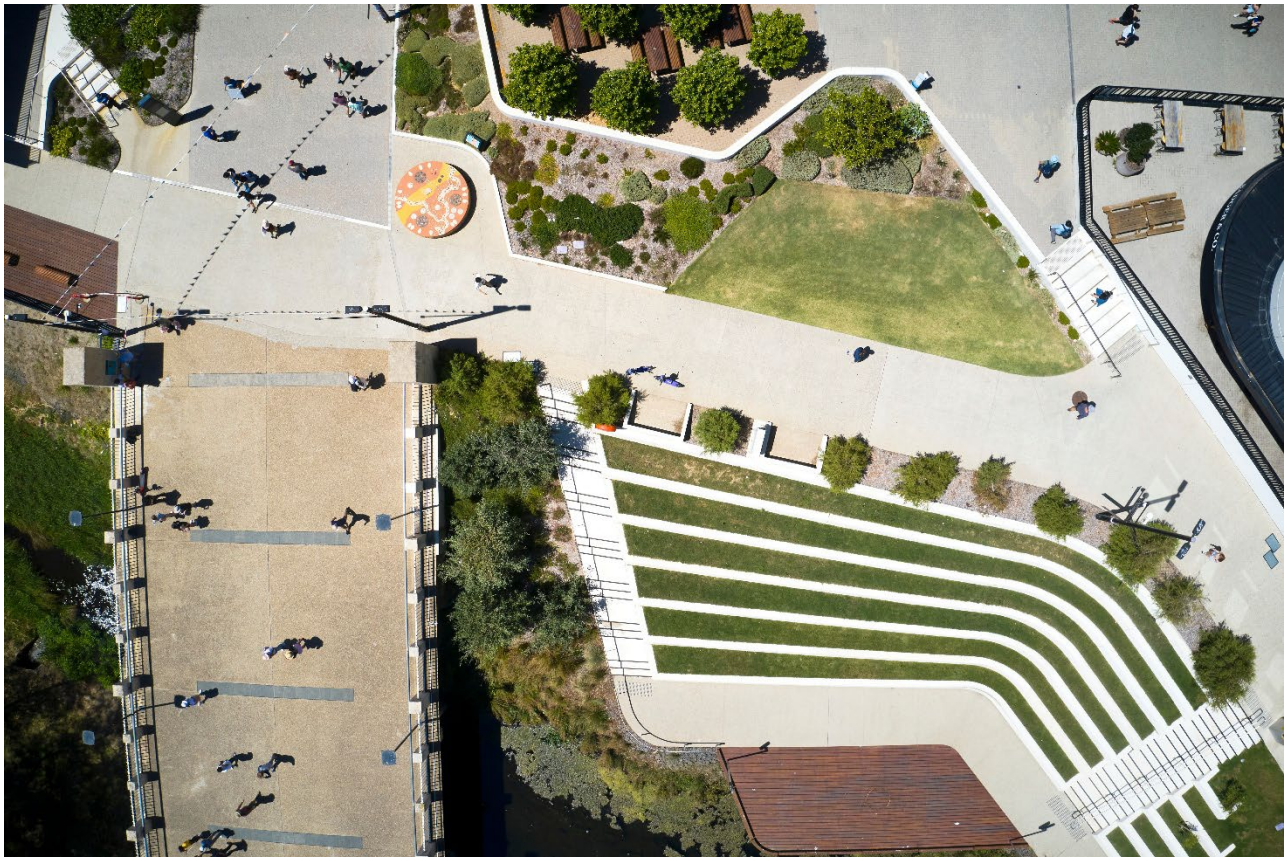
Australian National University

Carbon Accounting Methodology 2024



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Contents

Introduction

This report documents the methodology which ANU uses to calculate its carbon footprint. It outlines the carbon emissions boundary, and the sources that are included in, and excluded from, the carbon footprint. It maps assumptions made and outlines improvement plans where applicable.

The University reports on greenhouse gas emissions annually based on a calendar year and uses this information to guide areas for climate action, to review emissions reduction strategies and to track change in emissions over time.

In accordance with carbon accounting principles, we aim to share the methodology as transparently, accurately and completely as possible. This is a continuing journey of improvement, with this report containing details on our data improvement plans. We are committed to increasing both accuracy and completeness over time.

We will update this methodology each year based on the previous year's emissions, identifying any changes in methodology, emissions boundary, emissions factors, and other relevant changes.

Overview

This section outlines the standards and guidelines used to develop the emissions footprint and identifies what is included in, and excluded from, the University's emissions reporting boundary.

Standards and guidelines

ANU uses the global Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol)[1] as the basis for annual carbon accounting and reporting. We are also guided by sector specific guidance in the Standardised Carbon Emissions Framework for Further and Higher Education (SCEF), developed by EAUC (UK Alliance for Sustainability Leadership in Education)[2].

In addition to voluntary reporting, we are required to report under two schemes, using scheme specific guidelines:

- National Greenhouse and Energy Reporting Scheme (NGER)[3]. The NGER methodology is derived from the GHG Protocol with some differences in reporting boundaries and methodologies[4].
- Commonwealth Climate Disclosure Policy[5]. The emissions reporting framework generally follows NGER methodology, but with additional Scope 3 emissions categories being added each year[6]

Both regimes use Australian financial year (July – June) reporting.

This report outlines the methodology that ANU uses for its voluntary accounting and reporting. The University uses the calendar year as its financial year, including for carbon accounting and reporting on emissions.

Whilst the carbon accounting methodology aligns with both the mandatory regimes there are differences in the emissions reported due to:

- the differing timeframes,
- different inclusions - ANU voluntarily reports a broader range of emissions, aiming for full disclosure of all Scope 1,2 & 3 emissions

[1] https://ghgprotocol.org/corporate-standard
[2] https://www.eauc.org.uk/scef
[3] https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme
[4] NGER reporting does not include refrigerants (HFC) other than SF6. ANU voluntarily reports on emissions from refrigerants. NGER operational boundary definition is different to the GHG Protocol.
[5] https://www.finance.gov.au/government/climate-action-government-operations/commonwealth-climate-disclosure
[6] In 2023/24 additional inclusions were domestic flights, refrigerants (optional), hire cars, travel accommodation and solid waste to landfill.

Base year

The base year for ANU greenhouse gas (GHG) emissions reporting is the 2019 calendar year. The original base year included Scope 1 and 2 emissions plus waste and university travel. That year, being prior to COVID, was considered a representative year for ANU operations, and the first where good quality data was available. A calendar year was chosen as this aligns with the ANU fiscal year.

The base year is used to assess the University's progress in emissions reduction and achieving our targets. ANU has a base year recalculation approach as per Appendix A.

ANU organisational and operational boundary

Organisational and operational boundaries together define which assets, operations and activities are included in the University's GHG inventory. Setting clear boundaries is a fundamental part of carbon accounting and reporting, enabling ANU to be:

- consistent about what is reported
- complete about reporting the emissions for which we are responsible, and
- transparent about what is included and excluded.

Organisational boundary

The organisational boundary defines which parts of the University are assessed for inclusion in the GHG inventory. The organisational boundary applies to the ANU and includes assets and services within the following University sites, as well as activities that occur across the whole University.

Inclusions

- Main campus (Acton), ACT
- Mount Stromlo Observatory (MSO), ACT
- Spring Valley Farm (SVF), ACT
- Black Mountain, ACT
- Northern Australian Research Unit (NARU), NT
- Siding Springs Observatory (SSO), NSW
- Kioloa Coastal Campus, NSW
- Rural Clinical Schools (RCS), NSW & NT
- Warramunga Seismic Station, NT
- Leased tenancies

Exclusions

The following sites and entities are excluded from the organisational boundary for emissions reporting.

- China Liaison Office, Beijing
- North American Liaison Office
- ANU (UK) Foundation
- Clinical Training Facilities that are joint initiatives with University of Canberra (UC) and where UC controls utility bills (Bega, Cooma, Moruya, Goulburn)

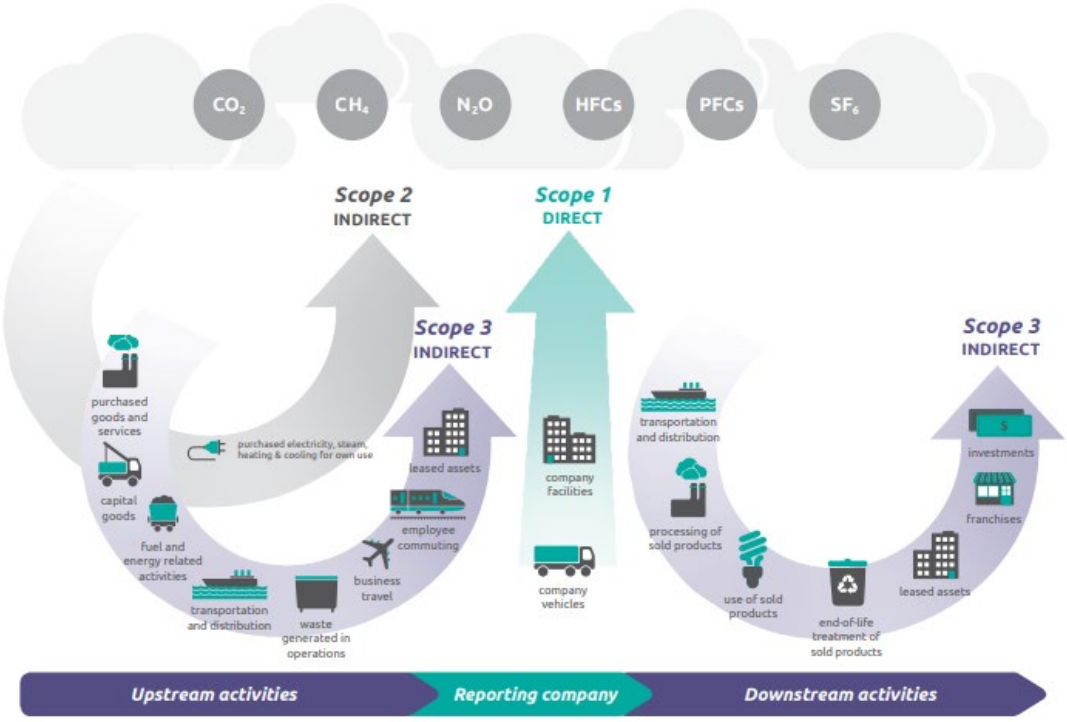
Operational boundary

The University's operational boundary defines which emissions sources are included in ANU reporting. Emissions sources are divided into 3 scopes, as defined by the GHG Protocol and shown in Figure 1.

There are many activities within ANU's entire value chain that can generate emissions.

- Scope 1 - direct emissions from ANU sites including burning of fuels in gas boilers, generators and company-owned vehicles, as well as fugitive emissions from refrigerants and laboratory gases
- Scope 2 - covers indirect emissions from the generation of purchased energy consumed by the organisation – in the case of the University this is electricity
- Scope 3 - other emissions that are not under the University's direct operational control but that are associated with the entire ecosystem of the organisation – its value chain.

Figure 1: overview of GHG Protocol scopes and emissions across the supply chain



To assess which assets and services are within the University's operational boundary we use the operational control approach, as defined in the NGER legislation:

> *A person will have operational control over a facility if they have the authority to introduce and implement any or all of the following for the facility:*
>
> - *operating policies*
> - *health and safety policies*
> - *environmental policies, or*
>
> *where more than one corporation has the authority to introduce and implement any or all of these policies, the corporation that has the greatest authority to introduce and implement operating policies and environmental policies has operational control over the facility.*

This definition differs slightly from the GHG Protocol definition of operational control however the University uses the NGER definition to maintain alignment with our mandatory reporting requirements. This means we include emissions sources within our Scope 1 & 2 emissions, such as some student accommodation, that might otherwise be Scope 3 emissions.

The following sites are currently excluded from the GHG inventory:

Table 1: Exclusions from ANU GHG inventory

Sites/assets/activities excluded	Reason for exclusion
Rural clinical schools – long term student residence (LTR) in Bega, Mossy Point, Goulburn and Cooma	Students are responsible for organising their utility contracts so difficult to get the data. Emissions assessed as being immaterial
Rural clinical schools –two sites in NT	These two sites are considered immaterial and are not part of the Darwin-Katherine Interconnected System (electricity grid)
NCEPH office, Wollongong	Leased site - All-inclusive rental cost so difficult to get data and energy use is considered immaterial
ITS hub, Townsville	Leased site - All-inclusive rental cost so difficult to get data and energy use is considered immaterial
BBQ gas bottles	These are excluded across all ANU sites and are considered immaterial

Changes to the inventory

This report is the first detailing our carbon accounting methodology. Any changes will be reported in this section each year. Changes to emissions reported on a year-by-year basis can be due to changes other than emissions reduction, including changes to methodology, emission factors and/or ANU operational boundary/inclusions. This section details these other changes and where necessary will quantify any impact on the overall carbon footprint.

Operational boundary changes

In 2024 the following operational boundary changes occurred:

Table 2: Operational boundary changes

Site/activity	Changes in 2024	GHG approximate impact
RCS, 11 McKenzie St, Goulburn	New inclusion	Negligible
RCS, U5/103 Bombala St, Cooma	New inclusion	Negligible
RCS, U2 73 Lynch Street, Young	No longer included	Negligible
RCS, 3/19 Eden Street, Bega	New inclusion	Negligible
RCS, 7 Pacific Street, Batemans Bay	New inclusion	Increase 8tCO_2-e
Sydney office	Lease ended June 2024	Negligible
Unit 6/6 Dacre Street	ANU lease ended in Mar 2024	Reduction 0.5tCO_2-e
1 Arnott St	ANU lease ended in April 2024	Reduction 32tCO_2-e
Faulkner Court, MSO	New inclusion August 2024	Increase 11tCO_2-e
136 Narrabundah Lane, ACT	New leased site from 2023	Increase 8.5tCO_2-e

Emission factor changes

The Jurisdictional Renewable Power Percentage (JRPP) for the ACT changed from 74.1% to 79.51%. The figure is for a financial year - for calendar year an average of the two years is applied. The Renewable Power Percentage (RPP) for 2024 is 18.48%.

Methodology changes

This is the first methodology report and therefore any changes will be documented for the first time next year.

GHG emissions

This part of the report outlines the emissions methodology for the three different scopes. For each emissions source there are details of the data sources, any assumptions made, any exclusions, a data improvement plan where applicable and the calculated GHG emissions with relevant emission factors and units.

The University's full emissions footprint can be found in Appendix C, as published in the ANU 2024 Annual Report.

Scope 1

The University's main scope 1 emissions sources are:

- combustion of natural/mains gas for heating
- transport fuel (diesel, petrol and LPG) used by ANU owned or leased vehicles
- stationary fuel (LPG/bottled gas for sites not on the main gas network, diesel generators, hand tools/equipment)
- fugitive emissions (HFCs and SF6) from the use of refrigeration, air-conditioning, heat pumps and laboratory gases

There are also Scope 3 emissions associated with some of these sources (e.g. grid distribution losses for electricity; raw material extraction, refinement and transportation for fuels). These are reported separately in *Scope 3 Fuel & energy related activities* section.

Natural Gas

The University's Acton campus in Canberra is the main consumer of natural gas, used for winter heating. Other sites with natural or mains gas are Mount Stromlo Observatory (MSO) and some of our NSW Rural Clinical School buildings. Some other sites use bottled or tank gas for heating purposes. These are reported separately under stationary fuels.

Data sources

1. Natural gas (GJ) from supplier invoices and sub-meter readings
2. Emission factors from the annual National Greenhouse Account (NGA) Factors for stationary combustion of natural gas distributed in a pipeline

Assumptions

No assumptions required.

Exclusions and data improvement plan

Some Rural Clinical School data on natural gas was unavailable. We are working towards including a full data set in the next round of reporting.

Methodology

The supplier invoices give the total quantity of gas consumed in gigajoules (GJ) for each site, which is then multiplied by the emission factor for the period. The methodology is taken from the NGA Factors.

Emissions

Emissions Source	Data source	Energy Content Factor	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
Natural Gas	Invoices	N/A	51.53	237545	GJ	12241

Transport fuels

Transport fuels mainly cover the University's fleet of vehicles (mainly vans, trucks, utilities and 4WDs, as well as some passenger cars). ANU also owns other non-road vehicles such as forklifts, tractors and ride-on mowers. These are included here. Forklifts run on exchangeable LPG gas bottles and the tractors and ride-on mowers are generally supplied by on-site diesel tanks/pods.

Data sources

1. Vehicle fuel consumption (kL) and fuel type (diesel, petrol, LPG) from fleet provider
2. Invoices from LPG and diesel oil suppliers
3. Emission factors from annual NGA Factors for transport fuel emissions (diesel oil, gasoline, LPG)

Assumptions

Some on-site diesel tanks (such as those at Siding Springs) are used for both stationary (generator) and transport (ride-on mower, tractor) purposes. Where this is the case, the greater use has been taken since separation is difficult.

Exclusions and data improvement plan

Some forklifts may be excluded – a full inventory of assets is needed to quantify all sources of diesel oil and LPG consumption across all ANU sites. This will be completed over the next year.

There are currently five hybrid electric (HEV) cars in the ANU fleet. These are all non-plug-in hybrid vehicles and therefore no separate electricity use is reportable.

Methodology

Vehicle fuel consumption (kL) is multiplied by the relevant energy content factor and emission factor for the relevant asset class (heavy/light commercial, passenger) and fuel type (e.g. diesel oil, gasoline/petrol).

Other non-road transport is calculated in the same way. For LPG for forklifts the kilogram weight bottles of gas are converted to litres and then multiplied by the relevant energy content factor and emission factor.

Emissions

Emissions Source	Data source	Energy Content Factor	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
Diesel - fleet	Fleet provider, Invoices	38.6	70.37 (Heavy) 70.41 (All other)	61576	Litres	167
LPG - forklifts	Invoices	26.2	61.00	1411	Litres	2.3
Petrol - fleet	Fleet provider	34.2	67.62	46861	Litres	108
Non-road transport – diesel	Invoices, fuel card	38.6	70.41	3124	Litres	8.6
Total						**286**

Stationary fuels

Stationary fuels are those not related to transport and include petrol for small equipment/hand tools (mainly for maintenance/parks & gardens), diesel oil for generators and LPG (bottled gas) for heating. Natural gas combusted for heating is also a stationary fuel but is reported separately for emissions tracking purposes.

Data sources

1. Fuel cards for gasoline and some diesel tanks
2. Invoices from local suppliers of LPG who fill tanks or replace gas bottles as needed and filling of diesel tanks
3. Emission factors from annual NGA Factors for stationary combustion of liquified fuels - automotive gasoline/petrol, diesel oil and liquid petroleum gas (LPG)

Assumptions

No assumptions were necessary.

Exclusions and data improvement plan

BBQ gas bottles are excluded as it is too time consuming to collect this data and it is considered insignificant (<1% of total emissions).
Petrol for small hand tools was excluded as this is considered negligible with an ongoing program to change tools to electric where possible.
Some Rural Clinical School data on LPG was unavailable. We are working towards including this data in the next round of reporting.

Methodology

For LPG, invoices with LPG quantities supplied in either litres or kilograms are converted to kilolitres and multiplied by the energy content factor (ECF) and the relevant emission factor for the period. The methodology is taken from the NGA Factors report.
Diesel fuel consumption (kilolitres) is multiplied by the relevant ECF and emission factors for the fuel type. The methodology is taken from the NGA Factors report.

Emissions

Emissions Source	Data source	Energy Content Factor	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
LPG	Invoices	25.7	60.6	34	kL	53
Diesel	Invoices, fuel card	38.6	70.2	3.5	kL	9.5
Total						**63**

Refrigerants and laboratory gases

ANU uses refrigerant gases (HFCs) for air-conditioning and other refrigeration and in heat pumps. We also use sulphur hexafluoride (SF_6), one of the most potent greenhouse gases, in the Heavy Ion Accelerator Facility located on the Acton campus. We use a range of laboratory gases, the majority of which are not greenhouse gases.

Data sources

1. Refrigeration service contractors provide amount of refrigerant recharged and type
2. Research School of Physics (Heavy Ion Accelerator Facility) for SF_6
3. Global Warming Potentials (GWP) for refrigerants are from IPCC Fifth Assessment report (AR5) - NGA Factors Appendix 2

Assumptions

It is assumed that top-ups of refrigerants within systems equate to losses from the system. This assumption accords with GHG Protocol Guidance.
For SF_6 the financial year estimation is used, until an improved measurement project is implemented.

Exclusions and data improvement plan

Refrigerant R22 has been excluded as it is not a reportable gas under the Kyoto Protocol. Laboratory gases were excluded in 2024 due to data not being made available in time by suppliers. With the data available at the time of publishing, these emissions were estimated to be approximately 30 tCO_2e (<1% of total emissions). A robust approach to data collection and assessment will be developed in 2025 to ensure that data is received from suppliers in a timely and consistent manner, to allow for inclusion in the inventory.

HFC

We are working with our service contractors on templates for refrigerants to ensure that all relevant lifecycle data including installation, servicing and disposal emissions are accounted for and reported. At present we are reporting on all servicing emissions and some disposal emissions.

SF_6

Currently, SF_6 emissions are estimated based on changes in tank pressure.
We are currently undertaking a load cell project which will install a very high precision (accuracy of <0.0015%) weighing system to the existing SF_6 storage tank. This will allow emissions to be reported annually, based on true empirical data, accurate to 5kgs.

Methodology

Hydrofluorocarbons (HFCs)

ANU uses the Lifecycle Stage Approach in the GHG Protocol Guidance on Refrigeration and Air-Conditioning Equipment.

This method requires information on the quantity of refrigerant used to service equipment and the quantity of refrigerant recovered and recycled from retiring equipment.

It can be summarized as follows: E = (IE + S + DE) x GWP x CF where:

E = emissions from refrigeration/air-conditioning in carbon dioxide equivalents (tonnes)
IE = installation emissions (refrigerant used to charge new equipment – total full charge of new equipment. This is omitted if the equipment has been pre-charged by the manufacturer)
S = quantity of refrigerant used to service equipment
DE = disposal emissions (total full charge of retiring equipment - refrigerant recovered from retiring equipment)
GWP = the 100-year global warming potential of the refrigerant
CF = the tonnes from kilograms conversion factor = 1 tonne/1000 kg

Sulphur Hexafluoride (SF_6)

SF_6 is used in our Heavy Ion Accelerator Facility and any losses (kg) due to leaks/servicing are currently estimated by the Research School of Physics on an annual (Australian financial year) basis. The data is provided to the Sustainability team every July. Once the load cell project is completed, we will be able to more accurately report on calendar year emissions.

Emissions

Emissions Source	Data source	GWP (AR5)	Data	Unit	Emissions (tCO_2-e)
R134	Service Contractors	1120	147	kg	165
R32	Service Contractors	677	5.9	kg	4
R404a	Service Contractors	3943	45	kg	178
R410a	Service Contractors	1923	56	kg	107
SF_6	Research School of Physics	23500	54.8	kg	1288
Total					**1742**

Scope 2

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by ANU.

We collect data on our electricity use from all the sites within our operational control. We also report some electricity use for sites outside our operational control but within our Scope 3 boundary. We calculate and report on both location and market-based emissions from electricity use[7].

The Acton campus essentially operates on a micro-grid with a main utility invoice for most of the campus and many sub-metered buildings. However not all buildings are sub-metered. Given the need to accurately measure electricity consumption for different buildings within the Acton campus and in sub-sections of buildings e.g. for cafeteria leases, we are working on improving accuracy over time by upgrading sub-metering and associated monitoring.

ANU has several solar installations (1.1MW installed capacity at the end of 2024) at both Acton and Mount Stromlo Observatory. Almost all the renewable energy generated is used on campus and is measured as a reduction in electricity imported from the grid.

Data sources

1. Electricity invoices
2. Skyspark energy management system
3. Emissions Factors from annual NGA Factors for both location and market-based approaches
4. Inverter data from solar PV

Assumptions

No assumptions were necessary.

Exclusions and data improvement plan

Some student accommodation is excluded as it is privately owned and managed and outside of ANU operational control. These are reported in Scope 3 Student accommodation.
Long term residences for students at the rural clinical schools are excluded as the utility supply is the responsibility of the students and so is difficult to source. The emissions are small and are considered immaterial.

Premises that ANU leases out to third parties, such as cafes on campus are currently included as Scope 2 as we do not have the necessary sub-metering in place. Once this sub-metering is finalised, we will report leased premises in Scope 3.

Methodology

The total electricity consumption (kWh) from utility invoices is multiplied by the emission factors for sites in each state/territory, as per the data and methodology in the NGA factors report.

Market-based electricity accounting includes the annual Renewable Power Percentage (RPP) and the ACT's Jurisdictional Renewable Power Percentage (JRPP). In 2023 these were 18.96% and 74.13% respectively. In 2024 the RPP is 18.48% and the JRPP is 79.51%. This gives a renewable percentage of 98%. ANU reports emissions per calendar year and the JRPP is based on a financial year, therefore the adjusted JRPP for CY2024 which was applied is 76.82%.

[7] Location-based accounting measures the actual emissions associated with the electricity *supplied* via the grid to ANU. The market-based method focuses on emissions associated with electricity *purchased* by ANU including contractual agreements like Renewable Energy Certificates or Greenpower.

Market-based electricity is calculated by applying the relevant RPP and JRPP to the total energy consumption for each state and then applying the national residual mix factor to the remaining energy. The national residual mix factor for 2024 was 0.81 for Scope 2 emissions.

Emissions (location-based)

Emissions Source	Data source	Data	Unit	Emissions (location based) (tCO_2-e)
Electricity - ACT	Invoices	105,434,240	kWh	70641
Electricity - NSW	Invoices	1,826,653	kWh	1224
Electricity -NT	Invoices	83,388	kWh	46
Electricity – generation	Inverter readings	259,000	kWh	-
Total				**71911**

Emissions (market-based)

Emissions Source	Data source	Data	Unit	Emissions (market based) (tCO_2-e)
Electricity - ACT	Invoices	105,434,240	kWh	4014
Electricity - NSW	Invoices	1,826,653	kWh	1206
Electricity -NT	Invoices	83,388	kWh	55
Total				**5275**

Scope 3

Scope 3 emissions include all indirect emissions (except Scope 2 electricity).
These emissions occur from sources within the University's value chain but are controlled by other entities e.g. waste management contractors, service contractors, supply of materials and services, lessees and lessors. It also includes business travel by ANU employees, as well as staff and student commuting.

To assess our Scope 3 emissions, ANU has used the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard and the EAUC Standardised Carbon Emissions Framework for sector specific emissions sources. An assessment of relevance of all emission sources was completed in 2023 applying these standards. The completed assessment of relevance is included in Appendix C. During the preparation of the 2024 inventory, ANU participated in the working group for a project facilitated by the Tertiary Education Facilities Management Association (TEFMA) and Australasian Campuses towards Sustainability (ACTS) to develop a detailed Scope 3 emissions tertiary education guideline for Australasia. This guideline, when published in early 2025, will align with the ANU inventory method and provide a consistent methodology for the sector.

This year is our first time reporting comprehensively on our Scope 3 emissions and is a high-level estimate, particularly in the categories of goods and services and capital goods. Over the coming years we aim to increasingly improve the accuracy of these emissions, based on working with our suppliers to identify more specific emissions data.

Inclusions and exclusions

The below table gives an overview of which Scope 3 emissions are included when mapped against the GHG Protocol categories (1-15). A materiality assessment was completed which is included in Appendix C.

GHG category	Upstream Category	Included/Excluded
1	Purchased goods and services	Included
2	Capital Goods	Included
3	Fuel and energy related activities (grid transmission losses, well to tank)	Included
4	Upstream transportation and distribution (freight/postage)	Included
5	Waste generated in operations (incl. wastewater and solid waste)	Included
6	University (business) travel	Included
	Business accommodation	Included
7	Employee commuting Employee Work from Home	Included Included
8	Upstream leased assets	Some included[8]
	Downstream Category	
9	Downstream transportation and distribution Student travel (termtime and place of origin) External College residences (not included in Scope 1 or 2)	Excluded – not relevant Included Included
10	Processing of sold products	Excluded – not relevant
11	Use of sold products	Excluded – not relevant
12	End of life treatment of sold products	Excluded – not relevant
13	Assets owned and leased out (e.g. cafes)	Currently included in Scope 1 and 2
14	Franchises	Excluded – not relevant
15	Investments	Included

ANU does not report any downstream transportation or distribution of goods or products (all upstream delivery is included in Category 4) but externally run student College residences that are not under the University's operational control are reported as Category 9. Since almost all student accommodation is within the University's operational control most accommodation is reported as Scope 1 and 2. The only exceptions to this are John XIII, Burgman and Gowrie Hall.

Categories 10, 11 and 12 are not reported as ANU does not produce and sell products, rather the product is knowledge and student educational experiences. Category 13 is not reported currently as these emissions are included in Scope 1 and 2. ANU does not have any franchises, so Category 14 is excluded. Guidance in the GHG Protocol clarifies that Category 15 is primarily for private financial institutions (e.g. commercial banks) but also is relevant to other entities with investments not included in Scope 1 and 2, therefore they are included here.

[8] See Operational Boundary section for exclusions

Purchased goods and services and capital goods

Data sources

Categories 1 and 2 account for operations within the University's supply chain that are not included in the other Scope 3 categories. The two categories are combined here, as the data for both comes from the University's financial system. The financial software used by ANU is Oracle Peoplesoft, and all employee purchases are made through this system. Expenditure is identified in the Chart of Accounts, with over 270 accounts. These have also been mapped against a set of categories identified by the Australian University Procurement Network (AUPN). Data sources used were:

- Emission factors based on $ spend (input output data from FootprintLab Pty Ltd)
- Emission factors for water system (Icon Water)

Assumptions

Categories 1 and 2 include very broad assumptions around emission factors for different categories. Although there are 270 expenditure categories, the variation of products and services within each category and consolidated invoicing makes allocation of specific emission factors highly complex and difficult. This means that these categories are for the most part highly inaccurate and serve to give an idea of magnitude only.

Exclusions and data improvement plan

The emissions in Categories 1 and 2 are based on spend-based emissions factors ($/ tCO_2e) which is the least accurate methodology for estimating emissions. Spend-based emissions factors rely on input output databases (IO).

The University will work towards improving the accuracy of these categories by engaging with our suppliers to identify supplier-specific data where possible. We aim to start working on this first with our major suppliers from 2025 onwards, with an ongoing commitment to improvement.

Methodology

Total expenditure in each of the AUPN L3 and L4 categories was identified and relevant spend based emissions factors applied. Where the categories contained many different products and/or services the largest % of expenditure in that category was allocated. This approach gives a high-level indication of emissions for screening and investigation purposes. In some cases, the categories were split to allow the application of more representative emission factors. As discussed in the data improvement plan, the next stage is to work with specific suppliers to improve the data.

It is important to ensure that emissions reported in other Scope 3 categories are removed from these two categories to avoid 'double counting'. Several categories were removed where more accurate data was available. Categories that were removed include utilities (natural gas, electricity and water supply), waste management, business travel and accommodation, and property rental. This is because there are more accurate ways to calculate emissions for these sources than estimates based on spend e.g. meter readings, supplier invoices, travel management company data on distance and mode of travel for staff business travel. In addition, many of these are reporting in separate categories to Cat 1 &2.

Expenditure categories removed as more accurate data available

AUPN L3	AUPN L4	Account description	Reporting category
Plant & Vehicle operational costs	Fleet management	Misc Creditor – Fuel card	Scope 1
Transportation expenses	Airfares	Domestic Travel - Airfares	Cat 6
Transportation expenses	Airfares	International Travel - Airfares	Cat 6
Transportation expenses	Car hire	Domestic Travel - Car Rental	Cat 6
Transportation expenses	Car hire	International Travel - Car Rental	Cat 6
Travel expenses	Accommodation	Domestic Travel - Accommodation	Cat 6
Travel expenses	Accommodation	International Travel - Accommodation	Cat 6
Travel expenses	General travel expenses	Domestic Travel -Other	Cat 6
Travel expenses	General travel expenses	International Travel - Other	Cat 6
Utilities	Electricity usage	Site Service - Electricity	Scope 2
Utilities	Gas	Site Service - Gas and Fuel	Scope 1
Utilities	Water rates	Municipal & Water Charges	Cat 5
Waste & environment	Recycling	Site Service - Garbage/Recycling	Cat 5

Emissions

Spend based data

Emissions category	CapEx Emissions (tCO_2e)	OpEx Emissions (tCO_2e)	Total emissions
Works contractors	2111	29752	31863
Other professional services		6528	6528
Building maintenance services		5426	5426
Food & beverage		3299	3299
Subscriptions & memberships		3192	3192
Desktop hardware	156	2559	2715
Plant & equipment repair		2033	2033
Lab equipment and supplies	575	733	1309
Cleaning		1154	1154
IT software	5	1017	1022
Real estate		922	922
Furniture, fittings & equipment	10	751	762
Office supplies		663	663
Printing		622	622
Advertising & media		515	515
Telecommunication expenses		340	340
Grounds maintenance		303	303
Research		246	246
Training		158	158
Legal		134	134
Print equipment & maintenance		81	81
Insurance		77	77
Recruitment		74	74
Financial Services		65	65
IT services		4	4
Grand Total	**2858**	**60647**	**63505**

Supplier data

Water

Data for water use is available via water meters and invoices from the water supplier. ANU has both a potable (drinking) water supply and a non-potable (recycled) water supply which is used only for irrigation. There is also some rainwater capture and surface water intake from Sullivan's Creek.

The emissions factor for both potable and recycled water supplies are assumed to be the same[9]. Other assumptions include:

- Total emissions and water production figures provided by Icon Water are from the financial year 2022/23
- ACT scope 2 emissions are taken as zero (using market-based electricity approach)
- Emissions not directly attributable to water or wastewater are split evenly between the two

Emissions Source	Data source	Emission Factor	Data	Unit	Emissions (tCO_2-e)
Water*	Water supplier	0.034	686,083	kL	23

- Total of both potable and non-potable water supplies

Data Centres

ANU leases rack space in two data centres located in the ACT as well as using Microsoft data centres for enterprise software systems. The electricity used by ANU at the ACT datacentres is included in Category 8 Upstream leased assets.

[9] Pers comm with Icon Water, October 2024

Fuel and energy-related activities

This category covers emissions associated with Scope 1 and 2 activities that are generated as part of the fuel product's life cycle. For example, the extraction of fossil fuels, and their transportation to the point of sale or losses in the transmission of electricity via the grid.

Sub-category	Boundary	ANU energy sources included
1.Well to tank (WTT) emissions of purchased fuels	All upstream emissions (cradle to gate) from extraction of raw materials, production and transportation to point of combustion	Natural gas, diesel, petrol, LPG
2. WTT emissions of purchased electricity*	All upstream emissions from extraction of raw materials, production and transportation to point of combustion by a power generator	Electricity
3.Transmission and distribution (T&D) losses*	All upstream emissions of energy consumed in a T&D system	Electricity

*These are combined in the NGA factor for Scope 3 electricity

Data sources

- Scope 1 and 2 consumption data for fuels and electricity
- Emission factors from annual NGA Factors

Assumptions

No assumptions were necessary

Exclusions and data improvement plan

None

Methodology

The consumption for each of the fuel types is multiplied by the appropriate Scope 3 emission factor from the NGA Factors.

Emissions

Emissions Source	Energy Content Factor (GJ/kL)	Emission Factor	Data	Unit	Emissions (market-based) (tCO_2-e)
Electricity - ACT	N/A	0.045	105,434,240	kwh	545
Electricity - NSW	N/A	0.045	1,826,653	kwh	163
Electricity - NT	N/A	0.07	83,388	kwh	8
Transport fuels- Diesel	38.6	17.3	64,700	kL	43
Transport fuels - Petrol	34.2	17.2	46,861	kL	28
Transport fuels - Liquid Petroleum Gas	26.2	20.2	1,411	kL	1
Natural Gas – ACT/NSW Metro	N/A	13.1	237,545	GJ	3112
Stationary fuels - diesel	38.6	17.3	3.5	kL	2
Stationary fuels - LPG	25.7	20.2	34	kL	18
Total					**3920**

Transportation and distribution

Being an educational institution rather than a product manufacturer means that this category is not a highly significant one for ANU. The main activities include the delivery of ordered products to ANU and the mailing of documents etc from ANU. A further inclusion here is employee relocation expenses.

At this time the data is spend based. It is impossible to separate downstream and upstream data, so both are reported in this category.

Data sources

- Spend-based data on freight and postage from ANU financial system
- Spend based data for staff relocation expenses
- Spend-based emission factors from FootprintLab

Assumptions

Staff relocation expenses were assumed to be movement of goods by land and therefore a road freight emission factor was applied.

Exclusions and data improvement plan

There are no exclusions. We cannot discern whether the activity is upstream or downstream transportation i.e. either receiving goods or sending out mail/packages etc so both upstream and downstream transportation and distribution is included in this category (Category 4).

The total emissions in this category are only 0.49% of the University's total emissions and therefore data improvement is not currently considered a priority.

Methodology

Total expenditure in each of the three logistics categories was identified and relevant spend based emissions factors applied.

Emissions

Emissions Source	Data source	Emission Factor	Data	Unit	Emissions (tCO_2-e)
Misc Creditors - Couriers	Finance system	0.204	225,639	$	47
Postage and freight	Finance system	0.208	1,648,923	$	342
Employee relocation expenses	Finance system	1.083	624,388	$	676
Total					**1065**

Waste

This category includes both solid waste and wastewater.
ANU contracts waste collection services for a range of different waste sources. In 2024 this included general waste (landfill – red bin), commingled (recycling-yellow bin), paper and cardboard (blue bin), paper mix, classified paper, e-waste, and metal. There is also a separate contract for collection and disposal of hazardous/licensed waste materials. We collect and compost our parks/garden waste on site and use as mulch around campus.

Data sources

- Waste contractor monthly invoices with tonnes collected for each waste source
- Wastewater emission factor from Icon Water
- Staff (FTE) and student (EFTSL) numbers from ANU Data Insights team
- Emission factors for waste estimated from annual NGA Factors and waste contractor's bi-annual waste audit

Assumptions

We currently only report on emissions from our landfill waste, being the main source of GHG emissions. It was assumed that all recycled waste is zero emissions and that all waste in the co-mingled (yellow) bins is recycled – in reality there is contamination of the yellow bin which means that this also sometimes goes to landfill, however this is currently unquantifiable.

The waste emission factor used is based on an audit of the general waste stream mix. It is assumed that these audits are representative of all the red bins across campus.

Exclusions and data improvement plan

Only waste from the Acton Campus is currently included. In 2025 we plan to also include waste emissions from our Kioloa site which is now serviced by the same waste contractor. Our other sites are small with waste being minimal. Waste data for these sites is generally not available as collection services are often provided as part of the local council service. This means the service is included based on a fixed cost basis in the rates notice rather than invoiced by a private contractor on a weight basis.

Waste from some of the student residences are excluded as waste collection for these sites is outside the ANU contract – this will be investigated further with the aim to include waste from all residences within ANU operational control in 2025.

This report also excludes the emissions from the collection and transport of waste by the waste contractor to the waste management site, which is an optional reporting source. We aim to include this in the 2025 report.

Hazardous/licensed waste materials are currently excluded – we plan to include this in 2025. E-waste is also excluded as it is considered to be emissions free.

Only wastewater at the Acton campus is currently included. Some sites are not connected to sewer such as Kioloa or Siding Springs Observatory whilst others are considered immaterial, and it is very difficult to obtain data.

Methodology

Solid Waste

In 2024, ANU had several different bins around the Acton campus including Paper & Cardboard (blue bin), commingled recycling (yellow bin) and general waste (red bin).
ANU and their waste contractor carry out a limited waste composition audit bi-annually. This audit classifies materials based on practical recyclability of materials, identifying key waste categories of:

- Paper & Cardboard,

- Mixed recyclables (rigid plastics, container deposit scheme materials, glass and aluminium) - these are considered inert waste streams
- Organic material (including food and garden waste)
- General residual waste - this included paper towels, food packaging, coffee cups and polystyrene as well as other waste in small quantities.

An assessment of the red bin showed an average percentage of these waste types as per the table below. The total weight of general waste is provided monthly by the waste contractor. The percentages of different waste types in the red bin as per the table are then applied to the emission factors for each waste stream to give an average emission factor for the waste in the red bin of 1.79tCO_2-e/kg.

This emissions factor is then applied to the total weight of waste collected in the red bins each year.

Waste type	Emissions Factor (tCO_2e/kg)	% of red bin from audit
Food	2.1	21.7
Paper and Cardboard	3.3	15.78
Inert waste (including concrete/metal/plastic/glass)	-	11.64
General residual waste	1.6	50.88
Average emissions factor	1.79	

Wastewater

The wastewater emission factor is provided by Icon Water and is based on emissions/person. The total number of full-time equivalent staff (both casual and permanent) and equivalent full-time students (EFTSL) is multiplied by the emission factor. This is likely to a conservative estimation of wastewater emissions since staff and many students are not on site 24/7 unlike residential buildings.

Emissions

Emissions Source	Data source	Emissions Factor	Data	Unit	Emissions (tCO2-e)
Solid Waste (GWD/landfill) - Acton	Waste contractor	1.79	955,545	Kg	1710
Wastewater	Icon Water and Dat Insights team	33.81	22987	Person	777
Total (waste and wastewater)					**2487**

University business travel

University travel includes ANU staff travelling on business and any associated accommodation as part of that travel. It includes various modes of transport, both land and air, and includes staff and some students.

ANU does not currently have a robust data collection process for business travel. In 2024, the University's travel provider was not mandatory to use and is currently only used by approximately 35% of travellers. This means the data from this source is highly inaccurate.

To address this issue, in 2023 the University set up a Travel Emissions Tracker which uses the mandatory travel approval e-forms that travellers are required to complete as an authorisation prior to any travel. There are exceptions to this such as for trips shorter than 100km distance from Canberra, and there may be some non-compliance, however this data is the most accurate available. The data from the e-forms is processed to create a dashboard with emissions data for various modes of transport (land, air and water), different traveller groups and University colleges.

At present we report on our domestic and international flights using the data from the Travel Tracker. We also report on hire cars (domestic and international) using data provided by the hire car companies, as well as other land-based transport (taxis) based on financial data. Emissions from the ANU vehicle fleet is included in Scope 1.

Data sources

- ANU Travel Tracker (from ANU travel approval e-form data)
- Corporate Travel Management (CTM) software
- Emission factors in the Travel Tracker are from the UK Greenhouse Gas Conversion Factors
- Data from hire car/Flexicar companies
- Financial spend on taxis/Ubers
- Financial spend on 'other surface transport' (filtered based on supplier to identify the type of transport where possible)

Assumptions

The ANU Travel Tracker makes assumptions about the data extracted from the e-form including (not exhaustive):

- First travel segment originates in Canberra
- All travel terminates in Canberra
- Travel segments with an unknown mode of transport and where travel is into or out of Australia are classified as air travel

For air travel

- No intermediate stopovers are included unless specifically recorded on the e-form
- Radiative forcing (RF) uplift factor of 1.7 from 2023, and 1.9 in earlier years. This is included in the UK air travel conversion factors with RF
- Distance uplift factor of 0.08 in each year. This is included in the air travel conversion factors
- The emissions per km for travel distances d <= 600 km is most closely approximated by the UK conversion factor for domestic travel, where the average distance of UK domestic flights in 2024 was 414km
- That the emissions per km for travel distances 600 < d <= 3700 km is most closely approximated by the UK conversion factor for short haul travel between the UK and Europe, where the average distance of UK short haul flights in 2024 was 1537 km
- That the emissions per km for travel distances d > 3700 km and to/from the UK is most closely approximated by the UK conversion factor for travel "Long-haul, to/from UK"

- That the emissions per km for travel distances d > 3700 km and not to/from the UK is most closely approximated by the UK conversion factor for "International, to/from non-UK" travel

For surface travel:

- Due to the expenditure in the 'other surface transport' category being predominantly purchase cards and reimbursements it was very difficult to ascertain the transport mode. Consideration was made to allocate a generic 'private car' factor but there are currently no suitable spend-based emission factors for cars generally – some other measure needs to be known e.g. the distance travelled or fuel use. Therefore these expenditures were coded as hire car/taxi.

Exclusions and data improvement plan

Scope 3 business travel excludes ANU fleet vehicles which are reported under Scope 1.

We currently only report on

- air travel, both domestic and international
- hire cars
- taxis/Uber

Exclusions currently include public transport (coaches, trains) and private car use. Air travel is by far the largest travel emissions source, accounting for approximately 93% of total emissions.

ANU are in the process of procuring new travel management software which should be online by mid-2025. The use of this system will be mandatory, ensuring that in 2025 the data available from the travel management system will increase in accuracy.

Methodology

Date is extracted from the e-forms by the ANU Insights Team, it is then cleaned and assumptions applied. The UK greenhouse gas conversion factors are then applied which include different emissions factors for various categories of distance (haul) and cabin class. Distances are calculated using the Greater Circle method and percentages of different cabin class usage are estimated from the travel management software where this data is available (economy 86%, business 13%, first 0.5%, premium economy 0.5%). These percentages are then applied to the data from the e-forms.

E = Cd where:

E = emissions in tonnes CO_2-e
D = the greater circle distance (km) calculated separating the coordinates of the source and destination of each travel segments, after destinations are geocoded to coordinates.
C = the conversion factor used to derive $CO2_e$ emissions (kg).

Emissions

Emissions Source	Data source	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
International flights	ANU Travel Tracker	Various (UK GHG Conversion Factors)	89,820,000	pkm[10]	16800
Domestic flights	ANU Travel Tracker	Various (UK GHG Conversion Factors)	9,160,000	pkm	1830
Hire cars	Hire car companies	Various gCO_2e/km for different car classes	529,451	km	84
Flexicar	Flexicar	Various gCO_2e/km for different car classes	21,373	km	33
Taxis/Uber	Financial system	0.699	312,890	$	219
Other surface transport	Financial system	0.699	1,611,421	$	1126
Total			101,455,135		**20,093**

[10] passenger km - used for shared/public transport (aeroplanes, buses, trains etc)

Travel accommodation

Accommodation associated with travel forms a part of Category 6. We have separated it for reporting purposes so we can better track our emissions from business travel and progress towards our reduction targets for air travel.

Data sources

- Spend data from financial system
- Data for number of international and domestic nights and hotel star ratings from Corporate Travel Management (CTM) software
- Emission factors from FootprintLab

Assumptions

It was assumed that the data in the CTM software only accounts for 35% of all actual accommodation booked and an adjustment was made accordingly. This assumption is based on a similar % use for travel bookings.

Exclusions and data improvement plan

Accommodation can be booked through the ANU travel management provider but as with travel, only approximately 35% of staff currently do so.

ANU are in the process of procuring new travel technology and provider which should be online and mandatory by mid-2025. This will increase data accuracy.

Methodology

Data was drawn from both the CTM software and the financial system. The CTM data was sorted into international and domestic accommodation. For international accommodation an emission factor by country is applied. Where countries were not listed in FootprintLab, a country with a similar economic demographic was chosen for the emission factor. Domestic accommodation was split into star ratings from 3 to 5 and an Australian emission factor based on the star rating applied.

Accommodation is categorised within several financial categories

AUPN L3	AUPN L4	Account description
Travel expenses	Accommodation	Domestic Travel – Accommodation
Travel expenses	Accommodation	International Travel – Accommodation
Travel expenses	General travel expenses	Domestic Travel - Other
Travel expenses	General travel expenses	International Travel - Other

The first two financial categories were excluded to avoid double-counting with the CTM data.

The final two categories above (General travel expenses) were investigated to identify what transactions were included. The categories contain a mix of many expenditure types, mainly through reimbursements and purchase card payments. Items included visas, VAHA residency payments, workshop contributions, accommodation, food, travel allowances and general travel including transport/flights.

An estimate was made that 25% of the transactions were related to accommodation costs with a further 50% being related to food/meal expenses and a final 25% being broad general expenses. Therefore 25% of the total spend for these two categories was taken as accommodation and a generic spend-based emission factor applied.

50% was allocated an emission factor for food and catering and is reported in Category 1 Goods and Services. The final 25% of spend was excluded as it was too difficult to allocate a specific emission factor to this spend. It also included some flights (along with other transport) with the risk of double counting with data from the Travel Tracker.

Emissions

Emissions Source	Data source	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
Domestic accommodation	CTM	Various (by star rating)	12,677	No of nights	389
Domestic accommodation	Financials	0.18	295,590	$	53
International accommodation	CTM	Various (by country)	5,045	No of nights	132
International accommodation	Financials	0.18	497,560	$	89
Total accommodation					**663**

Employee commuting and work from home

This category includes emissions from employee travel between their home and workplace and emissions associated with working from home. ANU completed its first detailed travel survey in 2024. The survey was aimed at both employees and students based on their termtime travel to the University. Results from student termtime commute is detailed in the student commuting section. For full details on the survey methodology, assumptions and exclusions see the detailed survey report.

Data sources

- 2024 staff and student travel survey
- ANU Insights team for FTE staff and student numbers
- UK greenhouse gas conversion factors
- Climate Active work from home calculator

Assumptions

It is assumed that the results from the survey are representative of the University population. The staff response rate was 10.8% (n=548).

Exclusions and data improvement plan

Casual staff and students who live on campus were excluded. Staff working overseas were excluded and those working 100% remotely were only asked questions about their home office set-up.

Methodology

Commute

The ANU survey asked several questions about which mode of transport was used to commute (including mixed modes in one trip), the distance travelled and how often the trip was made. The total passenger kilometres (pkm) for each mode of transport were then calculated.

Within the car mode, respondents were asked about the fuel type and size of car. This allowed estimation of emissions based on the categories in the UK Conversion factors which include small, medium and large cars.

Work from home

The survey asked questions about how often respondents work from home, from where they work (the state, as electricity emissions factors vary state by state), what heating and cooling they have, how they use it and what their office set-up is. This data was then used to estimate emissions based on FTE hours worked from home, adjusted for location and heating/cooling averages.

Emissions

Emissions Source	Data source	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
Car	ANU Travel survey	Various (UK GHG Conversion Factors)	14,716,244	pkm	3549
Local bus	ANU Travel survey	0.13495	413,140	pkm	56
Motorbike	ANU Travel survey	0.14323	204,387	pkm	29
Taxi	ANU Travel survey	0.16984	22,357	pkm	5
Total			**15,356,127**		**3639**
Work from home	ANU Travel survey	Climate Active calculator	4300	FTE hours	**421**

Upstream leased assets

ANU leases several buildings in Canberra and other locations for various uses including office and archive spaces. Leased sites include:

121 Marcus Clarke Street, Canberra (4 tenancies)
11 Barry Drive, Canberra (3 tenancies)
136 Narrabundah Lane, Canberra
Perth office, WA
NCEHS, Wollongong, NSW
ITS Hub, Townsville
CDC datacentre
Sydney office

The NCEHS site in Wollongong and the ITS Hub in Townsville are excluded from the University's operational boundary as identified in Part 1 of this report, due to difficulty collecting data and immateriality of emissions. 121 Marcus Clarke Street and 11 Barry Drive are currently reported in Scope 1 & 2 as ANU are the utility contract owners. This will be reviewed in 2025 to ascertain more clearly the operational control conditions under which these leases operate. The Sydney office closed in June 2024 so is reported here for half the year. ANU leases rack space in the Canberra Data Centre (CDC) and energy use associated with this rack space, as well as a proportion of the energy use by the base building is included.

These sites only use electricity therefore only these emissions are reported currently.

Data sources

- Apportioned consumption data provided by the lessor
- Emission factors from NGA Factors for electricity – market-based method

Emissions

Emissions Source	Data source	Data	Unit	Emissions (tCO_2-e)
Perth office	Lessor	15,597	kWh	10
CDC datacentre, ACT	Lessor	1,384,431	kWh	53
Sydney office	Lessor	3,516	kWh	2
136 Narrabundah Lane (Symonston warehouses)	Lessor	222,557	kWh	9
Total				**74**

Student commuting

ANU includes the following travel in the student commuting category:

- Student termtime commute to the University
- Student travel to and from place of origin (both domestic and international)

Data sources

- 2024 staff and student travel survey (for termtime commute)
- ANU Insights team – place of origin and country/state (number of students only) and equivalent full time student load (EFTSL) for the year
- UK GHG conversion factors for land and air-based travel

Assumptions

- It is assumed that the results from the travel survey are representative of the University population. The student response rate was 3.5% (n=482)
  - *Domestic locations* – students originate from the state capital. All domestic students from QLD, NT, WA, SA and TAS fly direct to Canberra. For students from VIC and NSW it was assumed half fly and half drive in a private car (50% large petrol/50% large diesel). Distance estimated for flights using the Greater Circle Method and Google maps for road travel. For domestic students from Canberra/ACT data is collected in the student and staff travel survey and included in the termtime commute.
  - *International locations* – students make one return trip per year between the capital city of their country of origin and Canberra. All international students fly via Sydney and then transit to a domestic flight to Canberra. Distance estimated from capital city of each country using the CEPII database (distcap).
  - All flights assumed to be economy class.
  - Emission factors used were the UK conversion factors with definitions of distance (Long > 3700km; short<3700km >400km; very short <400km)
  - Includes radiative forcing and wheel to tank factors

Exclusions and data improvement plan

None for place of origin commute. The data is considered the most accurate obtainable without obtaining individual student data. The assumptions made are considered robust. For termtime commute, students who live on campus were excluded from the travel survey.

Methodology

Place of origin commute

Using the data provided on student place of origin, distances were calculated using the CEPII database greater circle method, Google maps and the series of assumptions as identified. Distances were then multiplied by the relevant emission factors.

Termtime commute

As with the staff commute, the ANU travel survey asks several questions about which mode of transport was used to commute (including mixed modes in one trip), the distance travelled and how often the trip was made. The total passenger kilometres (pkm) for each mode of transport was then calculated and averaged across the broader student community based on equivalent full time student load (EFTSL) numbers for the year.

Within the car mode, respondents were asked about the fuel type and size of car. This allowed estimation of emissions based on the categories in the UK Conversion factors.

Emissions

Emissions Source	Data source	Emissions Factor	Data	Unit	Emissions (tCO_2-e)
International student place of origin commute	PSP Insights	Various from UK Conversion Factors	198,715,404	pkm	46,204
Domestic student place of origin commute	PSP Insights	Various from UK Conversion Factors	9,665,252	pkm	2,345
Student termtime commute	ANU travel survey	Various from UK Conversion Factors	12,589,045	pkm	2,702
Total			**220,969,701**		**51,251**

External college residences (not included in Scope 1 & 2)

ANU includes most University accommodation within its operational boundary and therefore it is reported in Scope 1 and 2. However three residences are considered outside the operational control boundary and are reported in this category – John XIII, Burgman and Gowrie Hall.

Data sources

- Natural gas consumption (in GJ) is based on data from supplier invoices and meter consumption reports
- University's sub-metering and energy management system
- Emission factors from annual NGA Factors for stationary combustion of natural gas distributed in a pipeline and ACT electricity (market-based)

Assumptions

There are no assumptions made.

Exclusions and data improvement plan

Other Scope 1 emissions associated with these facilities, such as fuels are excluded. ANU will work with the accommodation management companies to include all Scope 1 and 2 emissions, but it is not currently considered a high priority.

Methodology

The supplier invoices or sub-metering give the total quantity of gas (GJ) or electricity (kWh), which is then multiplied by the appropriate emission factor. The methodology is taken from the annual NGA Factors report.

As for Scope 2, electricity is reported on a market-based approach using the RPP and JRPP for the ACT.

Emissions

Emissions Source	Data source	Data	Unit	Emissions (tCO_2-e)
Electricity – ACT (market-based)	Invoices/Skyspark system	2,193,053	kWh	84
Natural Gas	Invoices/Skyspark system	17,568	GJ	905
Total				**989**

Investments

The University has a range of investments that are administered by the Investment Office and governed by the Investment Policy and the Socially Responsible Investment Policy. The University publishes an annual Socially Responsible Investment (SRI) report which provides details of the University's Long Term Investment pool (LTIP), including the carbon intensity of investments.

Emissions data provided here includes the following investments within the University's LTIP: Domestic Equity, Overseas Equity, Direct Debt, Catastrophe Bonds and Infrastructure. This accounts for 72% of the LTIP.

Data sources

Data is sourced from:

- Public company disclosures
- MSCI estimated emissions
- Fund manager estimated emissions

Assumptions

Ownership percentages are calculated in AUD based on the market capitalisation and position sizes as of 31 December 2024. This excludes infrastructure investments where emissions data is provided on a financial year (ending 30 June 2024) basis. This is the industry standard reporting for infrastructure assets in Australia. Accordingly, ownership percentages for infrastructure investments are calculated as of 30 June 2024.

Exclusions and data improvement plan

Emissions data is not available for 28% of the LTIP. This includes cash (10%), government bonds (13%) and alternative investments (5%) that do not report carbon emissions. The alternative investments without emissions data are financial strategies that are known to produce very low, or no, emissions.

Methodology

Equities - calculated using the GHG Protocol methodology for Equity investments. Proportional scope 1 & 2 emissions are allocated to ANU based on the proportional share of equity in investee companies. Direct Debt – calculated using the Partnership for Carbon Accounting Financials (PCAF) Global GHG Accounting and Reporting Standard Part A: Financed Emissions (2nd Edition) which conforms with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard for Category 15 Investments.

The fund manager used a combination of company reported scope 1 and scope 2 emissions where available according to PCAF Data Quality (DQ) 2 methodology, and estimated emissions using a DQ 4 revenue-based calculation method that relies on environmentally extended input output (EEIO) models.

$$ANU\ Financed\ Emissions = the\ Fund's\ financed\ emissions \times ANU's\ percentage\ ownership\ in\ the\ fund$$

Catastrophe Bonds - these are classified as *Debt investments (without known use of proceeds)* under the GHG Protocol and are optional to report. This is because catastrophe bonds don't fund a particular project, rather they are issued by insurance companies to transfer risks related to catastrophic events to investors.

$$ANU\ Financed\ Emissions = the\ Fund's\ emissions\ intensity\ per\ \$m\ investment \times the\ value\ of\ ANU's\ investment\ in\ the\ fund$$

The PCAF standard refers to emissions intensity per $m investment as *economic emission intensity*. It is calculated as follows:

$$Emissions\ intensity\ per\ \$m\ investment = \sum \frac{\frac{Position\ value}{Company's\ EVIC} \times Company's\ emissions}{Total\ fund\ value}$$

EVIC means the issuer's enterprise value including cash.
For scope 2 GHG emissions, market-based emissions take priority over location-based emissions.

Where possible company reported data is used. On occasion, Bloomberg provides an estimate for any missing numbers. When no information is available from Bloomberg, the fund manager works on a best-efforts basis to find the missing information from other sources or by contacting the company. Where this is not possible, the manager generates an estimate based on the region and type of the company. Averages are then generated for each grouping and used to fill in any gaps. Some companies are full/partial state run entities - these are treated as P&C (property and casualty) companies of that region for the purposes of estimations. *Infrastructure* – the University's three infrastructure investments are classified as Equity investments under the GHG Protocol. This is because these funds invest specifically in infrastructure equity. As such, the methodology used is the same as for Equities. The calculation is as follows:

$$ANU\ Financed\ Emissions = the\ Fund's\ emissions\ intensity\ per\ \$m\ investment \times the\ value\ of\ ANU's\ investment\ in\ the\ fund$$

$$Emissions\ intensity\ per\ \$m\ investment = \sum \frac{\frac{Position\ value}{Company\ value} \times Company's\ emissions}{Total\ fund\ value}$$

The individual methodologies for the infrastructure funds are:

Fund 1: Emissions data is sourced from the portfolio companies. Two portfolio assets have NGERS obligations on reporting their emissions, and as such, the emissions for these two assets were sourced from the NGERS reporting. This emissions for these two assets, which account for >99% of the fund's total emissions, are calculated according to the GHG Protocol. A number of renewable energy assets in the portfolio are internally managed and where this is the case, the emissions are estimated by the manager.

Fund 2: Financed emissions are calculated in line with the methodology provided by PCAF. Data has been primarily collected directly from the portfolio companies and where this is not possible the fund manager made appropriate estimates applying industry methodology. Most portfolio companies have either third-party verified or internally audited GHG assessments.

Fund 3: This is a listed infrastructure fund with the methodology and data sources the same as for Equities.

Investment fund	Market value $m	tCO_2e/$m invested	Total fund financed emissions (tCO_2e)	ANU % of fund	ANU financed emissions (tCO_2-e)
Domestic Equity 1	374.60		18,456.80	100	18,457
Overseas Equity 1	109.67		279.14	100	279
Overseas Equity 2	225.20		2,537.20	100	2,537
Direct Debt 1	46.03		10,603	2.4938	264
Direct Debt 2	43.44		17,262	2.7661	478
Catastrophe Bonds	47.24	5.37			254
Infrastructure 1	40.06	332.11			13,303
Infrastructure 2	41.13	11			452
Infrastructure 3	102.55	119.2			12,223
Total					**48,247**

Appendix A - Abbreviations

ACT	Australian Capital Territory
AR5	IPCC Fifth Assessment Report
AUPN	Australasian Universities Procurement Network
BEV	Battery electric vehicle
CE	ANU Campus Environment
CEPII	Centre for Prospective Studies and International Information
CF	Conversion factor
CO_2-e	Carbon dioxide equivalent
CTM	Corporate Travel Management
EAUC	Alliance for Sustainability Leadership in Education
ECF	Energy content factor
EF	Emission factor
EFTSL	Equivalent fulltime student load
FBT	Fringe benefits tax
FTE	Fulltime equivalent
GHG	Greenhouse gas
GJ	Gigajoules
GWD	General waste disposal
GWP	Global warming potential
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
IT	Information technology
ITS	Information technology software
JRPP	Jurisdictional Renewable Power Percentage
kW	kilowatt
kWh	kilowatt hour
LPG	Liquid petroleum gas
LTR	Long term student residence
MSO	ANU Mount Stromlo Observatory
MW	Megawatt
MWh	Megawatt hour
NARU	ANU Northern Territory Research Unit
NCEPH	ANU National Centre for Epidemiology and Population Health
NGA	National Greenhouse Account
NGER	National Greenhouse and Energy Reporting
PSP	Planning and Service Performance
PHEV	Plug-in hybrid electric vehicle
PV	Photovoltaic
RCS	ANU Rural Clinical School
RF	Radiative factor
RPP	Renewable Power Percentage
SCEF	Standardised Carbon Emissions Reporting
SF6	Sulphur hexafluoride
SSO	ANU Siding Spring Observatory
SVF	ANU Spring Valley Farm
T&D	Transmission and distribution
WTT	Well to Tank

Appendix B - ANU Base Year Recalculation Guideline

This guideline identifies the conditions under which ANU will recalculate its base year emissions. This is in accordance with the requirements of the GHG Protocol: Corporate Accounting and Reporting Standard (GHG Protocol).
The University has selected the base year of 2019 for its reporting of greenhouse gas (GHG) emissions.

As per the GHG Protocol, there are certain situations that may trigger a recalculation of the base year emissions.

These include the following:

- Structural changes in the reporting organisation, which may include divestitures, acquisitions and mergers
- Changes in calculation methodology, improvements in the accuracy of emission factors or data monitoring
- Discovery of significant errors or several cumulative errors that are collectively significant

The University's approach is that if the cumulative effect of any of these situations equals or exceeds a significance threshold of 5% of total base year emissions, a base year recalculation will be triggered.

These guidelines can be triggered both by emissions decreasing or increasing.
In the case that the base year is recalculated the reason and impact will be clearly reported.

Appendix C – 2024 greenhouse gas emissions inventory

Emission source	Scope 1 t CO_2-e	Scope 2 t CO_2-e	Scope 3 t CO_2-e	Total t CO_2-e
Electricity (Location-Based Method)*		71,910	4,833	76,743
Electricity (Market-Based Method)*		5,275	716	5,991
Natural Gas	12,241		3,112	15,353
Other energy	63		20	83
Fleet and other vehicles	286		72	358
Refrigerants	1,742			1,742
Solid Waste			1,710	1,710
Wastewater			777	777
Potable water			23	23
Goods & Services			60,647	60,647
Capital Goods			2,858	2,858
Postage & freight			1065	1065
University travel – flights			18,630	18,630
University travel – taxi/hire cars			1,463	1,463
University travel - accommodation			663	663
Employee commute			3,639	3,639
Employee work from home			421	421
Student commute			51,251	51,251
Upstream leased assets			74	74
External College residences			989	989
Investments**			48,247	48,427
Total kg CO_2-e (location-based)	**14,332**	**71,910**	**200,494**	**286,736**
Total kg CO_2-e (market-based)	**14,332**	**5,275**	**196,378**	**215,984**

* Includes both the market-based and location-based accounting methods for electricity. Location-based accounting measures the actual emissions associated with the grid electricity supplying ANU. The market-based method focuses on emissions associated with electricity purchased by ANU including contractual agreements like Renewable Energy Certificates or Greenpower. ANU renewable energy for 2024CY is 95.3% for ACT operations.

** Investment emissions were included after publication of the ANU 2024 Annual Report, therefore totals will differ between the two reports.

Australian National University

Appendix D – Scope 3 emissions relevance assessment

GHG Protocol category	Description	Size – significance	Ability to influence	Risk exposure	Stakeholder expectations	Sector guidance	Relevant (2 or more?)
1	Goods & Services	✓	✓	✓	✓	x	✓
2	Capital goods	✓	✓	✓	✓	x	✓
3	Fuel/energy related activities	✓	✓	x	x	x	✓
4	Transportation of goods to ANU	x	✓	✓	x	x	x
5	Waste from operations	x	✓	x	✓	x	✓
6.1	Uni business travel	✓	✓	✓	✓	✓	✓
6.2	Travel accommodation	x	✓	x	x	✓	✓
7	Employee commute	x	✓	x	✓	✓	✓
8	Assets leased to ANU	x	X	x	x	x	✓
9.1	Transportation of goods from ANU	-	-	-	-	-	N/A
9.2	Student travel to ANU	✓	✓	✓	✓	✓	✓
9.3	External College residences (not in Scope 1 or 2)	x	✓	✓	✓	✓	✓
10	Processing of sold goods	-	-	-	-	-	N/A
11	Use of sold goods	-	-	-	-	-	N/A
12	End of life treatment of sold products	-	-	-	-	x	N/A
13	Assets owned by ANU and leased out (e.g. cafes)	✓	✓	x	x	x	✓ Currently captured in Operational

GHG Protocol category	Description	Size – significance	Ability to influence	Risk exposure	Stakeholder expectations	Sector guidance	Relevant (2 or more?)
							boundary due to sub-metering challenges
14	Franchises	-	-	-	-	-	N/A
15	Investments	✓	✓	✓	✓	-	✓

Appendix E - Summary list of data sources

Scope	Activity	Data	Measure	Internal Source	Data quality
1	Refrigerants	Service contractors	Kg	Campus Environment (CE)	1
	Laboratory gases	Suppliers	Kg	Contracts office	2
	Transport fuel (diesel, petrol, LPG)	SG Fleet	kL	Contracts office	1
	Stationary fuel - Natural gas	Utility invoices	kL	Resource data software	1
	Stationary fuel – LPG, diesel	Delivery invoices/ suppliers	kL	Asset managers in CE, invoices, Contracts Office	1
2	Electricity	Utility invoices	kWh	Resource data software	1
3	Purchased goods & services/capital goods	Spend categories	$	University Procurement and Contracts Office (UPCO)	4
	Travel - Hire cars	Hire car company data – Hertz, Enterprise, Sixt	km	ANU Travel services	1
	Travel - flights	Travel E-forms	pkm	ANU Travel Tracker	2
	Travel - taxis	Spend categories	$	University Procurement and Contracts Office (UPCO)	4
	Travel – other surface transport	Spend categories	$	University Procurement and Contracts Office (UPCO)	4
	Travel - accommodation	Travel management software/ spend	nights	ANU Travel services/ University Procurement and Contracts Office (UPCO)	3
	Water	Icon Water	kL	Resource data software	2
	Waste - solid	Waste contractor	Kg	Resource data software	2
	Waste - wastewater	Icon Water emission factor/person	Kg/person	Planning and Service Performance Division (PSP)	2
	Employee commuting	Travel Survey – averaged data	pkm	Internal travel survey	2
	Employee work from home	Travel survey – averaged data		Internal travel survey	2
	Student – termtime commute	Travel survey – averaged data	pkm	Internal travel survey	2
	Student – travel from origin	Student home location (country/state)	pkm	Planning and Service Performance Division (PSP)	2

Scope	Activity	Data	Measure	Internal Source	Data quality
	Investments	Fund managers	$m invested	Investment Office	2

Data hierarchy

- 1 – supplier primary data e.g. kWh from utility company. The best available data.
- 2 - supplier data but with gaps and/or average data e.g. travel survey
- 3 – supplier data with significant gaps
- 4 - spend-based average data