GRIFFITH UNIVERSITY

Carbon Management Report

2023-2024

Contents

Cover picture: Solar installation on N11, Nathan campus, 16 November 2023, DS Energy

Griffith University acknowledges the people who are the traditional custodians of the lands on which we learn and work, and pays respect to the Elders, past and present, and extends that respect to all Aboriginal and Torres Strait Islander peoples.

Griffith University campuses sit on the lands of the Yugarabul, Yuggera, Jagera, Turrbal, Yugambeh and Kombumerri peoples. We acknowledge Aboriginal and Torres Strait Islanders' unique relationship with and understanding and ongoing stewardship of these lands. Through collaboration with staff, students and community members we are committed to embedding Indigenous cultures and diverse knowledge systems in our learning and teaching, research, operations, and partnerships. Griffith University acknowledges Elders past and present who guide the way to a more sustainable future for all. Under the guidance of the Griffith University Elders and First Peoples Knowledge Holders Advisory Board we seek to ensure sustainability actions are aligned with First Peoples' knowledge and cultural practices.

Executive Summary

The annual Carbon Management report reflects on our progress in managing the carbon footprint of the University, with a focus on the major sources of operational carbon emissions: electricity, air travel and waste. It notes our targets, outlines our carbon emissions for the year ended 30 June 2024 and compares our performance to the baseline, the previous year and the higher education sector TEFMA benchmarks.

Overall, the total carbon emissions for the 2023/24 year were 44,724.9 tonnes of carbon dioxide equivalent (tCO_2-e), 47.6% below the 2010/11 baseline and 6% lower than the prior year. This continues the University's long term success in mitigating the additional emissions resulting from increases in student load, staff numbers and campus facilities.

Performance of scope 1, 2, and 3 emissions for 2023/24 can be summarised as follows:

- Scope 1 emissions relate to the direct consumption of fossil fuels. Scope 1 accounts for 3.1% of the total carbon emissions for the year. 2023/24 scope 1 emissions were 1,407.8 tCO_2-e, a small reduction on the previous year resulting from reduced gas use and reduced fuel consumption for the University vehicle fleet, and a 33% decrease on 2010/11.

- Scope 2 emissions are the emissions associated with the consumption of electricity generated off campus. These account for 60.1% of the total Carbon footprint for the year. 2023/24 scope 2 emissions were 26, 872.1 tCO_2-e, 6% decrease on 2022/23 and 49% below 2010/11 levels. Contributions to the reduction in scope 2 emissions included:

    - 50% renewable power from Columboola Solar farm from 1 December 2022
    - continued Reduction in the market-based grid emissions factor (a result of the increased percentage of renewables in the Australian market)
    - increased solar generation on campus from the new Logan rooftop installations
    - small reduction in annual consumption from energy efficiency projects and ongoing controls replacements and building tuning. These projects have offset the impacts of increased activity on campus and warmer weather which would be expected to increase consumption.

- Scope 3 emissions, the emissions as a direct consequence of the University's goods or services e.g. waste, paper, flights and distribution losses from the electricity counted under scope 2. This form the remaining 37% of our emissions with total 2023/24 emissions being 16,445 tCO_2-e, a small reduction on 2022/23 and a 46% decrease on 2010/11. Flight emissions form close to half the total for this category at 8,104.2 tCO_2-e. This is a reduction compared to the prior year and achieves the target level for 2029.

The final section of the report focuses on actions to reduce our emissions and sets out our pathway to achieve the updated target of achieving net zero emissions based on the 2010 baseline by 2029.

Introduction

This report

- reviews our carbon footprint over recent years and associated targets
- reviews how Griffith University compares against the sector on a scope 1 and 2 emissions and electricity consumption basis
- reviews scope 1, 2 and 3 emissions and describes initiatives to manage each category
- outlines our pathway to Net Zero 2029.

Our carbon emissions footprint

The boundary for the Griffith University operational carbon emissions footprint was set in 2008/9 based on the Greenhouse Gas (GHG) methodology and we continue to report on that basis. Our carbon calculations and submissions for both the statutory National Greenhouse Emissions Reporting Scheme (NGERs) and our GHG report are prepared by Pangolin Associates. This allows us to compare performance over the long term. This report refers to emissions based on the GHG methodology only, as the NGERs methodology only covers scope 1 and 2 emissions and there are some differences in what is included in each category in the two protocols. These are not material and the trends relating to scope 1 and 2 and the associated emissions reductions are similar.

The categories of emissions are defined as follows:

Scope 1

Emissions on our campuses, or associated with the University's business, generated through the combustion of fossil fuels in University owned vehicles, natural gas and LPG use as well as synthetic gases e.g. refrigerant gas leakage.

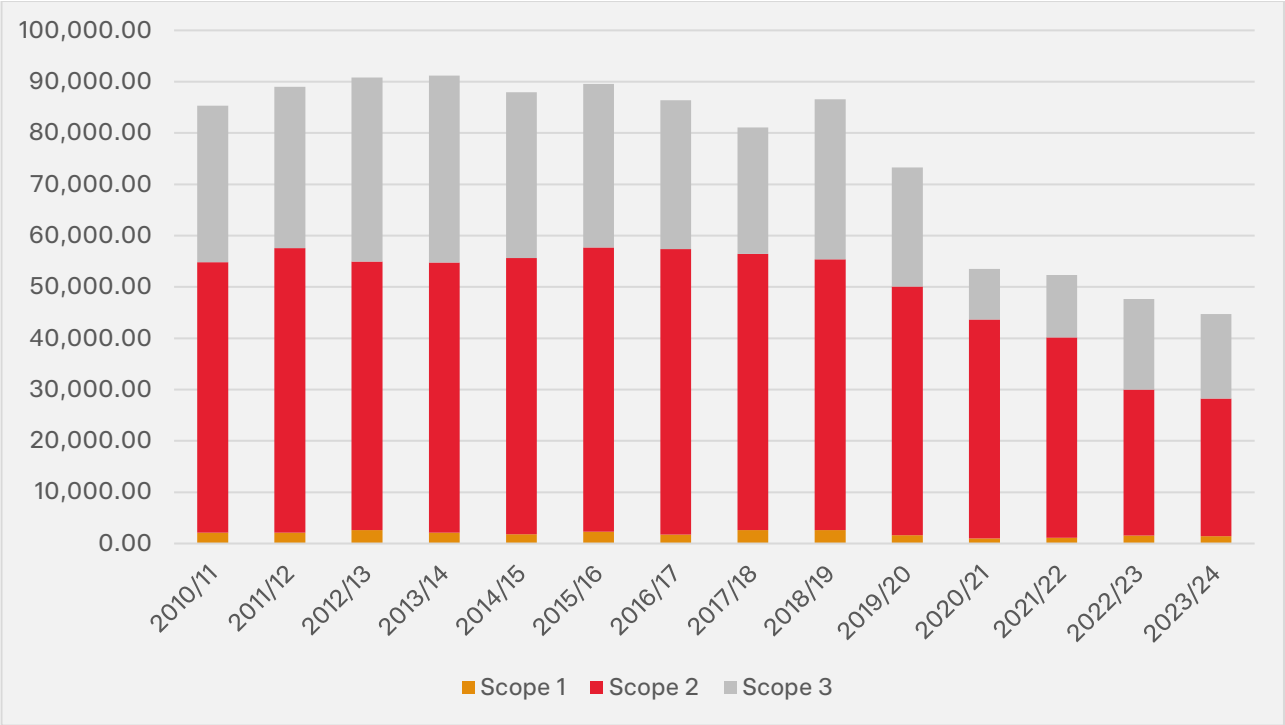
Scope 2

Emissions associated with the use of electricity imported from the grid or from a third-party supplier of energy in the form of heat or electricity.

Scope 3

Emissions as a direct consequence of the use of goods or services provided to the University to enable it to conduct its business. Sources include waste disposal, cleaning services, food and beverage services, IT and other equipment, paper, flights, and transmission and distribution losses from electricity. This is a partial consideration of scope 3, omitting for example, working from home and employee commuting emissions. More detail is provided in appendix C.

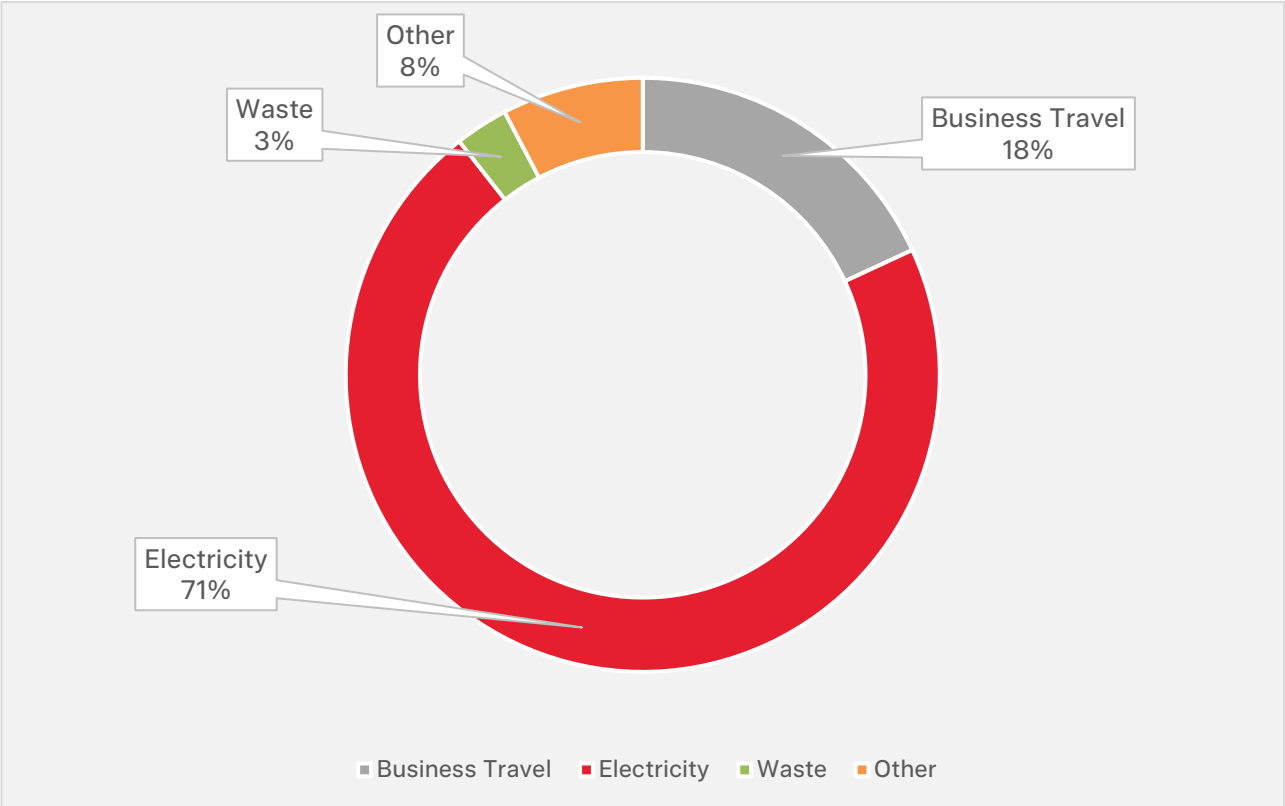
Our scope 1, 2 and 3 emissions since the 2010/11 baseline emissions year are as shown below:



Scope 1, 2 and 3 emissions by year

1. Refer appendix 1 for tabulated emissions figures.

Alternatively, emissions can be broken down by category or source. For the 2023/24 year, the carbon emissions breakdown by source is as follows:



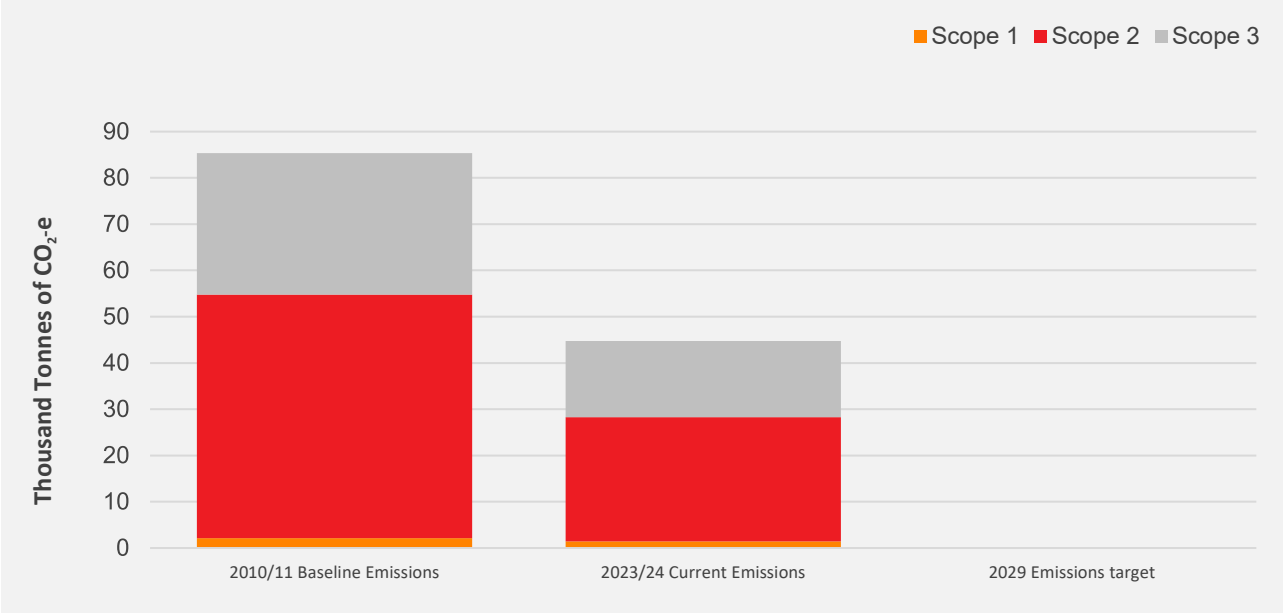
2023/24 carbon emissions breakdown

1. Other emissions includes

Food & beverage	0.1%	Stationary fuels	0.9%
ICT equipment	2.4%	Synthetic Greenhouse Gasses	1.8%
ICT services	1.2%	Transport fuels	0.7%
Office supplies & services	0.6%		

Our operational carbon emissions target

In 2012 the University developed its first Carbon Management Plan, as part of its broader commitment to sustainability. This plan was updated in 2016 and the *Creating a Future for All: Strategic Plan 2020–2025* further updated the targets. This aligned Griffith University targets with the 2019 Intergovernmental Panel on Climate Change (IPCC) recommendations to halve carbon emissions from 2010 levels by 2030 and reducing them to zero by 2050. This target was accelerated in 2023 to achieve net zero emissions based on the 2010 baseline by 2029 in response to the findings of the sixth assessment report from the IPCC and the new Australian Government target of a 43% reduction on 2005 carbon emissions by 2030.



Comparison of 2010/11 baseline emissions, current emissions and the updated 2029 target

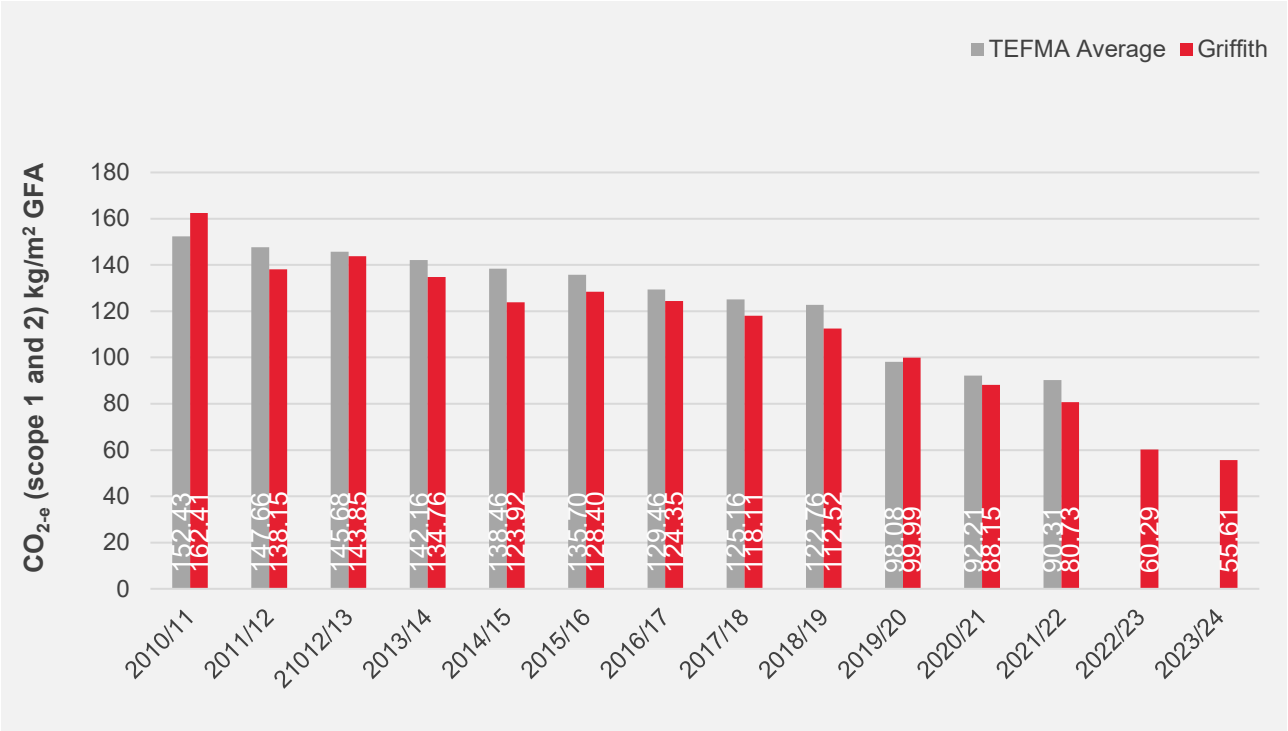
The 2029 target has the following underpinning assumptions:

- 5% residual emissions will be offset (based on 2010 baseline emissions of 85,344 tCO_2-e)
- flight emissions will achieve our target of a 25% reduction by 2029(8,100 tCO_2-e) based on the 2010 baseline of 10,500 tCO_2-e and these will also be offset
- on renewal of our power purchasing contract (which ends December 2028), 100% renewable power will be available and affordable for all campuses and leased premises.

2023/24 Year-on-year performance comparisons

	Total emissions tCO_2-e	**% change relative to 2010/11 baseline**	**% change relative to prior year (2022/23)**
Scope 1 Direct emissions	1,407.80	-33%	-8%
Scope 2 Indirect emissions associated with the use of grid (offsite generated) electricity	26,872.10	-49%	-6%
Scope 3 Emissions as a consequence of use of goods/services (partial)	16,445	-46%	-7%
Total	44,724.90	-47.6%	-6%

Against the higher education sector (TEFMA) benchmarks



Scope 1 and 2 CO_2-e Emissions per m^2 GFA

Note: [1] TEFMA excludes residences GFA. [2] 2023 and 2024 TEFMA average value not yet available. [3] Comparison relates to campus gross consumption only.

Scope 1 emissions

Scope 1 emissions were 3.1% of total emissions for 2023/24. These include:

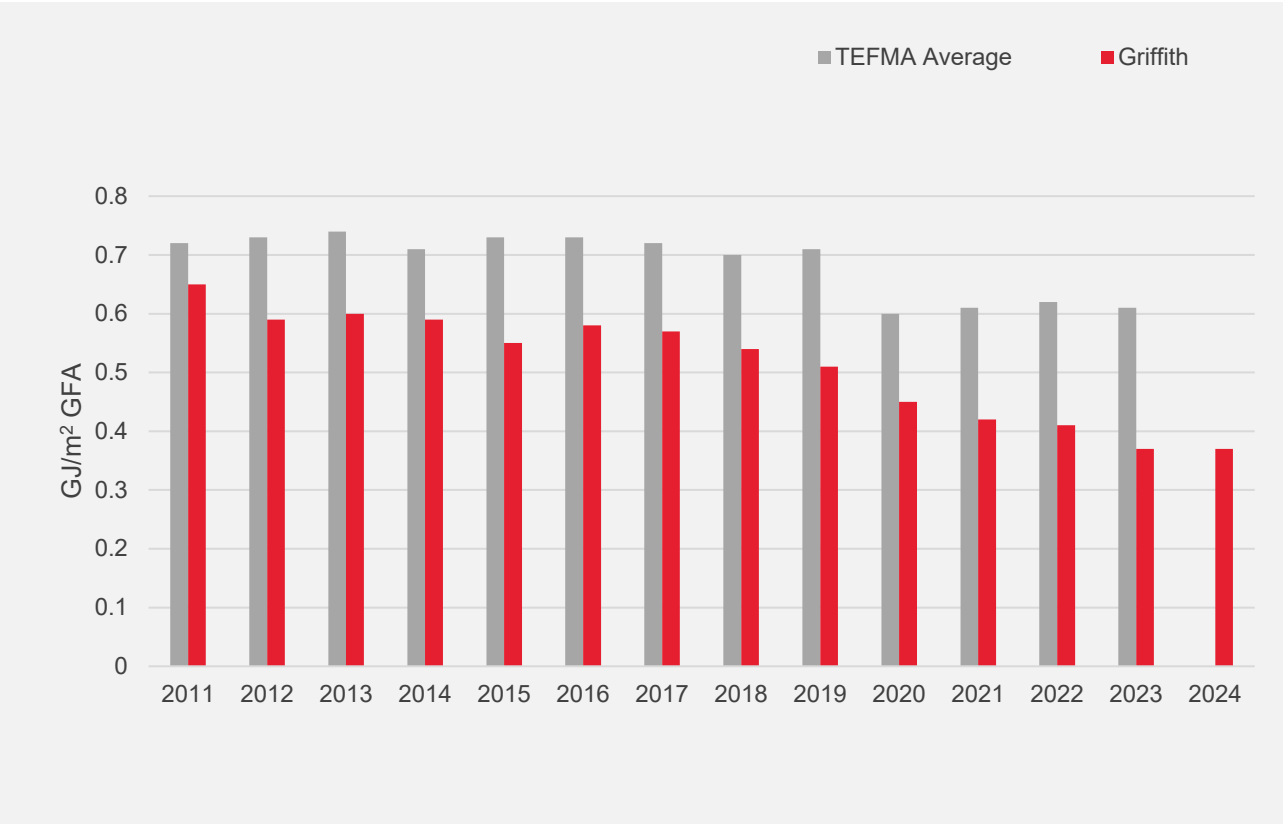
- natural gas and LPG consumption for boilers, hot water heating cooking and laboratory use
- transport fuels e.g. fuel for fleet cars and other University vehicles
- stationary fuels for fixed equipment e.g. generators
- synthetic gases e.g. refrigerant for cold rooms, air conditioning units, chillers.

Initiatives underway to reduce these include:

- Supporting the transition of fleet vehicles to 50% hybrid electric vehicles (HEV) 50% battery electric vehicles (BEV) by 2025, electric vehicle chargers have been installed at both Nathan and Gold Coast campuses in 2024 and are now in operation. The fleet fuel consumption is beginning to reduce as expected.
- The installation of an e-scooter/e-bike charging station at Eco Centre (N68) was completed this year in conjunction with the Eco Centre team. This supports staff and students that choose to adopt these forms of transport and positions Griffith for the future if it chooses to commence reporting commuting emissions for staff and students.
- Priorities for reducing gas consumption on campus have been identified, commencing with replacing gas water heaters with electric when they reach end of life, which will progress in 2024/5. The Griffith Design Guidelines require no further new natural gas/LPG installations on campus for building heating or hot water requirements. Some exceptions for laboratory gas use may be required until the available technology is suitable for the research activities, this is a small part of the gas use profile.

Scope 2 emissions

Scope 2 emissions, indirect emissions associated with the offsite generation of electricity consumed on campus, were 60% of emissions for 2023/24. Electricity consumption normalised on gross floor area is lower than the sector average as shown below.



Electricity consumption – per m^2 GFA

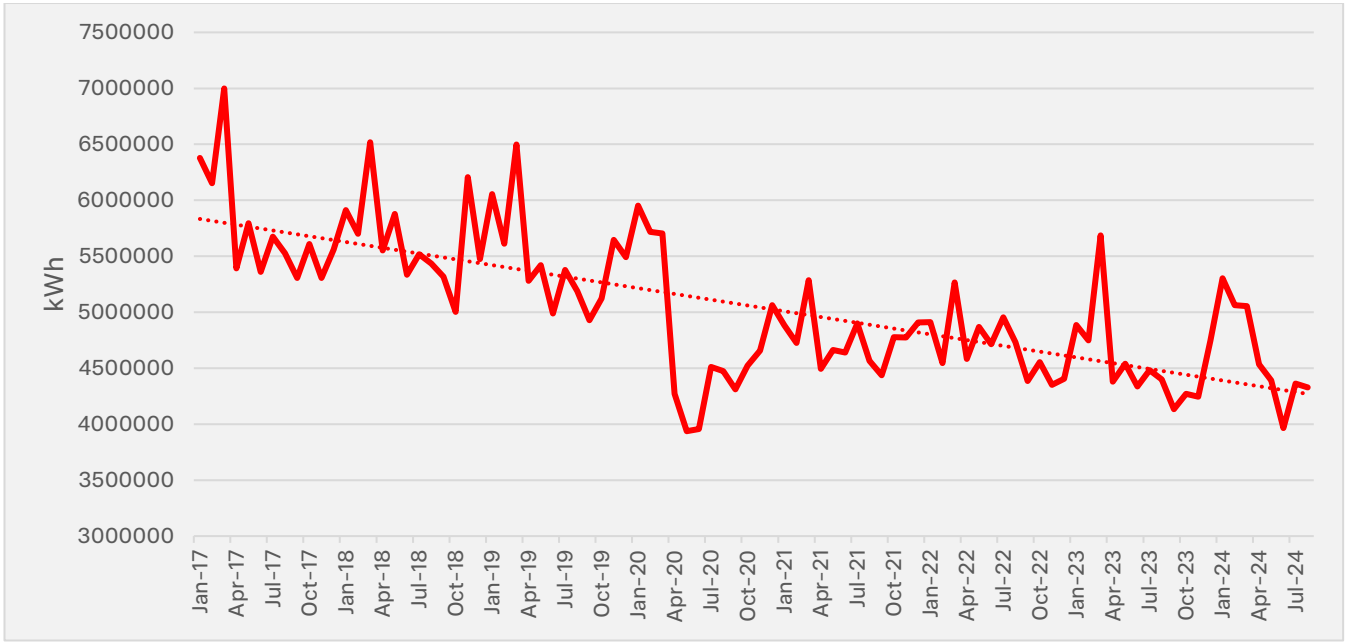
Note: [1]TEFMA excludes residences GFA. [2]2024 TEFMA average value not yet available.

We continue to focus on reducing these emissions by

- reducing electricity consumption by improving the electrical efficiency of buildings
- increasing onsite renewable generation through the roof top solar project
- purchasing offsite renewable power through our agreement with CS Energy. The intent of the agreement was to provide the University 50% renewable power from the Columboola Solar Farm, located in the Western Downs Region of Queensland. However, plant commissioning issues reduced the overall output of the solar farm by 30% and in turn our renewable portion received was reduced by approximately 30%, but still achieving a reduction in our scope 2 emissions for the year.

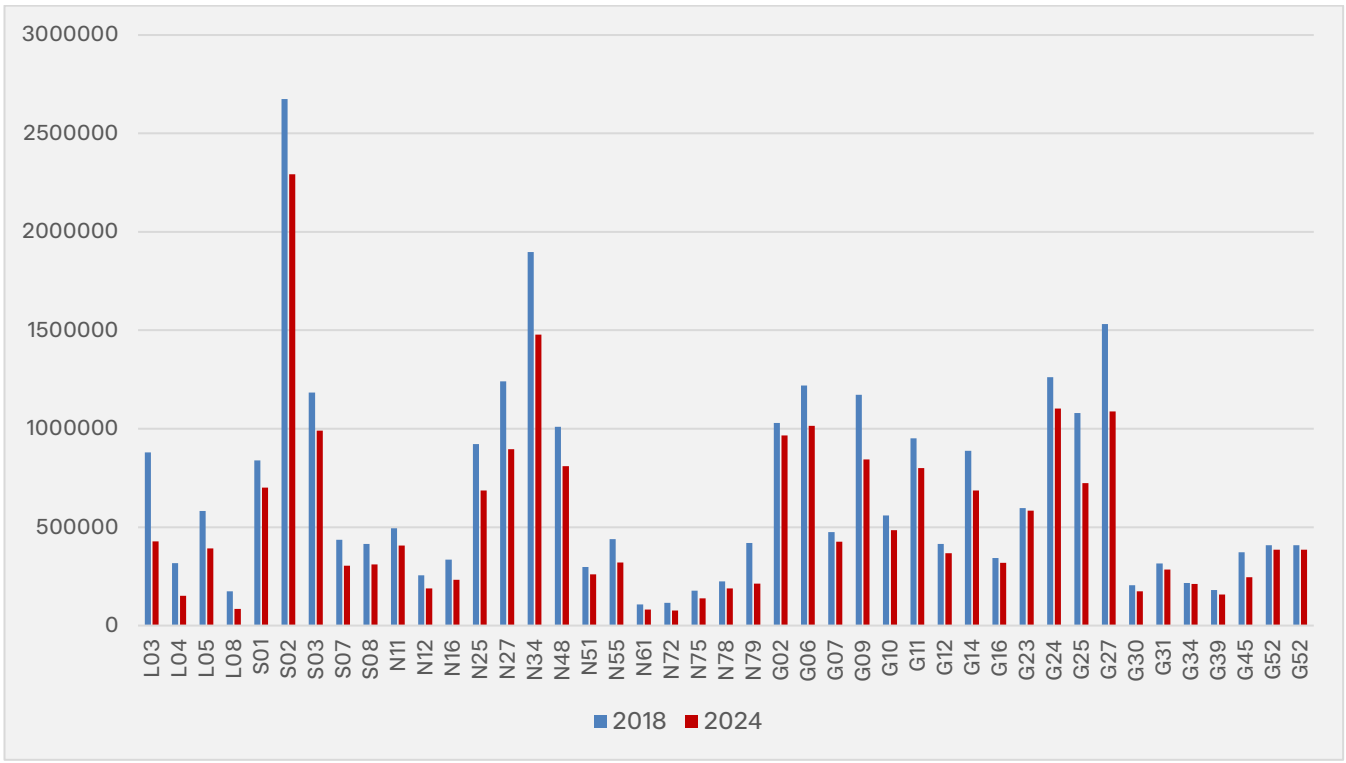
Looking at the onsite and offsite solar together, in 2023-24, 38.1% of our power consumption came from renewable sources, a total of 21,591,781.8 kWh, or 77,730.4 GJ.

Analysing power consumption in more detail confirms a declining trend in power consumption over the last 7 years.



Power consumption – All campuses

The bar chart below depicts the variation in average annual consumption between the years 2018 and 2024 across a range of University buildings. Building consumption varies with building function, with research laboratories for health and science having higher normalised consumption than general teaching buildings. Buildings that include their own chiller plant have higher consumption than those that rely on the central campus provisions.



kWh/GFA/year 2018 vs 2024

Energy efficiency projects

Nathan Campus 1072kW Solar system

The Nathan campus solar system was commissioned in May 2024 and is shown on the front cover of this report. These additional systems bring the Nathan campus's total system size to 1600kW. This is part of a university wide strategy to install 4000kW of rooftop solar across 3 campuses, Logan, Nathan and Gold Coast. The key features of the Nathan system are:

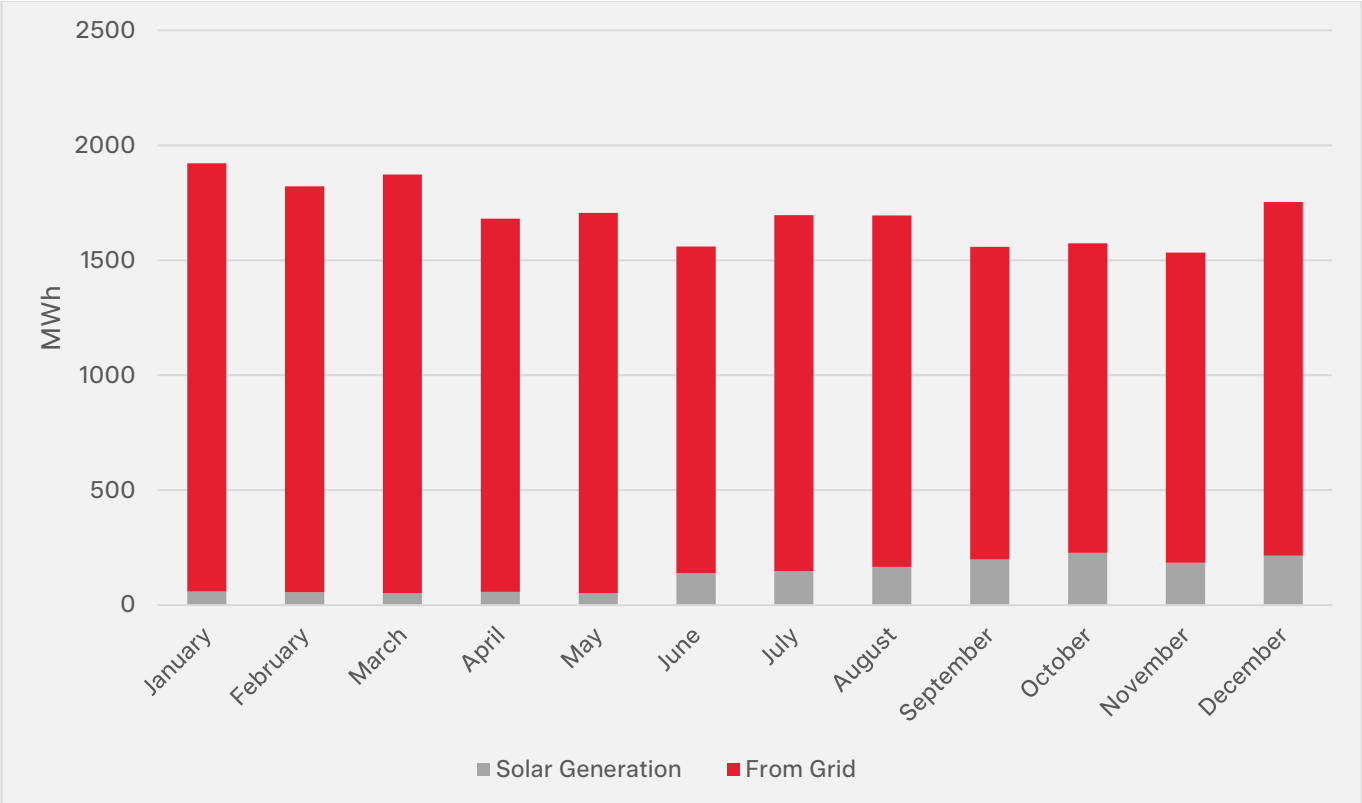
- uses solar panel optimisers to check and optimise the power being generated from each individual solar panel
- uses 2257 highly efficient 475W Astronergy double glass solar panels
- integrates with our campus monitoring system for display and logging.

Some of the key benefits of rooftop solar are:

- local generation of electricity which reduces energy cost and transmission losses
- using existing structural assets (rooftops) to install solar rather than creating new structure and civil works
- generates electricity with zero operational carbon emissions.

Table: Nathan rooftop solar system – Project energy savings and return on investment.

Total Cost of Works	$1,794,566
Annual power savings (kWh) (estimated)	1,694,000 kWh
Annual tCO_2-e reduction	1590
Project spending ($) per annual tCO_2-e saved	1130
Annual electrical bill savings (estimated)	$250,000
Return on investment	7.2 years



Nathan campus consumption by month

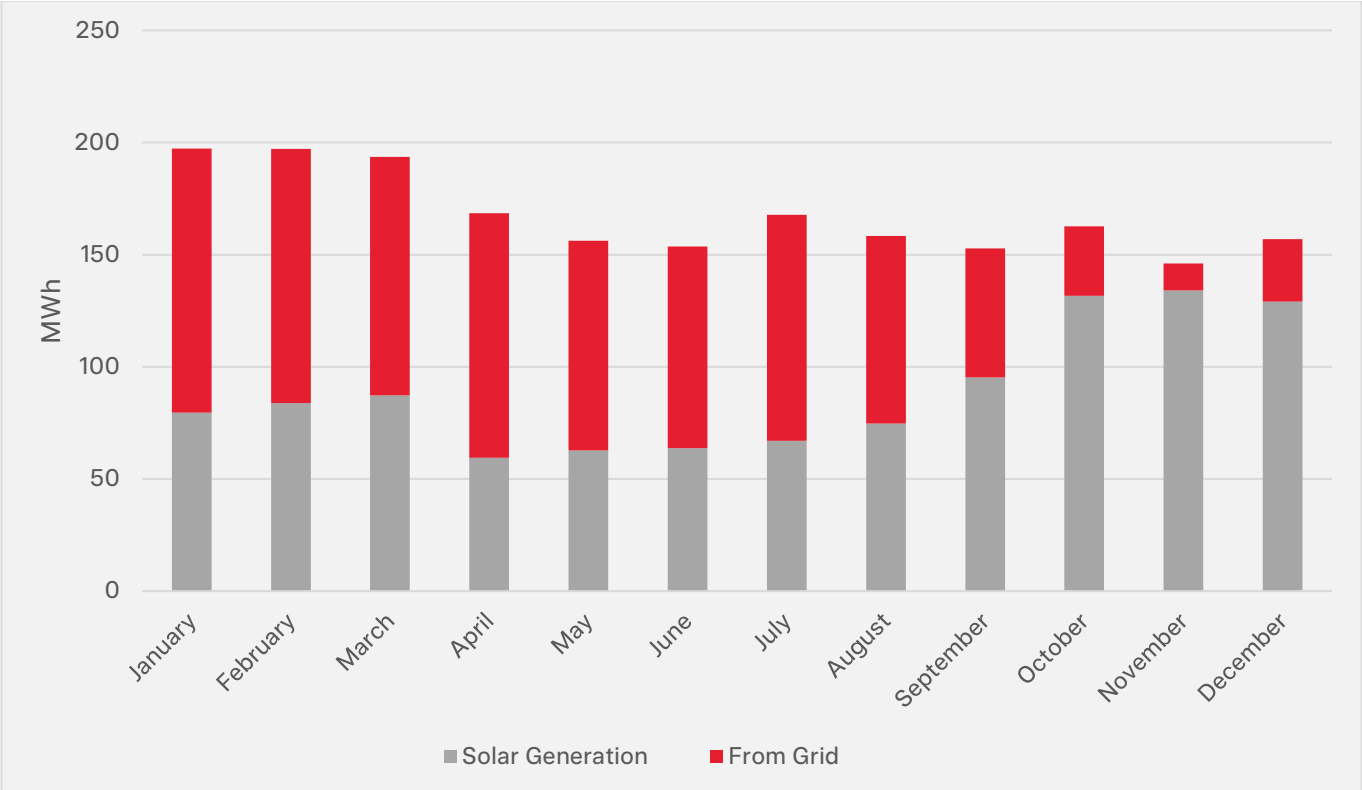
Logan Campus 851kW Solar system

The first whole of campus solar system was commissioned at Logan Campus in September 2023.

Table: Logan rooftop solar system – Project energy savings and return on investment.

Total Cost of Works	$1,951,494
Annual power savings (kWh) (estimated)	1,345,000 kWh
Annual tCO_2-e reduction	1260
Project spending ($) per annual tCO_2-e saved	1545
Annual electrical bill savings (estimated)	$200,000
Return on investment	10 years

Total Energy consumed at Logan by month is shown in the graph below, with actuals from January to September and estimated consumption based on last year for October to December. There were some commissioning issues in the early part of the year, so the solar generation was reduced. The system has generated 1 million kWh in its first year of operation and is forecast to produce 70% of Logan campus's power.



Logan campus consumption month by month

Chiller replacements

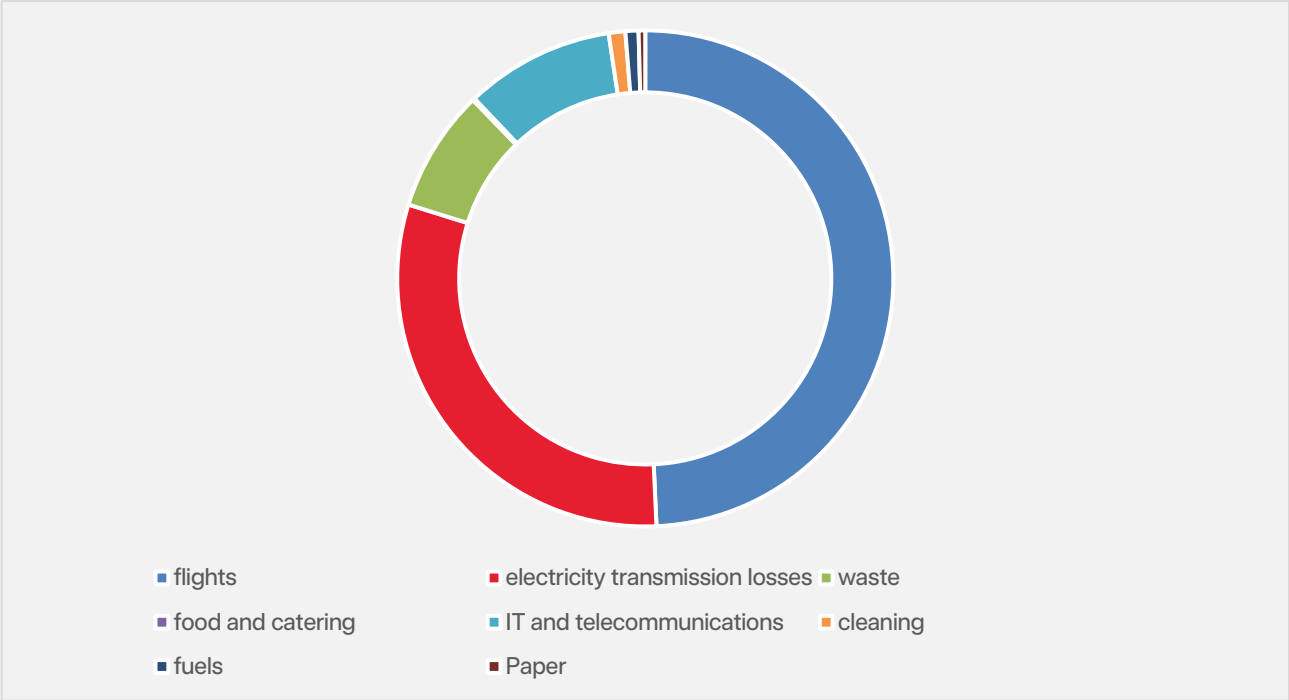
The high efficiency chiller replacement projects continued this year with the following projects completed in the first half of 2024:

- replacement of one chiller at each of G21, G22 and G29 plants—including replacement of building pumps with variable speed drives and other energy efficiency measures arising from a detailed review of the performance of the air conditioning systems
- replacement of all Chillers at Logan campus Chiller Plant (L02) and upgrade of site wide building pumps to improve performance and reduce power consumption.

The impact of these will be assessed once a full year of data is available.

Scope 3 emissions

The University has monitored partial scope 3 emissions from 2010/11 onwards, these form 37% of this year's emissions. The details on which scope 3 emissions are measured and their relative proportions are shown on the graph below.

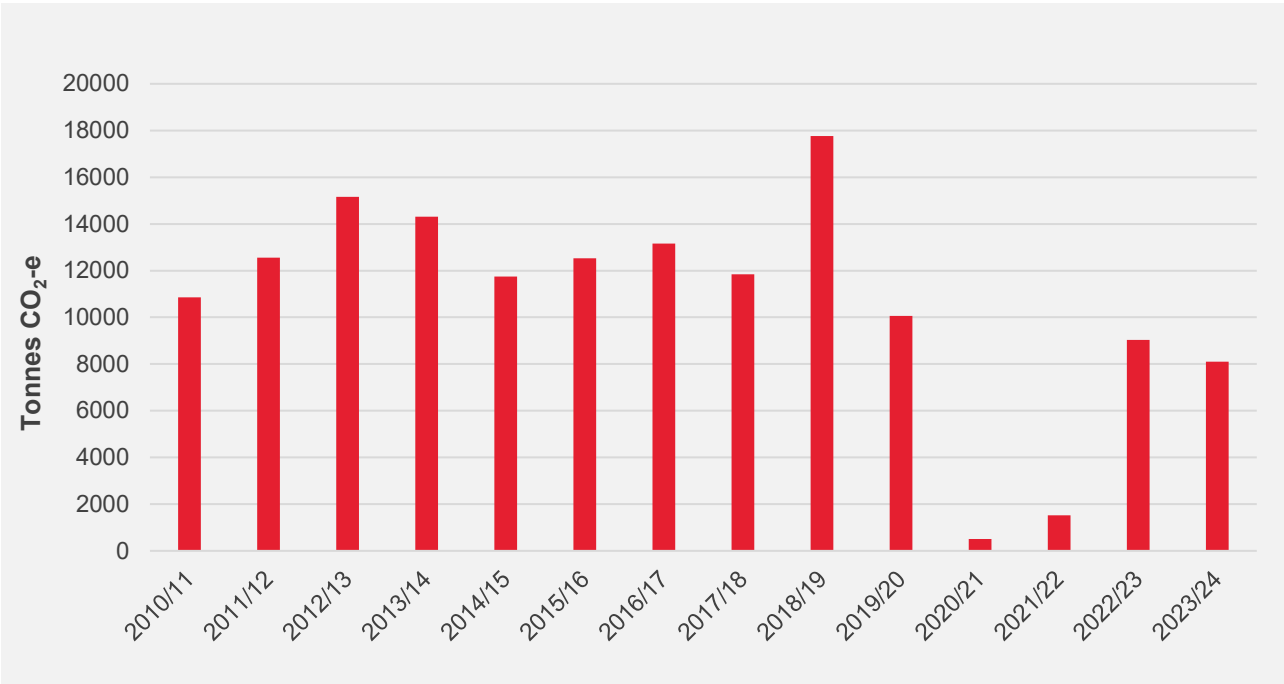


2023/24 scope 3 emissions

After electricity related emissions (with management as described earlier), the next largest contributors are flights and waste, with more detail given below.

Managing our flights

Carbon emissions since the baseline year are shown in the graph below:



Carbon emissions from business air travel from baseline year until present

This year saw similar levels of flight activity to the previous year, with the slight reduction attributed to the financial position of the University and some anomalies in quarterly vs annual flight data (estimated at 10%) which we are working with our travel provider to resolve.

Further detail on the business air travel data is given in appendix B.

Managing our waste

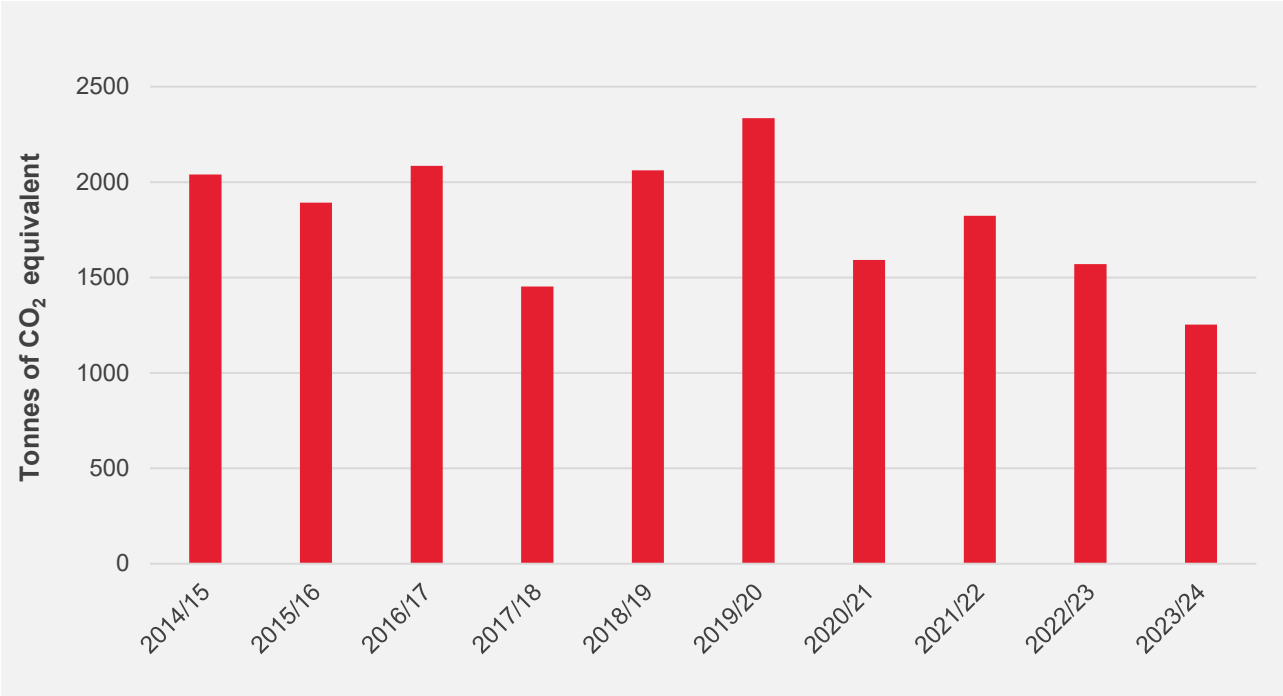
Emissions from waste since the baseline year are shown in the graph below. The data is based on a mixture of weighed waste and average bin weights so lacks reliability (and varies with contract provider).

Initiatives for waste reduction continue including

- collection of organic waste for composting and Containers for Change recycling which contributes to Griffith University's hardship grants for students
- installation of resource recovery facilities on campus at both Gold Coast and Nathan which are now operational will improve the accuracy of weights of waste directed to landfill and allow waste sorting to increase recycling volumes
- bins at South Bank, Mount Gravatt and Logan are now weighed improving the reliability of data.

The improved measures for waste handling are expected to reduce landfill waste by 30% in the first year increasing to 40% reduction in the second year.

The TEFMA benchmark data is for landfill and recyclable waste combined. As the data on recyclable waste is considered unreliable, a comparison to TEFMA benchmark data is not presented here.



Carbon emissions from landfill waste from baseline year until present

Pathway to Net Zero 2029

The Net Zero 2022 report updated Griffith's pathway to achieve Net Zero by 2029 based on the 2010 emissions boundary (which includes partial scope 3 emissions as detailed in appendix C). The pathway employs three key strategies for reducing our carbon footprint:

- avoiding emissions
- reducing emissions
- generating and purchasing clean energy.

The pathway includes the following key levers:

- high efficiency chiller replacements for replacements planned for end-of-life assets
- energy efficiency measures including review of building and server room temperature set points, fitting VSD drives to mechanical equipment where applicable, occupancy sensors, etc.
- onsite renewables — Logan and Nathan systems online, majority of Gold Coast to complete by end 2024 with project close out in 2025
- offsite renewables — purchase of 50% renewable power (in place from December 2022); 100% renewable power on contract renewal in January 2029
- reduction in air travel of 25% on 2010 baseline year by 2030
- reduction in paper use, waste, behavioural change programme
- migration to electric car fleet or other low carbon transport options
- reduction in gas consumption on campus.

As the largest contributors to our carbon footprint, the current initiatives focus on reduction in energy consumption and flight related emissions as follows:

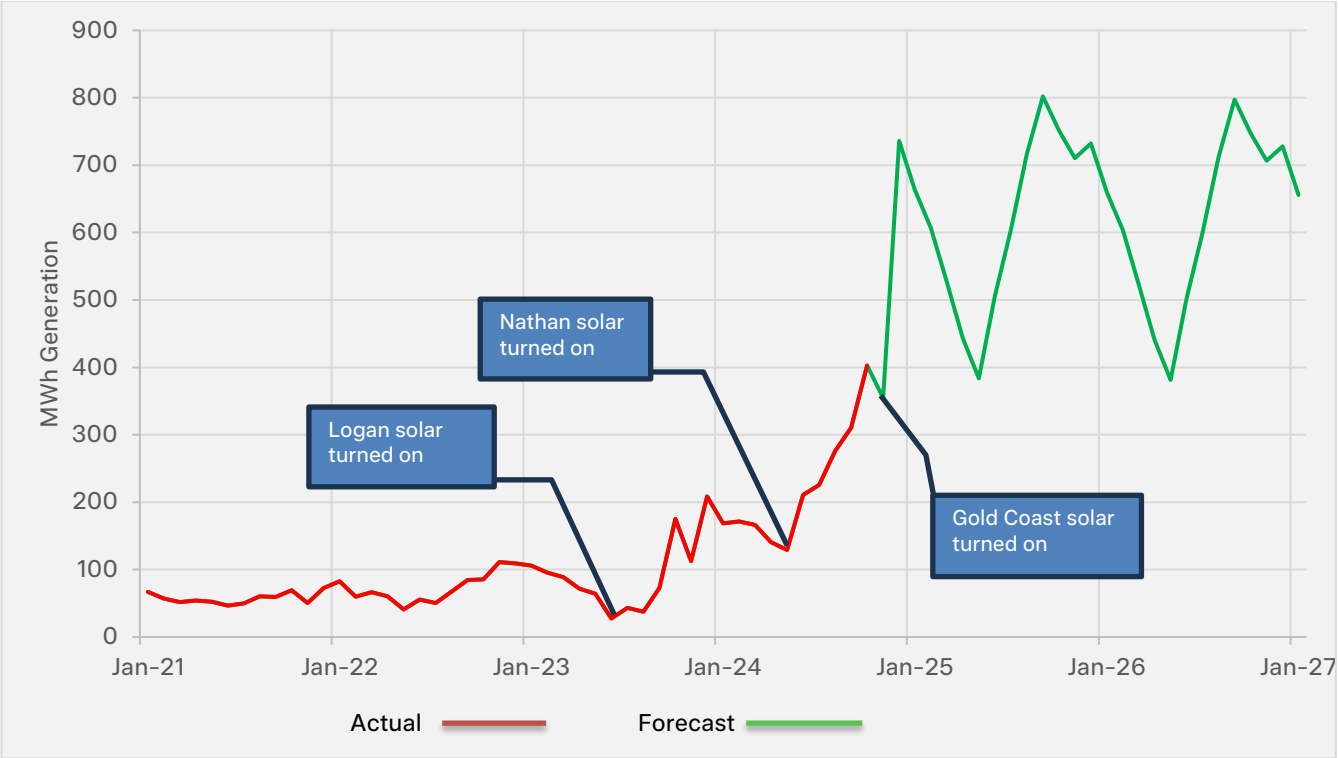
Flights

The University community will continue to work together to target a reduction in air travel of 25% on 2010 baseline year by 2030 by looking at initiatives such as investing in digital technology to enable virtual meetings and conferences, to incentivise travel reduction and to review University policy relating to international collaboration.

Electricity

The scope 2 electricity emissions remain the greatest part of our emissions. Energy reduction projects in progress and planned for next year are as follows:

- Replacement of one further chiller at G29 plant together with ongoing building controls and tuning upgrades to improve energy efficiency of existing buildings (across all campuses).
- The Technical Annex (N81) will complete in March 2025 with rooftop solar panels and energy efficient installations throughout. The refurbishments of Environment 1 (N55), Sciences 2 (N34) and Technology (N44) will update air conditioning, hot water and lighting systems to current energy efficient standards for plant as part of the research facilities upgrade.
- On site renewables—installation of the roof top photovoltaic panels continued through 2024 with 1060kW added at Nathan campus (completed in April 2024) and 2280kW to be completed at Gold Coast campus by the end of 2024. This increases forecast solar generation for the calendar year (assuming no delays in construction or Energex approvals) to 3292 MWh, approaching 7% of annual consumption, as shown in the graph below.

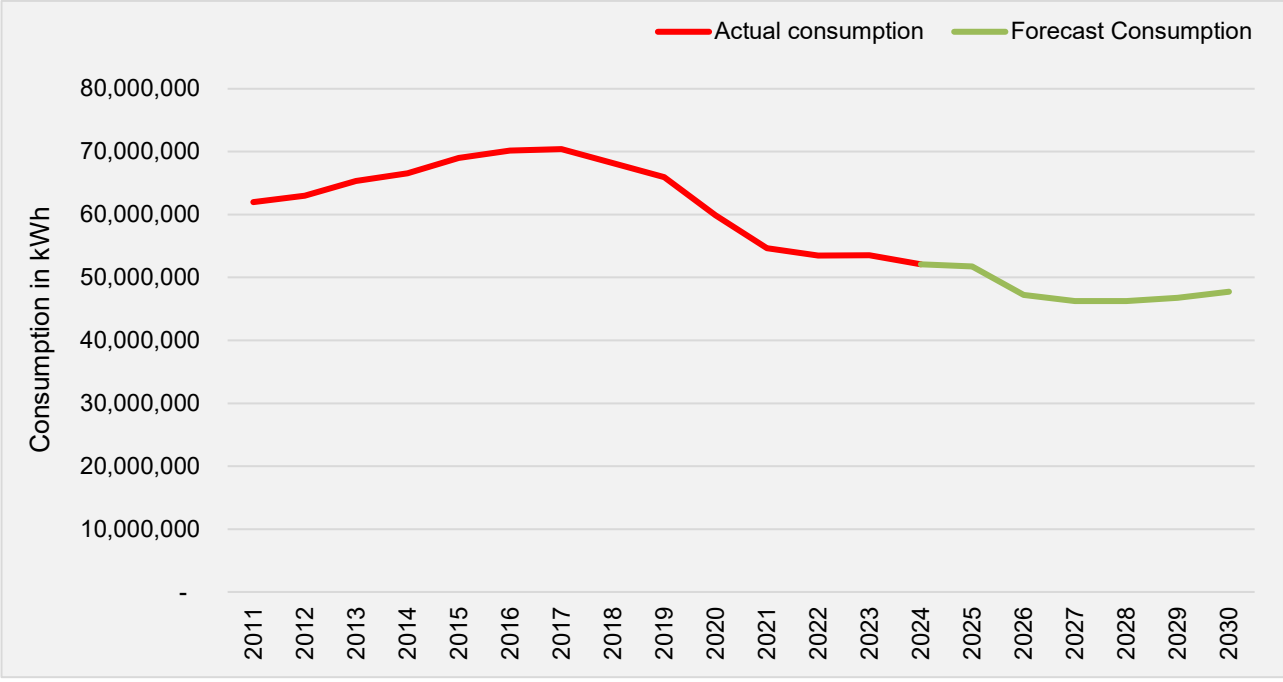


Monthly forecast solar generation (MWh)

These factors combine with the following planned changes in buildings and associated consumption:

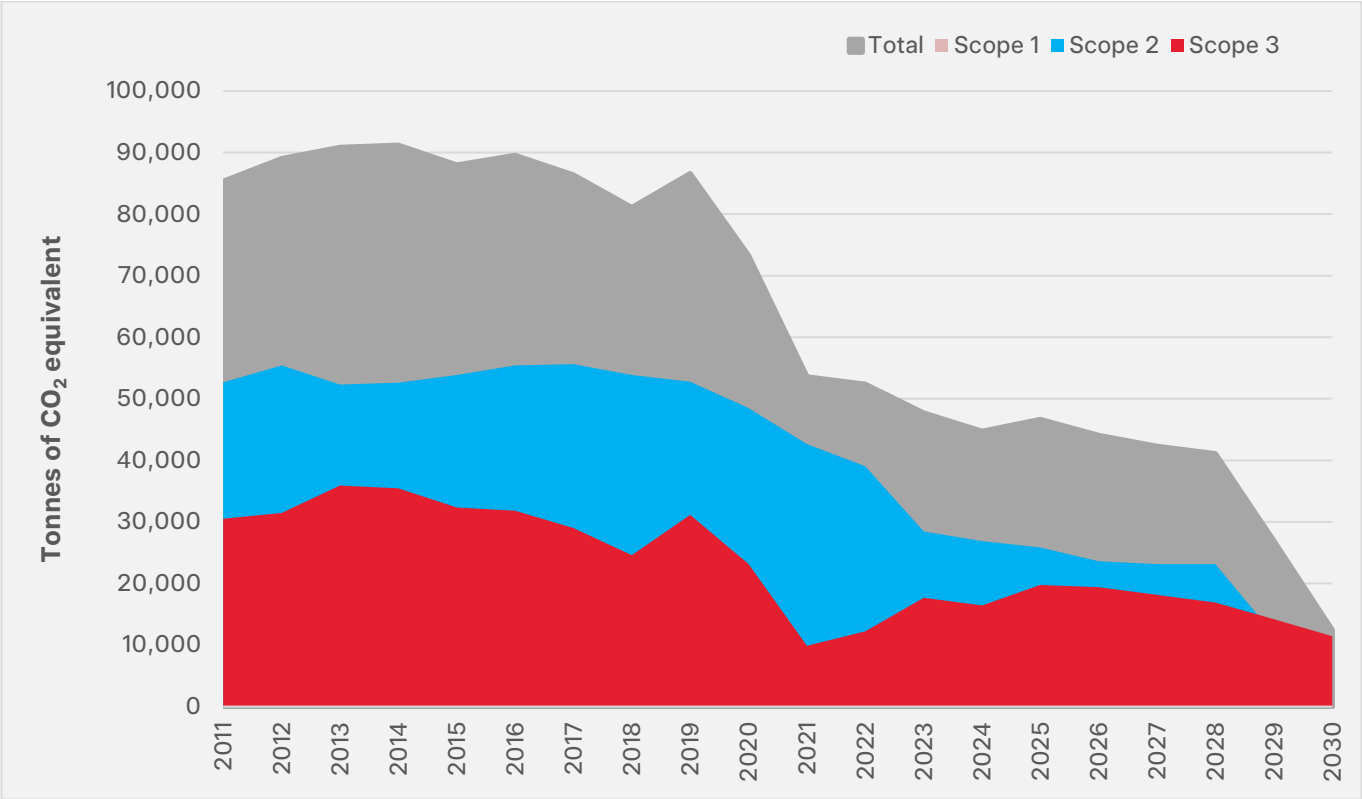
2025	Practical completion of Technical Annex (N81) Completion of Nathan consolidation and exit from Mount Gravatt
2027	CBD campus (Treasury) opens
2030	Arrivals Building (N82) opens

Taking the above into account, the forecast power consumption to 2030 is shown below:



Annual electricity consumption forecast to 2030

The carbon emissions associated with electricity consumption will include the benefits of the 50% renewable energy. Forecast emissions are as follows:



Annual carbon emissions to 2030

Key assumptions underpinning the emissions target for 2024/25 are:

- activity levels on campus similar to 2018/19
- solar installations on campus generate as expected at Nathan and Logan, and the Energex approval is granted for Gold Coast installations
- 50% renewable portion from the electricity sourcing agreement
- electricity consumption at the Treasury building has been estimated based on limited data and the current project timeline
- flights are estimated at 12,954 tCO_2-e, 20% above the 2010 baseline, and a 60% increase on this year's total (as it was unexpectedly low).

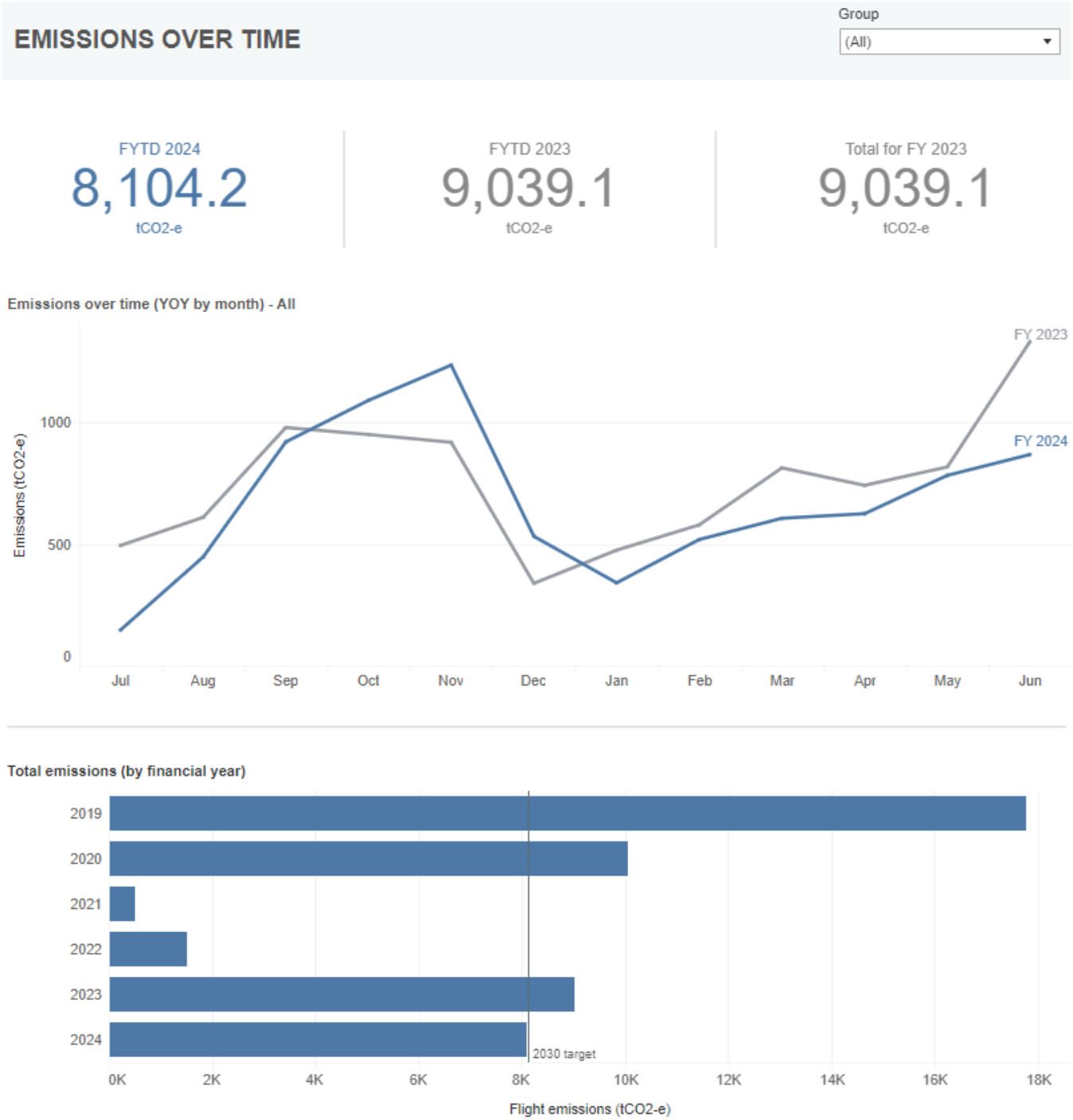
The targets set as part of the strategic plan 2020–2025 for 2025, the final year of the plan, is a 45% reduction on the 2010 baseline.

Appendix A: Table of emissions from Baseline 2010/11 to present

Table: Griffith University Carbon Footprint—emissions tCO_2-e from Baseline 2010/11 to present

Year	Scope 1	Scope 2	Scope 3	Total
2023/24	1,407.8	26,872.1	16,445.0	44,724.90
2022/23	1,529.4	28,444.1	17,695.3	47,668.8
2021/22	1,104.3	39,031.5	12,207.4	52,343.1
2020/21	1,008.3	42,629.8	9,896.3	53,534.5
2019/20	1,592.5	48,499.1	23,214.6	73,306.2
2018/19	2,627.8	52,775.1	31,148.9	86,551.8
2017/18	2,588.9	53,880.1	24,585.2	81,054.2
2016/17	1,739.8	55,624	29,020.9	86,384.7
2015/16	2,274.7	55,440.4	31,835.4	89,550.5
2014/15	1,813.4	53,840.2	32,318.2	87,971.8
2013/14	2,124.8	52,604.7	36,459.6	91,189.1
2012/13	2,637.1	52,281.1	35,912.2	90,830.4
2011/12	2,115.7	55,431.1	31,456.9	89,003.6
2010/11	2,114.6	52,694.3	30,535.5	85,344.4

Appendix B: Aviation emissions detail



Appendix C: Scope 3 emissions by Greenhouse Gas Protocol categories

Emissions Sources	2021/22	2022/23	2023/24
Scope 3 Cat 1 - Purchased goods & services	858.6	772.8	808.8
Advertising			
Cleaning Services	164.5	189.5	177.3
Construction (refurbishment)			
Food & Catering	196.4	34.6	22.9
Office Paper	0.3	14.0	71.1
Printing			
Stationery			
Telecommunications	497.4	534.7	537.5
Water			
Scope 3 Cat 2 - Capital goods	554.2	828.4	1,061.2
Livestock			
IT Equipment	554.2	828.4	1,061.2
Construction (new builds)			
Scope 3 Cat 3 - Fuel-and-energy-related activities	7,433.9	3,821.4	5,160.9
Diesel oil			
Electricity	4,278.6	3,664.8	5,020.9
Ethanol (IC)			
LPG	5.4	35.2	35.4
Natural Gas	46.4	49.0	39.9
Post 2004 Diesel oil	7.0	20.3	19.9
Post 2004 Ethanol (IC)	0.2	2.0	1.9
Post 2004 Gasoline	7.8	50.1	42.9
Scope 3 Cat 4 - Upstream transportation & distribution			
Couriers			
Postage			
Scope 3 Cat 5 - Waste generated in operations	1,839.6	1,614.8	1,292.0
Landfill	1,823.4	1,570.1	1,235.8
Waste—incineration	16.2	44.7	56.2
Scope 3 Cat 6 - Business travel	1,521.0	9,039.1	8,104.1
Business Flights	1,521.0	9,039.1	8,104.1
Domestic Hotel Accommodation			
International Hotel Accommodation			
Taxi			
Scope 3 Cat 7 – Employee commute			
Employee Commute			
Scope 3 Cat 8 - Upstream Leased assets	N/A	N/A	N/A
Griffith as tenant utilities consumption—typically Griffith pay utilities bills direct and report as scope 2			
Scope 3 Cat 9 Student commute			
Student Commute			
International student flights			
Scope 3 Cat 10 Processing Sold products	N/A	N/A	N/A

Emissions Sources	2021/22	2022/23	2023/24
Scope 3 Cat 11 Use of Sold products	N/A	N/A	N/A
Scope 3 Cat 12 End of Life treatment of sold products	N/A	N/A	N/A
Scope 3 Cat 13 Downstream leased assets	3,088.0	1,618.9	1,703.3
Tenants' utilities emissions	3,088.0	1,618.9	1,703.3
Scope 3 Cat 14 Franchises	N/A	N/A	N/A
Scope 3 Cat 15 Investments			
Total (tCO_2-e)	12,207.4	17,695.4	18,130.3

GRIFFITH UNIVERSITY
QUEENSLAND AUSTRALIA

CRICOS: 00233E | TEQSA: PRV12076

griffith.edu.au

MAKE IT MATTER