change across the Eastern Adelaide region. • Promote and showcase achievements. • Provide information and advice to government on progress with the agreement.
Adapting Northern Adelaide *Expires 30 November 2021*	• Collaborate and work in partnership with a range of stakeholders that can contribute to delivering the objectives of this agreement. • Follow principles of inclusiveness and transparency. • Work together and with other stakeholders to implement the Adapting Northern Adelaide Plan to support resilient and prosperous communities. • Engage with industry, community and other partners to develop, improve and market the Northern Adelaide's green industries' products, services and capabilities that support a low carbon and adaptive economy.

Carbon Neutral Adelaide (City of Adelaide Council) 2015 *Expires 29 November 2020*	• Deliver the Carbon Neutral Adelaide initiative for the area comprising the Adelaide City Council municipal area. • Develop a shared vision for the Carbon Neutral Adelaide initiative, as well as an underpinning framework and an action plan. • Develop and implement climate change policies and initiatives to deliver the carbon neutral vision. • Foster innovation and opportunities in climate change. • Implement and deliver the Building Upgrade Finance mechanism, commencing in the City of Adelaide, subject to negotiation of a suitable funding model and establishment of an appropriate legislative framework. • Develop and implement climate change adaptation measures to grow community resilience to climate change impacts and costs, and enhance the City of Adelaide's liveability and vibrancy. • Empower the community, businesses and institutions to take action in support of the Carbon Neutral Adelaide vision. • Develop annual greenhouse gas inventories. • Demonstrate climate change action leadership locally, nationally and globally.

C.3 Agreements concluded

The following climate change sector agreements completed their full term during the reporting period (Table 12).

Table 12: Sector agreements that were completed during 2018 and 2019.

SECTOR AGREEMENT TITLE	KEY AIMS
Eyre Peninsula 2015 *Expired 30 June 2018*	• Identify and promote low carbon economic opportunities in the energy, water, transport and infrastructure industry sectors. • Recognise differences across the region and facilitate geographically specific responses to climate change. • Collaborate to support a better understanding of climate change risks and issues for communities. • Collaborate in a regional approach to further implement the adaptation plan. • Facilitate and grow community engagement, and industry participation in programs designed to promote behaviour change.
SA Water Corporation 2015 *Expired 30 September 2018*	• Reduce greenhouse gas emissions associated with the provision of water and waste water services for South Australia. • Increase the use of renewable energy sources. • Develop measures to adapt to climate change. • Support necessary research.
Limestone Coast *Expired 30 June 2019*	• Work in partnership to deliver the Limestone Coast Regional Climate Change Adaptation Plan. • Provide strategic decision making and direction towards achieving the objectives of the agreement. • Establish criteria to measure success for reporting on progress. • Provide recommendations to inform the annual business planning processes of the Limestone Coast Region partners on initiatives that may have business impact.

Appendix D : South Australian Energy Data and Technical notes

The Department for Energy and Mining (DEM) reported that for 2018-19, South Australia's renewable energy production amounted to 52 percent of the state's total generation.

The figure for renewable energy production calculated by AEMO is different to the one calculated by DEM for 2018-19. AEMO have used wind generation and solar PV generation in its renewable calculation whereas DEM has included wind, solar and a portion of small non-scheduled renewable generation. The small non-scheduled renewable generation figure is provided to DEM confidentially by AEMO and cannot be published publicly.

The number reported by AEMO and DEM for solar PV generation has differed in previous years. AEMO have changed their methodology for calculating PV generation in recent years. The modelling has become more sophisticated and therefore AEMO have chosen to update it periodically to get a more accurate picture of PV generation. Historically DEM has used its own calculation to estimate PV generation for consistency. AEMO have now determined a methodology to use going forward. DEM are comfortable with this approach and have therefore adopted their PV generation number for 2018-19.

South Australia's Climate Change and Greenhouse Emissions Reduction Act 2007 (SA) defines the SA target as: "to reduce by 31 December 2050 greenhouse gas emissions within the state by at least 60 percent to an amount that is equal to or less than 40 percent of 1990 levels".

A review of the progress towards the emissions target addresses technical issues, including those related to methods and data sources. The technical points that influenced the interpretation and comparability of the estimates of progress are outlined below.

- This is the sixth Section 7 report on the operation of the Act. The first was prepared in 2009.
- The Australian Government produces all states' and territories' greenhouse gas inventories and publishes them with a two year delay.
- States' and territories' greenhouse gas inventories are developed by the Australian Government in accordance with international guidelines and protocols. The estimates are derived from multiple data sources most of which are collected for other purposes, such as agriculture surveys. Data is collected specifically for greenhouse gas monitoring from Australia's large emitters, excluding governments, under the *National Greenhouse and Energy Reporting Act 2007*.
- All previous estimates of SA's net emissions are revised each year by the Commonwealth Government, which develops these estimates. Annual revisions mean that successive inventory statistics on change since the base year are not comparable.
- The estimate of South Australia's 1990 base year net emissions published in 2009 was revised by the Australian Government each year to 2019. All previous estimates for each year are revised, for example in 2019 all the 2017 estimates for inventories from 1989-90 to 2015-16 were revised. These revisions occur for all jurisdictions and for Australia overall.