Northumbria University
NEWCASTLE

# Annual Carbon Management Report

# 2022 - 2023

**Dr Paul Steadman**

**Sustainability Manager**

# Annual Carbon Management Report 2022/23

## Introduction

As part of Northumbria University's contribution to the UN Sustainable Development Goals (SDGs) and in pursuit of reducing our carbon footprint, considerable progress has been made over the past year in enhancing energy efficiency and integrating renewable energy sources. Northumbria has ambitious carbon reduction targets which require a wide range of interventions and changes to behaviour. Outside of our campus operations, our researchers tackle global climate challenges, such as over-exploitation of natural resources and glacial impacts of rapid climate warming.

This report provides a comprehensive overview of our carbon management initiatives over the past year. It encompasses a detailed analysis of our emissions profile, initiatives completed and the outcomes achieved. Additionally, we outline our future strategies to maintain our momentum towards a more environmentally conscious campus.

## Our Carbon Commitment

Northumbria University recognises the need for urgent action to reduce carbon emissions to tackle dangerous climate change. Our **Carbon Management Strategy 2020-2030** sets out our commitments to an 80% reduction in emissions by 2030 (against the 2014/15 baseline) and to achieve NetZero by 2040 at the latest. In support of this policy, we continue to make our buildings more carbon efficient by installing LED lighting, new boilers, energy retrofitting and improvements to our Building Management System.

Our carbon emissions have dropped by over 56% against our 2015 baseline, and we have reduced gas consumption by 27% and electricity consumption by 31% since 2015. Our electricity comes from 100% certified green sources and we were one of the earliest installers of a commercial PV system in the UK which is still fully functional, even after 21 years. Together, the photovoltaic arrays on our campuses save over 80 tonnes of $CO_2$ each year. In accordance with our carbon reduction commitments, we

also have an Ethical Investment Policy and our Ethical Investment Declaration pledges that we do not and will not invest in fossil fuel companies.

## Summary

- 56% reduction in Carbon Emissions since 2015.
  - 27% reduction in gas consumption.
  - 31% reduction in electricity consumption.
- 11% increase in emissions compared to previous year – due to COVID lockdowns in previous year.
- Despite an increase in business travel, $CO_2e$ remains on target for our 2030 goal.
- 34% reduction in water consumption since 2016.
- Major heat decarbonisation and PV project at Coach Lane East Campus.

## Carbon Reduction Projects

In June 2022, we commissioned air source heat pumps (ASHPs) at our City Campus East, saving 300 tonnes of carbon emissions annually with £1.7million of grant support from the Public Sector Decarbonisation Scheme (PSDS Phase 2). ASHPs are a more environmentally-friendly way of heating buildings as they take warmth from the air – even in freezing temperatures – to provide heating to our lecture theatres, offices, cafes and other facilities. The benefits of the scheme are clearly demonstrated within the reduction in annual campus gas usage (Fig.1.)

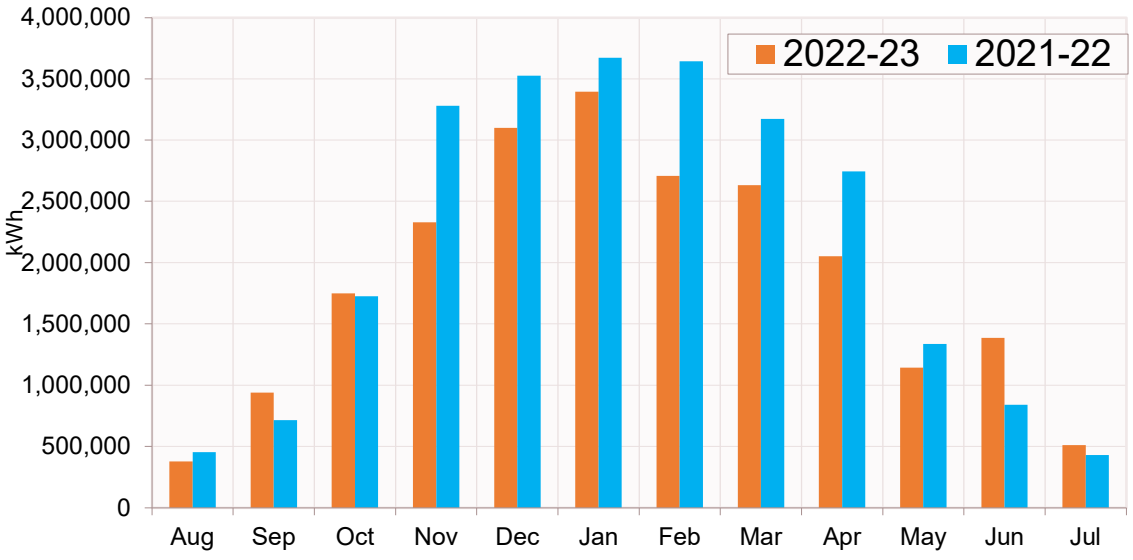



Fig.1 Campus Gas Usage Comparison

In October 2022, we successfully applied for £1.94million of grant funding to install ASHPs at our Coach Lane East Campus under PSDS Phase 3b. In addition, the scheme includes the installation of roof mounted photovoltaic panels and replacement of lighting to LED, the works estimated to save 360 tonnes of carbon emissions annually. The project will be commissioned in March 2024.

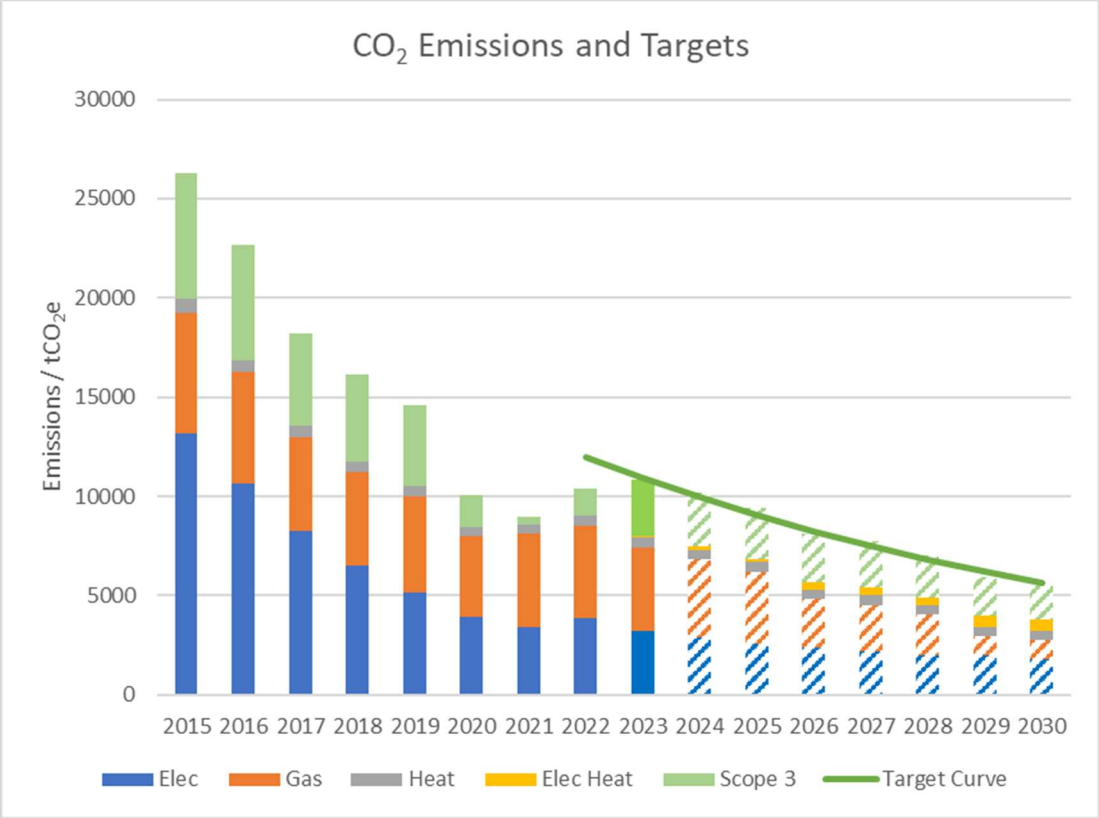
# Carbon Emissions 2022-23

We report on Scope 1, Scope 2 and a selection of Scope 3 emissions which we have reliable data for. These include those from gas, electricity, petrol, diesel and heat purchased from the Trinity Square heat network, refrigerant gases, business travel, waste, water and electricity transmission losses.

| | | Emissions 2014/15 | Emissions 2015/16 | Emissions 2016/17 | Emissions 2017/18 | Emissions 2018/19 | Emissions 2019/20 | Emissions 2020/21 | Emissions 2021/22 | Emissions 2022/23 | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Scope 1 | Gaseous fuels | 6,059 | 5,570 | 4,725 | 4,725 | 4,791 | 4,029 | 4,712 | 4,663 | 4,087 | $tCO_{2e}$ |
| | Vehicle fleet | 65 | 19 | 18 | 27 | 26 | 19 | 19 | 28 | 16 | $tCO_{2e}$ |
| | Refrigerant Gases | 107 | 153 | 106 | 225 | 72 | 19 | 13 | 47 | 10 | $tCO_{2e}$ |
| | **Total** | **6,231** | **5,742** | **4,849** | **4,978** | **4,889** | **4,067** | **4,744** | **4,738** | **4,113** | **$tCO_{2e}$** |
| | | | | | | | | | | | |
| Scope 2 | Purchased electricity (Grid) | 13,189 | 10,670 | 8,278 | 6,507 | 5,118 | 3,943 | 3,396 | 3,878 | 4,020 | $tCO_{2e}$ |
| | Purchased electricity (Other) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | $tCO_{2e}$ |
| | Heat purchased | 686 | 579 | 569 | 540 | 507 | 498 | 492 | 492 | 518 | $tCO_{2e}$ |
| | **Total** | **13,875** | **11,248** | **8,847** | **7,047** | **5,625** | **4,441** | **3,888** | **4,370** | **4,538** | **$tCO_{2e}$** |
| Scope 3 | Business Travel | 5014 | 4,616 | 3,603 | 3,560 | 3,420 | 1,134 | 15 | 840 | 2,483 | $tCO_{2e}$ |
| | Water | 213 | 238 | 243 | 231 | 160 | 126 | 56 | 70 | 60 | $tCO_{2e}$ |
| | Waste | 26 | 26 | 34 | 32 | 30 | 23 | 15 | 21 | 24 | $tCO_{2e}$ |
| | Other | 1,087 | 965 | 774 | 554 | 434 | 339 | 300 | 355 | 352 | $tCO_{2e}$ |
| | **Total** | **6,340** | **5,845** | **4,654** | **4,377** | **4,044** | **1,622** | **386** | **1,286** | **2,919** | **$tCO_{2e}$** |
| **Total emissions** | | **26,446** | **22,835** | **18,349** | **16,402** | **14,558** | **10,130** | **9,018** | **10,394** | **11,570** | **$tCO_{2e}$** |

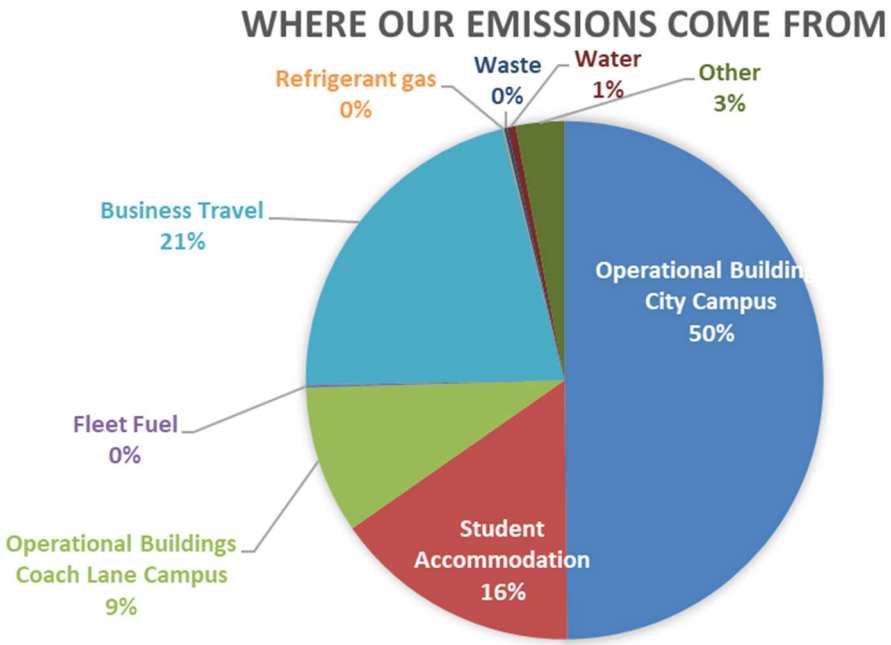
The baseline year for these emissions, which we report against annually, is 2014/15.

Our Carbon Emissions for 2022/23 were 11,570 tonnes $CO_2e$. This was a small increase on the three previous years, which were artificially low due to COVID restrictions on business travel. Despite this increase, however, emissions remain on target for the year to achieve an 80% reduction by 2030 of our 2014/15 baseline.




Scope 1 emissions from gas were lower than forecast for the year, with a slight increase in Scope 2 electricity. As we migrate away from gas to electrical heating (ASHPs), we expect to see a significant reduction in Scope 1 emissions.

Emissions from business travel increased to 2483 $tCO_2$ from 840 $tCO_2$ last year. Despite the increase, travel emissions remain significantly lower than pre-Covid levels (2017/18 3560 $tCO_2$). Business flights remain a major risk to future emissions targets. During 2022/23 there were 10.45 million kms travelled by air, which is significantly less than the 16.65 million kms travelled during 2017/18. To meet future targets, however, flights must remain at least 50% lower than pre COVID levels.




## Energy Use

| | kWh | litres |
|---|---|---|
| **Electricity** | 19,615,172 | |
| **Onsite Renewable Electricity** | 286,646 | |
| **Gas** | 22,385,604 | |
| **Heat Network** | 2,882,323 | |
| **Fleet Fuel** | | 4565 |
| **Total** | **45,169,745** | |

## Energy Wastage Identification & Energy Efficiency Projects

Northumbria is committed to continually improving the suitability, adequacy and effectiveness of our energy management system. A key element of this commitment is to demonstrate continual energy performance improvement. Our work to identify energy wastage via our energy audits and improve the efficiency of the campus supports our energy efficiency practices as well as cost savings. Sustainable energy management practice has become a culture within Northumbria, with several energy-saving initiatives implemented across the campus over recent years based on the

findings of the energy audits. The impact of these energy saving projects can be clearly seen with Northumbria having successfully reduced electricity consumption (kWh) by 31% since 2015.

Throughout 2022/23, to reduce energy wastage we completed a number of efficiency projects, including the £200k LED lighting upgrade to our Sutherland Building. We also installed £35k of LED lighting into the handrail of our City Campus East Bridge, replaced £61k of non-LED emergency lights at Trinity Square Accommodation with LED equivalent and £32k of lighting to the Ellinson Terrace.
Planned projects for the coming year include:

- LED Lighting projects including £560k of lighting upgrades at Winn Studios and New Bridge Street Accommodation.
- Installation of Air Source Heat Pumps, LED Lighting and Solar PV array at Coach Lane East (grant funding secured under PSDS Phase 3b).
- Upgrade of lab Fume Cupboards to Variable Air Volume (VAV).
- Upgrade of Ventilation Fans at City Campus East.

In addition to the above projects and in light of the ongoing energy crisis, we will be conducting further energy audits to identify energy wastage, such as PCs not turning off at night, lights not controlled by sensors and reviewing building opening times to reduce hours of operation where possible.

## Conclusion

The year 2022/23 has provided valuable insights and set the stage for Northumbria to further refine and enhance our carbon management strategies. While significant strides have been made to reduce our Scope 1 & 2 emissions, challenges persist with business travel.

The move to Low Carbon Heating remains the biggest challenge to achieving out Net Zero targets. Works continue to develop our Campus Heat Decarbonisation Strategy for City Campus, alongside supporting Newcastle City Council's development of a citywide heat network.

Northumbria is poised to build upon the successes of this year. We will embark on fresh initiatives, harness innovative technologies and strengthen our engagement with the community to advance towards a low-carbon future.

We continue to make concerted sustainability efforts under our Environmental Sustainability Policy. Looking ahead, Northumbria will continue its pursuit of excellence in carbon reduction and wider sustainability initiatives, setting an example for higher education institutions and the broader community alike.