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ACT GREENHOUSE GAS INVENTORY FOR 2022-23

PREPARED FOR:

ENVIRONMENT, PLANNING AND SUSTAINABLE DEVELOPMENT DIRECTORATE

ACT GOVERNMENT

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ACT Government

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The findings in this report have been formed on the above basis.

VERSION CONTROL

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1. ACT GREENHOUSE GAS EMISSIONS INVENTORY SUMMARY

The ACT's total net greenhouse gas emissions in 2022-23 were 1,622 kilotonnes of carbon dioxide equivalent (kt CO_2-e).

1.1 ACT emissions summary

The Australian Capital Territory (ACT) Government has adopted greenhouse gas (GHG) reduction targets established under the *Climate Change and Greenhouse Gas Reduction Act 2010* (the Act). This report provides estimates of the ACT's GHG emissions attributable to sectors within the Territory for the 2022-23 financial year. The estimates are based on the method established under the Act, the *Climate Change and Greenhouse Gas Reduction (Greenhouse Gas Emissions Measurement Method) Determination 2023* (the Determination).

The following ACT Greenhouse Gas Emissions Inventory Report 2022-23 has been prepared to satisfy Part 2, Section 12 of the Act.

It contains:

- the amount of GHG emissions in the ACT for the inventory year
- an analysis of the ACT's progress in meeting legislated GHG targets and the renewable energy targets including:
    - a comparison of annual emissions against legislated targets
    - identification of the main sources of GHG emissions in the ACT
    - an explanation of changes compared to 2021-22 and previous years
    - compliance with the renewable target and identification of the main sources of renewable energy generated for the ACT.

In summary, the ACT's total net GHG emissions in 2022-23 were 1,622 kilotonnes of carbon dioxide equivalent (kt CO_2-e). The major sources of emissions were transport including aviation (64.6%) and stationary energy (22.4%) consisting of fossil fuel gas combustion (19.9%), fugitive gas emissions (1.8%) and other stationary fuels (0.7%). Further emissions were generated from waste processing and decomposition including wastewater (9.9%), industrial processes and product use emissions (2.1%), and agriculture (1.0%). Total emissions were partly offset by land use, land-use change and forestry (LULUCF) which provided net sequestration (removal) of 192kt CO_2-e (-11.9% of total emissions) – that is, the sector absorbed more emissions than it generated. Table 1 shows the results for 2022-23.

Table 1. ACT 2022-23 greenhouse gas emissions by source

Emission Source	Emissions 2022-23 (Kt CO2-e)	Share of total emissions (inc. LULUCF)	Share of total emissions (exc. LULUCF)
Transport	1,170	68.8%	64.6%
Fossil fuel gas combustion	362	22.3%	19.9%
Waste including wastewater	180	11.1%	9.9%
Industrial processes/product use	39	2.4%	2.1%
Fugitive emissions	33	2.1%	1.8%
Agriculture	17	1.1%	1.0%
Other stationary energy	12	0.7%	0.7%
Sub total (excl. LULUCF)	1,814	111.9%	100%
LULUCF	-192	-11.9%	NA
Total (inc. LULUCF)	1,622	100%	NA

1.2 Changes in emissions

The ACT's total emissions have reduced by 1,419 kt CO2-e (-47%) since 1989-90.

Since the ACT's baseline year (1989-90) the Territory's population has grown 67% from 279,000 to 464,600 whilst total emissions have fallen 47% from 3,041 kt CO_2-e to 1,622 kt CO_2-e. The key driver of this outcome continues to be the emission reductions associated with electricity generation. Emissions from electricity began gradually declining in 2015-16 and then fell to zero in 2019-20 in line with the Territory's 100% renewable electricity supply target. Further contributors to emission reductions since 2012-13 were:

- carbon sequestration by the LULUCF sector, which changed from a net carbon emitter to a net carbon sink in 2016-17, representing an overall reduction of -443 kt CO_2-e since 2012-13
- a reduction in emissions from fossil fuel gas combustion of -17 kt CO_2-e
- a reduction in fugitive emissions associated with fossil fuel gas combustion of -4 kt CO_2-e (see section 2.2.1 Fossil fuel Gas for discussion of accounting changes for fugitive emissions)

The overall impact of these emission reductions has been partially offset by increased emissions from:

- transport including aviation (71 kt CO_2-e)
- waste decomposition including wastewater (80 kt CO_2-e) (see section 2.2.5 Wastewater for discussion of accounting changes in wastewater)

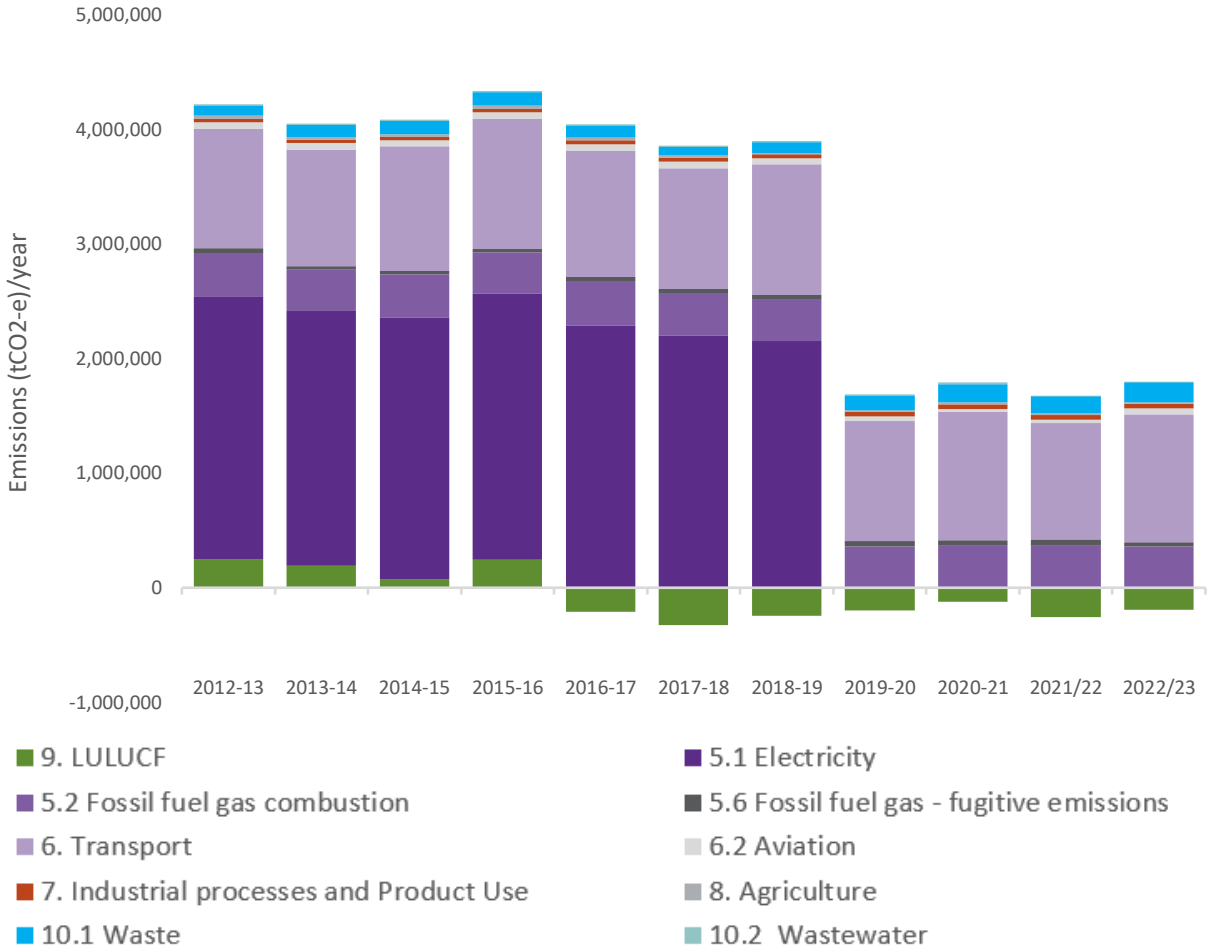

Figure 1. Net emissions and emissions by sector – ACT, 2012-13 to 2022-23

1.3 Per capita emissions

At 3.5 tCO2-e in 2022-23, the ACT's per capita emissions are just 19% of the national average of 18.3 tCO2-e (for the year 2020-21) and lower than all the other states and the Northern Territory, but higher than Tasmania[1].

Part two, section 8 of the Act states that the per person target, which is the average amount of GHG emissions produced per person in the ACT each year, is to peak by 30 June 2013. The ACT is in compliance with the target with per capita emissions falling since 2012-13. Per capita emissions decreased by 68% between 1989-90 and 2022-23. The majority of this decline took place from 2018-19 to 2019-20 as the ACT delivered on its renewable energy targets and per capita emissions fell from 8.4 to 3.3 tCO_2-e (60% decrease).

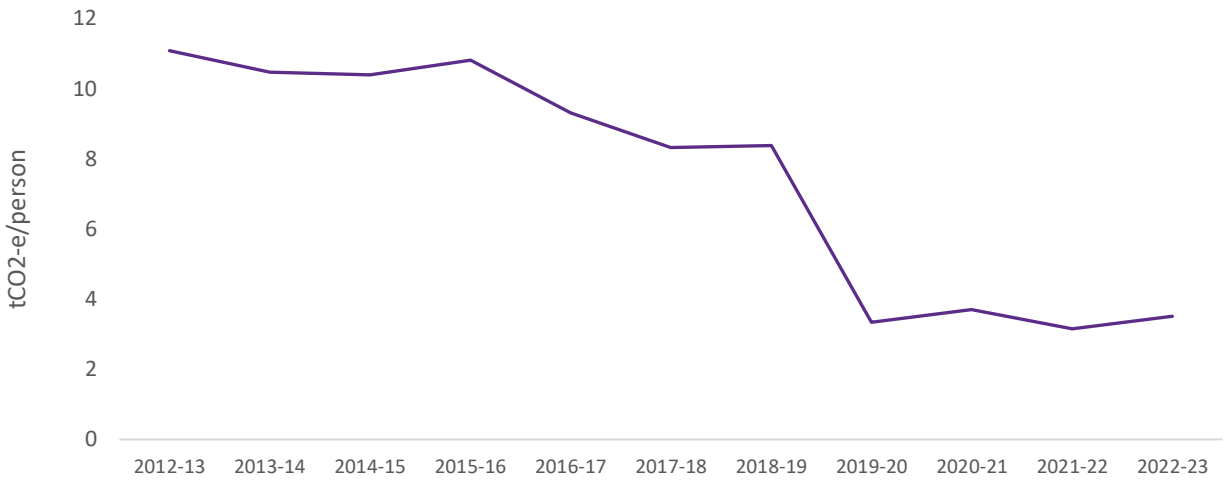

Figure 2. Trend in per capita emissions (tCO_2-e) – ACT, 2012-13 to 2022-23

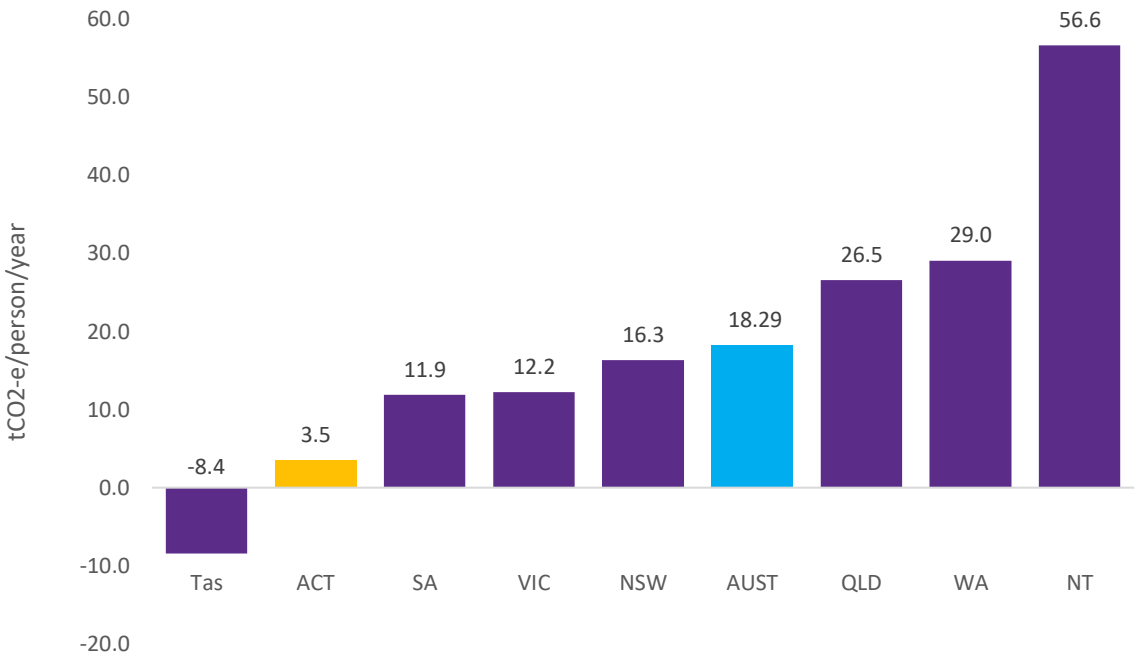

Figure 3. 2022-23 Per capita emissions (tCO_2-e) by State, Territory and Nation

[1]Sources: State and Territory Greenhouse Gas Inventories 2021 (AGEIS, 2023). National, state and territory population 2021 (ABS, 2023).

2. EMISSIONS BY SECTOR

2.1 Overview of emissions by sector

This section presents the ACT's GHG emissions by sector, describes the activities that drive these emissions and the reasons for changes over the past years (see Appendix 2 for a summary of all data restatements from the 2021-22 GGI).

Sector definitions are drawn from the five Intergovernmental Panel on Climate Change (IPCC) source categories:

- Energy
- Industrial processes and product use
- Agriculture
- Land use, land-use change and forestry (LULUCF)
- Waste

2.2 Sector changes compared to previous years

2.2.1 Energy

Electricity

Electricity-related emissions remained at zero in 2022-23 due to the ACT maintaining its 100% renewable electricity supply.

The ACT differs from all other Australian states and territories in having no thermal fossil fuel electricity generators located within its borders. Most of the electricity consumed in the ACT is imported from the National Electricity Market grid, and most of the imported electricity is generated at power stations located either within NSW, or, by way of flows through inter-connectors between state grids, Queensland, or Victoria. Consequently, a conventional jurisdictional GHG inventory following IPCC Guidelines (i.e., reporting only emissions from sources located within the jurisdictional boundary) would greatly under-estimate historic emissions arising from consumption of electricity in the ACT. For this reason, the ACT emissions inventory has always reported Scope 2 emissions for electricity consumption.

Since 1 January 2020, the ACT has offset 100% of residual electricity emissions through renewable generation and retiring Large Generation Certificates (LGCs). The financial year 2022-23 was the fourth year in which the ACT achieved zero electricity-related emissions. Total electricity flow in the ACT increased slightly to 3,071 GWh, up 2.4% on 2021-22. Total electricity input from the National Electricity Market was 2,720 GWh and the renewable power percentage (RPP) associated with the federal Large-scale Renewable Energy Target was 18.8% for the financial year 2022-23. Therefore, it was calculated that 511 GWh of the ACT's network sales was from LGC producing renewable sources. A further 252 GWh were generated from small-scale solar PV (<200 kW) within the ACT (up 41%) and 92 GWh of below baseline hydroelectricity from Snowy Hydro. These renewable sources do not generate LGCs and are therefore not captured in the RPP. The total quantity of renewable electricity supplied to the ACT in 2022-23 was 855 GWh up 10% on the previous year.

The ACT surrendered 2,216,000 LGCs in 2022-23 to maintain its 100% renewable electricity supply.

Table 2. 2022-23 pathway to zero emissions electricity

	2022-23 contribution to target (GWh)	YoY change (%)
Total electricity supplied to customers	3071	+2.4%
LRET generation	511	+0.7%
Small-scale solar PV (<200 kW)	252	+41%
ACT share of Snowy Hydro output[2]	92	-0%
Required surrender of LGCs	2,216	-0.3%
Residual electricity	0	

[2] Below baseline (pre-RET) generation

Stationary energy

Fossil fuel gas combustion emissions represented 19.9% of total ACT emissions in 2022-23, with fugitive emissions from the fossil fuel gas network (e.g., leakage) accounting for a further 1.8% of emissions.

Total fossil fuel gas combustion emissions (excluding transport) were similar when compared to last year (1.5% decrease) at 362 kt CO2-e and per capita gas use fell slightly from 17.4 to 16.8 GJ per capita.

The trend in per capita gas use shows a long-term decline as shown in Table 3, as more gas heating, hot water, and cooking is converted to electricity, gas appliances become more efficient and gas connections are further limited in new dwellings.

Since the accomplishment of 100% renewable electricity supply, fossil fuel gas has become the second largest emission source in the ACT with fossil fuel gas combustion and fugitive emissions comprising 21.7% of the inventory in 2022-23. Fugitive emissions fell from 53 kt CO2-e to 33 kt CO2-e in 2022-23 compared to 2021-22 due in part to a change in the NGER methodology that saw the proportion of unaccounted for gas (UAG) assumed to be leakage fall from 55% to 37%.[3]

Remaining stationary energy emissions arise from LPG (0.7%), firewood (<0.1%) and fuel oil (<0.1%).

Table 3. Fossil fuel gas emissions(combustion and fugitive) in the ACT (excluding transport)

Fossil fuel gas	Units	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Consumption	GJ	8,158,921	7,597,065	8,221,341	7,822,388	8,448,111	8,123,637	7,938,677	7,821,370	7,860,327	7,917,242	7,802,310
Per capita use	GJ/ capita	21.4	19.6	20.9	19.5	20.5	19.1	18.2	17.5	17.4	17.4	16.8
Fugitive emissions	$ktCO_2$-e	38	33	33	30	35	34	33	46	50	53	33
Combustion emissions	$ktCO_2$-e	378	352	376	358	387	372	368	366	369	371	362

Transport

Ground transport emissions were calculated to be 1,116 kt CO2-e in 2022-23, a 10% increase from 2021-22.

Sales of major transport fuels rose in all categories with petrol rising 13%, diesel rising 8% and all other transport fuels rising a combined 3%. Per capita transport energy use rose 7% to 35.1 GJ per capita, which is still slightly lower than pre pandemic levels (Table 4).

Table 4. Ground transport fuel consumption

Transport fuels	Units	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Petrol (unleaded, E10, E85)	kl	330,838	317,559	315,243	320,310	321,073	321,300	312,014	282,816	295,277	263,472	293,443
Diesel	kl	85,096	91,401	117,193	128,265	137,070	146,269	151,247	144,012	161,827	149,885	161,833
CNG (ACTION)	GJ	-	109,791	108,614	100,089	87,283	85,297	80,585	74,480	90,583	82,058	67,480
LPG	Kl	21,760	15,275	11,404	11,528	9,348	7,211	5,986	4,508	3,647	2,913	2,503
GJ/capita*	GJ							**37.8**	**34.1**	**36.2**	**32.7**	**35.1**

**Not calculated prior to 2018-19 because disaggregated fuel data not available. Note historic values have been restated due to correction of an understatement of the GJ content in ethanol in prior years.*

Table 5 Ground transport emissions in the ACT

Transport fuels	Units	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Total emissions	kt CO_2-e	1,040	1,019	1,083	1,139	1,105	1,056	1,140	**1,047***	1,124	1,016	1,116
Previously stated	kt CO_2-e	1,040	1,019	1,083	1,139	1,105	1,056	1,140	1,147	1,124	1,016	-

**Restated due to typo in previous report*

[3] See clause 17 of National Greenhouse and Energy Reporting (Measurement) Amendment (2022 Update) Determination 2022 (legislation.gov.au)

Aviation emissions were 54 kt CO2-e in 2022-23 or 3% of the total inventory.

Aviation emissions have been calculated in accordance with the GHG Protocol guidance for cities and account for emissions that occur within the jurisdiction. All emissions associated with the landing and take-off (LTO) cycle (including taxi-out, take-off, climb, descent, land and taxi-in) are taken as a proxy for aviation emissions that occur within the ACT boundary. It is assumed that all cruising altitude emissions occur outside of the ACT.

Activity data is sourced from the Bureau of Infrastructure and Transport Research Economics (BITRE) and provides the number of flight movements (departures and arrivals at Canberra airport; see Table 6). Fleet composition and LTO emissions have been estimated based on the top two aircraft used in Australia (Boeing 737-800 and Airbus A-320). LTO cycle emissions have been calculated using the 1.A.3.a Aviation 2 LTO emissions calculator 2019 developed by the European Environment Agency to assist European Union member states in developing their national inventories.

Emissions associated with commercial aviation were between 54 and 60 kt CO_2-e from 2012-13 to 2018-19 and fell to as low as 23 kt CO_2-e at the height of the pandemic. During the inventory year, commercial aviation emissions were 54 kt CO_2-e or 3% of the total inventory, in line with pre-covid levels.

Table 6. Aviation activity data Canberra Airport (Source: BITRE)

Aviation	Units	Baseline	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Arrivals	#	7,569	20,858	20,197	19,354	19,219	19,008	19,303	19,267	14,333	8,236	11,110	18,908
Departures	#	7,523	20,958	20,294	19,435	19,280	19,083	19,370	19,321	14,367	8,250	11,127	18,924

Table 7. Aviation emissions (kt CO_2-e)

Aviation	Units	Baseline	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Aviation fuel consumption	kl	8,315	22,986	22,258	21,325	21,170	20,942	21,265	21,221	15,784	9,068	12,232	20,817
Total emissions	kt CO_2-e	21	60	59	55	54	54	55	55	41	23	31	54

2.2.2 Industrial Processes and Product Use

Emissions from industrial processes and product use (IPPU) were calculated to be 39 kt CO2-e in 2022-23, a 10% decrease from 2021-22 revised estimate.

This category includes emissions from refrigeration and air-conditioning (RAC) systems in the residential and commercial/industrial sectors, mobile air-conditioning (MAC), and medical gases. However, estimation of emissions from medical gases has been avoided for 2022/23 as these emissions are negligible. Emissions from residential RAC are calculated using household data from the Australian Bureau of Statistics (ABS) along with other inputs and assumptions to estimate residential hydrofluorocarbon (HFC) leakage. Commercial RAC-related emissions data are obtained from the Australian Government. Activity data related to MAC were also obtained from the Australian Government.

These emissions represented 2.1% of the 2022-23 inventory or 39 kt CO2-e (see Table 9). IPPU emissions in the ACT arise mainly from HFC gases used in refrigeration and air-conditioning equipment. In 2022-23, this methodology and assumptions were reviewed leading to restatement of historic data. The changes fall into two categories:

1. **Addition of emissions associated with mobile air-conditioning (MAC) units, which increased emissions.** Emissions associated with the use of refrigerants in air conditioners in vehicles have been estimated by extrapolating refrigerant stock and leakage rates from the National Greenhouse Accounts to vehicles registered in the ACT (from ABS Vehicle Surveys). This addition increased ACT IPPU emissions by 8%.
2. **Revised assumptions relating to residential refrigerant emissions, which decreased emissions.** Assumptions used to calculate emissions associated with residential refrigerant use in air-conditioning and fridges were reviewed and revised in 2022-23. The changes and rationale are summarised below in Table 8 and resulted in an 82% reduction in emissions reported in this sector. The main drivers of this large change were significant downward revisions on refrigerant charge and leakage rate assumptions to correct for historic overstatement.

The net effect of the above changes is summarised in Table 9.

Table 8 Revisions to residential refrigerant emissions assumptions

Aspect	Previous value	Revised value	Rationale	Impact
Average charge (kg) per fridge	1	0.275	Value has been edited to align with latest IPCC guidance (See link)	Decrease
Average charge (kg) per AC	4.5	1.93	Previous value has been adjusted to align with Refrigerant Reclaim Australia	Decrease
Average annual leakage rate per fridge	12%	1.7%	Previous value was based on international leakage rates provided by IPCC which assumed very low to zero end of life recovery rates (See link) This is not reflective of Australia therefore assumption has been adjusted to align with the NGA factors (table 9).	Decrease
Average annual leakage rate per AC	9%	3.5%	Previous value was for commercial AC, value adjusted to indicative domestic A/C split leakage rate from NGA factors (table 9)	Decrease
% of homes with AC	47.2%	47.2% increasing to 63% in 2020	Error correction	Increase

Table 9. Industrial processes and product use emissions summary

Industrial processes and product Use (kt CO_2-e)	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Previous methodology	135	137	139	139	147	151	150	157	159	164	-
Changes due to addition of Mobile AC	11	11	12	12	12	13	13	13	13	13	-
Changes due to residential emissions assumptions	-116	-118	-122	-124	-126	-130	-131	-133	-135	-136	-
Change due to error correction	0	0	2	2	3	3	3	2	3	2	-
Revised emissions	**30**	**30**	**31**	**29**	**36**	**37**	**35**	**39**	**40**	**43**	**39**

2.2.3 Agriculture

Agricultural emissions were estimated to be 17 kt CO2-e in 2022-23.

Enteric fermentation accounts for the majority (~85%) of agricultural emissions, followed by agricultural soils and manure management. Enteric fermentation is positively correlated with numbers of meat cattle and sheep and lambs in the ACT. Agricultural emissions have been in decline from 2015-16 in line with a reduction in livestock numbers, with drought and market conditions listed as two reasons why herd sizes have decreased over this time. Emissions for this sector are calculated using the most recent data available from the ABS and are subject to a one-year lag. Emissions for this sector are updated retrospectively when livestock numbers are published.

Table 10. Agriculture emissions summary

Agriculture (kt CO_2-e)	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Total emissions	28	21	22.9	27.6	27.5	23.6	***16****	***13.9****	***17.5****	***17.5***	17.5

**Restated due adjustment of data from calendar year to financial year.*

2.2.4 Land Use, Land-Use Change and Forestry (LULUCF)

Emissions from the LULUCF sector in 2022-23 were -192 kt CO2-e, compared to -254 kt CO2-e in 2021-22 indicating the LULUCF sector is continuing to act as a net sink for carbon emissions in the ACT.

The ACT Government's reporting on LULUCF emissions is based on estimates prepared and published by the Australian Government in annual State and Territory Greenhouse Gas Inventories (STGGI) reports. STGGI reports are usually published approximately 18-24 months after the end of each reporting year. The latest STGGI report, used to estimate the LULUCF emissions this year, was released in April 2022 and it presents data for the year ending 30 June 2020. This means there is currently a time lag in reporting on annual LULUCF emissions estimates, of up to two years.

As noted in previous inventories, the LULUCF emissions source category has been subject to regular method changes at the national level, resulting in material fluctuations in the LULUCF emissions data year-to-year for each state and territory. Furthermore, these method changes have resulted in retrospective changes that extend back to the ACT's baseline year of 1989-90, which has had implications for the entire time series of emissions data. In 2022-23 further changes were introduced resulting in material restatements back to the baseline year (see Table 11).

Method changes by the Australian Government are focused on continually improving the estimates of LULUCF emission sources and removals through the incorporation of new science and technologies and updated data sets. To reduce these year-to-year fluctuations that have impacted the ACT emissions inventory reporting, the ACT Government has adopted a rolling average based on the previous three years of national inventory data for the current year's inventory. This approach smooths the interannual variations to some extent and reduces the extent to which the following year may see a significant increase or decrease and unsettle current considerations about legislated commitments and targets. It also enables the Territory to report on its updated inventory without needing to wait the full 18-24 months for previous financial year reporting. The ACT Government intends to continue using the Australian Government's authoritative datasets, and material changes in the LULUCF emissions source category will continue to be incorporated over time, although the impact will be expressed through changes that are averaged over several years.

The 2022-23 estimates for the LULUCF sector indicate that it has continued to act as a net sink for the ACT although removals were lower in 2022-23 compared to the previous year.

Table 11. Historic LULUCF emissions (kt CO2-e)

LULUCF (kt CO_2-e)	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Forest land	54	100	43	-144	-124	-245	-287	-193	-189	-242	-223
Cropland	147	53	6	399	-64	-60	60	-2	51	-1	24
Grassland	49	36	13	-12	-23	-21	-8	0	13	-10	6
Wetland	2	2	3	3	3	3	0	2	3	3	3
Settlements	9	8	8	2	6	3	-2	3	6	1	4
Harvested wood	-10	-8	4	-2	-4	-3	-8	-6	-8	-6	-7
Total emissions	**251**	**192**	**75**	**246**	**-207**	**-323**	**-244**	**-197**	**-124**	**-254**	**-192**
Previously stated	**108**	**179**	**78**	**-87**	**-76**	**-156**	**-200**	**-97**	**-144**	**-171**	

2.2.5 Waste

In 2022-23, emissions from landfill were 175 kt CO2-e, having increased by 25% compared to last year. Emissions from wastewater have risen slightly by 2% to 6 kt CO2-e in 2022-23.

Waste-related emissions fall into two separate sub-categories – methane emissions from the breakdown of organic materials in solid waste sent to landfill, and emissions of methane and/or nitrous oxide from the treatment of wastewater.

Emissions from landfill

In the ACT, solid waste emissions arise from the active Mugga Lane landfill site and the closed West Belconnen site. Because the breakdown of organic solid wastes in landfill sites is very slow, most of the methane emissions arise from legacy waste, sent to landfill as long as thirty or forty years ago. ACT waste emissions are estimated using the Solid

Waste Calculator workbook, built by the Clean Energy Regulator for use as a reporting tool by organisations required to report under the National Greenhouse and Energy Reporting Scheme.

Several years ago, the model was populated with annual disposal data provided by ACT NoWaste, extending back to 1975. Estimates for each successive year are made by adding, at the appropriate place in the model, the reported volume of waste sent to landfill during the year, and the volume of landfill gas captured and either used in engines to generate electricity or flared. Data on gas captured and burnt prior to 2019-20 has been supplied by LGI (Landfill Gas Industries) and previously by Energy Developments Ltd (EDL).

For a given waste stream composition, landfill gas emissions, the net amount of capture and flaring, are a complex function of several factors, which include the quantity of waste to landfill during the inventory year, the year-on-year profile of quantities sent in past years (extending back as much as two or more decades), the volume of gas captured and flared during the inventory year, and the year-on-year profile of capture and flaring in past years. Emissions from landfill have varied by as much as 75% over the inventory years 2012-13 to 2022-23 driven primarily by methane flaring volumes.

Table 12. Historic emissions from waste to landfill

Emissions from waste to landfill	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
(kt CO2-e)	90	103	116	119	102	73	93	126	159	140	175

Emissions from wastewater

Wastewater emissions were 6 kt CO2-e or ~0.3% of the total inventory in 2022-23. Wastewater emissions consist of methane and nitrous oxide released during the digestion treatment process used at Lower Molonglo Wastewater Quality Control Centre. Emissions from wastewater treatment are largely proportional to population and have shown a gradual increase over time, however a change to NGER Determination legislation in 2020 reduced the emission factor for nitrous oxide released from wastewater discharged into enclosed waters from 4.9 to 2.082 tCO2-e/t nitrogen produced[4]. This has caused emissions to fall ~50% from FY20-21 values. This change has been reflected in the data for 2021-2022 which has been restated from 13 to 6 kt CO2-e.

Table 13. Historic emissions from wastewater

Emissions from waste water	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
(kt CO2-e)	11	11	11	11	12	12	12	13	***6****	6

**Restated after 2020-21 changes mentioned above*

3. PROGRESS TOWARDS MEETING THE ACT TARGETS

3.1 The ACT greenhouse gas emissions targets

Compared to 1989-90 levels, the ACT's total emissions have fallen by 47%. The ACT has an interim emissions reduction target in 2025 of a 50 to 60% reduction from 1989-90 levels.

The ACT's emission reduction targets are legislated under the *Climate Change and Greenhouse Gas Reduction Act 2010.* Its principal target is to reduce GHG emissions to achieve zero net emissions in the ACT by 30 June 2045.

The ACT's interim targets are to reduce GHG emissions from 1989-90 levels by:

[4] See clause 38 of National Greenhouse and Energy Reporting (Measurement) Amendment (2020 Update) Determination 2020 (legislation.gov.au) and section 5.31 of National Greenhouse and Energy Reporting (Measurement) Determination 2008 (legislation.gov.au)

- 50 to 60% by 2025
- 65 to 75% by 2030
- 90 to 95% by 2040

The ACT has made progress towards its next interim target in 2025. As shown in Table 14, since 1989-90, emissions have decreased by 47%. This has been largely due to the ACT achieving its renewable energy target in recent years. The remaining 3% reduction required to meet the 2025 interim target requires changes to point-of-consumption technologies (e.g. zero emissions vehicles and/or a transition away from fossil fuel gas) and achieving this can take time. This assessment is made while noting that methodology changes and refinements at the national inventory level are ongoing and may result in further variations for key sectors such as LULUCF.

Another target relates to per capita emissions. The average amount of GHG emissions produced per person in the ACT each year was required to peak by 30 June 2013. Based on the table below, we note that per capita emissions peaked in 2012-13 and there has been a pronounced downward trend since.

Table 14. Progress towards emissions reduction targets

Year	1989-90	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Total emissions (kt CO_2-e)	***3,041****	***4,221****	***4,050****	***4,087****	***4,337****	***3,838****	***3,539****	***3,661****	***1,498****	***1,674****	***1,436****	***1,622****
Change relative to 1989-90	NA-	***39%****	***33%****	***34%****	***43%****	***26%****	***16%****	***20%****	***-51%****	***-45%****	***-53%****	***-47%****
Per capita emissions (tCO2-e)	***11.0****	***11.1****	***10.5****	***10.4****	***10.8****	***9.3****	***8.3****	***8.4****	***3.4****	***3.7****	***3.2****	***3.5****

**Restated after changes mentioned above*

3.2 The ACT renewable energy target

The ACT reached this milestone in 2019-20 and continues to maintain the target in 2022-23.

The renewable energy target is legislated under the *Climate Change and Greenhouse Gas Reduction Act 2010.* The ACT has a target of a 100% renewable electricity supply on and from 1 January 2020. Refer to section 2.2.1 for further details.

APPENDIX 1 DETAILED ACT EMISSIONS SOURCES 2022-23

Emission source (IPCC Categories)	Subcategories		2022-23 emissions (kt CO_2-e)
1 Energy			**1,577**
1.A Fuel Combustion	Stationary energy	***374***	
		Electricity	*0*
		Fossil fuel gas combustion	*362*
	Stationary LPG	*11*	
	Fuel oil	*<1*	
	Wood fuel	*<3*	
	Ground transport	***1,116***	
		Petrol	*582*
		Diesel	*440*
		LPG	*4*
		All other fuels	*90*
1.A.3.a Domestic aviation		***54***	
1.B. Fugitive Emissions from Fuels	Fossil fuel gas		*33*
2. Industrial processes			**39**
2.F Product uses as substitutes for Ozone Depleting Substances	Refrigeration and air conditioning		*39*
3. Agriculture			**17**
	Enteric fermentation		*15*
	Manure management		*1*
	Agricultural soils		*2*
4. LULUCF			**-192**
	Forest land		*-223*
	Cropland		*24*
	Grassland		*6*
	Wetland		*3*
	Settlements		*4*
	Harvested Wood Products		*-7*
5. Waste			**180**
	Landfill emissions		175
	Wastewater		6
Total			**1,622**

Note: Numbers may not sum due to rounding.

APPENDIX 2 SUMMARY OF 2021-22 RESTATEMENTS

Inventory aspect	2021-22 historic (tCO2-e)	2021-22 revised (tCO2-e)	Difference	Reason for change
Electricity	0	0	0	
Fossil fuel gas combustion	370,984	367,178	-3,806	Minor historic restatement due to error corrected
LPG	14,787	14,787	0	
Fuel oil	130	130	0	
Wood fuel	455	455	0	
Fossil fuel gas - fugitive emissions	53,140	53,140	0	
Ground transport	1,015,846	1,015,871	25	Minor historic restatement due to error corrected. E10 and E85 not correctly accounted for
Aviation	31,429	31,429	0	
IPPU	164,047	42,984	-121,062	Change to assumptions for residential refrigerant leakage and addition of mobile air conditioning leading to restatement of historic data. See section: 2.2.2
Agriculture	13,731	17,451	3,720	Data adjusted from calendar year data to FY data
LULUCF	-171,242	-253,919	-82,678	Major historic restatement due to broad changes to methodology and data revisions in the National Inventory. See tables 5.28, 6.4.18, 6.4.23,6.5.4, 6.5.7, 6.6.2, 6.6.11, 6.7.5, 6.7.7, 6.8.2, 6.8.5 and 6.10.7, in National Inventory Report 2021, Volume 1 (dcceew.gov.au)
Waste	140,345	140,345	0	
Wastewater	13,214	5,436	-7,778	FY21 restated due to change in emission factor for nitrous oxide released from wastewater discharged into enclosed waters from 4.9 to 2.082 tCO2-e/t nitrogen produced. See section 2.2.5 - emissions from wastewater