Carbon Emissions Report

2025

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University of Essex

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Carbon Emissions Report 2025

Vice Chancellor's Foreword

It is my pleasure to present our 2025 Carbon Emissions Report – an important document that explores in depth our efforts to monitor and reduce our carbon footprint, as we pursue our target to reach net zero by 2035. As a centre of learning and research, we have both the opportunity and the responsibility to lead by example in the transition to a low-carbon future.

We have continued to make significant progress to reduce our scope 1 and 2 carbon emissions across our campus operations, improve energy efficiency, and embed climate-conscious practices in our decision-making.

This report provides a transparent account of our progress, challenges, and the strategies we are putting in place to meet our targets across all three carbon emissions scopes. The continued reduction of our carbon footprint for energy use is really encouraging, and we will continue to strive towards our net zero vision.

Since 2011-12 our carbon footprint from energy use has halved, to less than 8,000 tonnes annually to below the UK HE average (approximately 9,800 tCO_2e). While emissions from natural gas are our largest direct source of emissions from energy use, these have fallen 5% from 2023-24 and 39% from 2019-20. The University's energy mix (ratio of gas to electricity use) has been steadily improving, moving from 67% gas and 33% electricity use in 2019-20, to 56% and 44% respectively in 2024-25, meaning we are taking greater advantage of our 100% green certified electricity and reducing our use of fossil fuels.

Developing our understanding of our indirect emissions (scope 3) has been a journey of discovery, allowing us to explore the data and identify our greatest impacts. The goods and services we purchase and the carbon impact of our home and international students arriving at our campuses collectively account for almost 90% of these emissions. Addressing this is a challenge for society, extending well beyond our campuses.

Tackling the climate crisis requires more than intent; it demands action, accountability, and collaboration. I want to thank everyone in our community who has contributed to this work, which I know requires significant levels of teamwork. Your commitment strengthens our resolve to build a university that not only educates for the future but actively protects it.

Professor Frances Bowen

Vice-Chancellor

*normalised for impact of pandemic.

Introduction

At the University of Essex we are working hard to minimise wherever we can the carbon emissions that arise from our activities. Sustainability matters to our community and achieving our goals is a collective challenge. Our Sustainability Sub-Strategy (SSS) contains several key performance indicators (KPIs) defining our aspirations to the reduction of these emissions.

The University has:

- Committed to reaching net zero scope 1 and 2 carbon emissions by 2035.
- Limited the amount of carbon emissions it will offset to a maximum of 3,000 tCO_2e.
- Set a target to generate 25% of its electricity requirements from renewable sources.

Our carbon emissions are derived using the Greenhouse Gas Protocol's approach to emissions, which groups them into three categories called "scopes".

- Scope 1: Direct emissions from activities the University owns or controls, such as gas used in our boilers and emissions from use of university vehicles.
- Scope 2: Indirect emissions associated with electricity purchased from the grid for use by the University.
- Scope 3: All other indirect emissions from activities that we do not directly control, but influence through purchasing, commuting, waste, travel, and leasing buildings.

You can view previous reports on our website.

The University's Scope 1 and 2 carbon emissions have been steadily decreasing for over a decade. This is a result of energy efficiency projects on our campuses, growth in in-house energy management and carbon reduction expertise, the creation of a sustainability long term enhancement capital budget, community actions and electricity grid decarbonisation.

Progress highlights

58%
reduction

Scope 1 & 2 carbon emissions since 2012-13 peak

39%

Proportion of our electricity our solar panels produced in July 2025

33%
reduction

Scope 1 & 2 carbon emissions since 2019-20

100%

Grid-derived electricity from certified renewable sources

39%
reduction

Gas use since 2019-20

13%
reduction

Electricity use since 2019-20

8%

Electricity generated from PV Solar panels

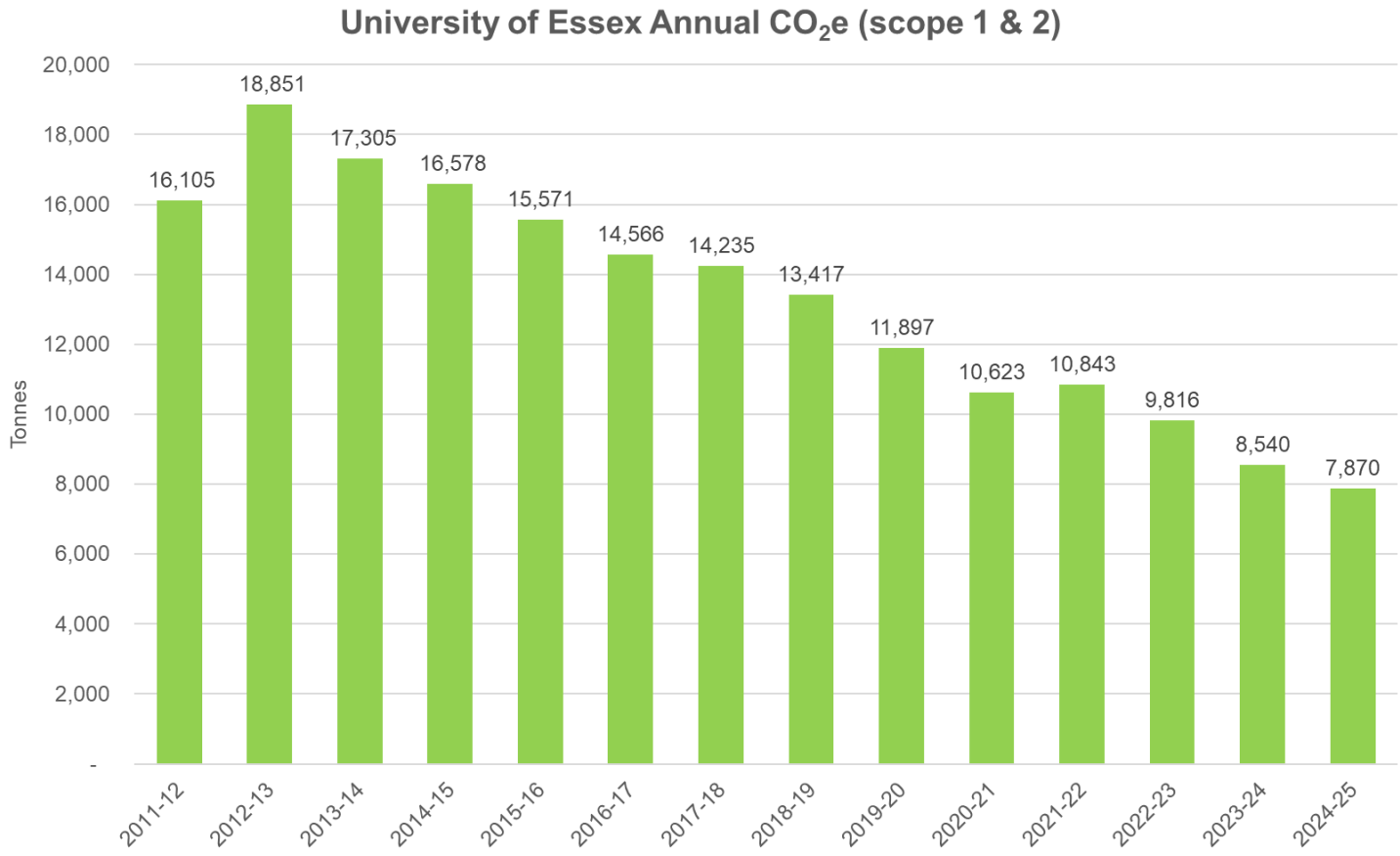


Figure 1. Annual carbon emissions at the University of Essex, 2011-12 to 2024-25

The University's energy mix has been steadily improving, with a decrease in gas use as a percentage of overall energy use.

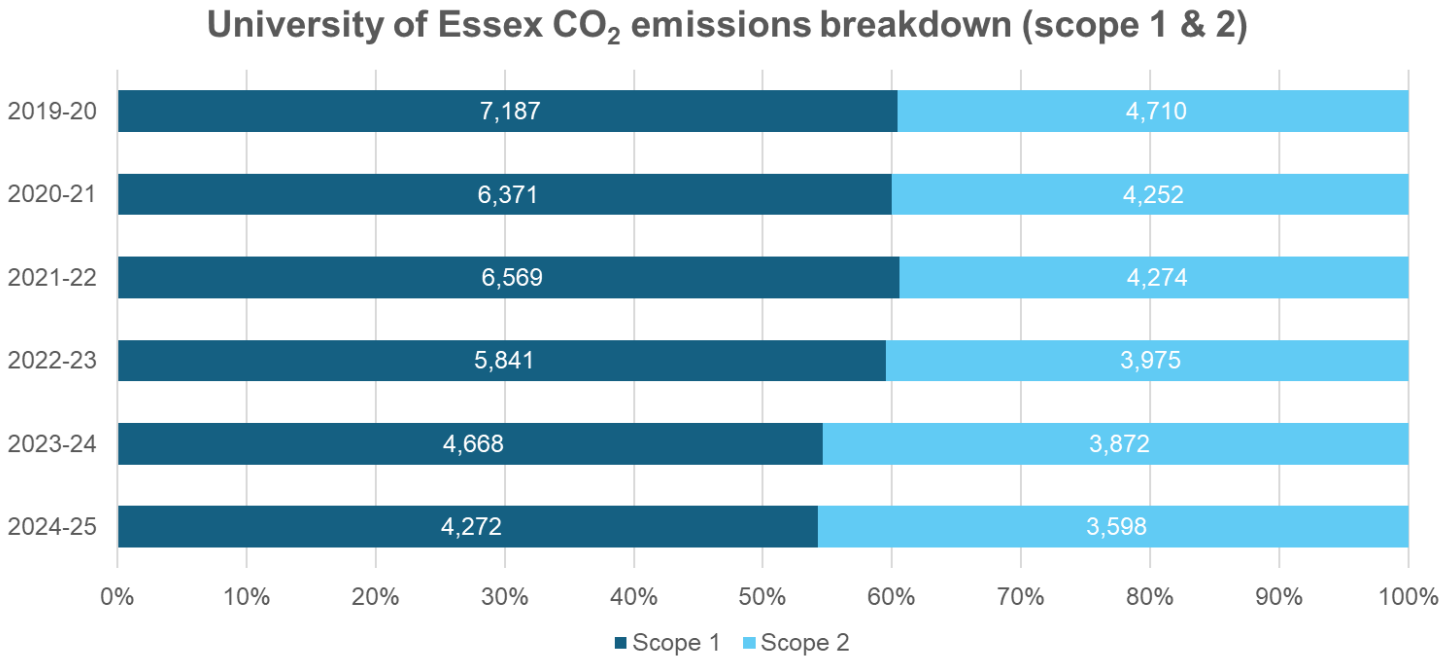


Figure 2. Gas vs Electricity emissions split 2019-20 to 2024-25.

The figures we have calculated for the University's scope 3 carbon emissions have increased since 2021-22. This is a result of a number of factors, including growth following the global pandemic, improved methodology (i.e. we are counting more inputs), increased spend (which forms the data for purchased goods and services, almost half of our scope 3 figure), an increase in the figure for international student arrivals (downstream transportation and distribution) and an increase in emissions from business travel. It is important to note, therfore, that exact year-on-year comparisons are difficult to make due to the number of variables for each category and variations in the availability of data. Scope 3 figures serve as a guide and an indication of our indirect emissions profile, identifying the categories where we, as an organisation, contribute most to the global carbon footprint.

We calculate scope 3 emissions retrospectively, with 2024-25 figures to be produced in due course.

- 5,827 tCO_2e (7%) increase from 2022-23 to 2023-24.
- 24,027 tCO_2e (34%) increase from 2021-22 to 2023-24.

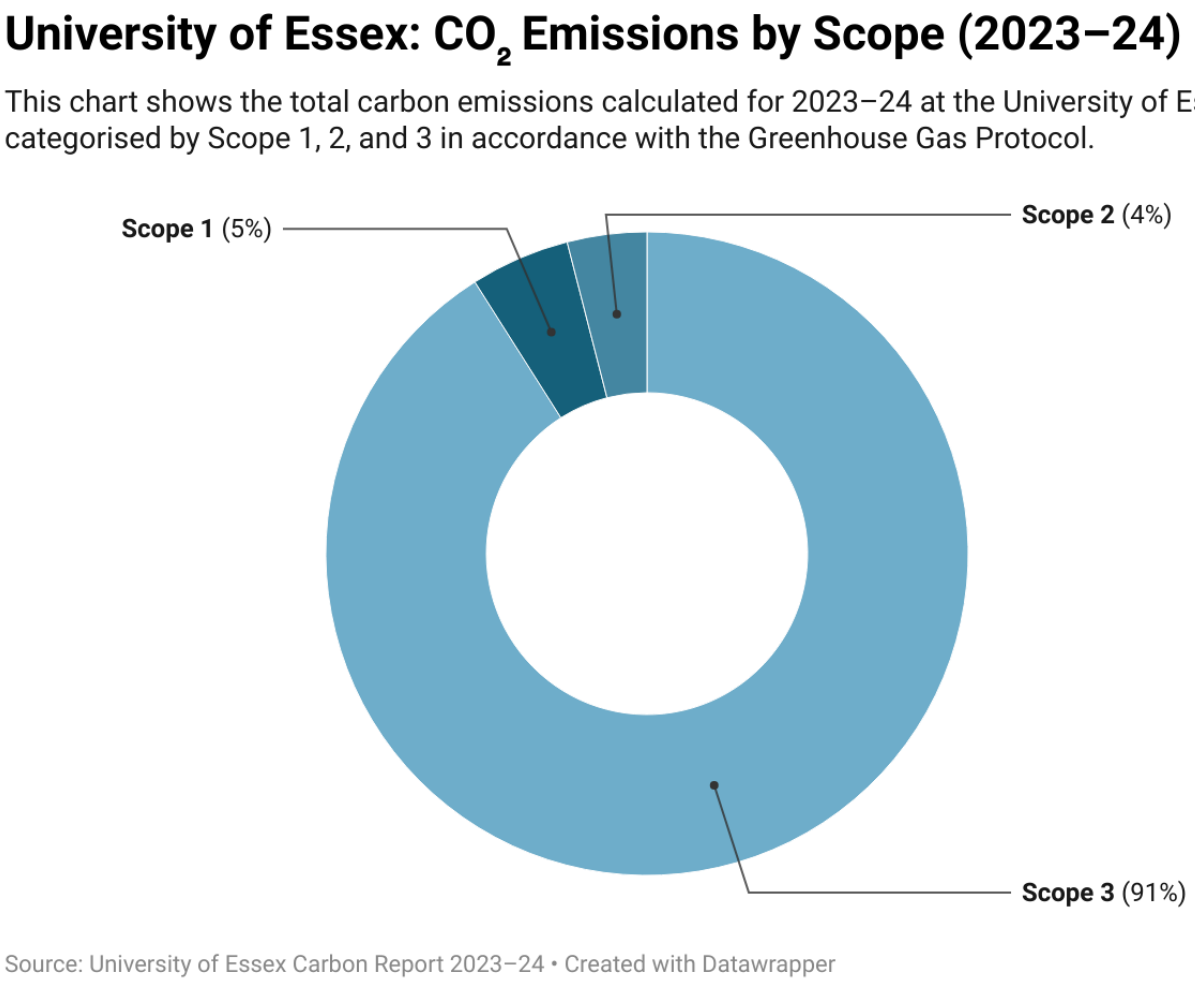


Figure 3. Scope 1, 2 and 3 split by proportion of overall emissions profile, 2023-24.

Scope 1: Direct Emissions

Heating by Natural Gas

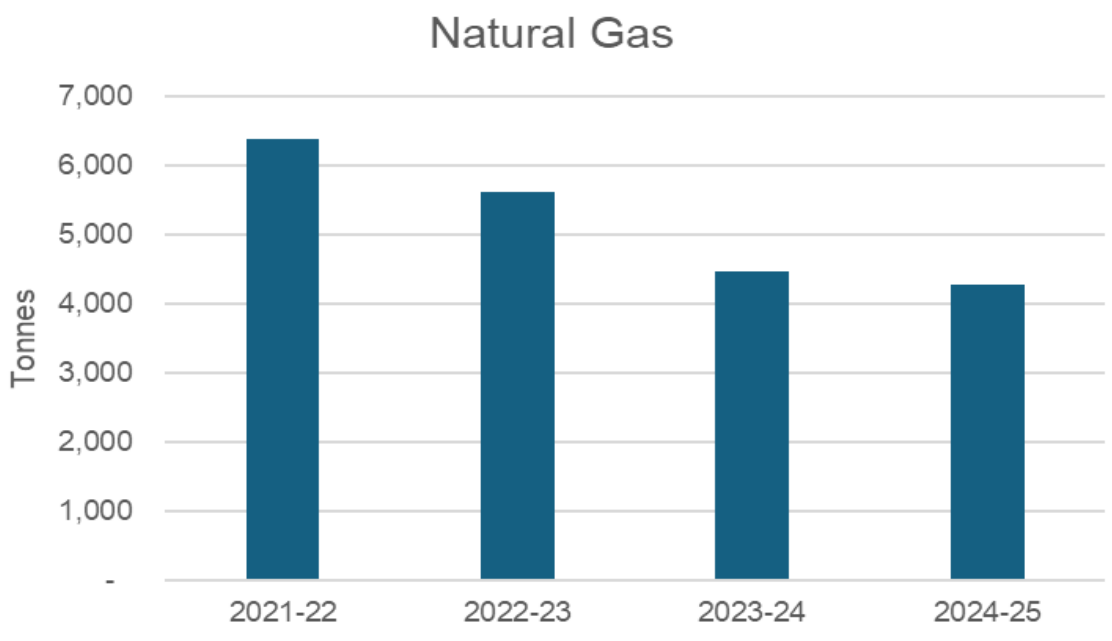
39% Reduction in emissions from gas use compared with 2019-20

Natural gas used in boilers for heating and hot water across our estate remains one of our largest direct emissions sources. Ongoing upgrades to insulation and new boilers have helped to reduce this figure over time, as well as several adjustments to building management systems (BMS). Reviewing BMS controls allows us to optimise the heating temperatures for our buildings, maintaining comfortable temperatures while making the most efficient use of gas to power the heating.

Moving our heating to electric systems will help to reduce these emissions further, as part of a significant upgrade to suitable equipment. Our most recent constructions (such as Clingoe House) use electricity for heating instead of natural gas.

As a proportion of our scope 1 and 2 emissions, our use of natural gas for heating is falling consistently.

Natural Gas 2024-25	
4,272 tCO_2e	2023-24: 4,486 tCO_2e 2022-23: 5,618 tCO_2e 2021-22: 6,380 tCO_2e
54% of Total Scope 1 and 2 carbon emissions	
5% reduction from 2023-24	



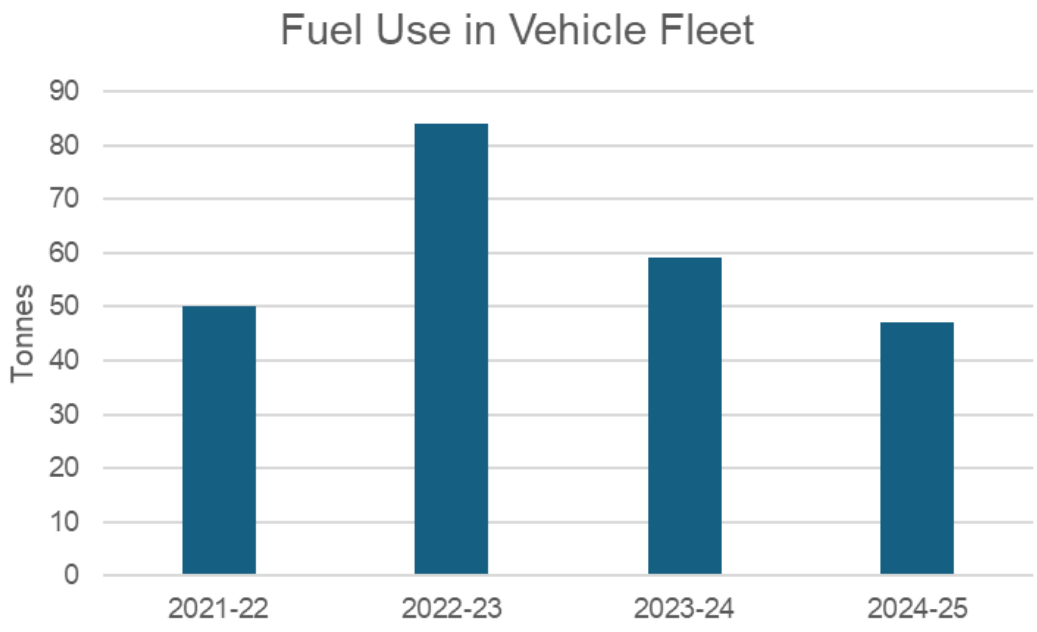
Fuel Use in Vehicle Fleet

63 Average annual tonnes of CO_2e from fuel used in vehicles over the last 3 years.

These are the emissions from diesel and petrol used in the University owned fleet of vehicles, and some Grounds machinery. Many vehicles in the University's fleet have been upgraded to electric vehicles which has helped to keep this figure low. While only a small proportion of our total emissions, this is an area where we can make reductions as part of regular upgrades, by making fuel-efficient choices.

The spike in 2022-23 is a consequence of greater fuel use compared with the previous and subsequent year. As the university's fleet is rationalised and upgraded to EVs, this will fall.

Fuel Use in Vehicle Fleet 2024-25	
47 tCO_2e	2023-24: 59 tCO_2e 2022-23: 84 tCO_2e 2021-22: 50 tCO_2e
<1% of Total Scope 1 and 2 carbon emissions	
20% reduction from 2023-24	



Fugitive Emissions from Refrigerants

0.14% This is a relatively small part of our emissions and as an estimate remains steady

A consequence of natural leakage from refrigeration and air conditioning systems is a contribution to greenhouse gases in the atmosphere. Maintenance and phased refrigerant replacement help address this to make sure there is as little leakage as possible. This figure is estimated based on 2021 figures and remains steady as no additional cooling systems have been installed since.

Fugitive Emissions from Refrigerants 2024-25	
139 tCO_2e	2023-24: 139 tCO_2e 2022-23: 139 tCO_2e 2021-22: 139 tCO_2e
<1% of Total Scope 1 and 2 Carbon Emissions	
0% reduction from 2023-24	

Scope 2: Direct Electricity Emissions

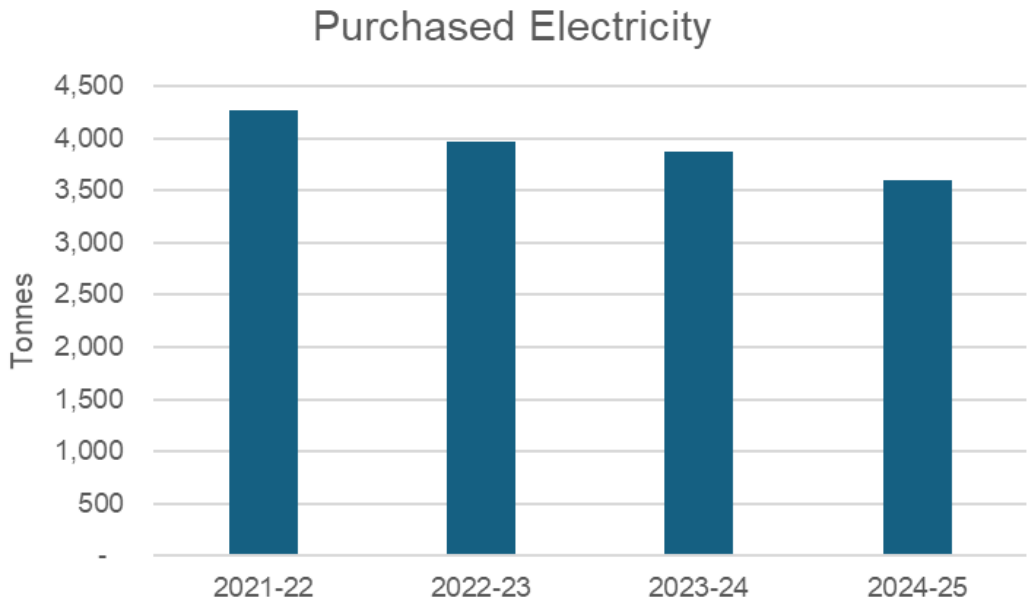
Purchased Electricity

24% Reduction in emissions from electricity compared with 2019-20

The University purchases its electricity through a 100% renewable energy tariff, however we calculate and report on these emissions as most of our electricity still comes via the national grid, and we therefore do not claim to be carbon neutral for purchased electricity. Solar installations now supply 8% of our on-site electricity, which is helping to reduce our emissions in this area, alongside improved efficiency and efforts to avoid electricity wastage.

Emissions from electricity have been steadily falling for several years, due to a combination of our implementation of energy efficiency measures (including LED lighting upgrades) and decarbonisation of the electricity grid in the UK.

Purchased electricity 2024-25	
3,598 tCO_2e	2023-24: 3,872 tCO_2e 2022-23: 3,975 tCO_2e 2021-22: 4,274 tCO_2e
46% of Total Scope 1 and 2 carbon emissions	
7% reduction from 2023-24	



Scope 3: Indirect Value Chain Emissions

Our previous Carbon Emissions Report provides detailed information on our calculations of scope 3 emissions for 2022-23 and the rationale for some of our methodologies. This report focuses on 2023-24 data. While scope 1 and 2 emissions are straightforward to calculate, scope 3 emissions are more complex due to the range of possible variables for each category, and the assumptions that must be made to allow us to reach our estimates.

Data that can be used to undertake analysis is not yet granular enough for us to be able to calculate most scope 3 emissions with absolute certainty. Instead, it gives us approximate figures that indicate the relative impacts of several activities, and those which are most carbon intensive. Consequently, our scope 3 calculations should be viewed as directional, rather than definitive.

Scope 3 emissions are the scope 1 and 2 emissions of the primary emitter (for example, for business travel, a flight will be the scope 1 emissions of the airline). We therefore do not have direct control over these emissions; however, we can affect them through our own policy decisions as well as individual and collective behaviour change. The analysis below orders the categories from highest to lowest.

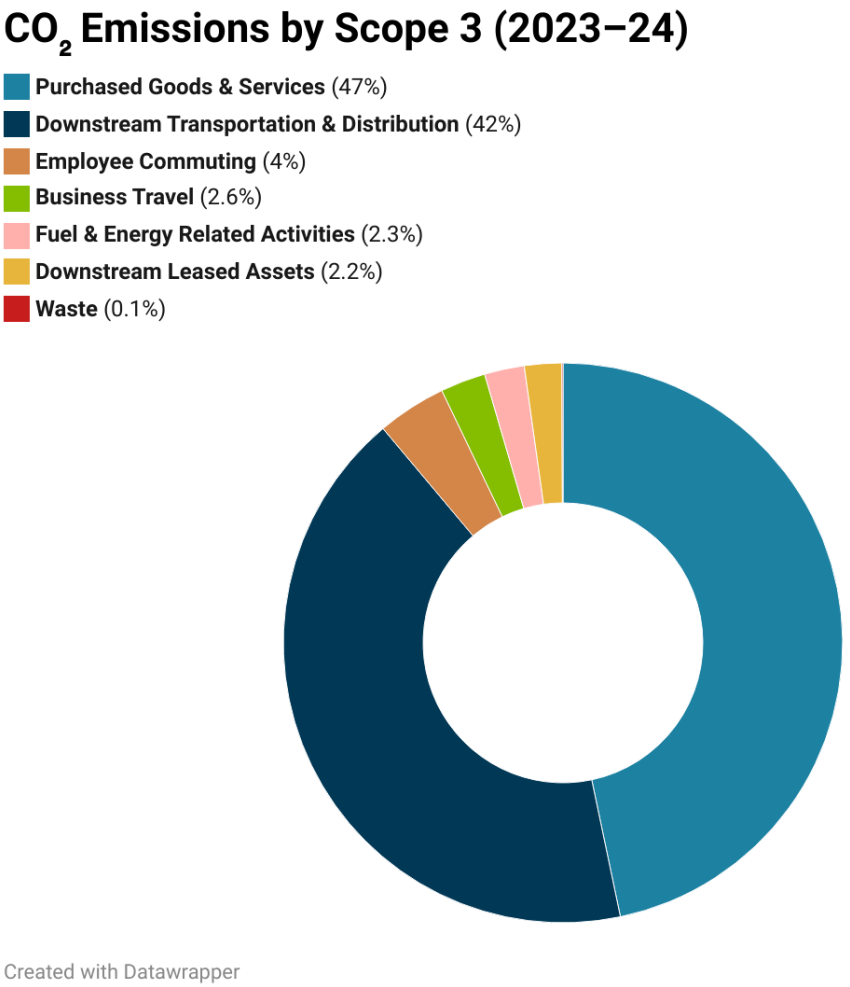


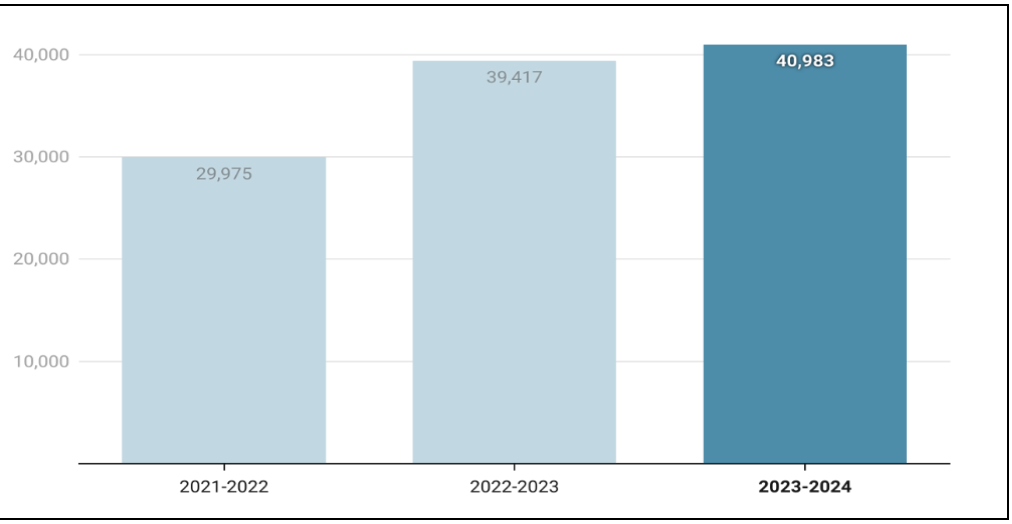
Figure 4: Relative proportions of our scope 3 emissions in 2023-24.

1. Purchased Goods and Services

47% This is our largest category of scope 3 emissions, accounting for almost half

This is the largest contributor to our carbon footprint. It includes all products and services the University buys, from computer software to lab equipment and catering to printer paper. Because these emissions are estimated using financial spend, higher purchasing volumes result in higher emissions. Unfortunately, we cannot currently account for the purchase of lower carbon products.

Scope 3 Emissions	% of Scope 3 emissions
40,983 tCO_2e	47%



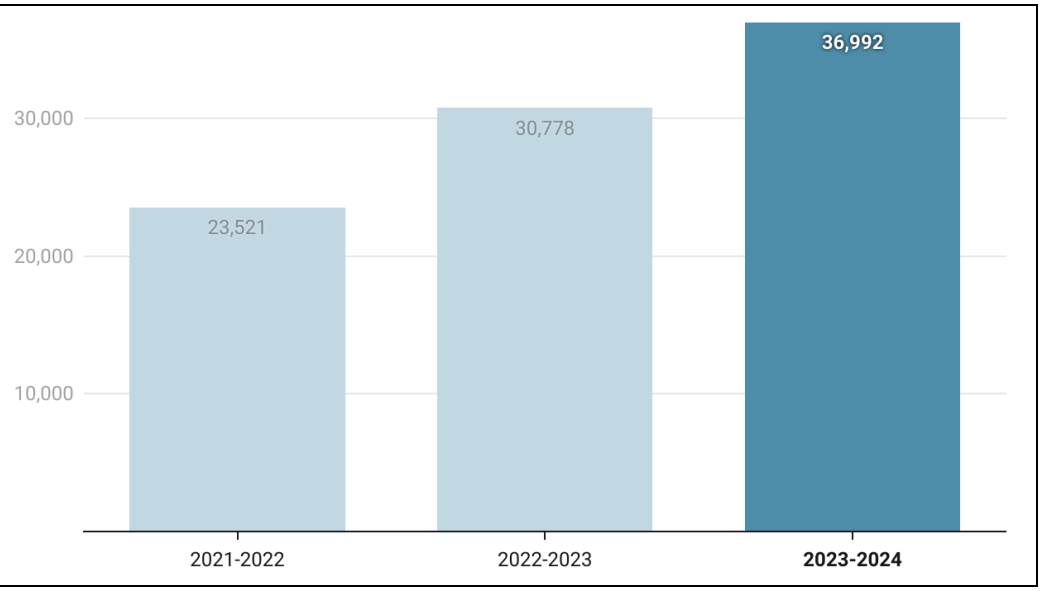
2. Downstream Transportation and Distribution

42% Student arrivals (international & UK) account for almost half of our scope 3 emissions

This category accounts for emissions from a broad spectrum of student-related travel, making it a significant contributor to the University's Scope 3 footprint in 2023-24. It encompasses international student arrivals and departures from 149 countries, as well as onward travel from airports to campus. Emissions from UK students travelling to and from the University by car are also included, with separate consideration given to fuel production and distribution through Well-to-Tank (WTT) factors.

Regular commuting by students during term time is included too, differentiated by transport mode based on the annual travel survey. The category further includes travel associated with study abroad programmes, inbound exchange students, and participants in language and summer schools. While the University does not directly manage these journeys, they reflect the institution's global reach and highlight the need to consider sustainable travel guidance and future engagement models as part of our wider environmental responsibility.

Scope 3 Emissions	% of Scope 3 emissions
36,992 tCO_2e	42%

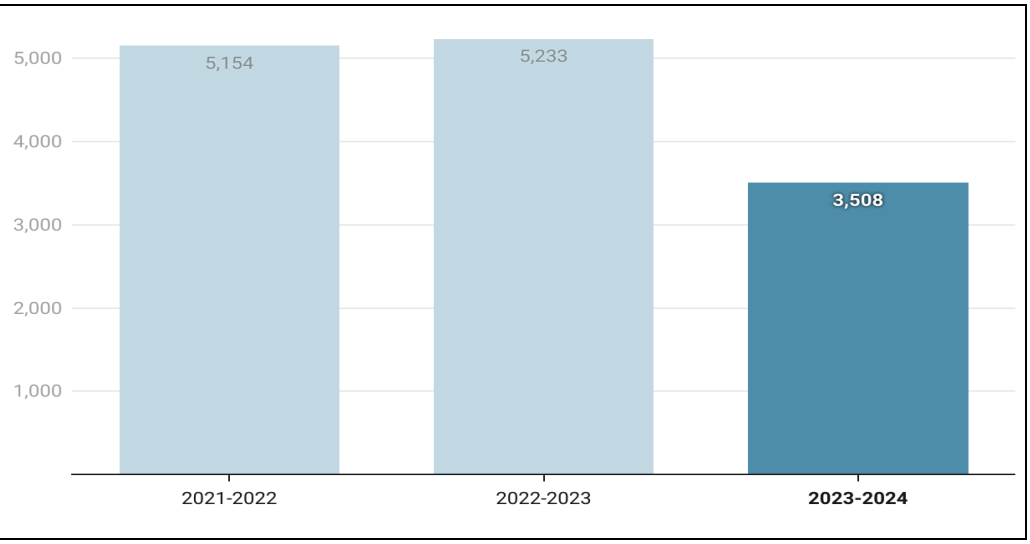


3. Employee Commuting

33% Drop in estimated commuting emissions in 2023-24 due to honing of methodology

Employee commuting covers emissions from daily travel to and from campus by car, train, bus, and taxi. Car journeys remain the dominant contributor, particularly due to the location of some campus sites. To address these emissions, the University promotes low carbon alternatives through initiatives such as EV charging points, carpooling schemes, improved cycling infrastructure, and discounted public transport. Flexible working arrangements have also helped reduce commuting related emissions, with remote work contributing a smaller footprint.

Scope 3 Emissions	% of Scope 3 emissions
3,508 tCO_2e	4%

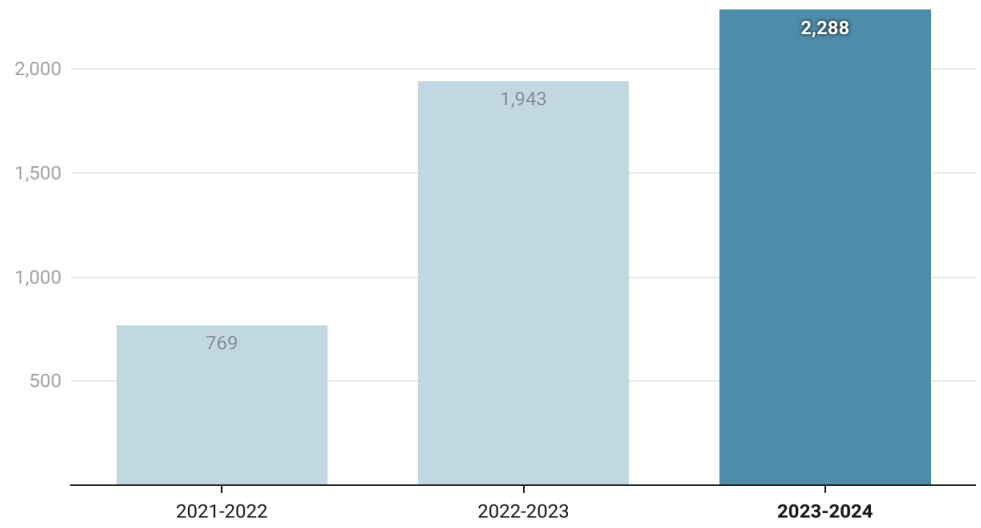


4. Business Travel

197% Increase in travel emissions in 2023-24 compared with 2021-22 (during pandemic)

These emissions include air and rail travel, car mileage and hotel stays related to University staff trips. As in-person academic events and international collaboration resumed post COVID, travel-related emissions increased with long-haul flights making up the largest share due to their high carbon intensity. A Sustainable Travel Policy is in development to promote rail travel, virtual meetings, and other low emission alternatives.

Scope 3 Emissions	% of Scope 3 emissions
2,288 tCO_2e	2.38%

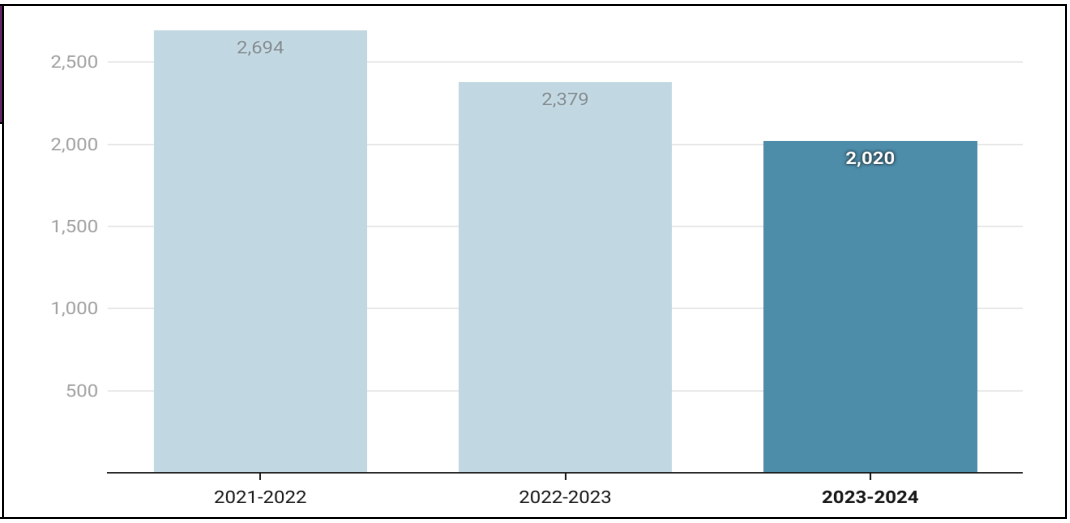


5. Fuel- and Energy-Related Activities

15% Year-on-year drop in these emissions, which are intrinsically linked to electricity use

These cover emissions from the production and transmission of purchased electricity and fuels before they reach our campus, such as extraction & refining of natural gas and transmission losses from the grid. The decline over time is linked both to improvements in our own energy efficiency, as well as efficiencies within the systems that supply these fuels.

Scope 3 Emissions	% of Scope 3 emissions
2,020 tCO_2e	2.30%



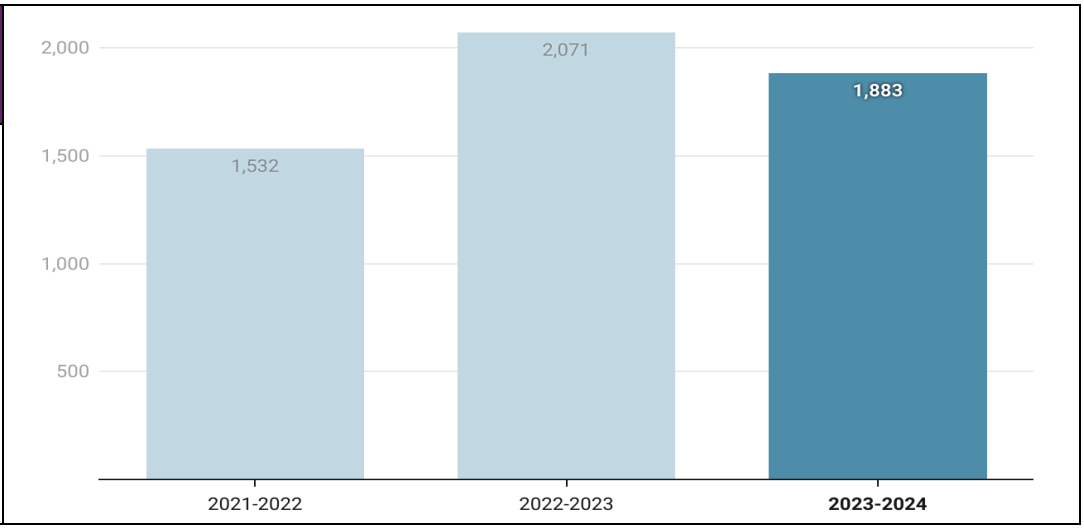
6. Downstream Leased Assets

1,829 Average carbon emissions for this category over the last three years

This category includes emissions from energy use in university-owned buildings that are leased out to third parties, such as private businesses at the commercial spaces at the Knowledge Gateway (some tenants manage their own utilities consumption and this is not included here), as well as on-site but externally-managed student accommodation at The Quays, Meadows and Copse.

Although the day-to-day energy consumption within these buildings is managed by others and falls outside the University's direct operational control, the emissions are still included within our carbon reporting boundary under the Greenhouse Gas Protocol.

Scope 3 Emissions	% of Scope 3 emissions
1,883 tCO_2e	2.2%



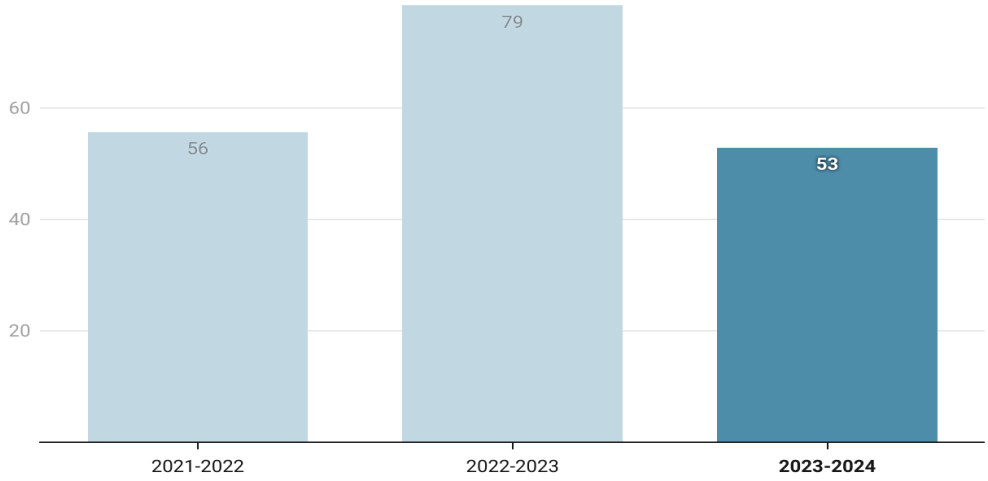
7. Waste Generated in Operations

0.06% Carbon emissions from waste management

Emissions from waste management include general waste, recycling, and organic materials. In 2023-24, the University recycled 34% of its total waste on site (an increase from the previous year). While waste represents a relatively small portion of our overall carbon footprint, it remains important due to other impacts of waste management.

Most of our general waste is incinerated with energy recovery, while materials like paper, glass, and metal are separated for recycling. Food waste is treated through anaerobic digestion, which produces methane gas for energy generation and solids which are used as fertiliser.

Scope 3 Emissions	% of Scope 3 emissions
53 tCO_2e	>0.1%



Appendix

The table below provides an overall summary of the University's scope 1, 2 and 3 emissions, split by category for 2023-24, our most recent full calculation.

University of Essex: CO_2 Emissions by Activity (2023–24)

Emissions are grouped by carbon-generating activity for the 2023–24 reporting year. Colours reflect the GHG Protocol scope classification

Carbon Generating Activity	Total Emissions (tCO2e)	% of Total Emissions
Heating by Natural Gas	4,470	4.64%
Fuel for Vehicle Fleet	59	0.06%
Fugitive Emissions from Refrigerants	139	0.14%
Purchased Electricity	3,872	4.02%
Purchased Goods and Services	40,983	42.57%
Downstream Transportation and Distribution	36,992	38.43%
Employee Commuting	3,508	3.64%
Business Travel	2,288	2.38%
Fuel and Energy Related Activities	2,020	2.10%
Downstream Leased Assets	1,883	1.96%
Waste Generated in Operations	53	0.06%

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