

Annual Carbon Management Report 2023-24



February 2025



**Northumbria
University**
NEWCASTLE

Northumbria University's Carbon Commitments

Northumbria University continues to recognise the need for urgent action on climate change and is committed to quantifying and reducing its own climate impacts measured in the form of greenhouse gas (GHG) emissions.

In its [Carbon Management Strategy 2020 - 2030](#), Northumbria University has committed to achieve Net Zero Carbon by no later than 2040. To set the University on a trajectory to meet this commitment, a target of 5000 tCO₂e by 2030 was also set, which represents an 80% GHG emissions reduction against the 2014-15 baseline.

Northumbria University reports on Scope 1, Scope 2 and selected Scope 3 emissions against this baseline, including energy, fuel, business travel, water and waste management.

Achieving these commitments for Scope 1 & 2 GHG emissions will require the energy efficient retrofit of buildings and plant, increased renewable energy generation and a transition away from fossil fuels, towards decarbonised electricity for heat generation and internal fleet. Policies and behaviour change in relation to travel, waste management and purchasing decisions will also help to address those indirect Scope 3 emissions which are included within the scope of Northumbria's targets.

This report summarises the key energy, water and carbon data prepared for submission to the Higher Education Statistics Agency (HESA) Estates Management Record and compares progress against Northumbria's targets for the 2023-24 financial year.

Summary 2023/24:

- **Total GHG emissions (Scope 1, 2 & selected Scope 3 emissions) in 2023-24 were 11,342 tCO₂e**
- **A significant (57%) reduction in carbon emissions has been achieved since the 2014/15 baseline year, due to a 30% reduction in electricity use, a 38% reduction in gas use. A 50% decrease in the carbon intensity of grid-supplied electricity has also supported Scope 2 GHG emissions reductions substantially**
- **Although a small 1.85% reduction in emissions compared to the previous year reverses increases seen in previous two consecutive years, total emissions remain 2257 tCO₂e (25%) above the University's trajectory to meet the 2030 target of 5000 tCO₂e, as set out in the 2020-2030 Carbon Management Strategy**
- **Emissions reductions this year were mainly led by a 10% decrease in natural gas use during 2023/24**
- **A major heat decarbonisation project has been installed at Coach Lane Campus during 2023-24, supported by external grant-funding of £1.9m from the Public Sector Decarbonisation Scheme (PSDS), originally secured in 2022**
- **Two further heat decarbonisation projects are in development to replace gas boilers at Wynne Jones and Durant Hall with air source heat pumps using PSDS funding of £928k, secured in 2023.**

Scope 1 & 2 GHG Emissions Inventory 2023-24

Scope 1 emissions occur directly from sources owned or controlled by the University, including exhaust emissions from gas boilers and internal combustion vehicles.

Scope 2 emissions occur indirectly from the generation of heat or electrical energy by others, which is then purchased and used by the University. This includes electricity used in buildings and electric vehicles, as well as heat generated by a third-party which is then purchased and used for heating at Trinity Square student accommodation.

Scope 1 & 2 emissions are managed similarly and are therefore grouped together in this report. The activities which give rise to these emissions are under the direct control of the University, whether the resulting GHG emissions occur directly or indirectly.

These emissions mostly arise from facilities and estates operations. They are being tackled via a range of technical and management actions to improve the energy efficiency of buildings through planned maintenance, retrofits and refurbishments, rationalising building opening hours and ensuring building management systems are operated efficiently so that the provision of heating, lighting, cooling and ventilation matches requirements for occupants without energy waste.

The activity data collected to compile the 2023-24 Scope 1 & 2 GHG emissions inventory is summarised in Table 1 below, including energy used on campus, mass of refrigerants used for maintaining cooling systems and the volume of fuel used in University vehicles.

Table 1: University activities associated with Scope 1 & 2 GHG emissions

Activity	Activity causing GHG emissions			
	23-24	22-23	% change	Units
Mains gas use	20.1	22.39	-10.23%	GWh
Grid electricity use	19.87	19.62	+1.27%	GWh
Purchased heat (Trinity Square)	2.88	2.88	+0.00%	GWh
Refrigerants (recharging refrigeration systems)	36	5	+620.00%	kg
Fuel use - internal fleet	5934	4565	+29.99%	litres

The above sources of activity data were converted into their carbon dioxide equivalents using appropriate intensity factors published in UK Government GHG Conversion Factors for Company Reporting (2024). The Scope 1 & 2 GHG emissions inventory is shown in Table 2 below:

Table 2: Scope 1 & 2 GHG emissions inventory

Activity	GHG emissions arising from activity (tCO _{2e})				Units
	23-24	22-23	abs change	% change	
Mains gas use	3695	4087	-392	-9.58%	tCO _{2e}
Grid electricity use	4114	4020	+94	+2.33%	tCO _{2e}
Purchased heat (Trinity Square)	518	518	0	+0.00%	tCO _{2e}
Refrigerants (recharging refrigeration systems)	32	10	+23	+236.25%	tCO _{2e}
Fuel use - internal fleet	14	11	+3	+30.71%	tCO _{2e}
Totals	8374	8645	-272	-3.15%	tCO_{2e}

Scope 1 & 2 GHG emissions breakdown by end-use: City Campus, Coach Lane Campus, Student Accommodation

The chart in Figure 1 below summarises the proportional contribution of Northumbria University's Student Accommodation and Operational Buildings towards overall Scope 1 & 2 GHG emissions, categorised by campus. This demonstrates that 18.7% of GHG emissions relate to student accommodation, with the proportion of emissions from Operational buildings at Coach Lane and City Campus calculated as 11.8% and 69% respectively.

Fleet and refrigerant emissions are shown for completeness, but are negligible in comparison to energy related emissions.

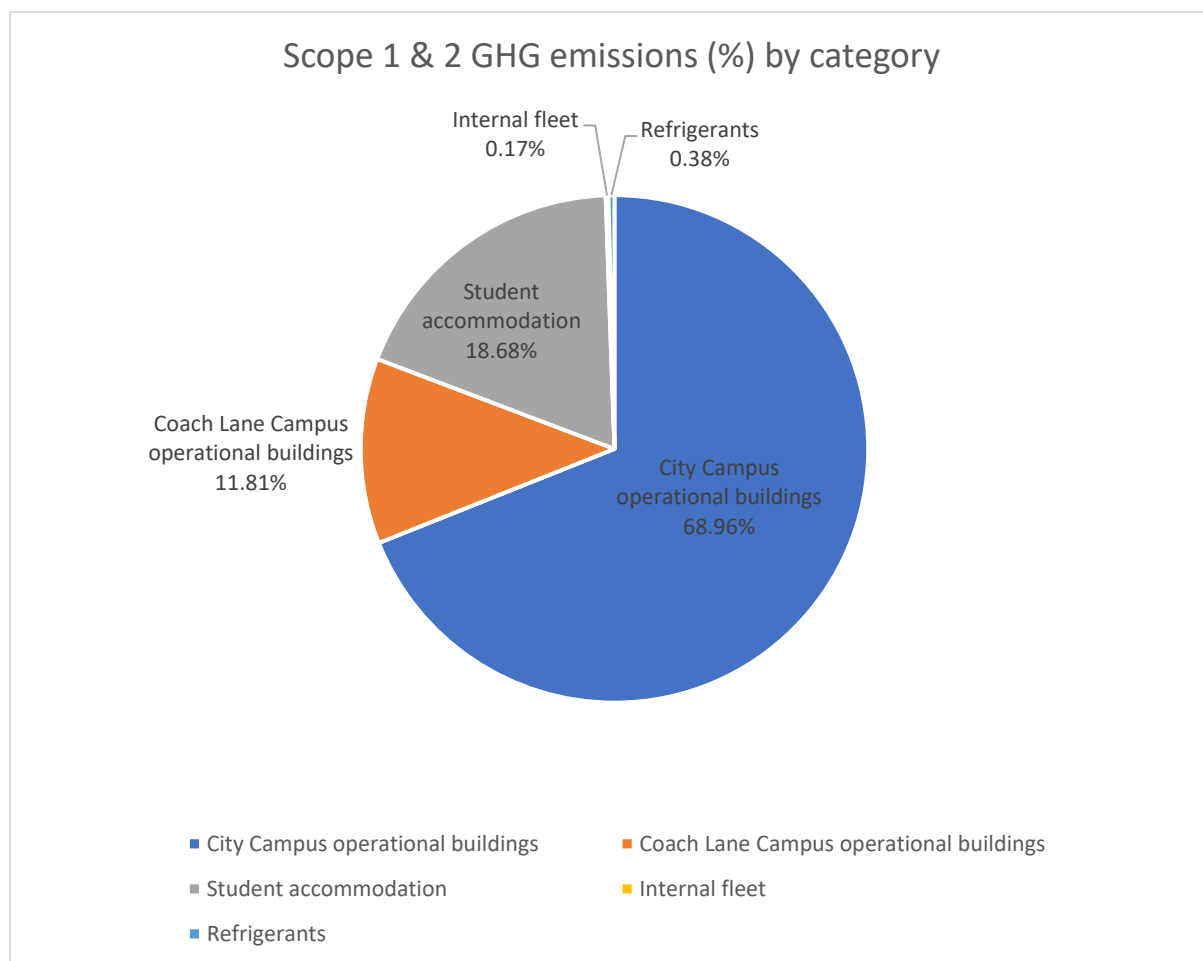


Figure 1: Proportions of Scope 1 & 2 emissions sources between Student Accommodation and Operational Buildings categories

Key actions taken to reduce Scope 1 & 2 GHG emissions during 23-24

Over the past year Northumbria University has implemented the following measures to reduce Scope 1 & 2 GHG emissions, including:

- Air source heat pumps (ASHP) have been installed to replace the end-of-life gas boilers at Coach Lane Campus East teaching buildings and Sports Centre. The investment was assisted by a Public Sector Decarbonisation Scheme grant of £1.9m
- Coach Lane Campus East is now operating entirely on decarbonised electricity for heating and hot water, with fossil fuel use being displaced entirely
- A 100 kW_p solar photovoltaic array was installed on the teaching buildings at Coach Lane Campus East to offset some of the increased electricity use for the heat pumps
- A heat decarbonisation project for Sport Central on City Campus was in the early stages of development as a potential PSDS bid. Following scheme eligibility changes for 2024 an application could not proceed and alternative approaches to funding being investigated
- Variable speed drives have been installed on the air handling plant at City Campus East 1 and 2 to match ventilation flow rates with occupancy, reducing fan power and thermal energy requirements
- As part of the 2030 Estates Masterplan development, a review of energy infrastructure was undertaken and includes recommendations to adapt the estate in order to meet future carbon reduction targets and achieve net-zero carbon by 2040
- The 'Greening the Campus' section of the Estates Masterplan, developed during 2023-24, includes a number of strategies for reducing carbon emissions and improving environmental performance against wider sustainability goals
- LED lighting replacements and associated controls have been installed at City Campus East to replace older, inefficient, fluorescent lighting
- There has been significant further investment in replacing fossil fuel vehicles on the internal fleet with fully electric equivalents, including a large Luton van
- During 2023-24, all electricity was purchased through 'green' energy tariffs, although we continue to report carbon emissions using published grid averages due to the non-specific origin of the renewable electricity generation.

Identifying energy waste and opportunities for improved efficiency

Work to identify energy waste via improved data analysis and energy audits supports Northumbria University's carbon reduction and cost reduction aims. Improved monitoring and targeting can help identify and address areas of inefficiency and waste, often highlighting opportunities for savings which can be implemented at low or no cost.

In conjunction with energy suppliers, work to add or reinstate automatic meter reading (AMR) equipment continues. This improves the accuracy of energy reporting, including the facility to import high frequency energy data to a half-hourly resolution into our energy database to identify and reduce higher than expected out-of-hours energy consumption, for example.

A number of buildings share common energy supplies and many larger buildings also include significant energy uses which would benefit from individual monitoring. Improved energy metering has been identified as a priority project due to the obsolescence and gradual failure of the existing energy monitoring infrastructure. A more robust approach has been trialled at

City Campus East and will be rolled out across the campus to improve the resolution of data available for identifying energy waste and carbon and cost savings.

Scope 3 GHG emissions inventory 2023-24

In addition to the Scope 1 & 2 emissions sources discussed above, the University also aims to reduce its wider carbon impacts and improve the reporting of indirect Scope 3 GHG emissions in alignment with the GHG Protocol. Scope 3 emissions occur in the value chain as an indirect result of the University's operations and form part of its wider footprint.

Whereas Scope 1 & 2 emissions are mostly related to estates operations and can be measured and influenced directly, the majority of Scope 3 emissions are organisation-wide and need to be influenced indirectly through a different approach involving a combination of organisational policy, awareness-raising and behaviour change.

In common with most industry sectors, gathering complete, reliable and accurate data for many sources of Scope 3 GHG emissions remains challenging and often lacks consistency between reporting periods. While quantifying this area of emissions reporting is likely to remain an area of continuous improvement, the University continues its work to reduce these indirect environmental impacts.

The 2020-2030 Carbon Management Strategy identified the sources of Scope 3 emissions to be included in the baseline, reduction targets and subsequent performance reporting. The selected Scope 3 GHG emissions are shown in Table 3 below:

Table 3: University activities associated with Scope 3 GHG emissions

Activity	Activity causing GHG emissions			
	23-24	22-23	% change	Units
Business travel - Air	11925110	10454122	+14.07%	Passenger km
Business travel - Rail	1746027	2043142	-14.54%	Passenger km
Business travel - Coach Hire	121026	38119	+217.50%	km
Business travel - Car Hire	215941	190000	+13.65%	km
Business travel - Grey Fleet	172314	175226	-1.66%	km
No. 1 Bus Service - City Campus to Coach Lane Campus	473645	293460	+61.40%	Passenger km
Water use (incl. supply and sewerage)	180857	157503	+14.83%	m ³
Transmission and Distribution (grid electricity)	19.87	19.62	+1.27%	GWh
Waste management	982	1104	-11.05%	tonnes

The above sources of activity data were converted into their carbon dioxide equivalents using either supplier data or standard factors in UK Government GHG Conversion Factors for Company Reporting (2024) where appropriate. The quantified selected Scope 3 GHG emissions inventory is shown in Table 4 below:

Table 4: Scope 3 GHG emissions inventory

Activity	GHG emissions arising from activity				Units
	23-24	22-23	abs change	% change	
Business travel - Air	2279	2260	+19.00	+0.84%	tCO _{2e}
Business travel - Rail	61.9	71.7	-9.80	-13.67%	tCO _{2e}
Business travel - Coach Hire	65.9	20.37	+45.53	+223.51%	tCO _{2e}
Business travel - Car Hire	36.1	31.44	+4.66	+14.82%	tCO _{2e}
Business travel - Grey Fleet	28.8	29	-0.20	-0.69%	tCO _{2e}
No. 1 Bus Service - City Campus to Coach Lane Campus	51.4	29.76	+21.64	+72.72%	tCO _{2e}
Water use (inc supply and sewerage)	61.28	59.5	+1.78	+2.99%	tCO _{2e}
Transmission and Distribution (grid electricity)	363.6	351.5	+12.10	+3.44%	tCO _{2e}
Waste management	20.9	23.49	-2.59	-11.03%	tCO _{2e}
Totals	2968.88	2876.76	+92.12	+3.20%	tCO_{2e}

Water usage increased by 15% compared to the previous year, although the carbon impact has been negligible and a number of major water leaks were detected quickly by the real-time water monitoring system to minimise waste. Rectification work and further specialist surveys are ongoing to reduce excessive water use.

Travel emissions, especially those arising from air travel, are responsible for the vast majority of the University's reported Scope 3 GHG emissions. Northumbria University currently appoints a third-party travel agency for air and rail business travel arrangements. The agency collects and collates detailed travel data, including carbon emissions estimates, for individual journeys by air and rail. The data is made available as a valuable and reliable resource for Northumbria University to use for reporting. A forthcoming change of University policy, which will provide options for staff to make separate travel arrangements, is likely reduce the accuracy and completeness of this data for future reporting. Alternative internal reporting channels will be required in order to maintain GHG emissions reporting integrity.

Scope 3 GHG emissions breakdown by source

The chart in Figure 2 below summarises the main sources of Northumbria University's Scope 3 GHG emissions included in the scope of the baseline and targets.

The vast majority of the University's Scope 3 emissions arise from air travel. Although flight related carbon emissions have only increased by <1% compared to last year, analysis of the activity data in Table 3 above shows that the total distance travelled by air increased by 14%.

Business travel emissions, especially those arising from air travel, continue to be a challenge to achieving our carbon reduction aims due to the international nature of the University's academic and research activities. Business travel emissions have reduced by around 50% since the original 2014/15 baseline year, but are not expected to reduce substantially towards 2030. As these are not considered directly addressable without restricting core academic activity, the University is considering offsetting as a potential approach for air travel emissions in order to meet the 2030 reduction target and net-zero carbon by 2040.

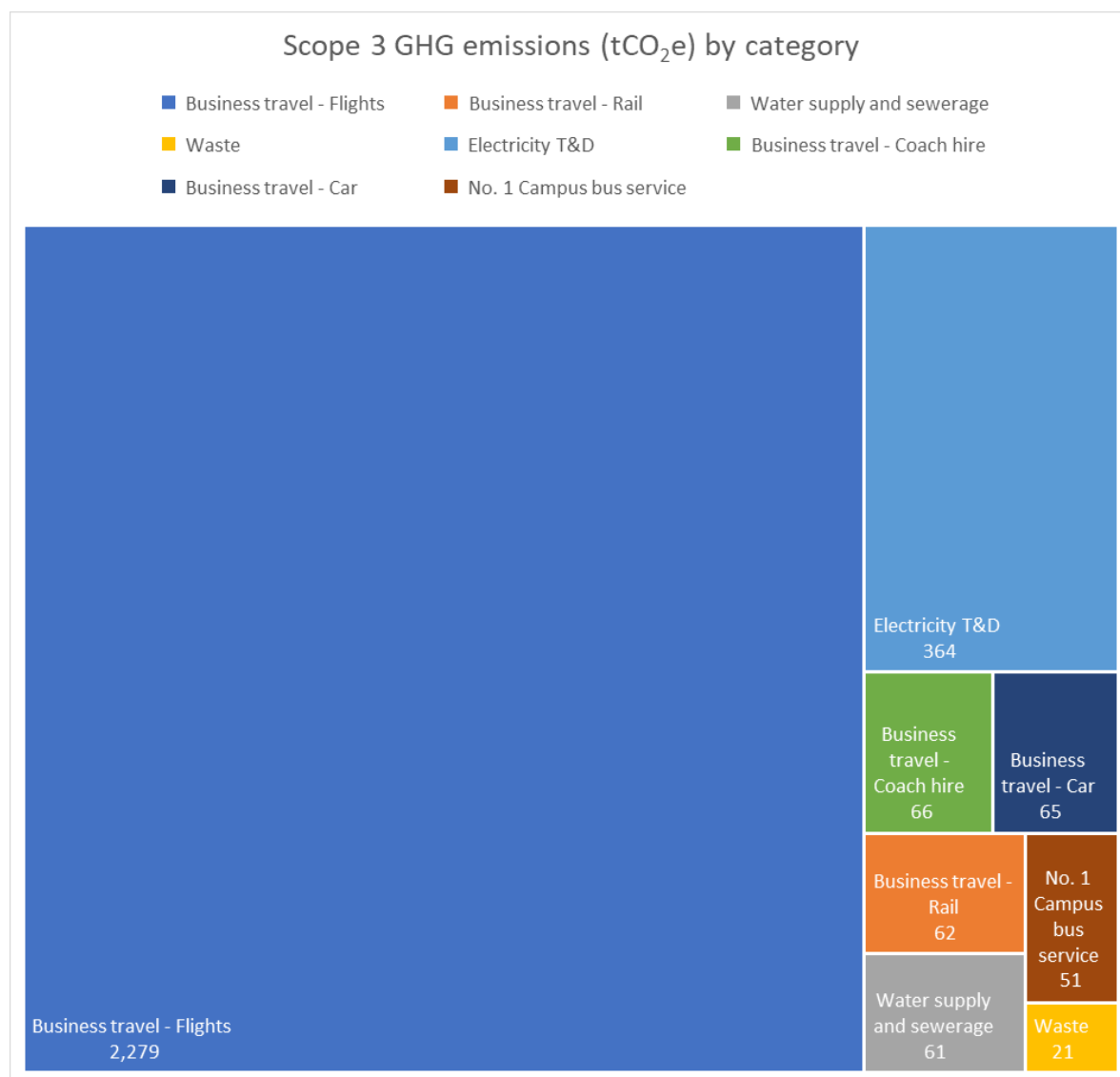


Figure 2: Scope 3 GHG emissions breakdown

Scope 3 procurement emissions 2023-24

Procurement related emissions are acknowledged as a major component of the University's wider Scope 3 carbon footprint. However, these emissions sources were originally excluded from the scope of the 2020-2030 Carbon Management Strategy on the grounds of data availability, accuracy and consistency between reporting periods. The strategy contained an aim to begin quantifying and reporting annually on procurement emissions by 2025 and a summary of GHG emissions by procurement category is therefore included in Table 5 below.

The figures were prepared for reporting to the Higher Education Statistics Agency (HESA) by UKUPC, based on Northumbria University's non-pay expenditure, mapped to the relevant category, and converted to their carbon equivalents by applying nationally published carbon intensity factors. Work is ongoing by the UK Government and other related organisations to continuously review and refine the carbon intensity factors, so comparisons to previous or future years may be inconsistent. An inherent shortcoming of spend-based carbon estimation methodologies is that their outputs do not accurately reflect additional expenditure used to secure more beneficial environmental outcomes. The difficulties in quantifying procurement emissions affect most industry sectors and the HESCET methodology appears to be the most appropriate source of data for quantifying procurement related GHG emissions for Northumbria University at the current time.

Table 5: Scope 3 procurement emissions by HESA category (source: UKUPC HESCET analysis for Northumbria University)

HESA Procurement Category	GHG emissions	Units
<i>E3SCICT - ICT</i>	19182.18	tCO _{2e}
<i>E3SCBS - Business services</i>	10976.20	tCO _{2e}
<i>E3SCMPI - Medical and precision instruments</i>	5390.17	tCO _{2e}
<i>E3SCFC - Food and catering</i>	5095.54	tCO _{2e}
<i>E3SCMP - Other manufactured products</i>	1455.86	tCO _{2e}
<i>E3SCCON – Construction</i>	734.12	tCO _{2e}
<i>E3SCOTH - Other procurement</i>	732.33	
<i>E3SCPP - Paper products</i>	346.33	tCO _{2e}
<i>E3SCWW - Waste and water</i>	236.37	tCO _{2e}
<i>E3SCMFCG - Manufactured fuels, chemicals, and gases</i>	179.25	tCO _{2e}
<i>E3SCUNC - Unclassified</i>	37.25	tCO _{2e}
Procurement Scope 3 GHG emissions total	44365.6	tCO_{2e}

At a total of 44,366 tCO_{2e}, indirect Scope 3 GHG emissions from procurement activities would equate to almost 80% of Northumbria University's carbon footprint if included within the target scope. In alignment with the original Carbon Management Strategy, it is still considered appropriate to continue to exclude procurement related GHG emissions from carbon reduction targets due to difficulties in making accurate and meaningful comparisons between reporting periods. However, we will continue to report the results of the spend-based GHG analysis each year and key actions taken to reduce procurement and supply-chain related impacts.

Key actions taken to reduce Scope 3 GHG emissions during 2023-24

Over the past year Northumbria University has implemented the following measures to support the reduction of Scope 3 GHG emissions, including:

- As part of the 2030 Estates Masterplan development, a review of campus infrastructure was undertaken and includes key recommendations to adapt the estate in order to meet future carbon reduction targets and sustainability goals
- The 'Greening the Campus' section of the Estates Masterplan, developed during 23-24, includes a number of strategies for reducing carbon emissions and improving wider sustainability goals, including improved biodiversity and encouraging sustainable travel
- Remote real-time water monitoring incorporating automatic leak detection has helped to minimise carbon emissions associated with water leaks and excess usage
- Specialist procurement representation is included within the Operational Sustainability Group to ensure supply chain impacts are included within the University's sustainability plans and actions
- In November 2023, we launched our updated [Sustainable Travel Plan](#), which focuses on supporting active travel and embedding sustainable travel behaviours, such as greater use of sustainable travel modes to minimise car traffic to University sites.

GHG Emissions vs. Reduction Targets

The University reports annually on Scope 1, Scope 2 and selected Scope 3 GHG emissions against a 2014/15 baseline to determine progress against its carbon commitments. Sources included in the target include electricity, gas, petrol, diesel, purchased heat, refrigerants, business travel, waste, water and electricity transmission and distribution (T&D) losses.

The carbon emissions reported for each of these sources since the 2014-15 baseline are shown in Table 6 below.

Table 6: Annual GHG emissions from 2014-15 to 2023-24

	Category	GHG emissions (tCO ₂ e)									
		2014/15 Baseline	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Scope 1	Gaseous fuels	6,059	5,570	4,725	4,725	4,791	4,029	4,712	4,663	4,087	3,695
	Vehicle fleet	65	19	18	27	26	19	19	28	11	14
	Refrigerant Gases	107	153	106	225	72	19	13	47	10	32
	Scope 1 total	6,231	5,742	4,849	4,978	4,889	4,067	4,744	4,738	4,108	3,741
Scope 2	Purchased electricity (Grid)	13,189	10,670	8,278	6,507	5,118	3,943	3,396	3,878	4,020	4,114
	Heat purchased	686	579	569	540	507	498	492	492	518	518
	Scope 2 total	13,875	11,248	8,847	7,047	5,625	4,441	3,888	4,370	4,538	4,632
Scope 3	Business Travel	5014	4,616	3,603	3,560	3,420	1,134	15	840	2,483	2,523
	Water	213	238	243	231	160	126	56	70	60	61
	Waste	26	26	34	32	30	23	15	21	24	21
	Elec T&D	1,087	965	774	554	434	339	300	355	352	364
	Scope 3 total	6,340	5,845	4,654	4,377	4,044	1,622	386	1,286	2,919	2,969
Total emissions		26,446	22,835	18,349	16,402	14,558	10,130	9,018	10,394	11,565	11,342

Total Scope 1, 2 & 3 GHG emissions for each year since the 2014/15 baseline are shown in Figure 3 below, along with the target trajectory set in the 2020-2030 Carbon Management Strategy. The 2030 target for Scope 1, 2 and selected Scope 3 GHG emissions is 5077 tCO₂e, which is equivalent to an 80% reduction from the original 2014/15 baseline. The 2030 target was aligned with the Tyndall Centre 'Science Based Target' for the Newcastle-upon-Tyne Local Authority area. This trajectory is indicated on the chart, alongside the annual reduction target trajectory from the 2020-2030 Carbon Management Strategy, set at 9.1% per year from 2020 to 2030. Both targets converge at 5000 tCO₂e by 2030, equivalent to an 80% reduction in GHG emissions from the 2014-15 baseline.

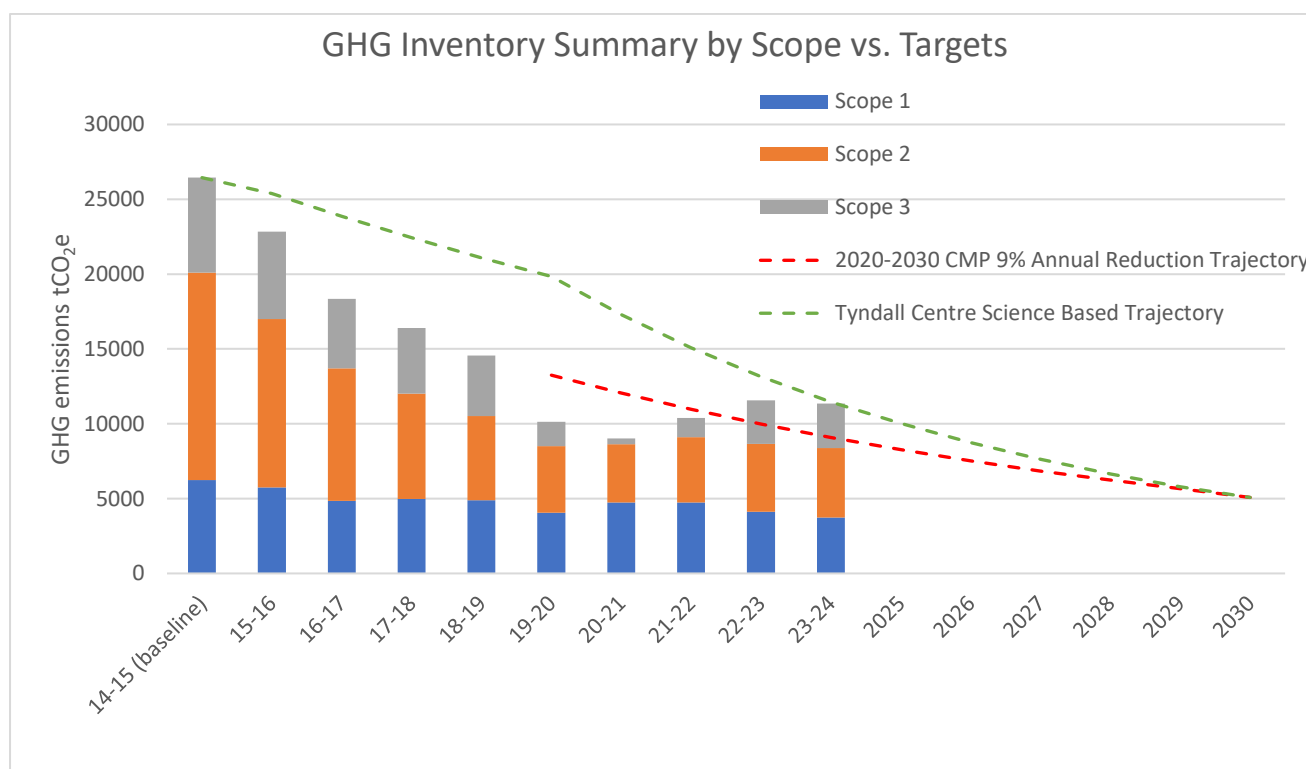


Figure 3: Annual GHG emissions vs. reduction targets to 2030

The chart shows that Northumbria University has made significant overall reductions against the 2014-15 baseline, having reduced GHG emissions by 57%. Despite this substantial early progress, GHG emissions remain 2257 tCO₂e (25%) above the 2020-2030 target reduction trajectory at the end of 2023-24, having reduced by a negligible amount in this year, following two consecutive years of increasing emissions.

Compared to the science-based reduction trajectory from 2015 to 2030, Northumbria University GHG emissions still remain 126 tCO₂e (1.1%) below this target in 2023-24, mainly as a result of significant earlier emissions reductions.

Based on a straightforward comparison between the annual GHG data and the reduction trajectory, total annual emissions exceeded the target for 2023-24 by 2257 tCO₂e, indicating that Northumbria University is not currently on track to meet its 5000 tCO₂e reduction target by 2030 and substantial interventions will be required in the remaining duration of the 2020-2030 target period in order to achieve these commitments. Planned lifecycle maintenance

will improve energy efficiency considerably, major investments in estates development will improve building fabric efficiency and incorporate decarbonised heat sources. In combination with the UK Government's target trajectory for decarbonising grid electricity, it is anticipated that Scope 1 & 2 GHG emissions will reduce substantially by 2030.

Air travel GHG emissions constitute 20% of overall GHG emissions (all scopes) and 77% of Scope 3 GHG emissions included within this report. The 2020-2030 Carbon Management Strategy identified these emissions sources as difficult to address directly, suggesting that carbon offsetting was likely to be one of the required approaches to meeting the 80% reduction target by 2030. Due to the international reach of the University's academic and research activities, carbon offsetting still appears to be the only feasible approach to meeting the 2030 target for this proportion of Northumbria University's GHG emissions.

Looking ahead

Planned projects for 2024-25 and beyond include:

- A major upgrade to the City Campus ageing HV electrical infrastructure is planned to commence in 2024/25. The project involves a significant increase in the electrical supply capacity to the campus through liaising with Northern Powergrid and will allow for future heat and transport decarbonisation. Modern replacements will also deliver reductions in electricity use in comparison to the older, less efficient transformers due to reduced losses
- Two PSDS funded heat decarbonisation projects are at advanced stages of development for the recently acquired Durant Hall and the North East Space Skills and Technology Centre (NESST), which is being built on the former site of the Wynne Jones building on City Campus. All heating and hot water demand will be met by decarbonised electricity instead of fossil fuels at both sites
- Carbon reduction and energy efficiency principles will be integrated into planned major building refurbishments, including building fabric measures to reduce heat losses, LED lighting, ventilation heat recovery, improved heating controls and the replacement of fossil fuels for heating with decarbonised electricity. Together, these projects are expected to contribute substantially towards carbon reduction targets as well as improving the campus for students and staff
- Demolition of Claude Gibb student accommodation during 2024-25 is expected to reduce annual Scope 1 & 2 GHG emissions by around 250 tCO₂e
- A number of backlog maintenance/lifecycle projects are due to be implemented which will deliver energy, carbon and cost savings. These include LED lighting replacement schemes, upgrades of fans and pumps and planned upgrades and updates to the BMS across the campus
- Scope 1 GHG emissions arising from refrigerant replacement due to leakage from older cooling systems is expected to reduce over the coming years due to the replacement of end-of-life chillers and refrigerant based heating/cooling systems as a result of planned lifecycle maintenance and recommendations from TM44 inspections
- Energy metering projects at Coach Lane Campus East, Pandon Building, Glenamara House, Sport Central, City Campus Library, Lipman Building, Sandyford Building,

Northumberland Building and Squires buildings are planned to improve data availability, resolution and accuracy

- Further review of building use and rationalising opening hours in order to minimise running costs will also help to reduce energy use and carbon emissions
- Specialist water infrastructure surveys will be commissioned in priority buildings with persistent unexplained high water usage, which is likely to result in a planned programme of remedial actions to improve water efficiency
- Northumbria University will be partnering with North East Combined Authority (NECA) and Mobilityways on a project aimed at measuring and reducing the environmental impacts of commuting in the region
- Understanding, quantifying and reducing the different sources of travel related GHG emissions will receive increased focus at Operational Sustainability Group meetings in 2024-25
- Northumbria University attained cycle friendly employer status in Jan 2025 from Cycling UK. The scheme supports our sustainable travel plan and demonstrates our commitment to active travel and providing alternative transport solutions
- We have contracted with WATbike to provide Dr. Bike service sessions to staff and students in order to further promote cycling to campus.

Conclusion

Northumbria University has reduced its GHG emissions by 57%, compared to the 2014-15 baseline set in the 2020-2030 Carbon Management Strategy. Although progress has slowed in recent years, GHG emissions have still been reduced by more than 3000 tCO₂e (22%) compared to the pre-covid levels of 2018-19, the year before the current strategy was set. However, a negligible reduction in emissions this year, following two consecutive years of increases means that Northumbria University is not currently on track against its 2020-2030 reduction trajectory towards 5000 tCO₂e by 2030.

Increases in energy use and related GHG emissions through acquisitions and committed new-build projects will be minimised through low-carbon design and the selection of decarbonised heat sources. There are also likely reductions associated with planned and potential disposals, such as the demolition of Claude Gibb student accommodation.

Despite a number of planned disposals, the majority of existing buildings across the estate are expected to still be in use in 2040. The transition away from fossil fuels and towards decarbonised electricity for heating and hot water generation in existing buildings requires significant investment to implement at the scale required to meet net-zero carbon by 2040.

The most significant decarbonisation projects progressed and implemented since 2020 have been made economically feasible by multiple phases of Public Sector Decarbonisation scheme. However, criteria changes affecting the higher education sector in 2024 means that Northumbria is no longer eligible to apply for future grant funding. In addition, the financial pressures impacting the Higher Education sector mean that it is not currently possible to allocate sufficient capital to decarbonisation projects against a number of other competing priorities. Heat decarbonisation projects aimed primarily at moving away from fossil fuels towards decarbonised electricity do not typically provide a positive return on investment.

With a focus on the 80% GHG reduction target by 2030 set in the 2020-2030 Carbon Management Strategy, energy efficiency and carbon reduction will be integrated with lifecycle maintenance and development of the campus, where building refurbishment projects and replacements of end-of-life and/or obsolete assets will lead to energy and carbon savings, as well as reduced operating costs through improved efficiency. The planned LED lighting schemes to replace ageing, obsolete and inefficient fluorescent lighting across the majority of the campus and the implementation of improved Building Management Systems are key examples of this approach. Similarly, opportunities to incorporate improved building fabric performance, new lighting and better control of heating, lighting and ventilation will be identified during refurbishment projects to reduce overall implementation costs and lead to more efficient buildings with improved carbon performance and reduced running costs.

Planned lifecycle replacement of plant and equipment in buildings will support the University's carbon reduction aims through improved energy efficiency. Significant investments in key University buildings over the next five years will integrate carbon reduction into major refurbishments and will be the primary strategy for reducing Scope 1 & 2 GHG emissions, rather than implementing standalone carbon reduction projects.

The University's carbon reduction trajectory is expected to be assisted substantially through the decarbonisation of grid electricity as an external factor. However, the same scenario planning also indicates that achieving the net-zero target by 2040 will not be possible without a large-scale transition from gas boilers towards heat pumps using decarbonised electricity across the campus.

Improved metering is being implemented as a priority project across the estate, as meaningful energy data is key to reducing Scope 1 & 2 GHG emissions. Improving the accuracy and resolution of energy data will help to identify and address energy waste, increase the accuracy of carbon reporting, aid decision-making in relation to investment priorities and help to monitor the outcomes of technical and management interventions.

Scope 3 GHG emissions continue to be a challenge, both in terms of measuring them and reducing them. However, as discussed earlier in the report, the University of Northumbria continues to take action to reduce a wide range of Scope 3 GHG impacts. Business travel emissions, especially those arising from air travel, are anticipated to be the most significant barrier to achieving the required emissions reductions towards the 2030 and 2040 GHG reduction targets due to the international nature of the University's research activities. Business travel emissions have reduced by around 50% since the original 2014/15 baseline year, but are not expected to reduce further towards 2030. As these sources are not considered directly addressable, the University is considering offsetting as a potential approach for air travel emissions in order to meet the 2030 GHG reduction target and achieve net-zero carbon by 2040.