




**Carbon  
Management  
Report  
2022-2023**



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Cover picture: Logan campus solar installation, 22 August 2023, Profly Solutions



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, Yugambah 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 Performance 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 2023 and compares our performance to the baseline, the previous year and the higher education sector TEFMA benchmarks.

Overall, the total carbon emissions for the 2022/23 year were 47,668.8 tonnes of carbon dioxide equivalent (tCO<sub>2</sub>-e), 44% below the 2010/11 baseline and 9% 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 2022/23 can be summarised as follows:

- Scope 1 emissions relate to the direct consumption of fossil fuels. Scope 1 accounts for 3.2% of the total carbon emissions for the year. 2022/23 scope 1 emissions were 1,529.4 tCO<sub>2</sub>-e, a small increase on the previous year resulting from increased gas use, and a 28% decrease on 2010/11.
- Scope 2 emissions are the emissions associated with the consumption of electricity generated off campus. These account for 59.7% of the total Carbon footprint for the year. 2022/23 scope 2 emissions were 28,444.1 tCO<sub>2</sub>-e, 27% decrease on 2021/22 and 46% below 2010/11 levels. Contributions to the reduction in scope 2 emissions included:
  - 50% renewable power from Columboola Solar farm from 1 December 2022.
  - Reduction in the market-based grid emissions factor applied to our power consumption from July to November (a result of the increased percentage of renewables in the Australian market).
  - Full year of benefits from energy efficiency projects completed in the previous year and ongoing building tuning and controls improvements keeping consumption to approximately the same as the previous year. 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 forms the remaining 37% of our emissions with total 2022/23 emissions being 16,777.2 tCO<sub>2</sub>-e, a 45% increase on 2021/22 and a 42% decrease on 2010/11. Flight emissions at 9,039.1 tCO<sub>2</sub>-e form more than half of this category, similar to the 2010 baseline year as expected as we return to more normal travel activity levels.

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.

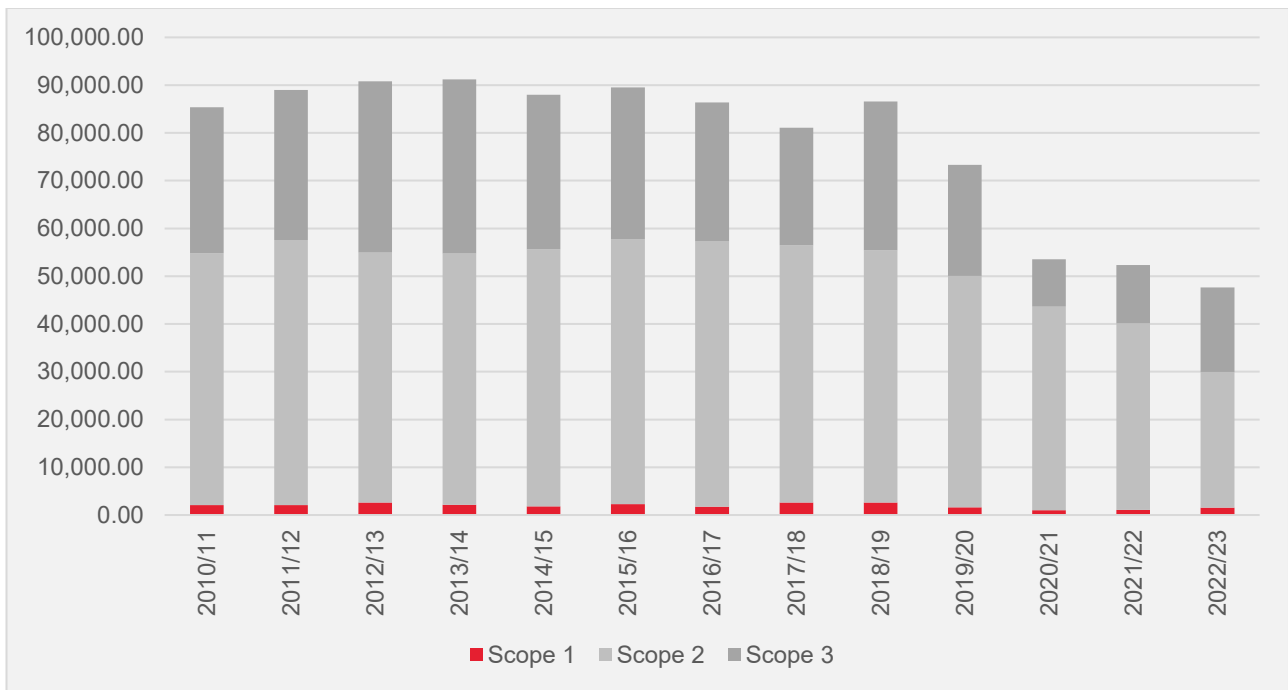
### Scope 2

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.

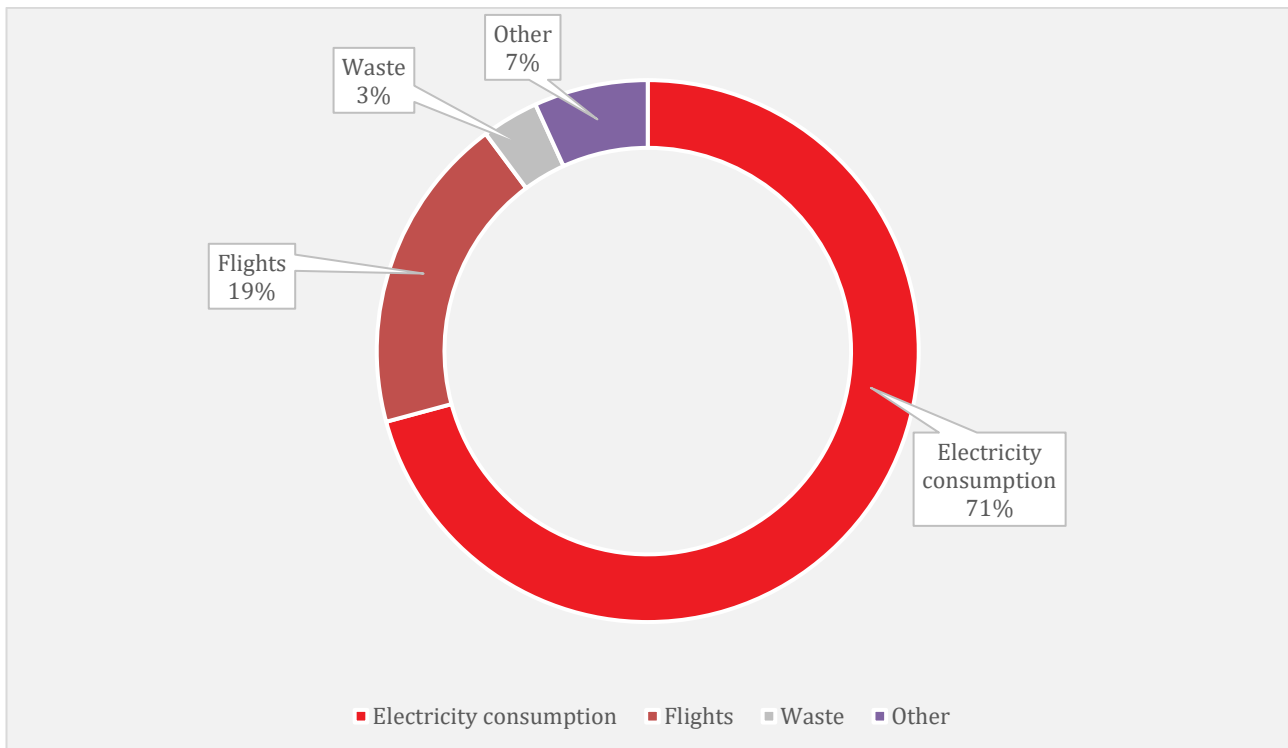
Our scope 1, 2 and 3 emissions since the 2010/11 baseline emissions year are as shown below:



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 2022/23 year, the carbon emissions breakdown by source is as follows:

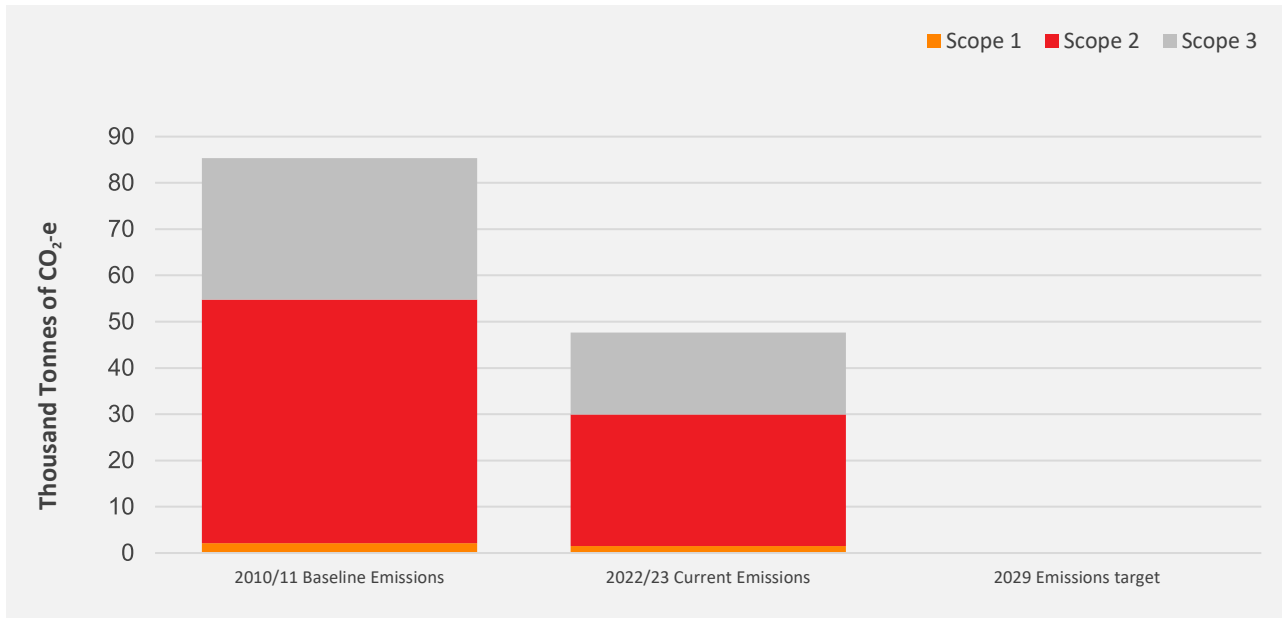


2022/23 carbon emissions breakdown

1. Other emissions includes
- |                            |      |                             |      |
|----------------------------|------|-----------------------------|------|
| Food & beverage            | 0.1% | Stationary fuels            | 1.0% |
| ICT equipment              | 1.7% | Synthetic Greenhouse Gasses | 1.8% |
| ICT services               | 1.1% | Transport fuels             | 0.8% |
| Office supplies & services | 0.4% |                             |      |

# 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:

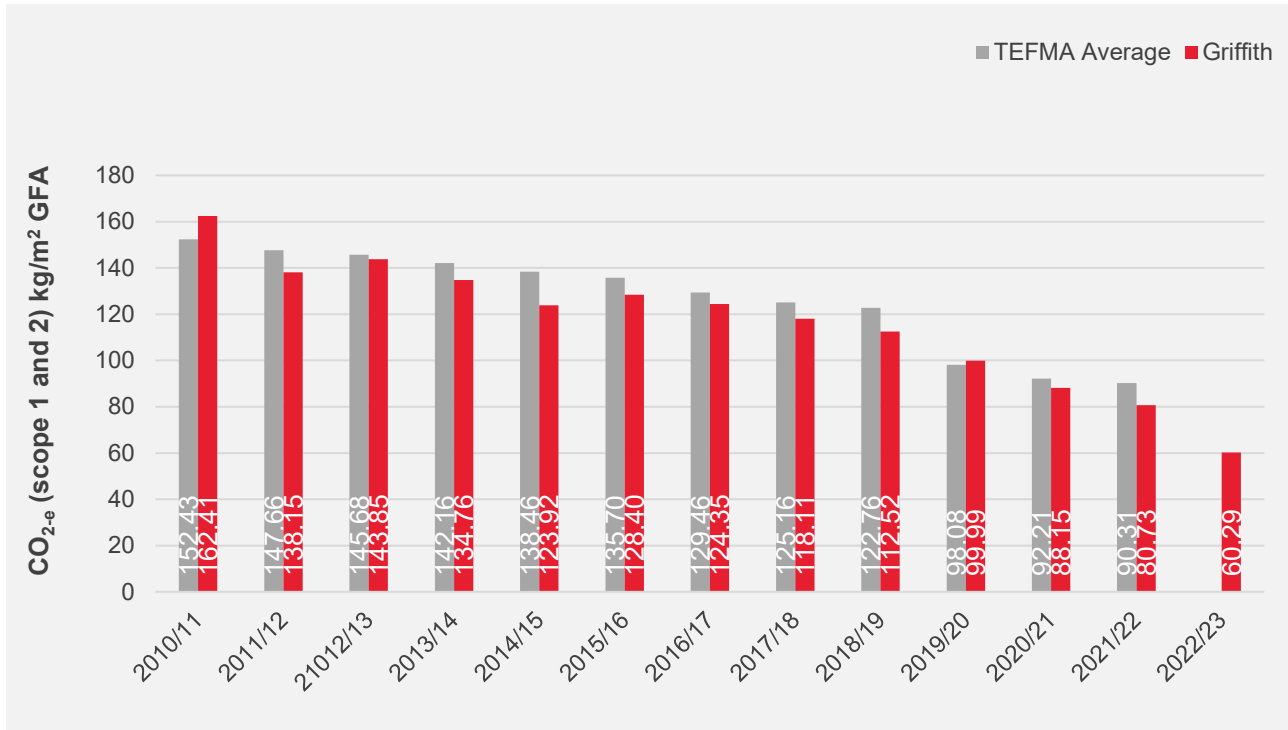
- 5% residual emissions will be offset (based on 2010 baseline emissions of 85,344 tCO<sub>2</sub>-e)
- flight emissions will achieve our target of a 25% reduction by 2029 based on the 2010 baseline of 10,500 tCO<sub>2</sub>-e and these will also be offset
- on renewal of our power purchasing contract (which ends December 2028), 100% renewable power will be available and affordable for all campuses and leased premises.

## 2022/23 Year-on-year performance comparisons

	Total emissions tCO <sub>2</sub> -e	% change relative to 2010/11 baseline	% change relative to prior year (2021/22)
Scope 1 Direct emissions	1,529.4	-28%	+38%
Scope 2 Indirect emissions associated with the use of grid (offsite generated) electricity	28,444.1	-46%	-27%
Scope 3 Emissions as a consequence of use of goods/services (partial)	17,695.1	-42%	+45%
<b>Total</b>	<b>47,668.8</b>	<b>-44%</b>	<b>-9%</b>



## Against the higher education sector (TEFMA) benchmarks



Scope 1 and 2 CO<sub>2</sub>-e Emissions per m<sup>2</sup> GFA

Note: <sup>1</sup> TEFMA excludes residences GFA. <sup>2</sup> 2023 TEFMA average value not yet available. <sup>3</sup> Comparison relates to campus gross consumption only.

## Scope 1 emissions

Scope 1 emissions were 3.2% of total emissions for 2022/23. 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.

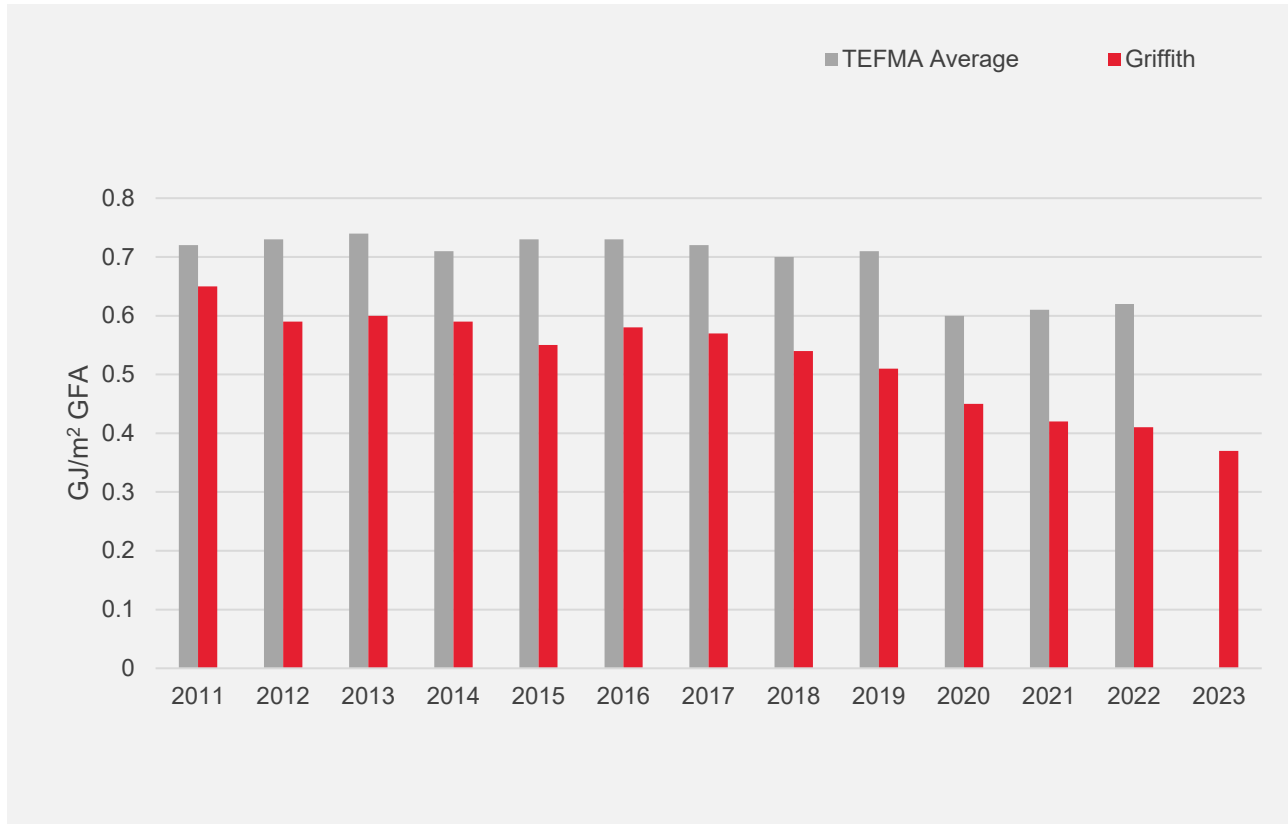
Initiatives underway to reduce these include:

- Supporting the transition of fleet vehicles to 50% hybrid electric vehicles (HEV) 50% battery electric vehicles (BEV) by 2025, electric vehicle chargers will be installed at both Nathan and Gold Coast campuses in 2024.
- The installation of an e-scooter/e-bike charging station at Eco Centre (N68) will be completed in November 2023. Further locations are being investigated for installation in 2024. This 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. The Net Zero Emissions 2.0 sprint team report identified a roadmap for degasification, funding will be confirmed in the coming years. The Griffith Design Guidelines now mandate no new gas 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, 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 2022/23. Electricity consumption normalised on gross floor area is lower than the sector average as shown below.



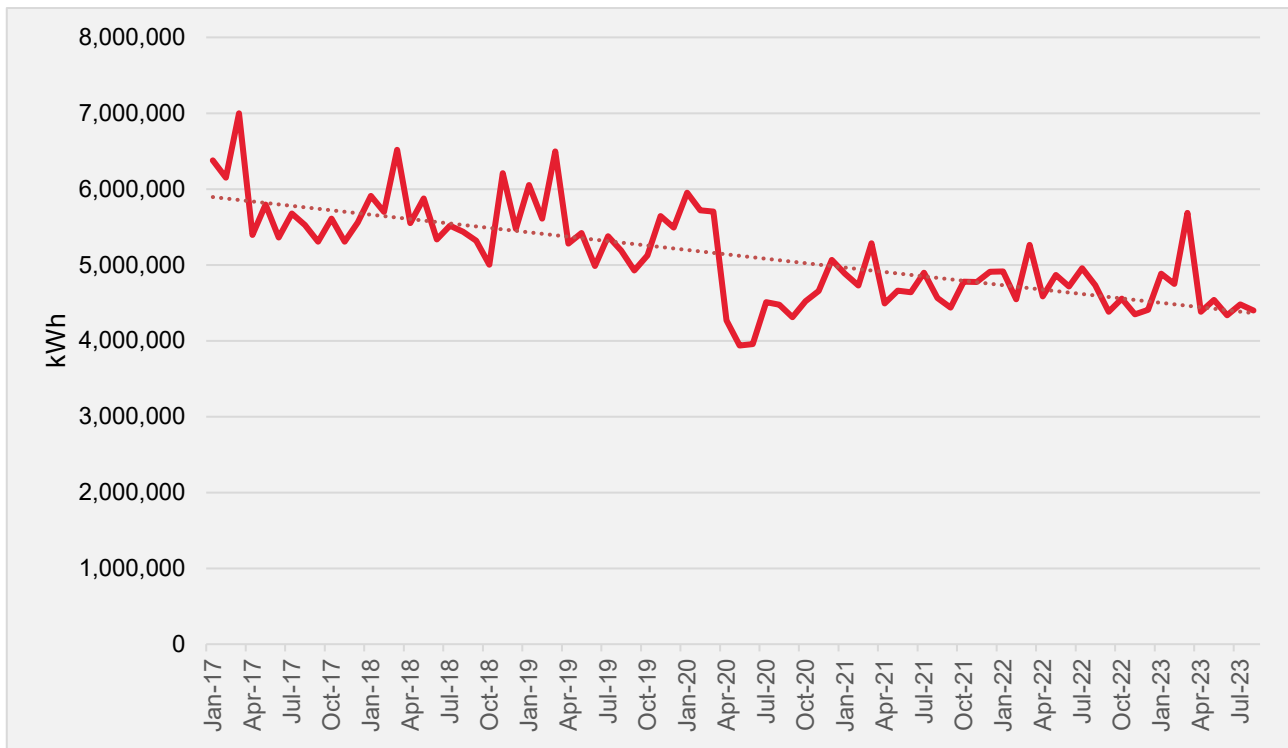
Electricity consumption – per m<sup>2</sup> GFA

Note: <sup>1</sup>TEFMA excludes residences GFA. <sup>2</sup>2023 TEFMA average value not yet available.

We continue to focus on reducing these emissions by

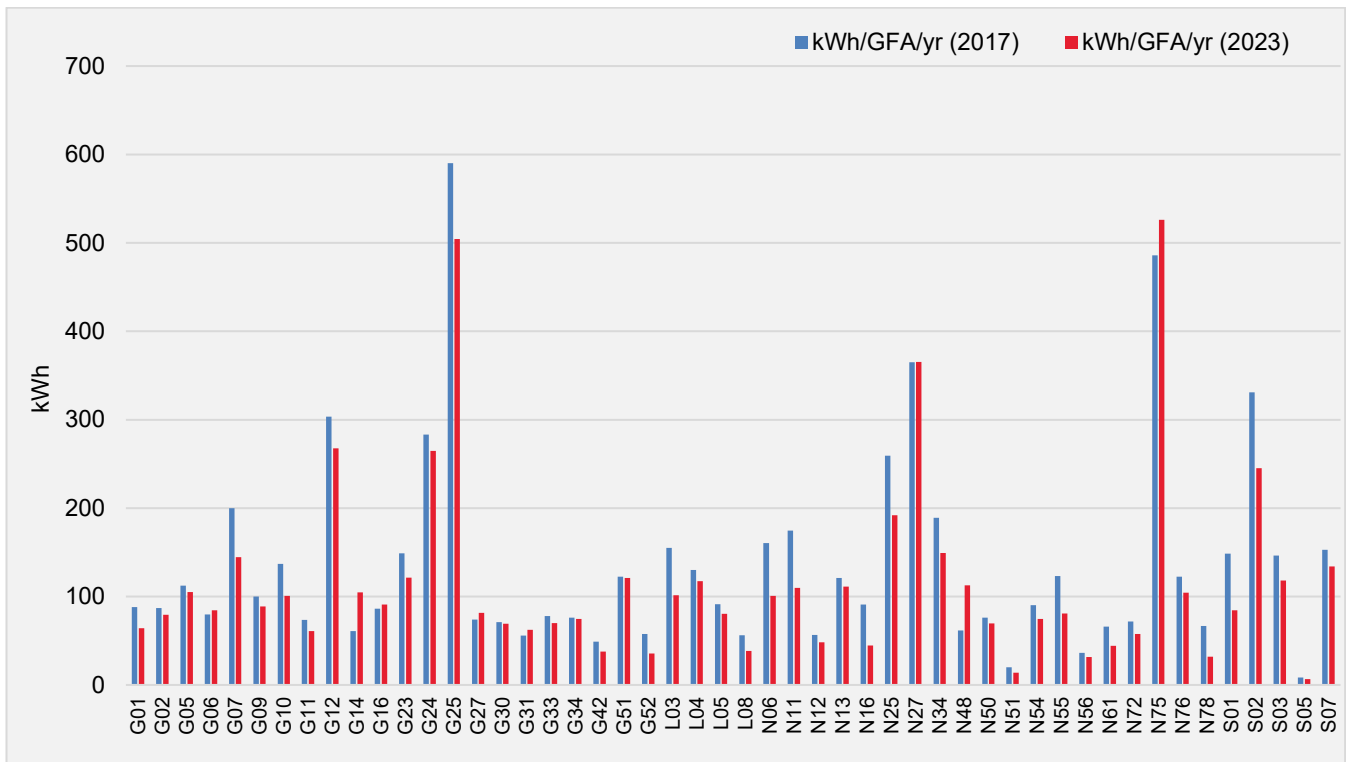
- reducing electricity consumption by improving the electrical efficiency of buildings
- increasing onsite renewable generation through the roof top solar project
- purchasing 50% offsite renewable power.

Analysing power consumption in more detail confirms a declining trend in power consumption over the last 6 years.



Power consumption – All campuses

The bar chart below depicts the variation in average annual consumption between the years 2017 and 2023 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.



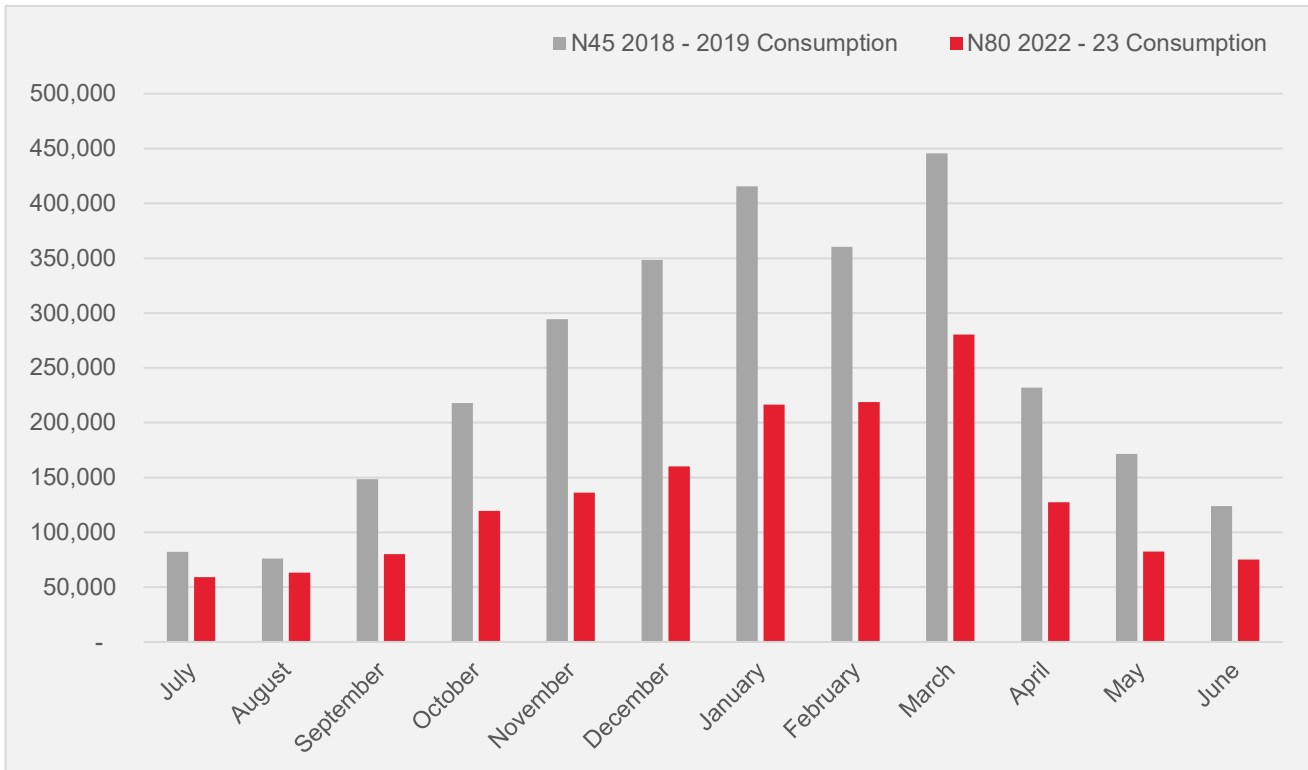
kWh/GFA/year 2017 vs 2023

# Energy efficiency projects

## Chiller Plant West (N80)

The chiller plant reached practical completion in March 2022 and last year’s report included the initial analysis of the savings over the winter months. The full year data shows a 44% saving in electricity use for 2022/23 compared to the last full year of operation of the previous plant prior to the pandemic (2018/19). The new plant is performing in line with the 2019 estimate that the new plant would be approximately twice as efficient, with an annual saving of 1,600,000kWh. It is likely that a greater cooling demand is now being met as the plant is achieving 100% availability whereas the previous equipment had no redundancy so if a portion was unavailable, conditions in buildings were not maintained.

A clear improvement in efficiency is noted during the summer months with November, December, January showing the largest power consumption savings (54%, 54% and 48% respectively).



N80 vs N45 Chiller Plant Energy Consumption Comparison

Table: N80 Chiller Plant – Project energy savings and return on investment.

Total Cost of Works	\$12,135,504.96
Annual power savings (kWh)	1,296,713.05
Annual tCO <sub>2</sub> -e reduction	1,205.94
Project spending per annual tCO <sub>2</sub> -e saved	\$10,063
Annual electrical bill savings	\$181,539.83
Return on investment	66.85

The total cost of the works includes the cost of the new building and the replacement of all plant, including the additional plant to achieve redundancy, improving the resilience of the plant overall.



## Logan Campus 851kW Solar system

The first whole of campus solar system was commissioned at Logan Campus in August 2023 and is shown on the front cover of this report. This is part of a University wide strategy to install 4000kW of rooftop solar across 4 campuses— Logan, Nathan, Gold Coast and South Bank. The key features of the Logan system are:

- using solar panel optimisers to check and optimise the power being generated from each individual solar panel
- using 1635 highly efficient 545W Canadian Solar panels
- integrating with the campus monitoring system for display and logging.

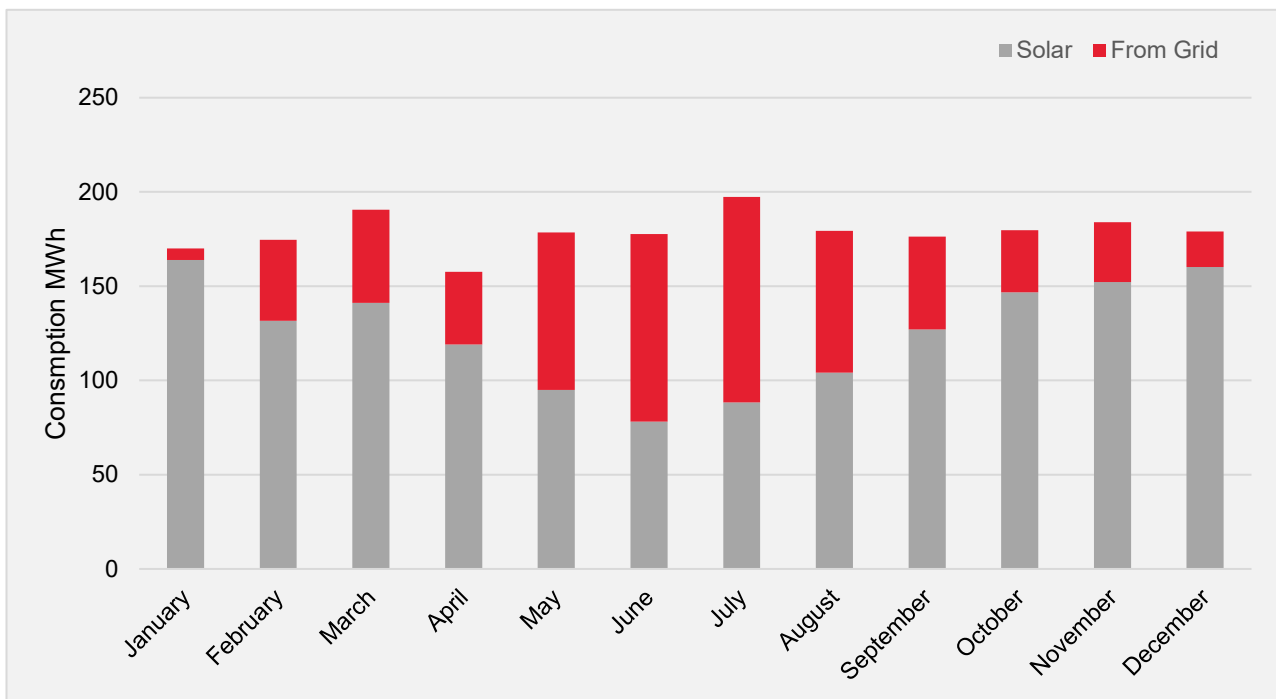
Some of the key benefits of rooftop solar are:

- 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
- generating electricity with zero operational carbon emissions.

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 <sub>2</sub> -e reduction	1260
Project spending (\$) per annual tCO <sub>2</sub> -e saved	1545
Annual electrical bill savings (estimated)	\$200,000
Return on investment	10 years

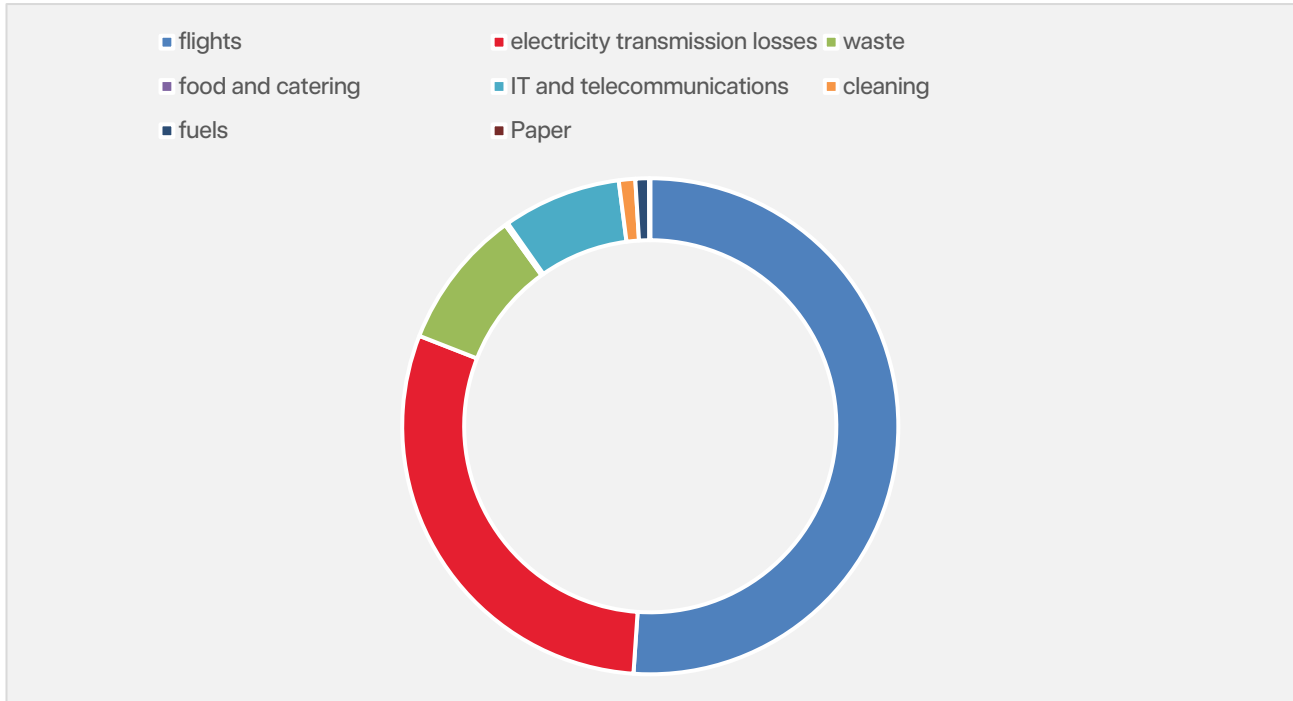
The estimated yearly generation is shown in the graph below. This shows that in the summer months the generation of solar is expected to equal the consumption. Over the year, it will produce 70% of Logan campus's power.



Logan campus consumption (yearly)

## 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.

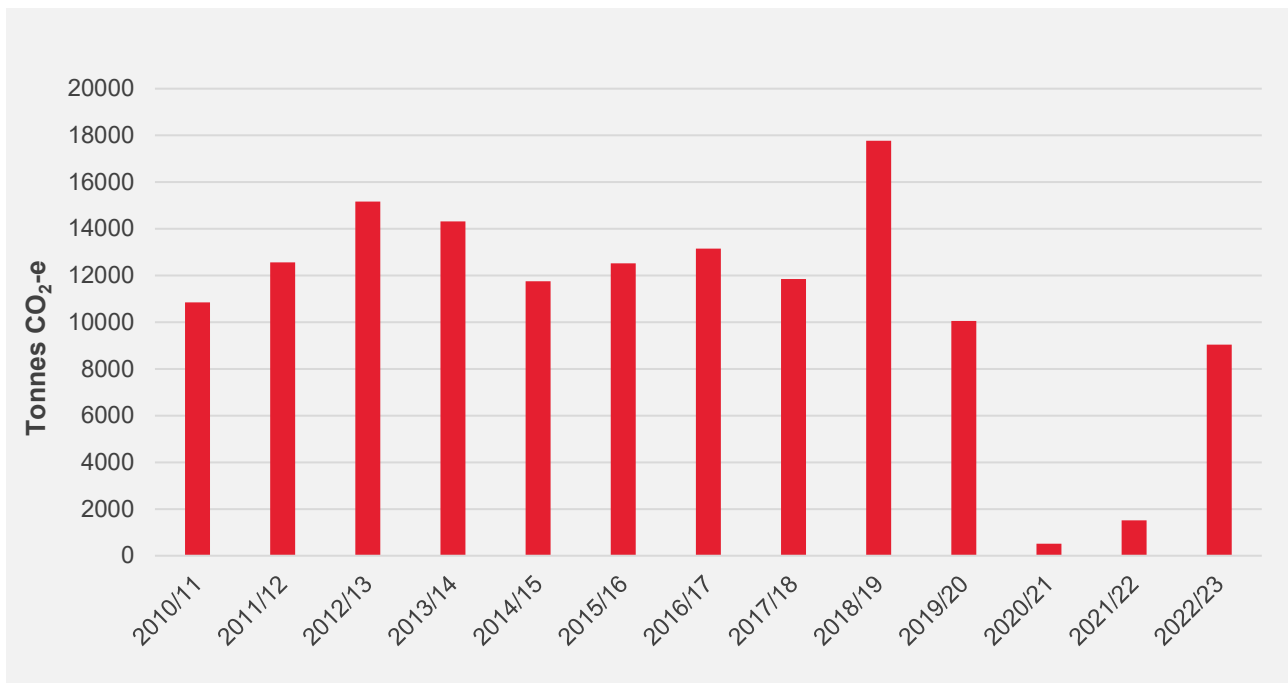


2022/23 scope 3 emissions

After electricity transmission and tenancy emissions, flights and waste are the largest contributions. More detail follows.

### 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

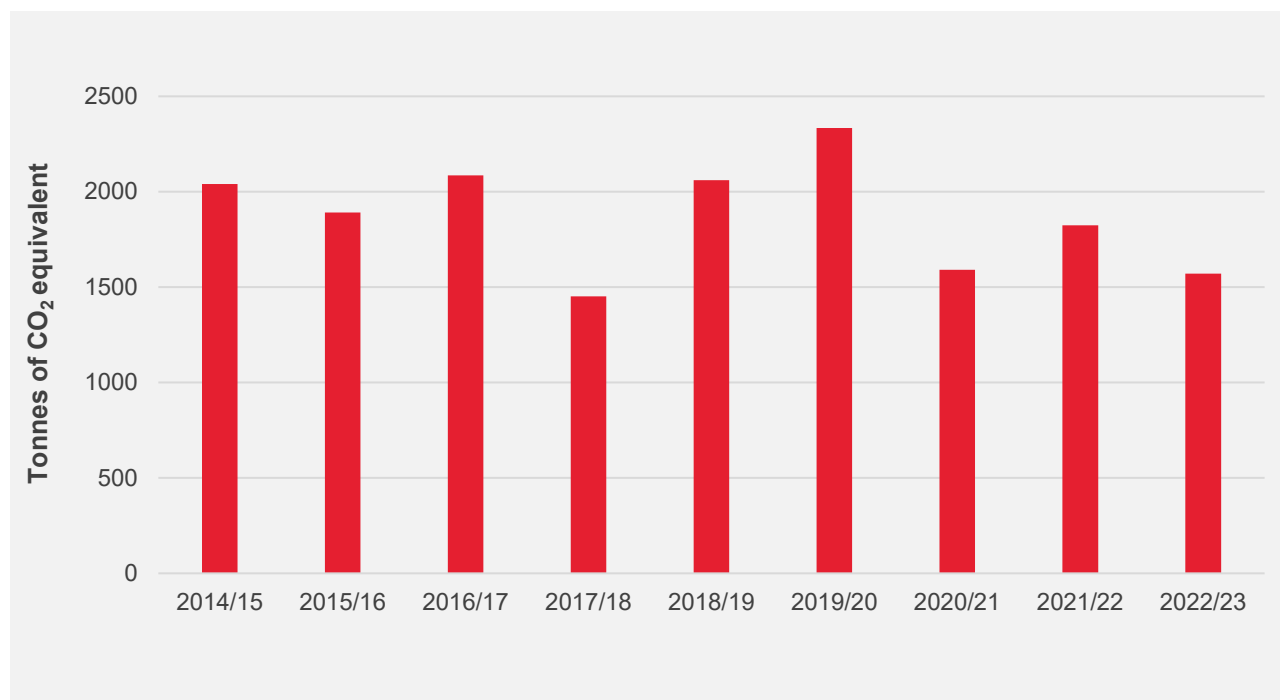
This year saw the expected increase in activity following the suspension of border restrictions and restoration of flight capacity. Activity has not returned to pre-pandemic levels, but the emissions for each flight have increased to reflect the recent lower occupancy of planes. It is expected that these will fall as planes reach full capacity, however the flight volume is likely to continue to increase. A continued increase in flight emissions is considered likely for next year as in-person events resume and postponed trips are planned.

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 increase in 2019/20, was a result of the changed methodology for the new waste contract. The waste was previously weighed but is now based on an average bin weight. New initiatives for waste handling have been developed including collection of organic waste for composting and Containers for Change recycling which contributes to Griffith University's hardship grants for students. A small decrease in waste volumes this year is a positive outcome considering the increased activity levels on campus.

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.
- offsite renewables—purchase of 50% renewable power (in place from December 2022)
- onsite renewables—investment of \$13.8 m in rooftop solar generation and other onsite renewable measures (in progress to complete 2024/25)
- 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
- water cooled chiller plant at the Gold Coast campus
- reduction in gas consumption on campus.

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

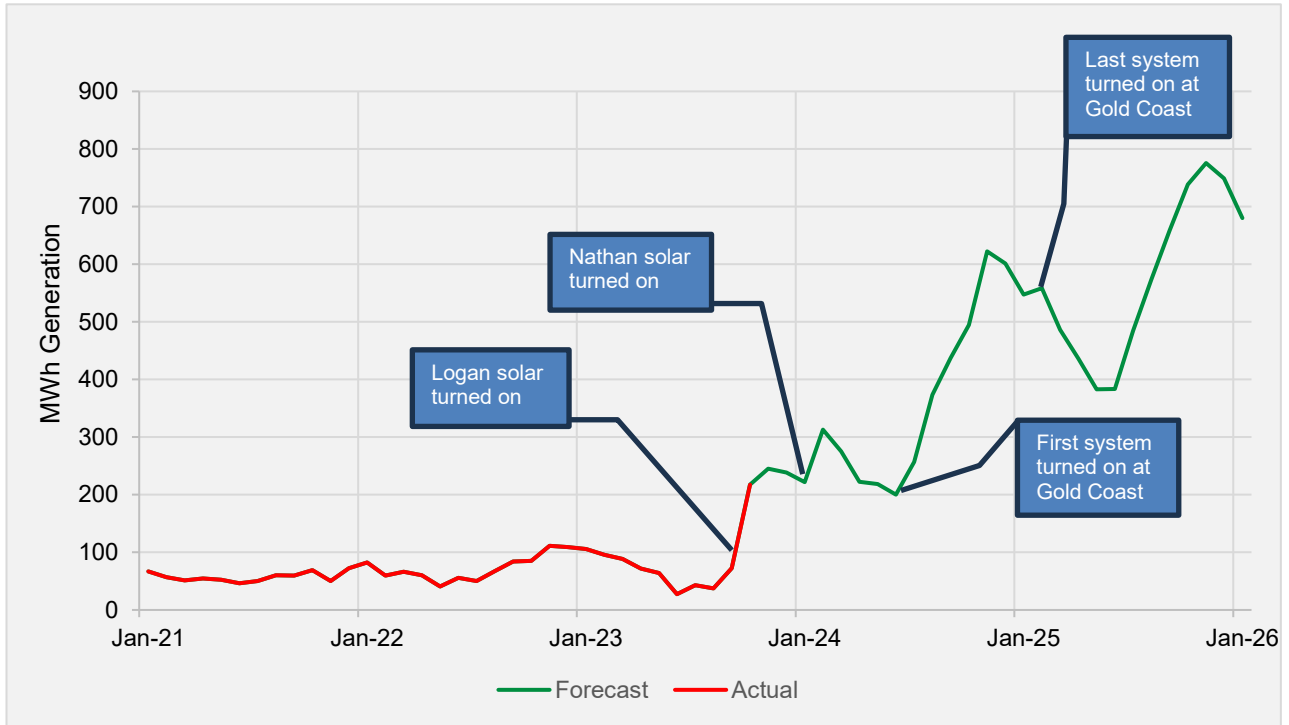
### Flights

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 chiller at each of G21, G22 and G29 plants—installation is in progress for completion in 2023. This includes 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)—installation is in progress for completion in 2023 with similar energy efficiency upgrades to the Gold Coast project.
- On site renewables—installation of the roof top photovoltaic panels will continue through 2024 with 900kW to be added at Nathan campus and 1500kW to be completed at Gold Coast campus by the end of 2024. This increases forecast solar generation for the year (assuming no delays in construction or Energex approvals) to 3565 MWh, approaching 7% of annual consumption, as shown in the graph below.

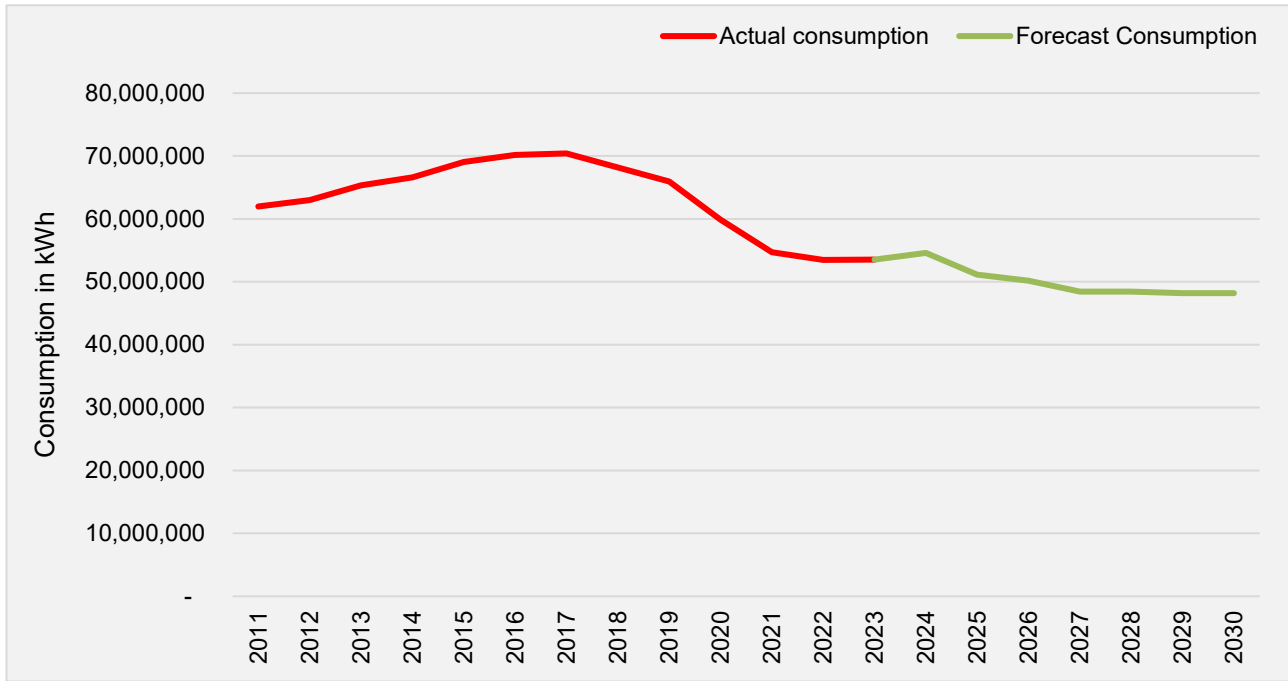


Monthly forecast solar generation (MWh)

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

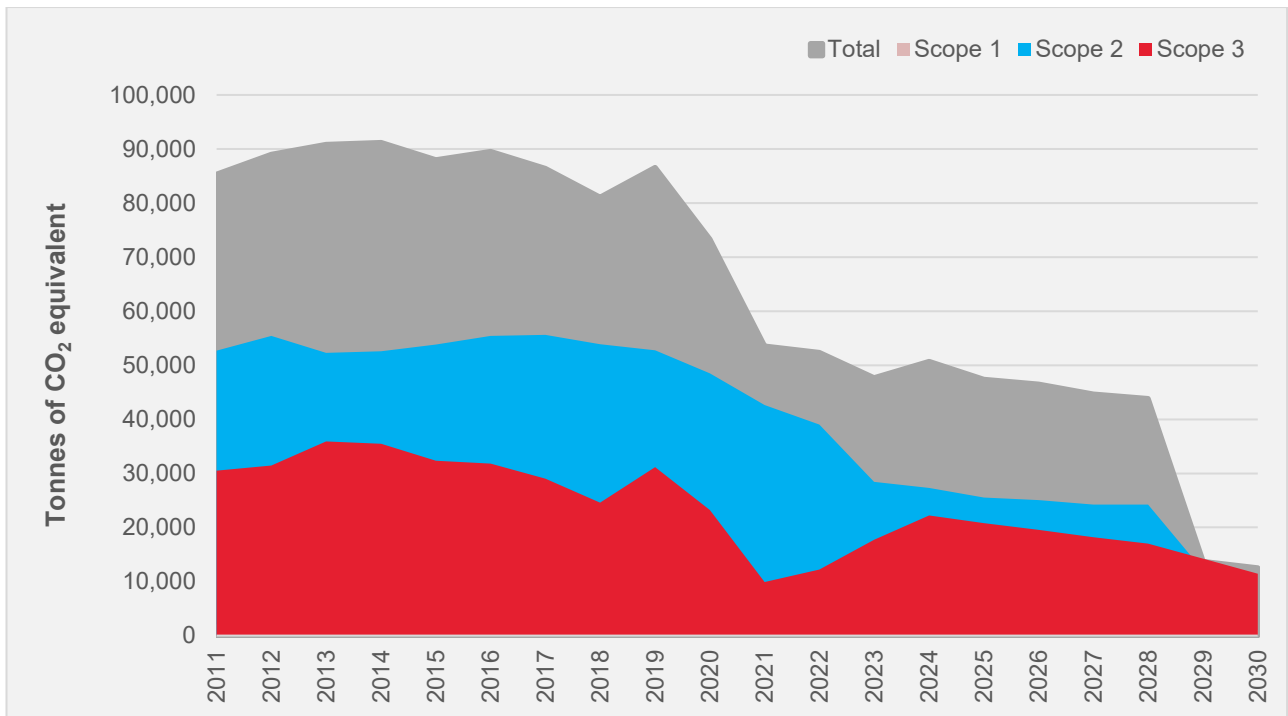
2023	Environment 2 (N13) plant shutdown (pending building demolition)
2024	Practical completion of Technical Annex (N81)
2025	
2026	Practical completion of Arrivals Building (N82) (first half of the year) Completion of exit from Mount Gravatt (first half of the year)
2027	Upgraded Nathan student accommodation opens (T1)—notional allowance for air conditioning 500 beds CBD campus opens (100% renewable power assumed)
2028	Completion of water-cooled chiller plant at the Gold Coast
2029	ADaPT opens Nathan Health and Wellbeing centre opens (first half of the year)

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 2023/24 are:

- activity levels on campus similar to 2018/19
- 50% renewable portion from the electricity sourcing agreement (from December 2022)
- flights are estimated at 15,361 tCO<sub>2</sub>-e—42% above the 2010 baseline, but a 14% reduction on the 2018/19 peak emissions, reflecting the continued recovery of international travel.

The targets set as part of the strategic plan 2020–2025 for the remaining two years are expressed relative to the 2010 baseline as:

Targets	2024	2025
% reduction on 2010 baseline	-40%	-45%

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

Table: Griffith University Carbon Footprint—emissions tCO<sub>2</sub>-e from Baseline 2010/11 to present

Year	Scope 1	Scope 2	Scope 3	Total
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

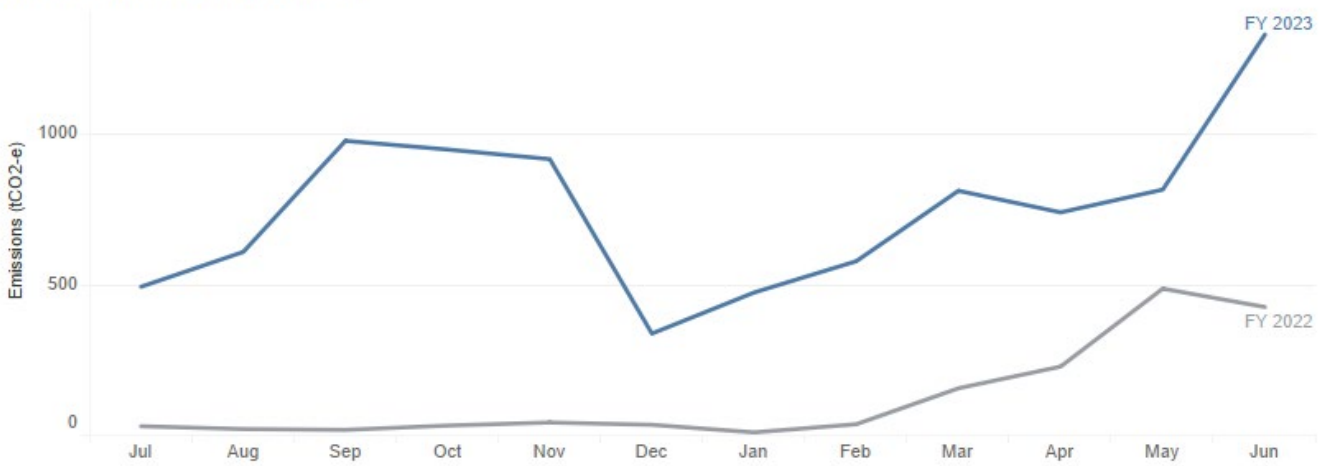
## EMISSIONS OVER TIME Group All

FYTD 2023  
**9,039.1**  
tCO2-e

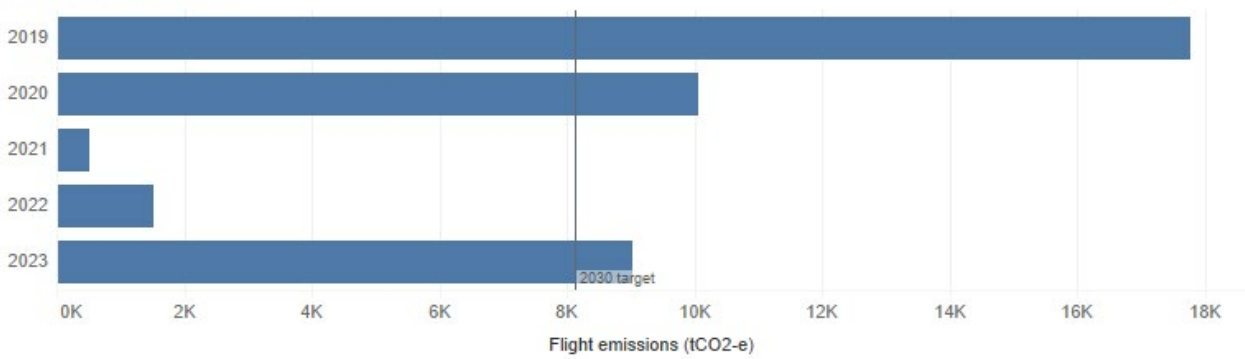
FYTD 2022  
**1,523.8**  
tCO2-e

Total for FY 2022  
**1,523.8**  
tCO2-e

Emissions over time (YOY by month) - All



Total emissions (by financial year)





## Appendix C: Scope 3 emissions by Greenhouse Gas Protocol categories

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

<b>Emissions Sources</b>	<b>2021/22</b>	<b>2022/23</b>
Scope 3 Cat 10 Processing Sold products	N/A	N/A
Scope 3 Cat 11 Use of Sold products	N/A	N/A
Scope 3 Cat 12 End of Life treatment of sold products	N/A	N/A
Scope 3 Cat 13 Downstream leased assets	3,088.0	1,618.9
Tenants' utilities emissions	3,088.0	1,618.9
Scope 3 Cat 14 Franchises	N/A	N/A
Scope 3 Cat 15 Investments		
<b>Total (tCO<sub>2</sub>-e)</b>	<b>12,207.4</b>	<b>17,695.4</b>

