WARWICK
THE UNIVERSITY OF WARWICK

ENERGY & CARBON REPORT

2023 - 2024

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Abbreviations

BEMS – Building Energy Management System

CHP – Combined Heat and Power. Specifically refers to the gas fired CHP generators used by the University

FTE – Full Time Equivalent

GHG – Green House Gas

GWh – Gigawatt Hour

kWh – Kilowatt Hour

m^2 – Square metre

m^3 – Cubic metre

MWh – Megawatt Hour

PGR – Post-Graduate Researcher

PV - Photovoltaic

tCO_{2e} – Tonnes of Carbon Dioxide Equivalent. (All greenhouse gas emissions combined and expressed in terms of carbon dioxide equivalent)

T&D – Transport and distribution (of grid electricity)

WFH – Working from Home

WTT – Well to Tank (specifically, the extraction, processing and transport of fuels prior to combustion for energy)

Introduction: The Way to Sustainable

The Way to Sustainable, published in 2022, sets out the ambitions of the University to reduce its environmental impact. It includes net zero targets for Scope 1 and 2 Carbon emissions by 2030, and all emissions - Scopes 1, 2, and 3 - by 2050.

This report provides an update on Scope 1, 2, and 3 carbon dioxide emissions, energy and water usage for the University during the 2023/24 reporting year and includes discussion on significant changes between years.

In 2025 we are refreshing our Sustainability Strategy, updating our targets, defining our priorities and describing our plans in greater detail.

Definitions:

Scope 1 Carbon emissions are direct emissions from sources owned or controlled by the University. These emissions result mainly from the burning of natural gas in boilers and combined heat and power engines, with a small contribution from other fuel sources used for heating, University owned transport, and leakage of refrigerant gases.

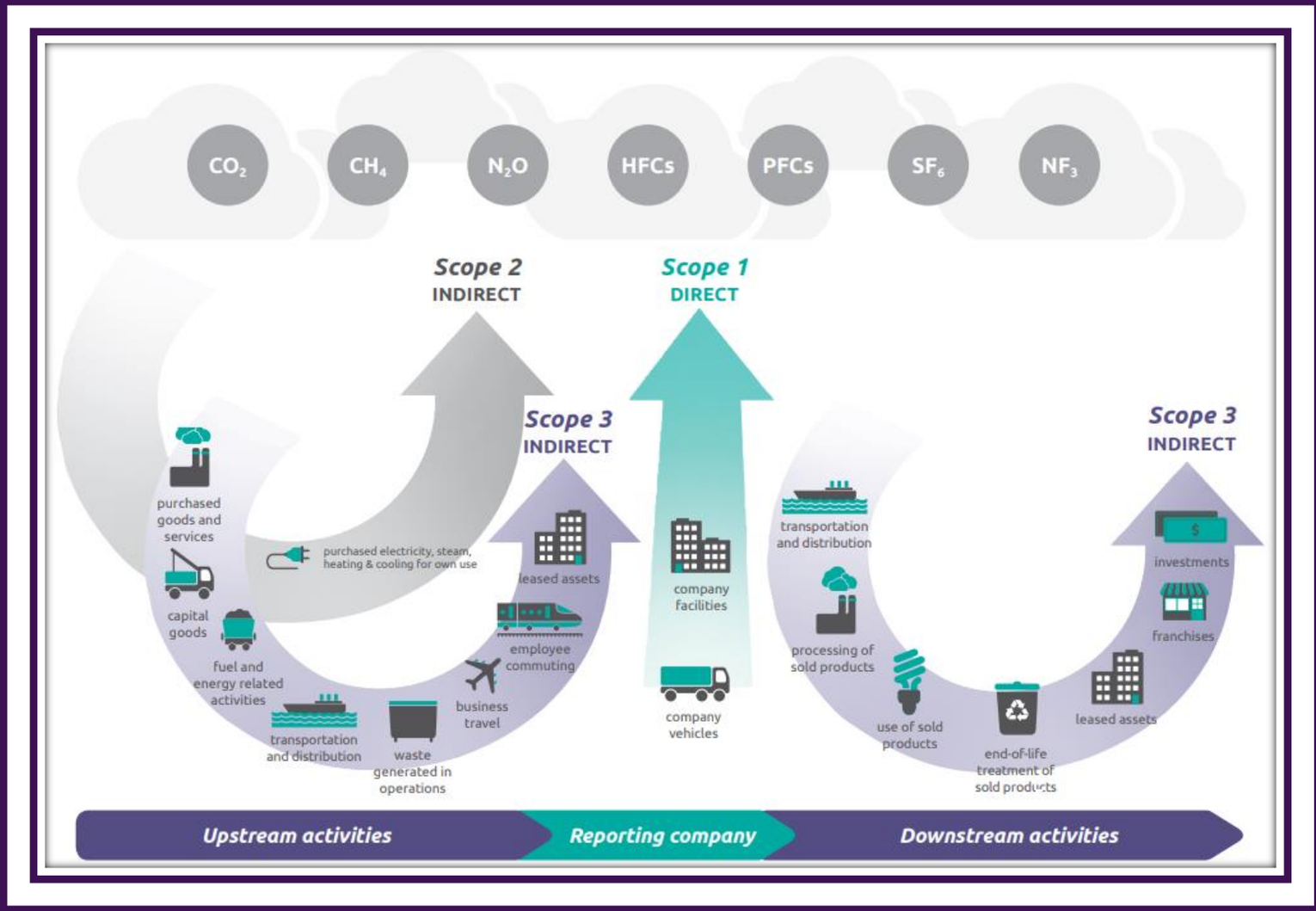
Scope 2 emissions are emissions from the generation of energy purchased by the University. For the University, these emissions are wholly due to the purchase of grid electricity. We report these emissions based both on the electricity we purchase (which is 100% renewable) and what we consume (which is a mix of all electricity sources connected to the national electricity network) - these are known as market based and location-based emissions, respectively.

Scope 3 emissions are all indirect emissions not included in Scope 2 that occur in the value chain of the University, including both upstream and downstream emissions. Scope 3 makes up most of the University's carbon footprint, with travel and procurement the largest categories.

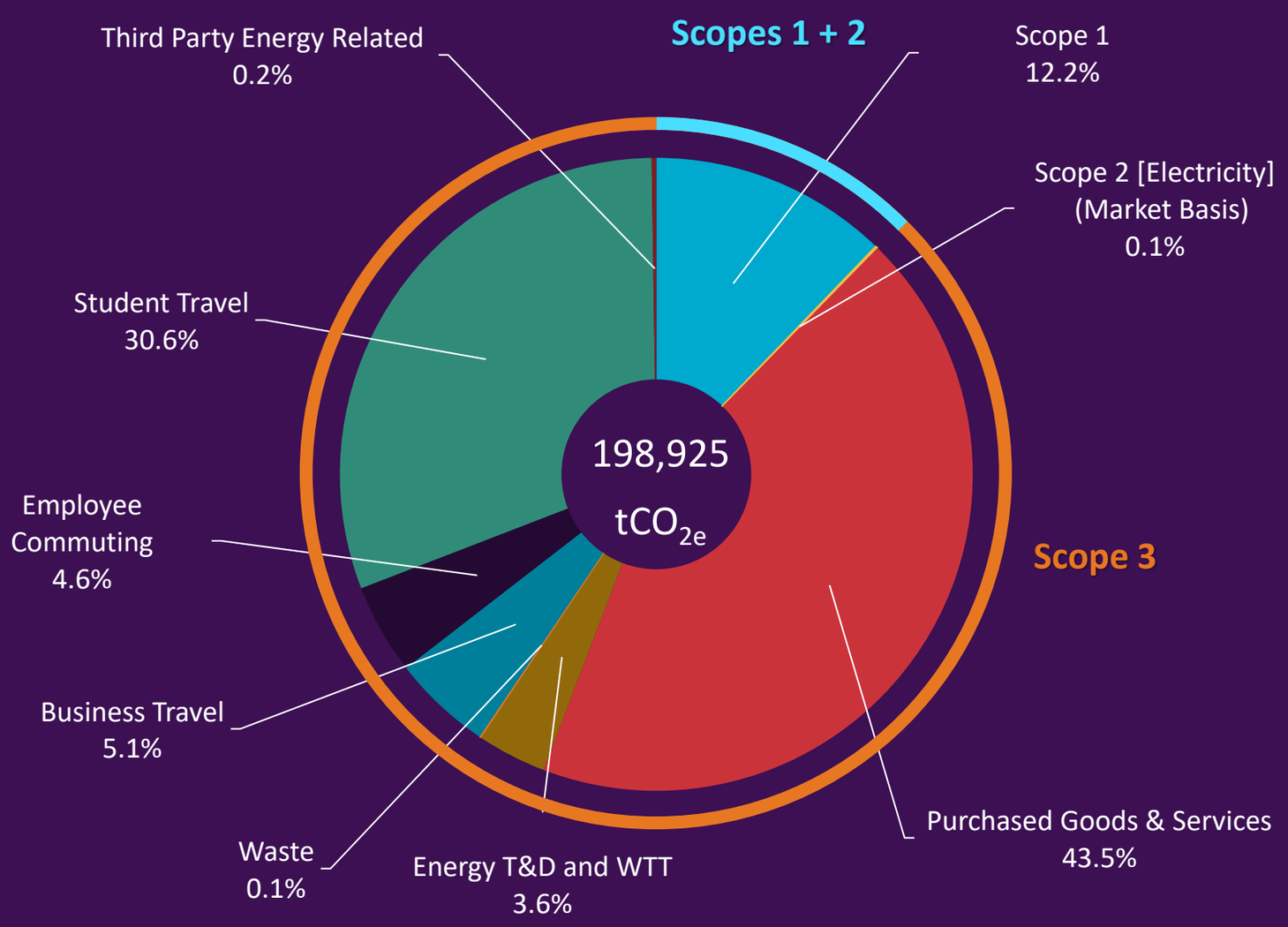
Carbon Emissions Reporting

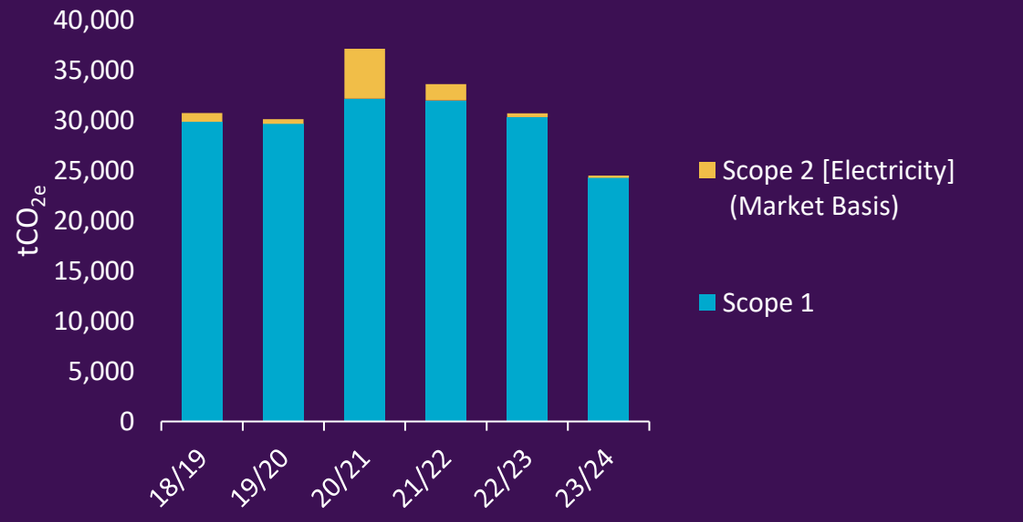
University Carbon emissions disclosure follows guidance from the Greenhouse Gas Protocol, with supplementary guidance from the Environmental Association for Universities and Colleges (EAUC) Standardised Carbon Emissions Framework (SCEF).

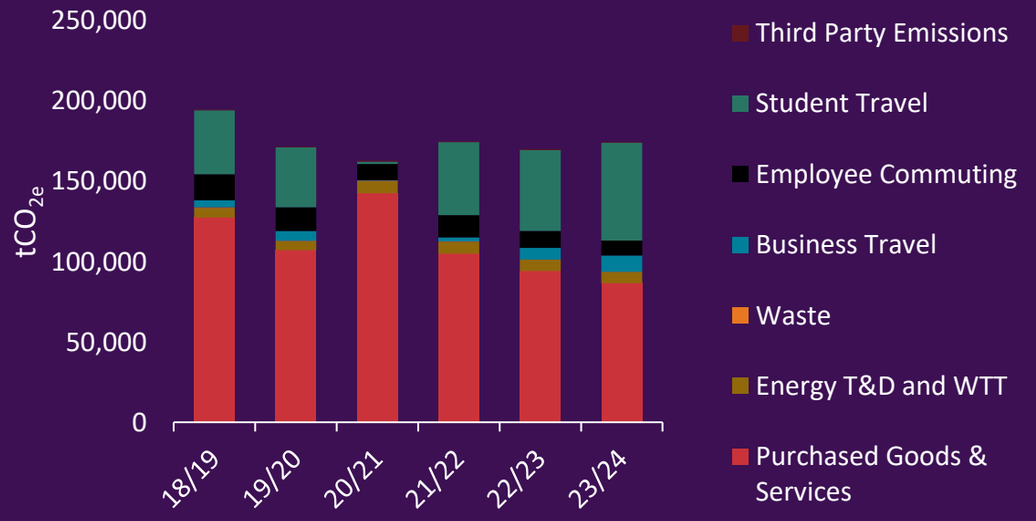
The image, taken from the Green House Gas Protocol illustrates how emissions are categorised by Scope.



2023 - 24 Emissions Overview



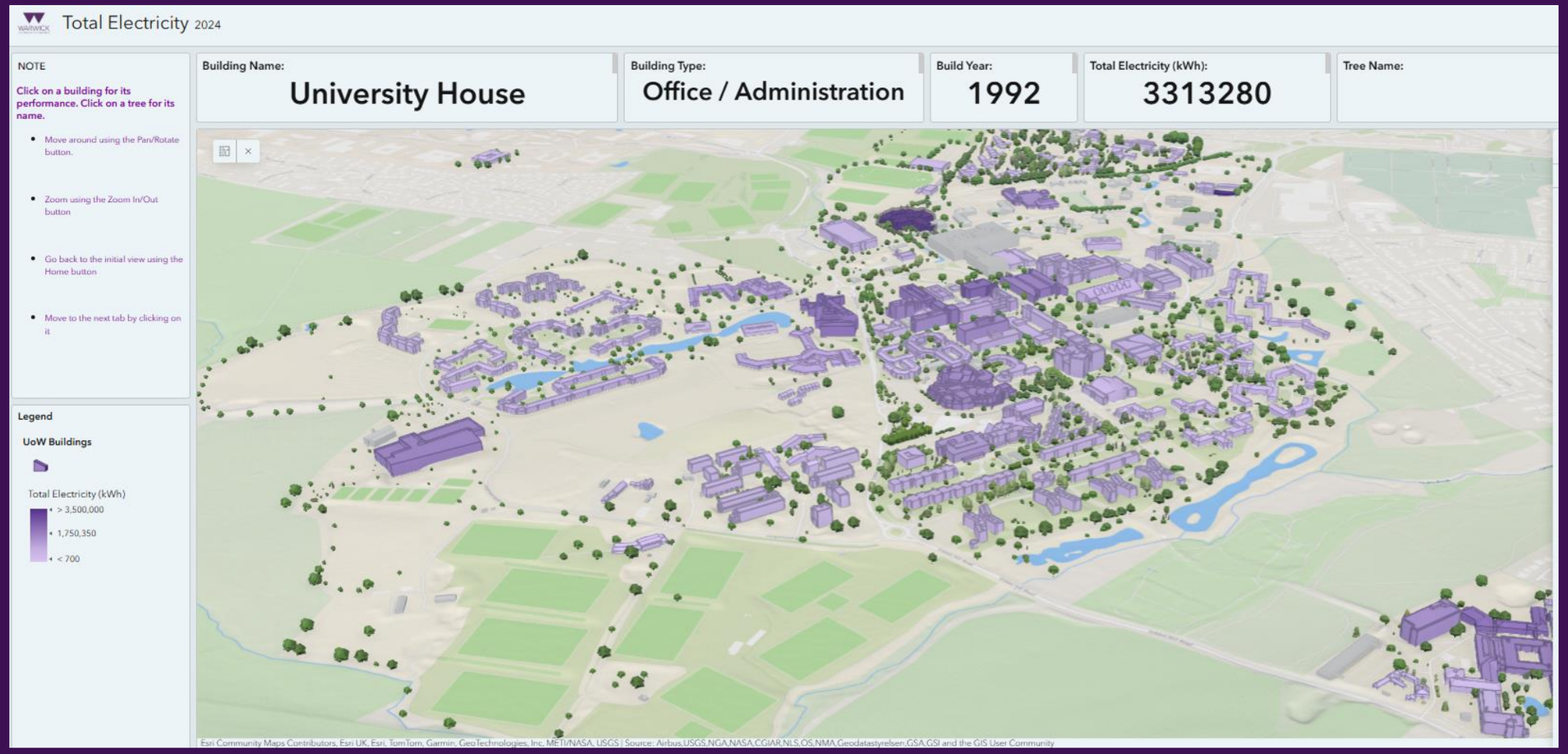




Campus Energy, Carbon and Water Interactive Model

We have developed an interactive campus model to visualise our building energy, carbon and water performance for the 2023/24 academic year.

This is available for anyone to view here.



Scope 1: Direct Emissions

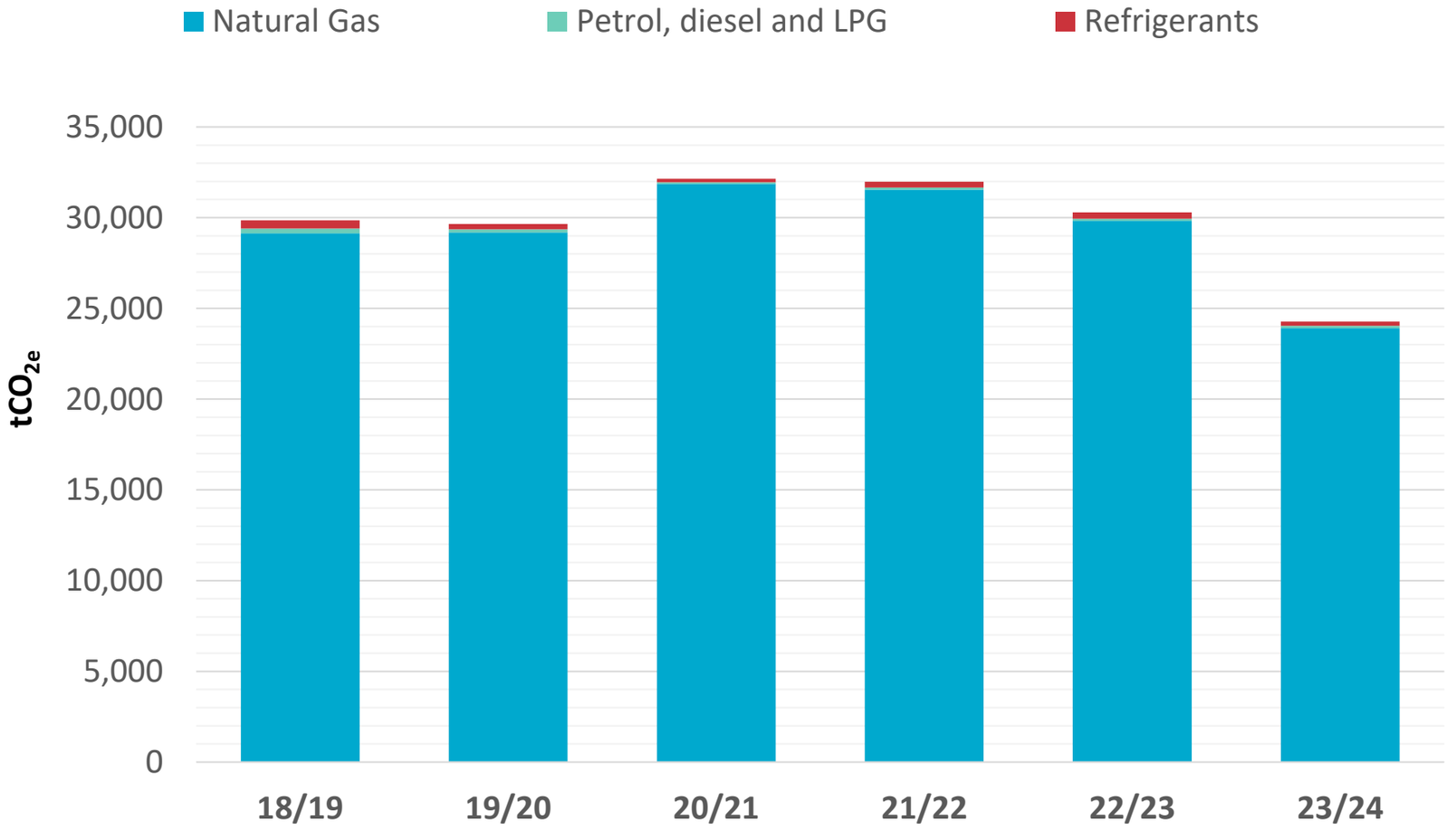
In 23/24 our Scope 1 emissions were 24,273 tCO_{2e}, an 18.9% reduction compared to the previous year and 17.5% compared to our baseline 2018/19

This is primarily due to a significant decrease in the amount of natural gas burned in our energy centres and represents good progress towards the 2025 interim target in the Way to Sustainable.

Use of gas-fired Combined Heat and Power (CHP) engines in these energy centres has been reduced to limit Scope 1 emissions, and we now purchase a greater proportion of our electricity from renewable sources.

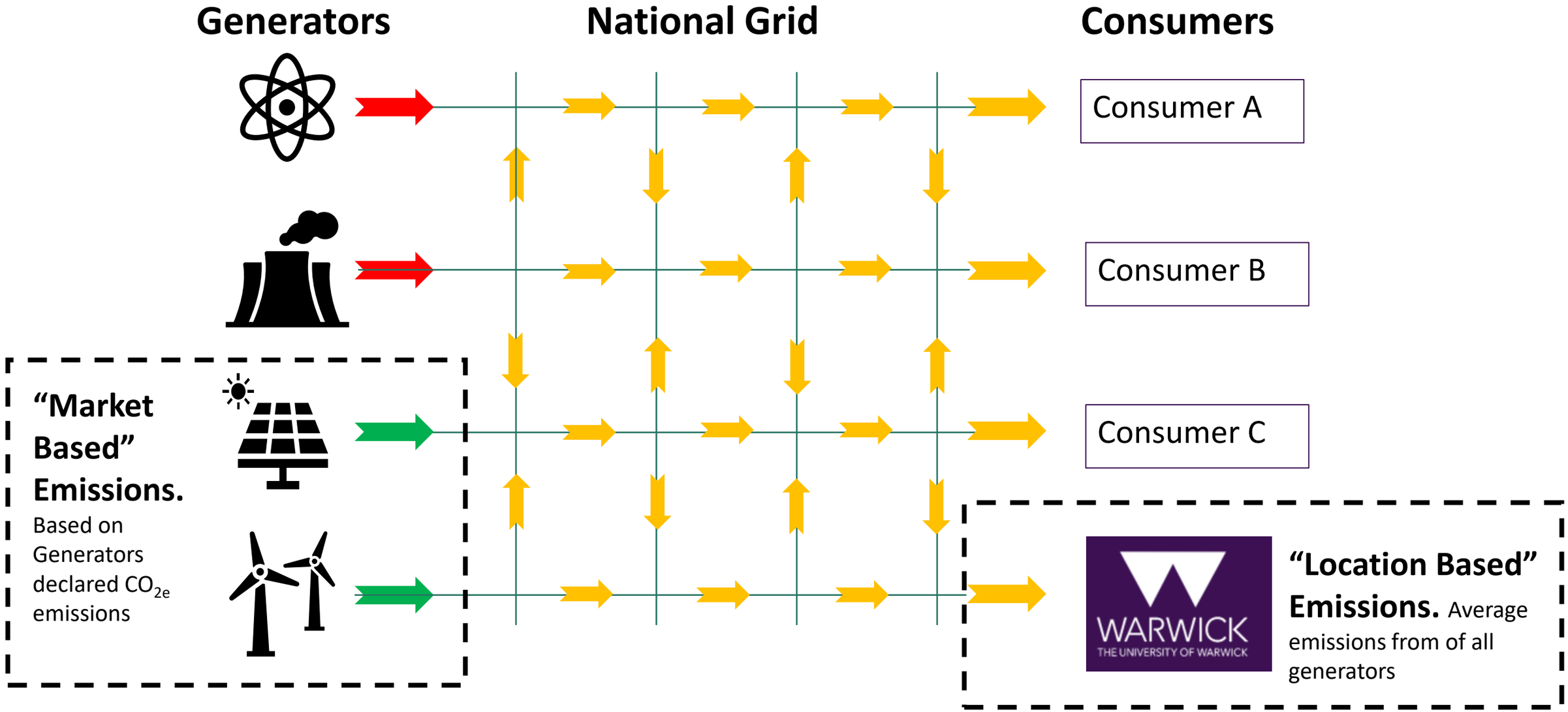
Emissions attributed to gas supplied to 3rd parties, and for related well-to-tank emissions, are included in Scope 3.

Case Study	Read More	Read More
Decarbonising Campus	Well to Tank	3rd Party Tenant



Scope 2 Reporting: Market Based and Location Based Reporting

The University reports both Market Based and Location Based emissions for Electricity in line with best practice. The graphic below illustrates the difference between these reporting methods



Scope 2: Indirect Emissions (Market-Based)

Since October 2021, all directly purchased electricity comes from 100% REGO-backed renewable supplies.

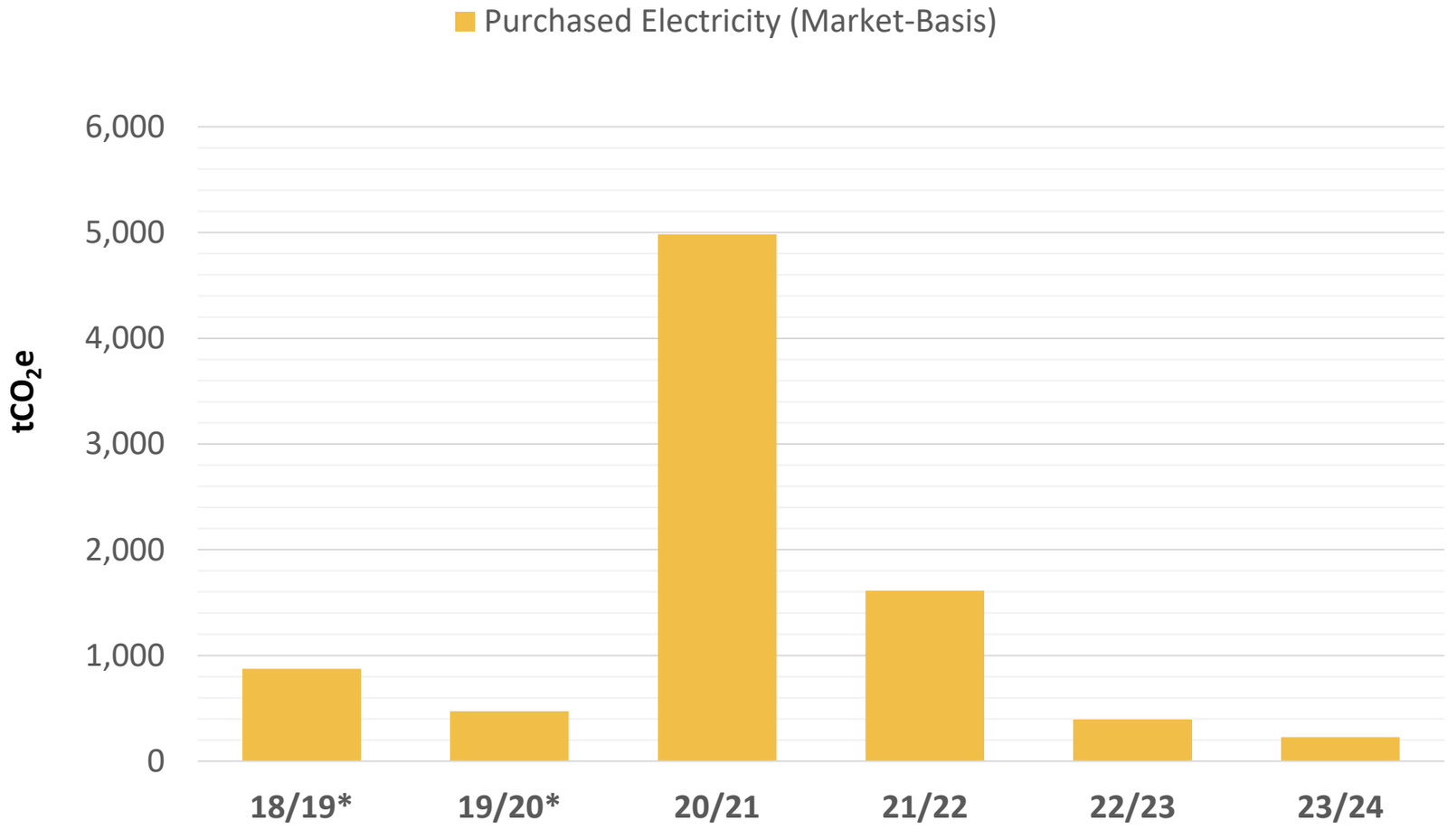
This means that market-based emissions from the purchase of electricity remain very low.

**18/19 and 19/20 market-based emissions are reported here from our supplier's fuel-mix disclosure from that period. REGOs were not purchased for this electricity. Since October 2021, the University has only purchased REGO-backed electricity.*

Emissions attributed to grid electricity supplied to 3rd parties, and for related well-to-tank emissions of fuels burned, are included in Scope 3.

Case Study

Smart lighting



Scope 2: Indirect Emissions (Location-Based)

Our location-based Scope 2 emissions were 9,713 tCO_{2e} in 23/24, a 34.2% increase on 22/23, and a 4.3% increase on 18/19.

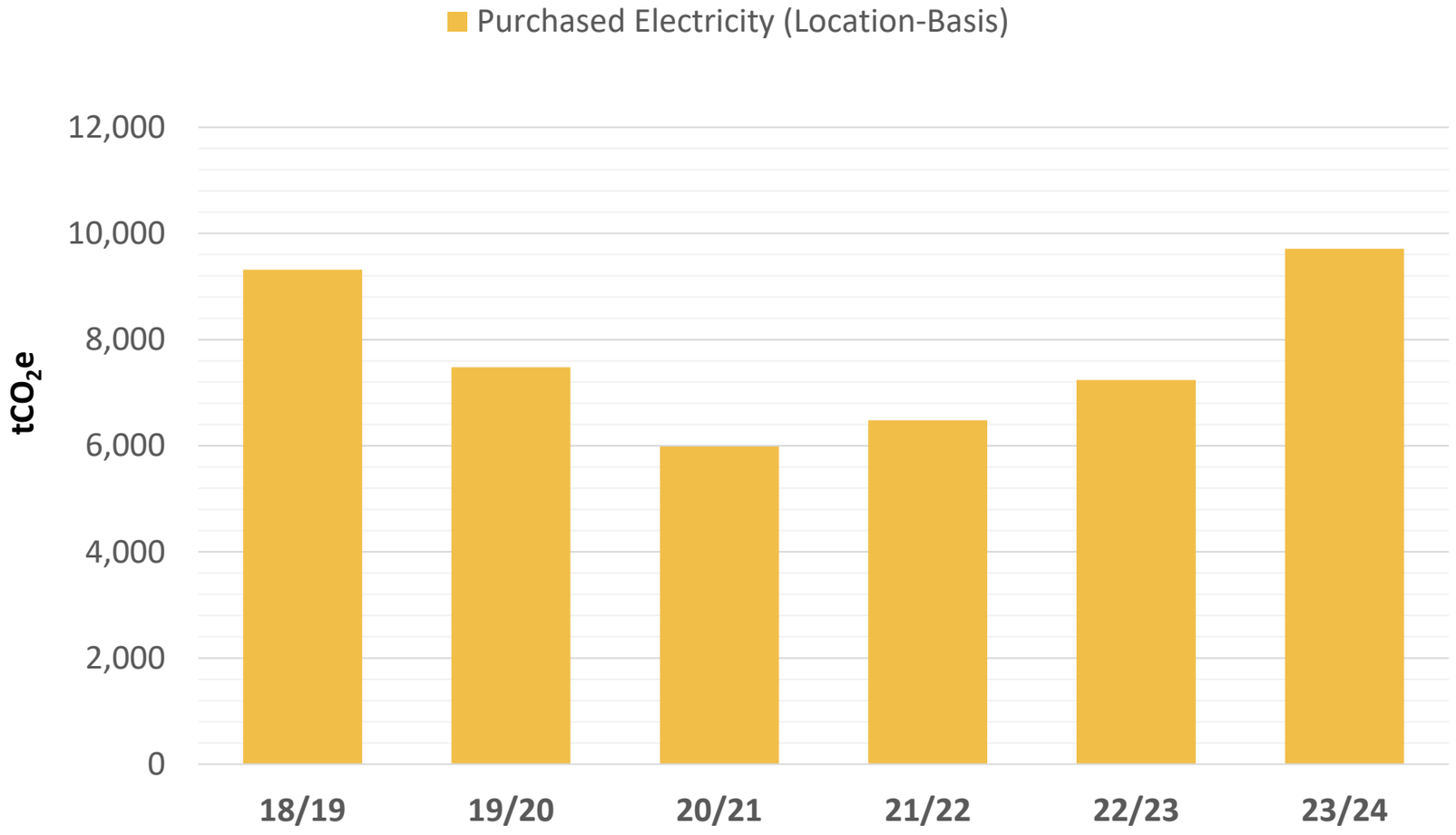
This increase is due to the additional grid electricity purchased following a reduction in self-generation from gas.

The reduction in Scope 1 emissions from gas exceeds Scope 2 increases and, as grid electricity continues to decarbonise, the benefits of "fuel switching" increase.

Emissions attributed to electricity supplied to 3rd parties, and for related well-to-tank emissions of fuels burned, are included in Scope 3.

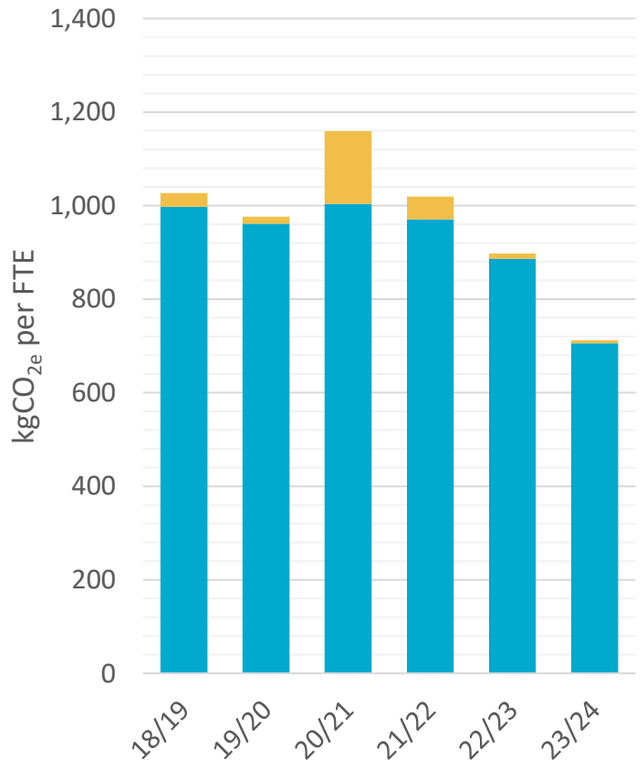
Read More

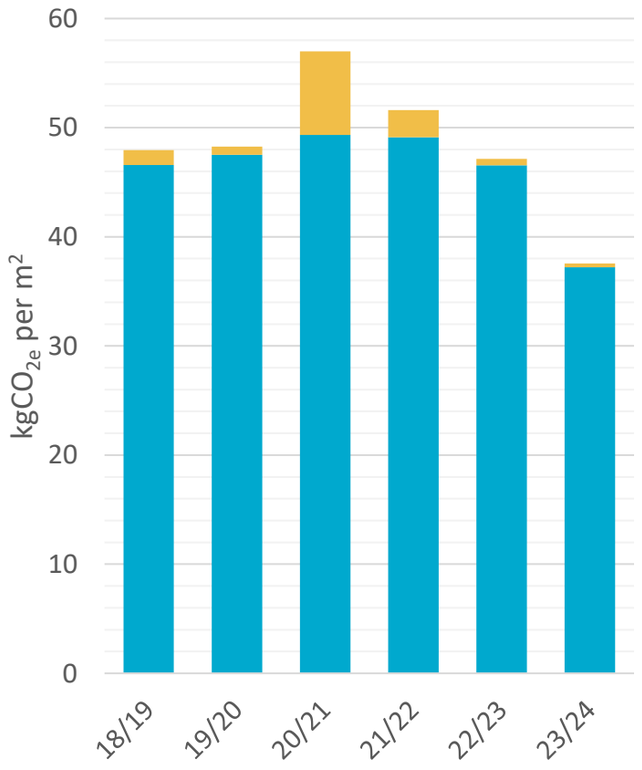
Well to Tank

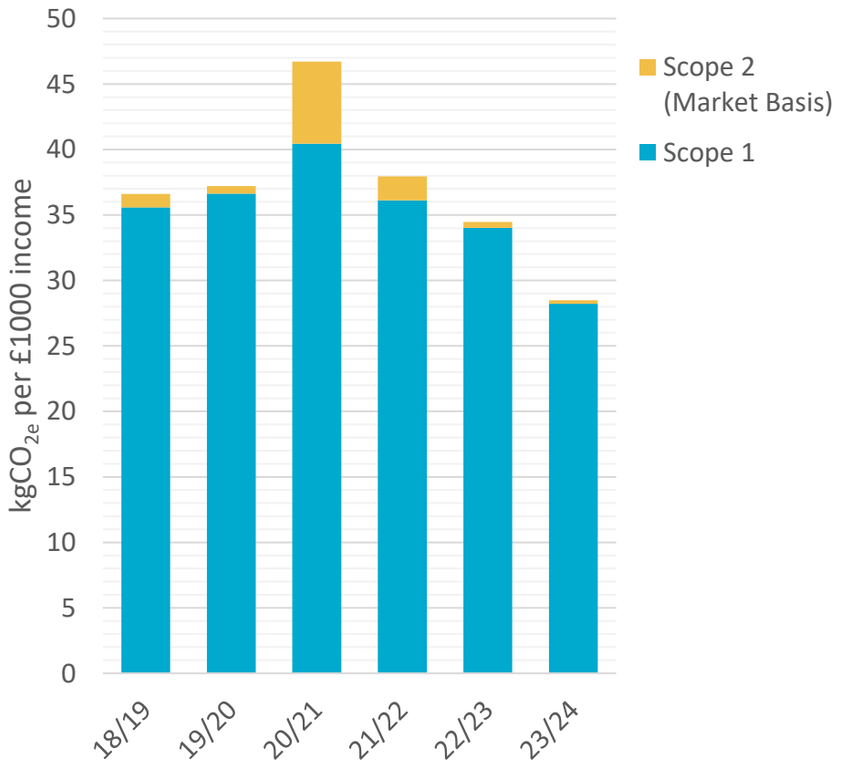


Scope 1 and 2 Carbon Intensity Ratios

The University is aiming to reduce Scope 1 and 2 emissions against a backdrop of continued growth. The intensity metrics below highlight how our emissions relative to three key factors, per full-time equivalent (FTE), per m2 of serviced building floor area, and per £1000 University income, have changed over the years.





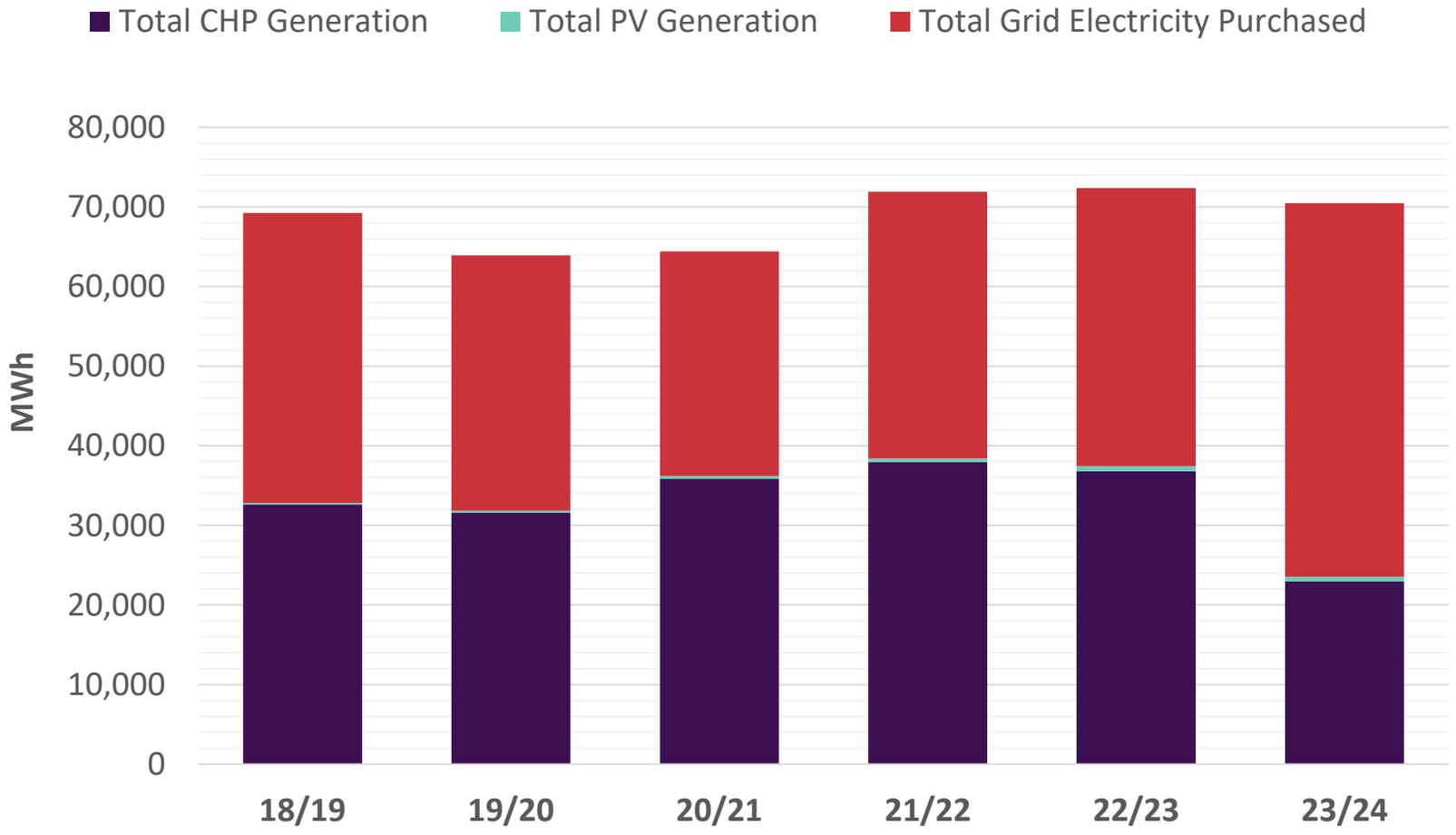


Total Electricity Consumption and Sources

In 23/24, the University generated 40% of its own electricity.

CHP electricity generation was substantially reduced in 23/24 to reduce Scope 1 emissions.

Further PV installations across campus are planned to increase the proportion of electricity from on-site renewable sources.



Case Study

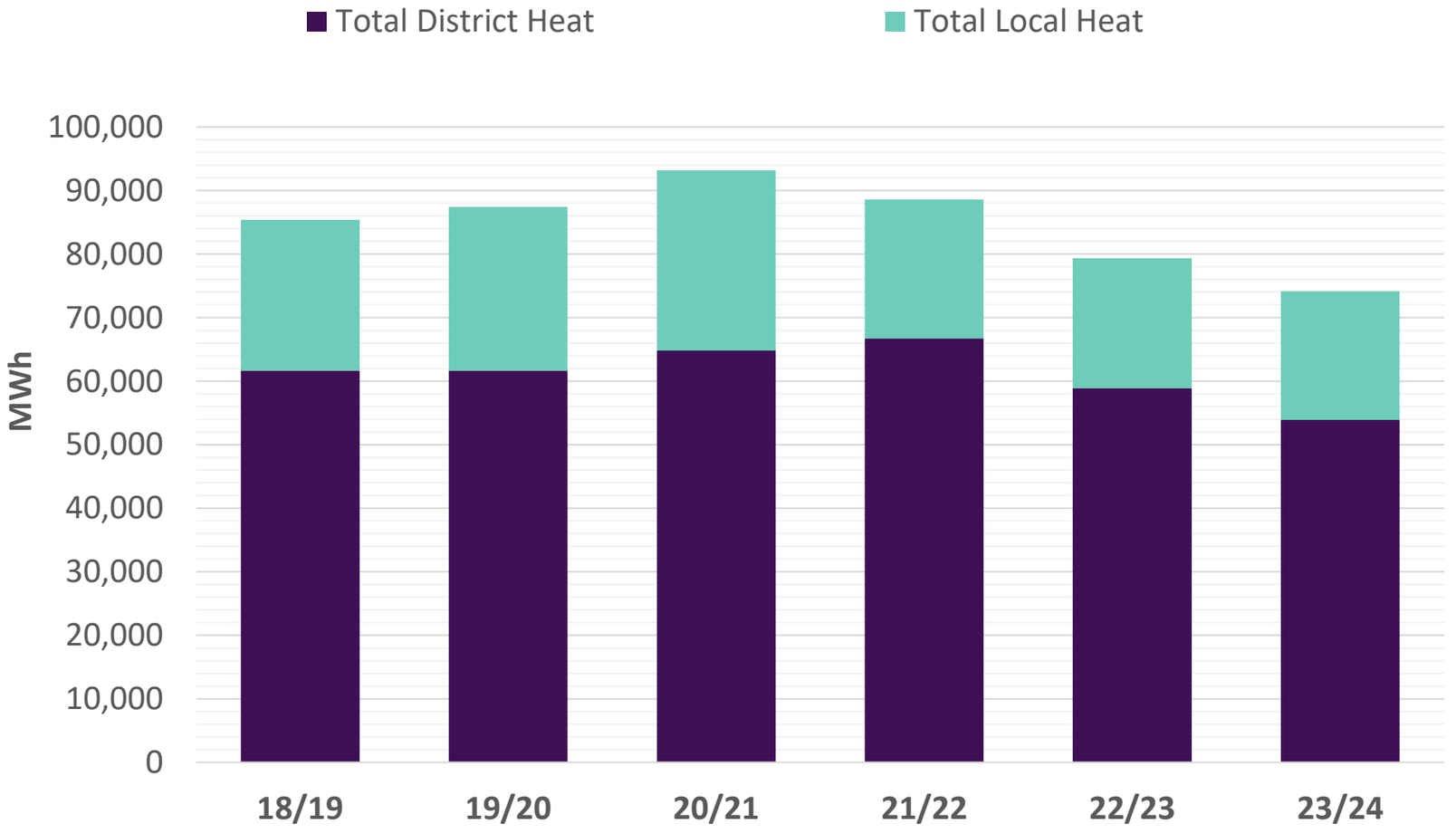
Decarbonising Campus

Thermal Energy

In 23/24, the University had a total indicative thermal demand of 74,000 MWh, a 6.5% reduction compared to 22/23, continuing the trend of reducing thermal demand since 20/21.

Significant thermal improvements have been made through the implementation of the Energy Policy over recent years.

Reductions this year were also supported by milder weather in 23/24.



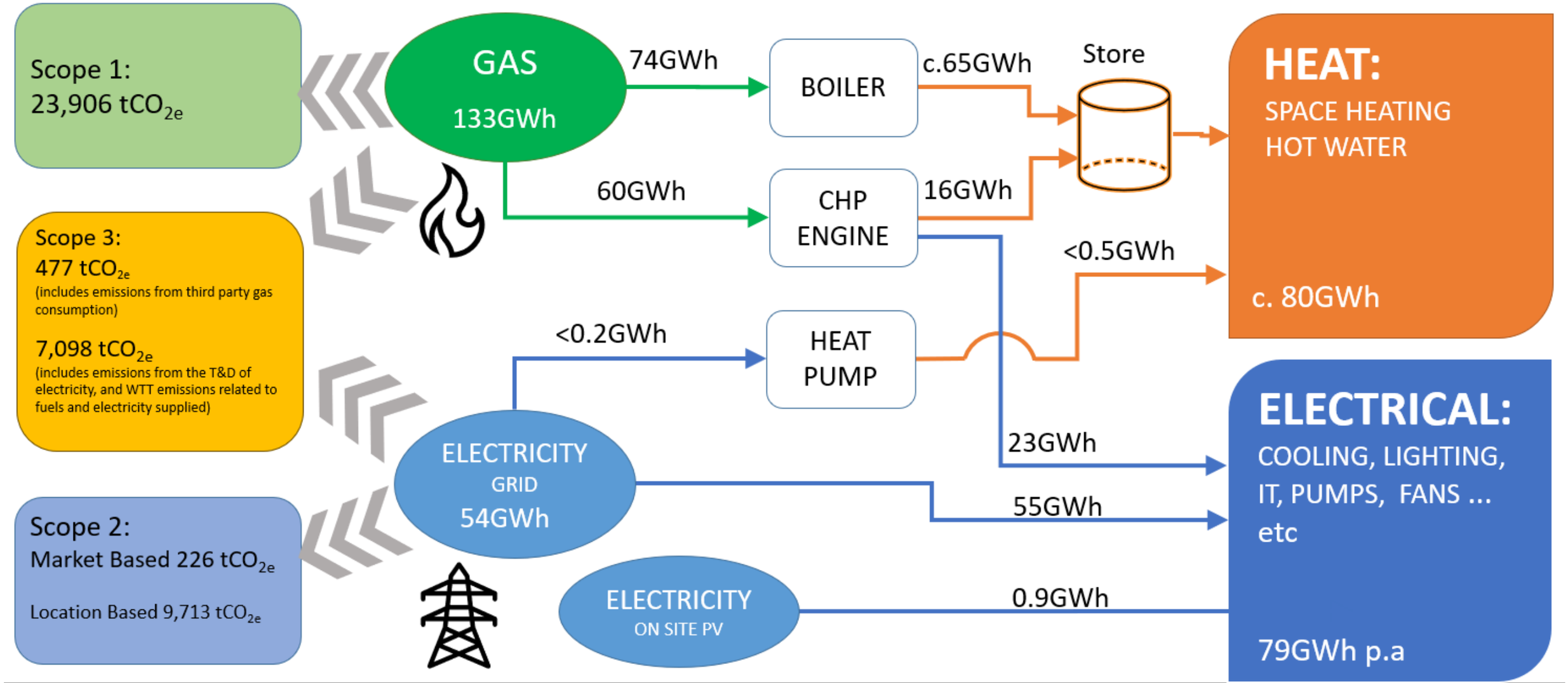
Case Study

Reducing Energy Usage

Read More

Energy Usage Policy

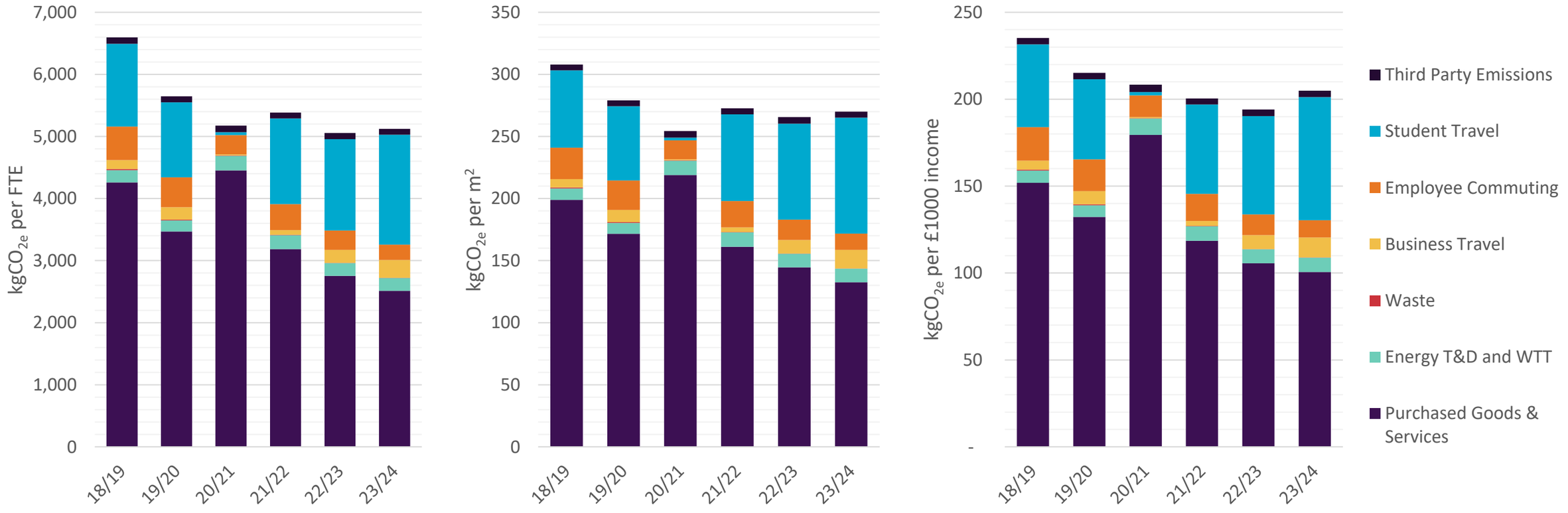
Energy Supply and Related Emissions Overview



Scope 3 Carbon Intensity Ratios

The University aims to be Net Zero for all emissions by 2050.

Scope 3 emissions per full-time equivalent (FTE), per m2 of serviced building floor area, and per £1000 University income are shown below, the aim of this reporting is to highlight efficiency improvements over time.



Scope 3 Category 1: Purchased Goods, Services and Water

Procurement related emissions are calculated based on category spend and conversion factors provided in the Higher Education Supply Chain Emissions Tool (HESCET). Although this approach provides a good indication of the relative impact of sub-categories and an indication of the overall scale of emissions, it is not an accurate method.

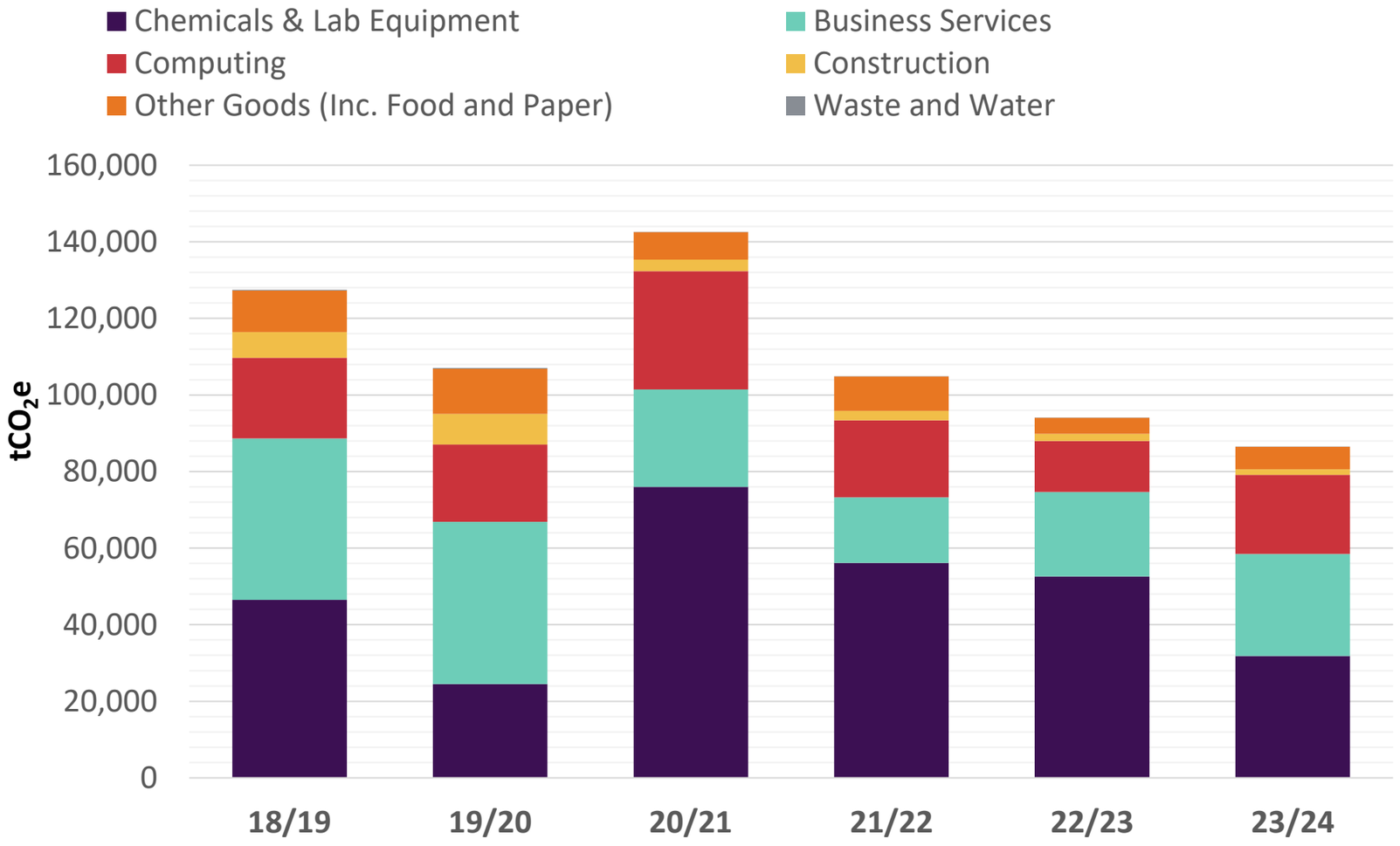
In 23/24 we joined the Net Zero Carbon tool from Net Positive Futures Ltd with the aim of improving accuracy by using supplier reported emissions.

Analysis of 23/24 procurement data highlighted expenditure not previously identified that contributes to reportable emissions in the Purchased Goods category, these emissions have now been added to previous years to create a new baseline.

We currently do not have data to separate capital (Category 2) and transportation (Category 4) from operational spend (Category 1).

Case Study

Reupholstery

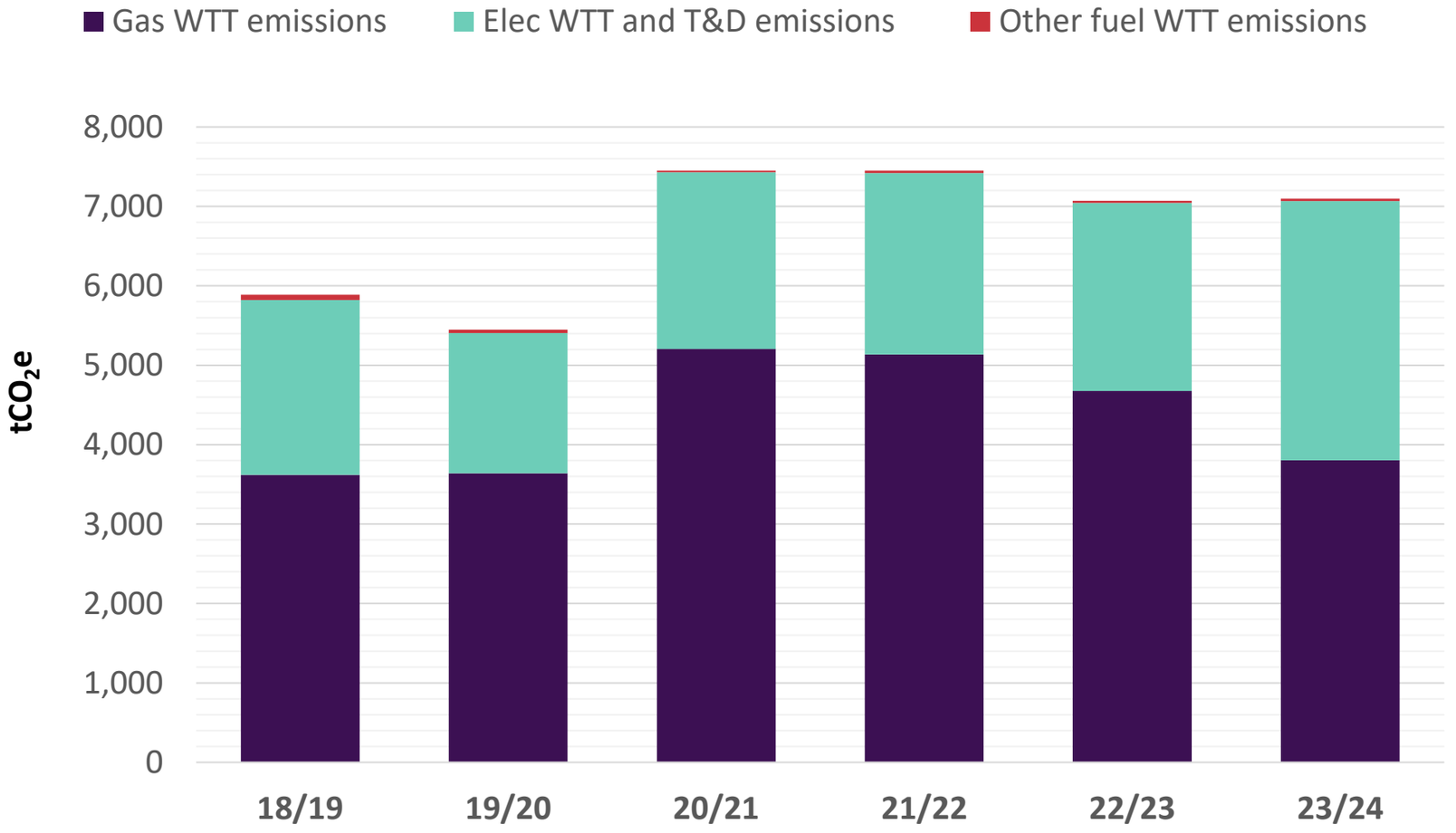


Scope 3 Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or 2

Scope 3 Category 3 emissions arise from the transport and distribution (T&D) emissions associated with our electricity consumption, and well-to-tank (WTT) emissions associated with our natural gas and fleet fuel consumption.

7,098 tCO_{2e} are attributed to these activities in 23/24, a 0.4% increase on the previous year.

These emissions will decrease in line with industry decarbonisation.

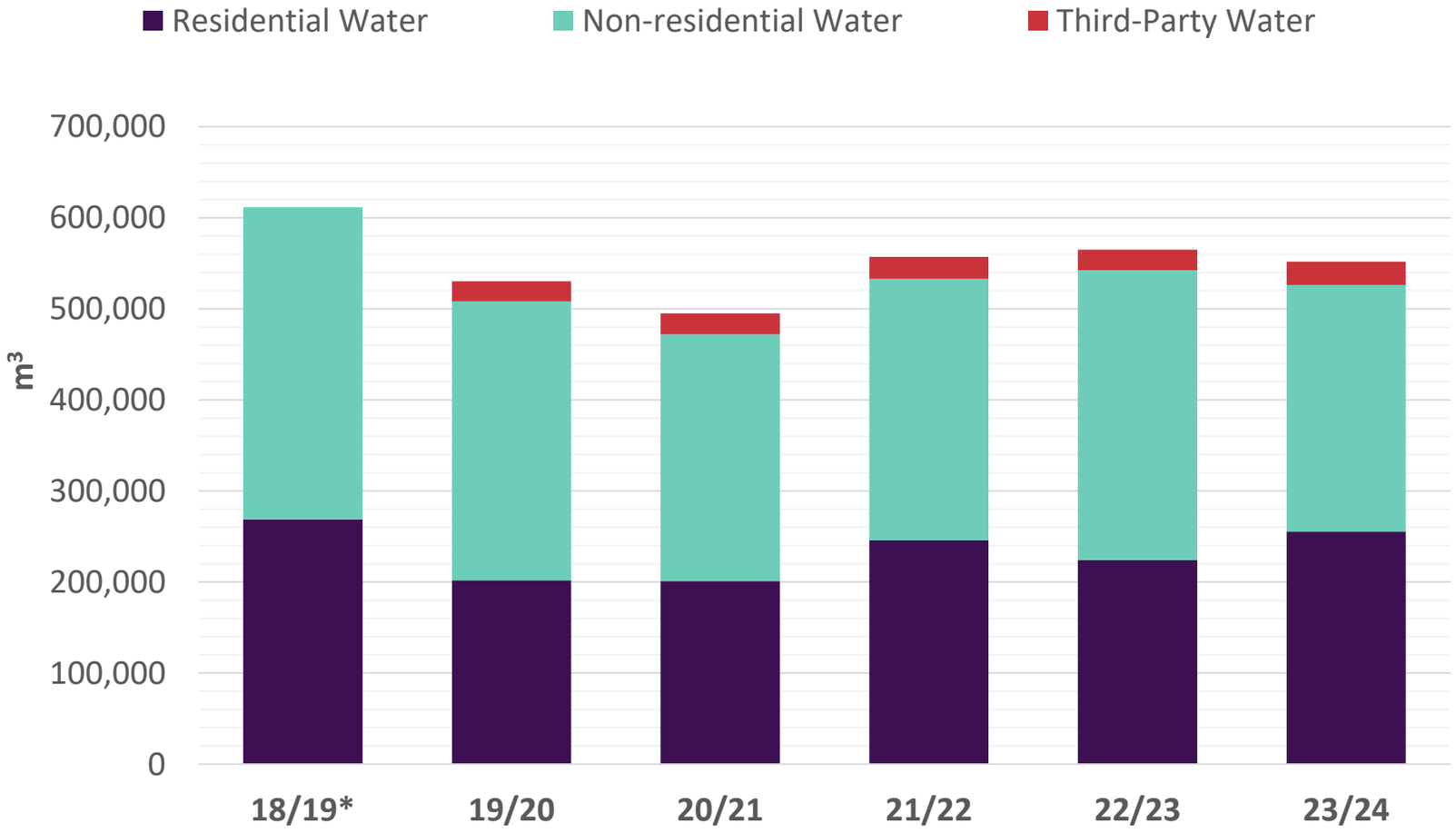


Water Consumption

Our Sustainability Strategy outlines our aims to reduce total campus water consumption.

Mains water use and wastewater treatment has a Scope 3 carbon impact but a much broader environmental impact too and we must preserve this valuable resource.

**18/19 3rd party water usage was not segregated from non-residential water*



Scope 3 Category 5: Waste, including Wastewater

Although carbon emissions arising from the waste we create are low compared to some of our other categories, the environmental impact far exceeds the carbon emissions reported here.

In December 2023, the appointment of a new waste contractor enabled much greater accuracy of data from general and recycling waste streams.

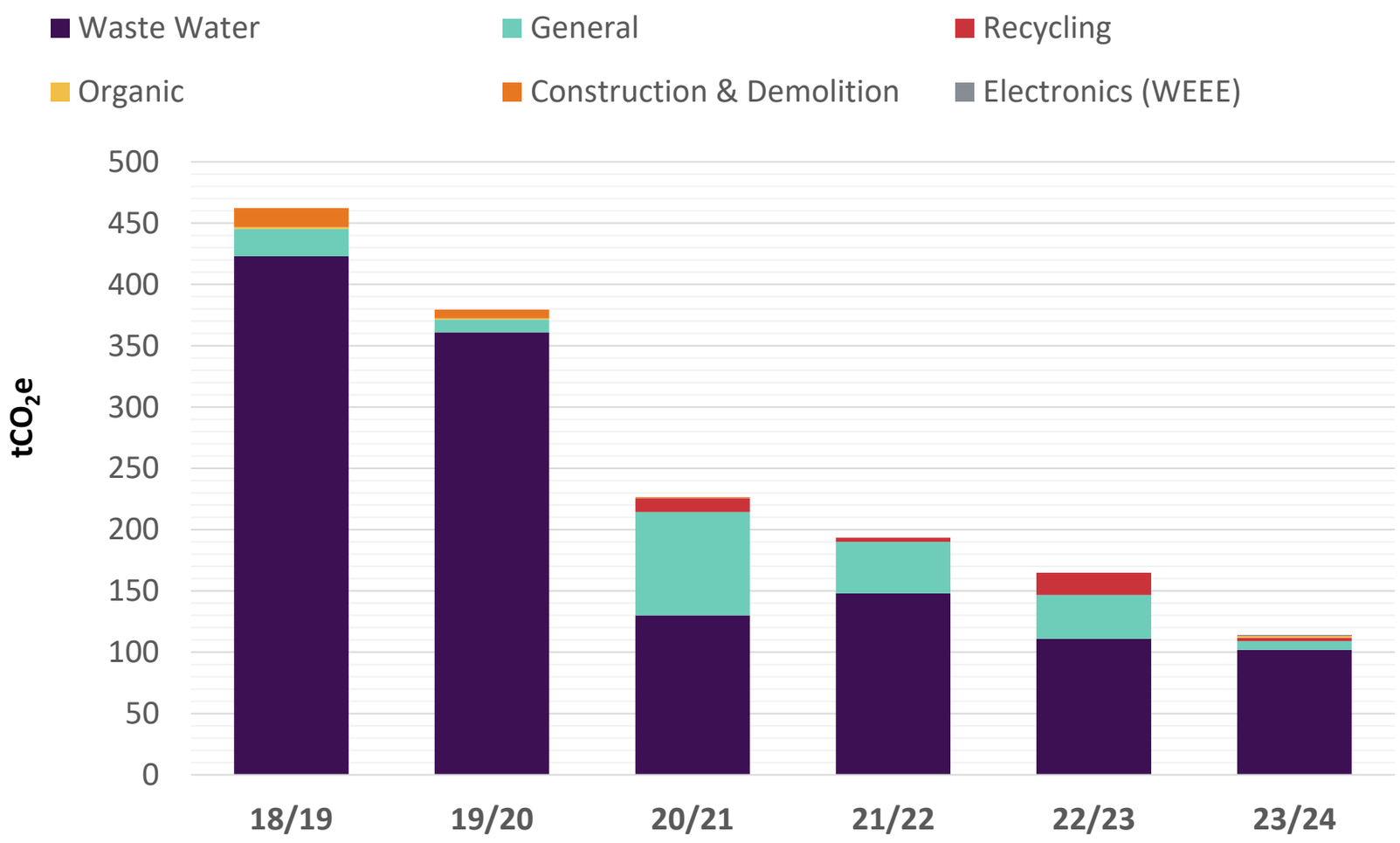
Emissions from wastewater processing represent the largest sub-category. These have decreased over time due to decarbonisation of wastewater processing.

Prior to 23/24, waste figures reported were estimated by the waste contractor.

For 2024, the published emission factor changed from waste disposal to waste removal approach. This had a significant reduction on calculated impact for waste generated on site.

Case Study

Donation Drive



Scope 3 Category 6: Business Travel, Including Travel to Study

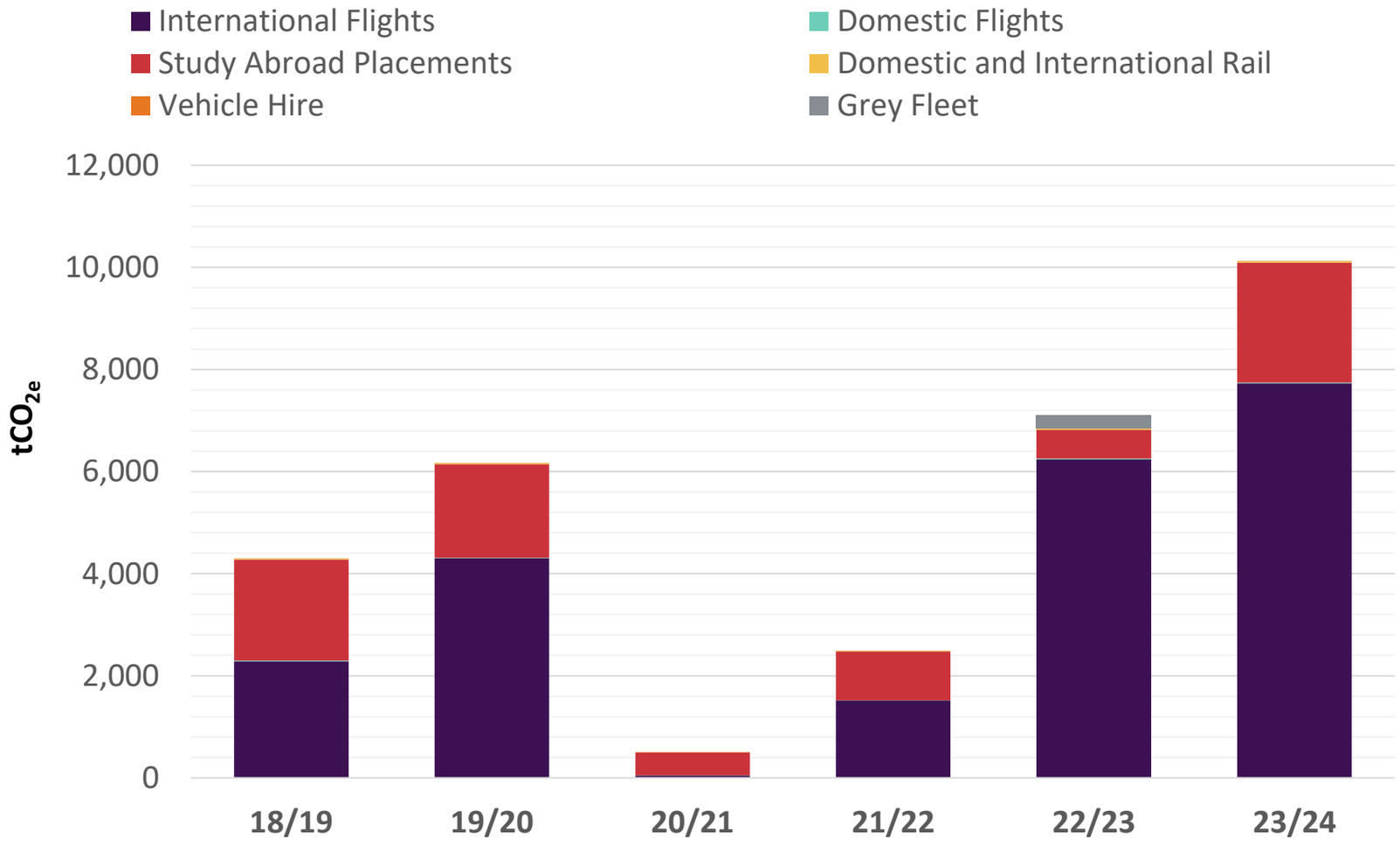
Business travel includes domestic and international travel across all modes provided through contracted services. Study abroad placements are reported outside of contracted services.

As the data availability increases historical emissions are re-baselined.

International flights, particularly those in business class, and long haul represent the greatest proportion of emissions

Learn More

Vehicle Hire



Scope 3 Category 7: Employee Commuting

Emissions for employee commuting comprise both staff and postgraduate research (PGR) staff emissions. Estimates are based on Car Park Automatic Number plate Recognition (ANPR) data and the results of the transport survey.

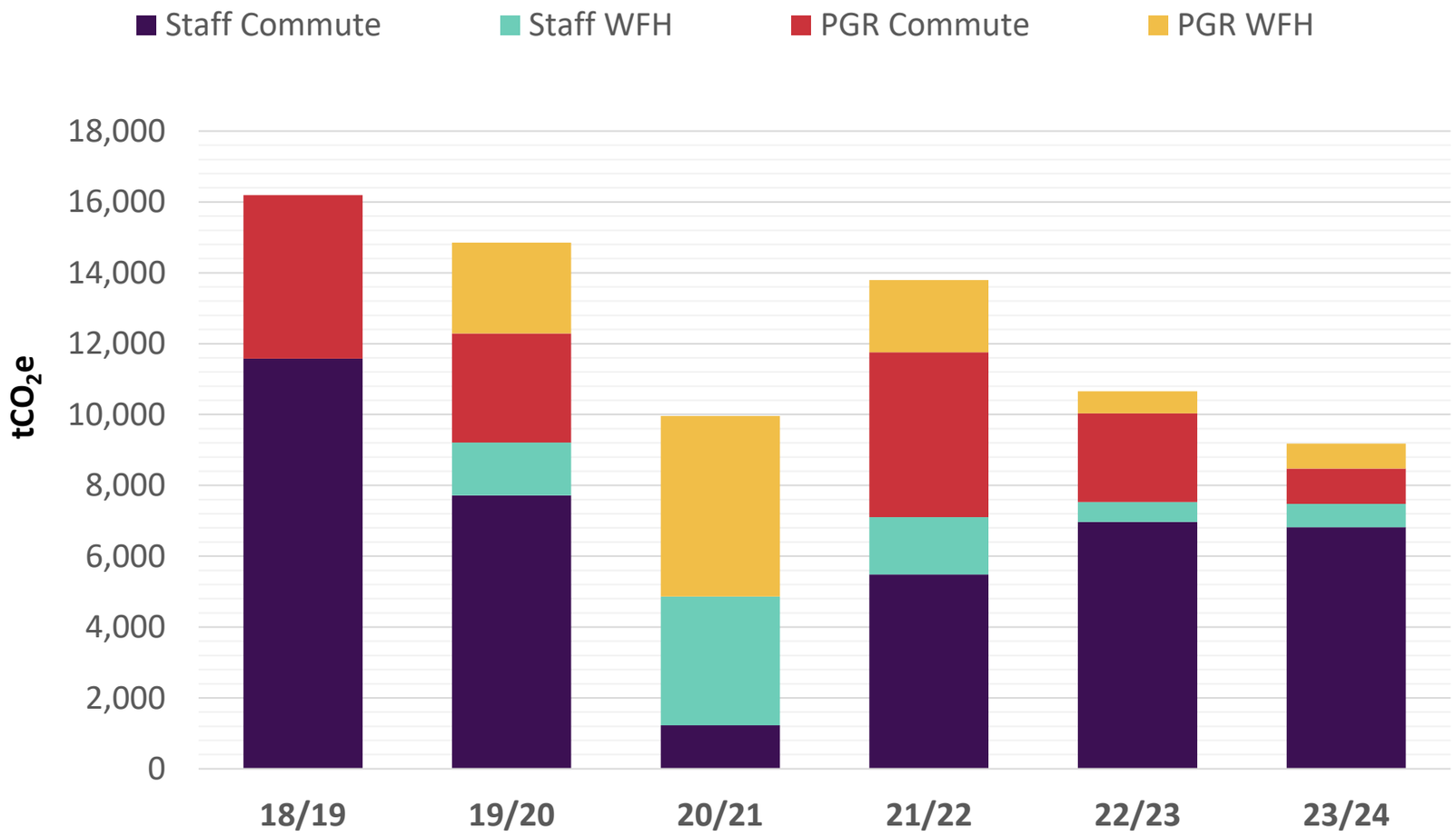
Staff travel is more carbon intensive than PGR travel. With the staff averaging 0.82 tCO_{2e} per person per year, and PGRs averaging 0.45 tCO_{2e} per person per year.

In line with the Greenhouse Gas Protocol and the UK Government's white paper on working from home during the COVID-19 pandemic, emissions generated by staff working from home are classified as Scope 3 emissions and reportable alongside commuting emissions.

The accuracy of emissions reported in this category are considered low due to reliance on surveys with relatively low response rates.

Learn More

Journey Sharing



Scope 3 Category 9: Student Travel

Emissions arising from student travel to and from their homes and commuting to University is included in this category.

Total emissions in this category have increased by 53% since 18/19.

Assumptions on frequency and methods of travel are made in line with HE guidance which uses distance-based grouping to estimate frequency of travel.

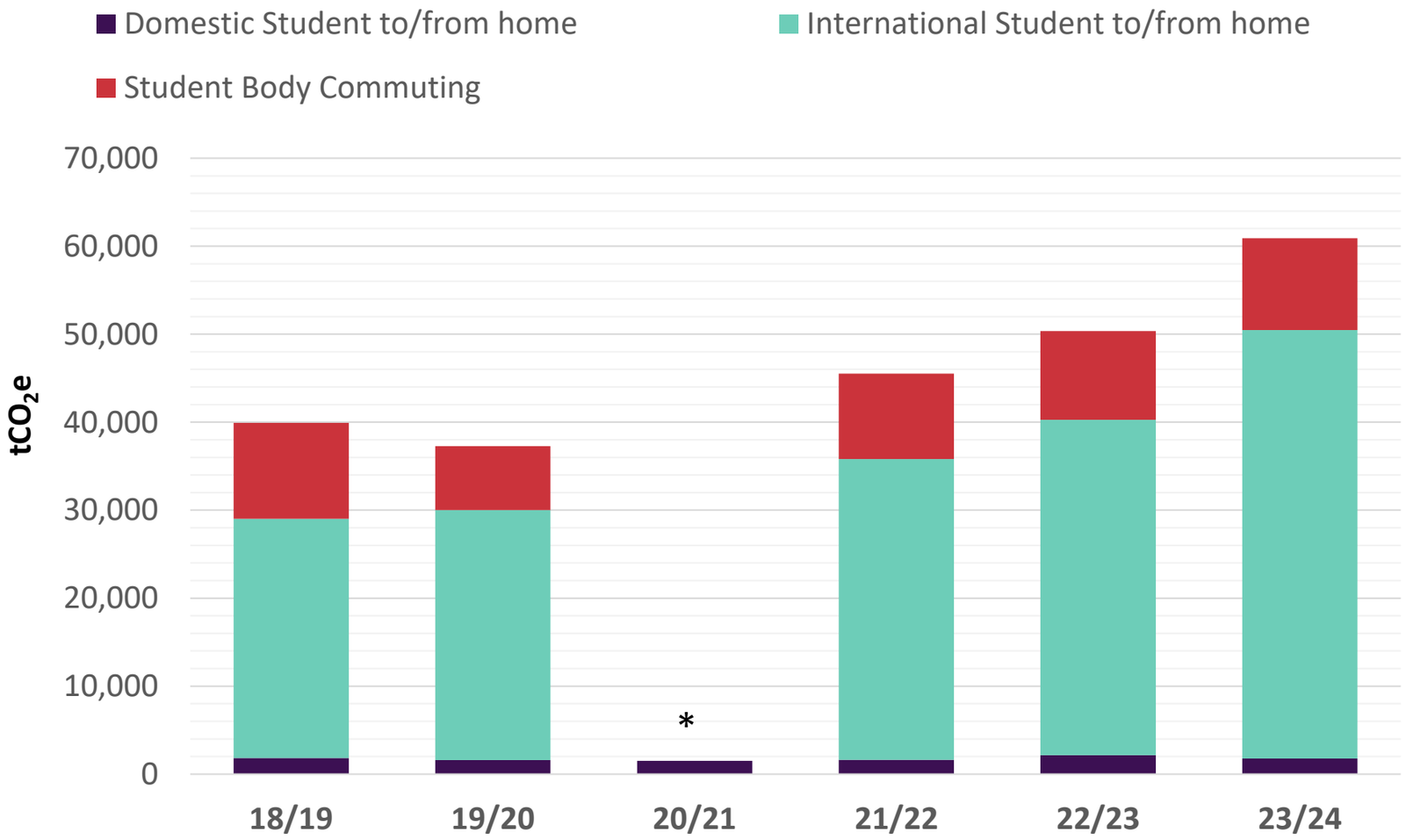
The University does not report student WFH emissions, and these are not included.

Data accuracy in the commuting sub-category is affected by the relatively low response rates to surveys.

** Due to a lack of available data and travel disruptions through 20/21 the assumptions on travel applied in other years are not considered appropriate. Although Student travel emissions will have been incurred at this time, we have not estimated the values.*

Learn More

Campus Buses



Scope 3 Category 13: Downstream Leased Assets

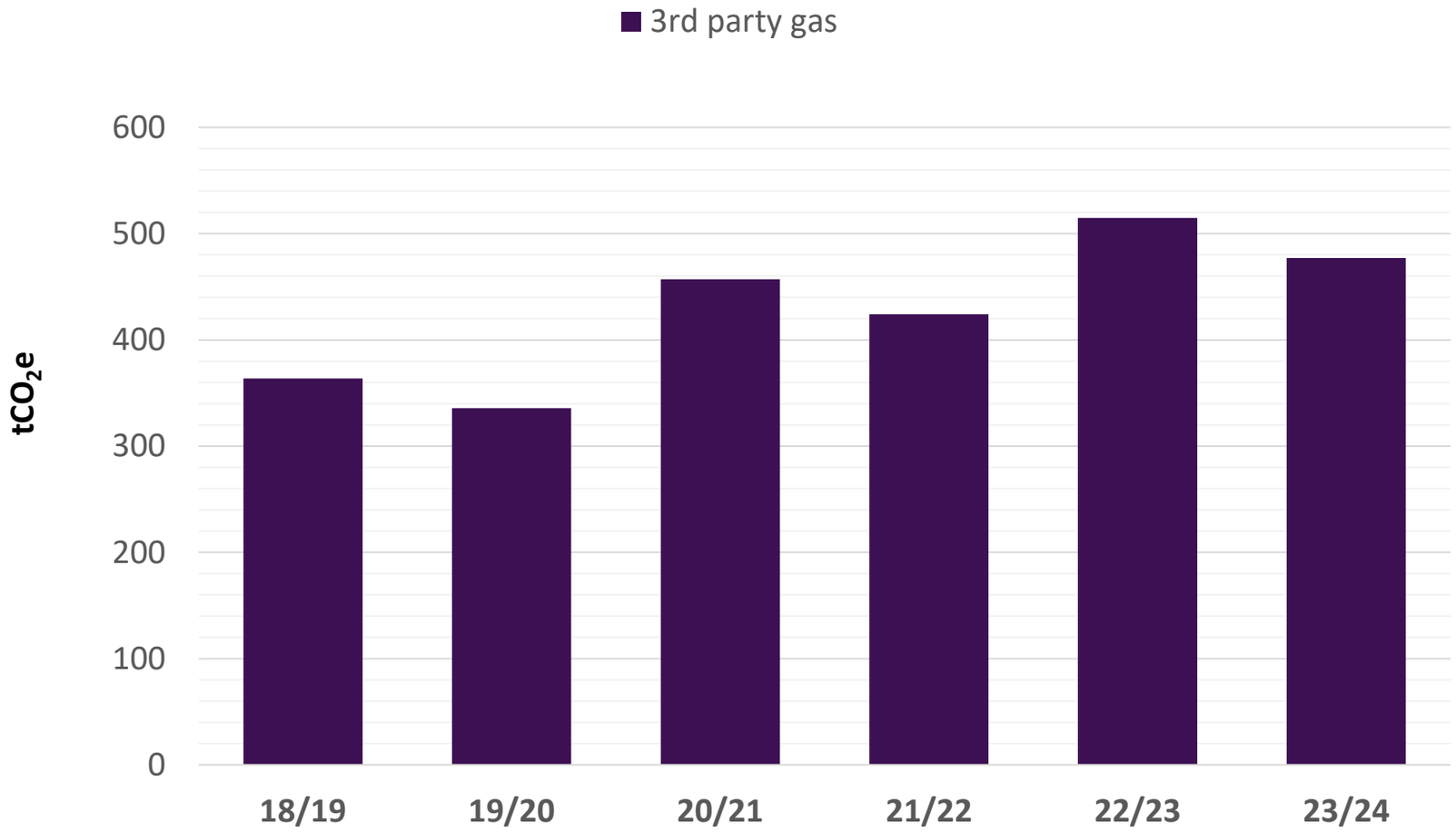
Third parties that lease space on campus, such as food outlets and private companies access energy supplies that pass through the University.

Scope 1 emissions arising from the combustion of this gas are excluded from our Scope 1 emissions but included in our Scope 3 reporting.

These emissions have remained relatively constant since 18/19 as the area of leased space has remained relatively consistent.

3rd party market-based grid electricity emissions are zero, as all purchased electricity is REGO-backed.

Emissions arising from 3rd party heat and electricity consumption provided from the University's gas-fired energy centres are included within our Scope 1 emissions according to the University role as energy centre owner and operator.



*This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in scope 1 or scope 2. This category is applicable to lessors (i.e., companies that receive payments from lessees).

Key Takeaways

1. Total University Scope 1 emissions for 23/24 were 24,273 tCO_{2e}, a 17.5% reduction on 18/19. Reductions are mainly due to reduced onsite electricity generation from gas.
2. Total University Scope 1 & 2 emissions (market basis) for 23/24 were 24,499 tCO_{2e}, a 20% reduction on 18/19.
3. The accuracy of Scope 3 emissions reporting is limited by the spend-based methodology used for the purchased goods category (currently the only practical approach, and the methodology used commonly across the sector), as well as small sample sizes in commuting surveys, but improvements in accuracy continue to be made.
4. Total University Scope 3 emissions in 23/24 are estimated at 174,426 tCO_{2e}, a 10% reduction on 18/19. Reductions are influenced by the changing emissions factors provided by the Department for Environment Food and Rural Affairs.
5. The most significant contributors to overall emissions are purchased goods (43%), student travel (31%), and natural gas combustion (12%).
6. Staff and students can help reduce emissions by choosing to travel sustainably, avoiding flights where possible, using energy responsibly and reporting energy wastage across campus, and choosing to share or re-use equipment rather than purchasing new.
7. The University is refreshing its Sustainability Strategy this year, updating our targets, defining our priorities and describing our updated plans in more detail.

THANK YOU

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THE UNIVERSITY OF WARWICK

WAY TO SUSTAINABLE