



## **Carbon Management Strategy 2022 - 2027**

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## REVISIONS

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Issue 1	18/07/2022	Document issued	A.T.Squire	Sustainability Manager
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		Re-approval		
Issue 6		Periodic review		
		Re-approval		

It is intended that this document covers the period 2022 to 2027, with annual reviews during that period in order to ensure it maintains relevance and suitability to the goals of the University and its developing estate.

### **Summary of changes since last review**

Initial issue

## **Executive summary**

The planet is warming at an unprecedented rate and the Humber region is one of the coastal regions around the world officially listed as at high risk due to rising sea levels and increasing flood threat.

The imperative for action has been recognised and the University has demonstrated its commitment, by signing the *Global Universities and Colleges Climate Letter*, which is recognised as part of the United Nations Climate Change *Race to Zero* campaign.

Recognising that global and national improvement will only be made with local and individual commitment and action the University is actively seeking to employ operating practices that integrate environmental integrity with a concern for the physical and social fabric of the campus

Demonstrating its resolve to generate real change the University of Hull has made an ambitious commitment to have a Carbon Neutral Campus by 2027, setting the University's centenary as the target date and reaffirming the University's desire to take tangible action to contribute towards the urgent need to reverse global heating and the climate crisis.

This Strategy outlines how the University of Hull will manage and control the carbon emissions created by its activities across the estate it owns and occupies, and how the Carbon Neutral Campus goal will be realized.

By setting realistic targets and monitoring its progress towards their attainment, the University strives for a continual improvement in its environmental performance and in the knowledge and awareness this engenders amongst students and staff.

This Carbon Management Strategy intends to bring structure, a systematic approach and manageability to the whole process of controlling and reducing carbon emissions from the University.

University of Hull recognises that it can only undertake effective control of its carbon emissions if it knows what impacts are being created by its activities and operational practices and those that will be made by future projects. Accordingly creating accurate and accessible data sources will be central to the success of this strategy and in facilitating research and innovation from the wider University community.

Key areas for action are highlighted to allow control over carbon emissions to be established and those emissions systematically reduced in a sustainable manner.

Sustainable reductions in carbon emissions will not be achieved from a one-off process and the University recognises it will not be instantaneous, that there is no silver bullet that will dramatically reduce energy consumption, no one intervention that will remove emissions from travel and waste streams. The goals of the University will be met by numerous actions and involve a great number of people. Progress will be incremental and require sustainability and carbon management to be integrated within the day to day activities of all aspects of the University operations.

Carbon management will develop and evolve as the University grows and evolves but through performance monitoring and proactive and collective action it will generate continuous and sustainable reductions in carbon emissions and become embedded as the normal operating practice of the University.

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## INTRODUCTION

The University of Hull is committed to operating as a sustainable organisation. We're building on our teaching, research and professional services to achieve this and ensure that the University operates as sustainably as possible. This is one of the key elements of the University's Strategic Plan with the University pro-actively working towards ensuring a sustainable future in all areas of the University activities.

The aim is to achieve academic sustainability, operational and financial sustainability, sustainability in our physical and ICT environment as well as promoting a sustainable natural environment.

The effective management of carbon emissions is seen as a critical element in achieving the sustainability goals that have been targeted. This document explains how University of Hull intends to deliver its reductions in its carbon emissions and meet its commitment to achieve a net zero status and achieve its goal of a carbon neutral campus by 2027.

Fundamental to creating the necessary effective management control are:

- The identification of the sources of carbon emissions and the current level of those emissions.
- To use this data to establish baselines and implement effective and regular monitoring of carbon emissions from all University activities
- To use the knowledge of our resource consumption to identify short, medium and long-term carbon reduction opportunities that are realistic, achievable, measurable and sustainable.
- Make the data available to the wider University community so as to facilitate research and innovation in carbon reduction management and technologies.
- To raise awareness of amongst all staff and students of the factors that result in carbon emissions and engender changes in attitude and behaviour that support not only reductions in carbon emissions but support the wider sustainability objectives.

The aim of this strategy is to provide the framework by which the University of Hull can realise the benefits associated with reducing its carbon emissions and as a result deliver more people-friendly, efficient and sustainable operating practices facilitating the continued enhancement of the University of Hull brand.

The University of Hull has already successfully taken measures aimed at reducing energy usage and thus the quantity of electricity and gas that must be purchased. This strategy aims to develop these further, alongside other measures, in order to bring about a sustainable reduction in carbon emissions.

The commitment to achieve a carbon neutral campus by 2027 has been made and this strategy aims to set out the methodology to allow the University achieve that goal and establish and embed working methods that continue to promote sustainable and ethically responsible use of natural resources.

## **BACKGROUND**

### Key objectives and drivers

The overarching aim of this strategy is to facilitate the effective control and management of carbon emissions and by doing so enhance the reputation of the University of Hull and contribute to an improved student experience.

The University has recognised the impact of climate change and the need to adopt more sustainable operating practices. As a result, the University has made a commitment to become a net zero emitter of carbon and achieve a carbon neutral campus by 2027. This strategy provides clarity on that aim and details how it is to be achieved.

It would be naive to ignore the fact that energy consumption represents a significant cost to the University. By managing the energy resources, it consumes in the most sustainable manner the University aims to control that expenditure and limit operational costs.

The Environment and the sustainable use of resources now has a key influence on Government policy and legislation. Energy consumption and waste streams are increasingly central elements in legislation and regulatory compliance and therefore must be managed and controlled.

By making data from carbon management activities available to the wider University community the intention is to support and facilitate research and innovation and enhance learning opportunities.

Making the University's performance available to all staff and students is a means by which carbon management can be integrated into the collective consciousness and become a motivator for behavioral change.

### Background

The University appreciates that establishing sustainable control over its carbon emissions will not be instantaneous, there is no silver bullet that will reduce energy consumption, no single intervention that will limit emissions from travel and waste streams. The goals of the University will be met by numerous actions and involve a great number of people.

The basic approach to manage and reduce emissions can broadly be summarized as;

- Establish robust monitoring processes to clarify the source and magnitude of emissions
- Utilise the data gathered to establish the current position and periodically update the University's position to stakeholders
- Identify opportunities to reduce consumption that generates carbon emissions and implement projects to realise those savings.
- Identify and implement interventions to upgrade facilities and equipment to utilize less carbon creating energy sources
- Directly utilise renewable energy sources in preference to nation energy distribution grids and networks

With the growing international, national and local focus on sustainability the language and terminology used continues to evolve and, in some cases, currently lacks broad consensus

understanding and definition and so to avoid doubt where this it thought to be the case the University will clarify the basis of its targets and achievements.

The University will adopt the widely recognized standard of grouping Carbon emissions into three areas. Scope 1 & 2 emissions are those over which the University has direct control with scope 3 emissions being those which exist because of the University's operation but over which it has only limited or indirect control.

### **Scope 1 Emissions**

Direct emissions resulting from University owned and controlled assets as a result of them consuming fossil fuels

- Stationary combustion - e.g. emissions from gas used in heating plant
- Mobile combustion – e.g. emissions from fuel used in University owned vehicles
- Fugitive emissions –e.g. release of greenhouse gases from leaks in refrigeration and air conditioning systems
- Process emissions – typically these are emissions released from on-site manufacturing or processes

### **Scope 2 Emissions**

Indirect emissions resulting from University operations that occur off-site but over which the University has direct control.

For the University these essentially will be those carbon emissions resulting from the use of purchased electricity. (the emissions resulting from the energy used in the transmission and distribution of the electricity fall under scope 3)

### **Scope3 Emissions**

These are the emissions generated as a result of the University's operations but over which the University has only indirect control.

The GHG protocol sub divides scope 3 emissions into 15 categories, however in terms of the University it is more straight forward to see them as falling into four main groups.

- Travel – Business travel and staff and student commuting
- Water – water consumption and wastewater treatment
- Waste – re-use, re-cycling or disposal of waste from the site
- Procurement – capital goods purchased, food and catering, Construction.

## CURRENT POSITION

In 2011, the University published its first Carbon Management Plan. The plan set a target of reducing Scope 1 and 2 CO<sub>2</sub> emissions by 34% by 2019/20 using the 1990 baseline of 19,090 tCO<sub>2</sub>e. This targeted reduction equated to a 2020 figure of 12,599 tCO<sub>2</sub>e.

The target did not however reflect the considerable changes that would be seen in the size and type of buildings within the University estate, nor did it reflect the introduction of more energy intensive teaching methods and facilities.

For the 2019/20 reporting year the Scope 1 and 2 CO<sub>2</sub>e emissions was 8,541 tCO<sub>2</sub>e. Using the 1990 baseline figure of 19,090 tCO<sub>2</sub>e, this equated to a 55.26% reduction in CO<sub>2</sub>e emissions. It is important to note that the COVID-19 lockdown was in place for some of this period which is reflected in the lower than expected carbon emissions, nevertheless, the University had made a significant reduction in carbon emissions through a number of improvements to its estate, specifically its engineering infrastructure.

The effect on the working environment and operation of the University created by the Covid-19 pandemic means the energy usage and carbon emissions from the 2020/21 reporting year are thought unlikely to be a representative indicator of the University's current or likely future carbon footprint.

The University has therefore adopted the 1<sup>st</sup> August 2018 to 31<sup>st</sup> July 2019 reporting year to be the basis of its carbon management baseline and is to use this data set as the starting point for the strategy to achieve carbon neutrality.

Using this energy data, a baseline position of the scope 1 and 2 emissions has been established for the whole university estate and for the main campus site (the subject of the carbon neutral aim)

	Whole Estate
Carbon emissions:	11,030 tCO <sub>2</sub> e
Energy consumption	52,480 MWh
Energy costs	£3.53 million/year

Considering just the main campus the consumption and carbon emissions become

Carbon emissions:	9,415 tCO <sub>2</sub> e
Energy consumption	45,238 MWh

The immediate aim of the University is to create a carbon neutral campus by 2027. This is very much a waypoint on the road to carbon neutrality across the whole of the University and its operations. This ambition being the first step on a longer journey does not however diminish its importance or the challenge in achieving it.

It is the intention of the Carbon Neutral Campus project that it provide a blueprint for the de-carbonisation of the remainder of the University Estate, and form a key milestone in the sustainability agenda for the University.



## METHODOLOGY FOR CONTROL

### Gas usage

The predominant use of gas throughout the University is to provide space heating.

The focus on reducing emission resulting from gas consumption therefore will be on maximising the efficiency and effectiveness of the University's heating plant and employing the most carbon efficient heat generators appropriate for each area.

In order to realise carbon reductions, the following stages of action will be taken for each gas consuming plant installation.

- Audit the existing plant and identify where and how efficiencies can be made to the plant and how it is installed
- Interrogate the control systems to highlight areas for improved operation of the system
- Implement works to realise improvements
- Monitor and report on savings generated

Early indications are that the above work could generate savings of c15% in carbon emissions from this source.

However, utilising heat pumps on site has the potential to greatly reduce the energy input required into heating systems. Furthermore, the de-carbonisation of national electricity supplies is expected to result in carbon emissions from electricity consumption being lower than those from gas within the next 5 years.

The medium to long term proposal therefore is to replace the gas fired heat generators with heat pump alternatives.

### University vehicles

The University operates a small number of vehicles and items of maintenance equipment that operate using fossil fuels (grounds equipment and stand-by generators). Although their combined contribution to the University's emissions profile is small they are likely to be highly visible and audible when in use and thus greatly colour the perception of stakeholders, especially those on campus, as to the commitment and progress towards carbon neutrality and sustainable operations.

The approach to these its will be

- Review current asset make up and establish the current position and carbon emissions contribution
- Critically evaluate the need for vehicles and establish whether Electric alternatives are viable given the pattern of use and replace where possible
- For grounds equipment, replace with electric/battery alternatives where possible and appropriate
- Stand-by generators investigate alternative fuels and alternative back-up power provision

### Fugitive emissions

Most cooling plant installed within the university estate contains refrigerant gases. As gas fired heating systems are replaced with heat pumps the number of plant items and volume of refrigerant gas will increase even further.

These gases are potent GHG and have global warming potentials far in excess of CO<sub>2</sub>. Monitoring of any release of these gases is therefore extremely important and any release of refrigerant gas will have significant impact on the scale of the University's carbon emissions.

The focus will be on ensuring plant containing GHG refrigerants are necessary and where that is the case that the GWP of those gases is as low as possible. Additionally, that the planned maintenance is robust and preventative so as to limit as much as is possible the release of refrigerant gases.

### Electricity Usage

Electricity usage is currently responsible for around 45% of the Carbon emissions from the University. As the generation and supply network continues to incorporate a higher percentage of generation from renewables and efficiencies in existing fossil fuel powered plant improve the carbon emissions from the use of electricity will naturally reduce.

This grid de-carbonisation will however not produce the reduction in emissions necessary to achieve carbon neutrality and certainly not within timescales to meet the University's aspirations.

The uses of electricity as a power source within the University are far more numerous than those of gas. However, while there is great variety in the equipment using the power the essential principles to reduce the quantity of electricity consumed are much the same.

The hierarchy of action would place elimination of unproductive consumption first and then create a reduction in that usage which is necessary through interventions to improve efficiencies and then move towards more sustainable and lower carbon emitting sources of the electricity. The action stages therefore are very similar to those that will be taken to reduce gas usage.

- Audit the usage and buildings and establish how and where power is being consumed.
- Audit the existing plant and identify where unproductive usage can be eliminated and how efficiencies can be made to plant operation
- Implement works to realise improvements
- Monitor and report on savings generated
- Identify where greater carbon savings can be achieved by installing alternative equipment and implement these changes
- Install on-site power generation and explore opportunities offered by the creation of a microgrid.

The scope 3 emissions generated as a result of the University's operations but over which there is only indirect control vary greatly but can be grouped into four main areas. Within these categories the University has varying levels of control over the magnitude of resource consumption and the resulting carbon emissions. It is also worth noting that the emissions resulting from the transmission and distribution of Grid electricity count towards scope 3 emissions for the University.

## Water Usage

The university uses large volumes of water to support its activities, most of this is connected with the provision of domestic water services for toilets and washrooms with onsite catering being another significant source of consumption.

Water consumption will be a necessary aspect of many taught courses and research activities. It is the intention in these areas to provide information to these faculties and departments of what that consumption is and to work with them where appropriate to identify where reductions in consumption could be made.

Where appropriate the University will seek to adopt rainwater harvesting systems with the intention of reducing the volume of water resources it consumes and thus the carbon emission associated with its supply to the University buildings.

## Travel and commuting

Business travel by university staff and representatives together with the commuting of staff and that of students to and from their term time addresses is expected to be a significant contributor to the scope 3 emissions of the University.

Furthermore, regardless of the actual level of emissions resulting from travel it is a highly visible indicator of the University's commitment to reducing its carbon emissions and as such is thought likely to play a significant role in promoting the shift towards a low carbon culture.

A separate transport strategy will identify the detail of how the University will move towards more sustainable travel options and promote the adoption of low carbon commuting amongst its staff and students.

Key elements of the strategy will be;

- The provision of adequate numbers of high-quality charge points in order to remove barriers to staff and students using electric vehicles for commuting.
- The review of the car parking provision on site and how this could integrate with low carbon travel options
- Ensuring business related travel is necessary that sustainable and low carbon options are made the most preferable choice.
- To ensure single occupant car journeys are minimized.
- Local, mass transit options are promoted and made viable

## Waste

Waste created by the activities of staff and students on the campus is, like transport, is a highly visible and emotive aspect of carbon management and sustainability. Promoting good waste management practices and having visible waste reduction initiatives is likely to play a meaningful role in engendering sustainable behaviors in staff and students.

A separate waste management strategy is to be produced detailing the current position, the aims and targets for waste management and the actions intended to achieve them.

One of the core targets of the waste strategy will be to reduce the volume of waste and ensure none of the waste from the campus goes to landfill.

Other areas of the waste strategy with a direct impact on carbon emissions will be the aim to increase the re-cycling rates and the procedures adopted by the University in replacing office equipment.

### Procurement

The emissions relating to the purchase of capital goods are another aspect of the scope 3 emission of the University.

The intention is to integrate sustainability and carbon management into the supplier selection policies to ensure as far as is reasonably practicable that suppliers at least comply with the University's need for Scope 3 reporting and preferably have carbon and sustainability strategies aligned with those of the University.

The purchase of one-off items of specialist equipment will remain driven primarily by the need and performance characteristics identified as being required from that equipment. It is intended however that as the procurement policies are updated and developed the carbon emissions will of equipment and the delivery routes of suppliers of them become part of the selection process.

Purchase of less specialized equipment and routinely replaced items such as office furniture and IT equipment needs to be reviewed and policies introduced to avoid un-necessary purchase of new items where existing items that are not in use or are significantly under-utilized can meet the user requirements and be reassigned.

The University recognizes that in many cases for every item purchased there is likely to be an item discarded and the disposal routes for those items will be assessed with carbon emissions of the various options a major factor.

Food retail and catering on site represents another area of scope 3 emissions. While the energy and water consumption of catering outlets will be accounted for in other areas food purchases and food waste will need to be accounted for within the total emissions of the University.

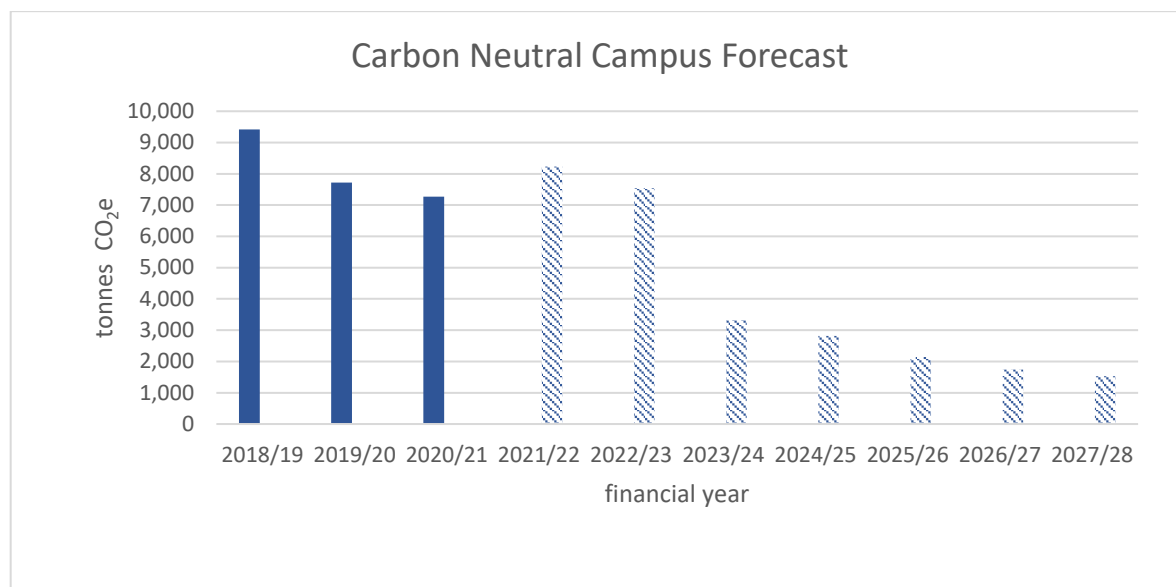
Not just the quantity of food purchased but its production methods and emission due to the logistics involved in its supply to the University will form a central point of consideration in the selection of both suppliers and products.

The emissions from food and drink retail are not currently recorded by the University and the first stage will therefore be to assess the current position and create a robust means of recording and accessing the carbon load this area creates.

## THE JOURNEY TO THE CARBON NEUTRAL CAMPUS

The University has set itself the target of having a carbon neutral campus by 2027, with regards to its scope 1 & 2 emissions. In order to achieve this aim this carbon management strategy and the activities it suggests will augment, inform and run in tandem with the University's strategic development plan.

Measures already being undertaken and planned are expected to have a major impact on the scope 1 & 2 emissions from the campus and begin the drive towards carbon neutrality.



There are a number of carbon efficiencies that will be made because of the implementation of the development plan. For example, building demolitions and space utilisation measures are thought to have the potential to reduce carbon emissions on the campus by approximately 34%. These are likely to take a number of years to come to fruition and are not indicated in the graph above.

Where new buildings are required in order to meet the developing needs of the University, either to provide specialist facilities or additional space, these will be designed with the aim of them being at least carbon neutral.

The demolition and disposal of the buildings identified in the development plan within the timescales required will be a key challenge in achieving the 2027 goal. Where buildings cannot be demolished, the intention would be that they should be mothballed and all but essential services isolated and thus the scope 1 and 2 emissions associated with them eliminated as far as practicable.

As indicated above the drive towards the carbon neutral campus has already begun with projects already started and in planning stages to;

- to install solar PV arrays around the campus and University owned sites that in combination will have a 19.0MWp generation capacity and by reducing the dependence on grid electricity supplies prevent carbon emissions by over 2,900 tonnes CO<sub>2</sub>e.

Current projections would have these projects complete and contributing power to the University by early 2023.

- There are planned lighting surveys to identify where efficiencies can be made both in the type of lighting installed and the controls of its operation.
- The energy consumption of HVAC plant is considered a major contributor to the carbon emissions of the campus and a major review of these systems is to be undertaken.
- Alongside the HVAC review will run a similar programme of work focused on the gas fired heating plant on site, with a view to reduce fossil fuel consumption and where possible replace the gas fired plant with heat pump based systems. This replacement strategy will dovetail with the campus development strategy and programme.

Opportunities to upgrade heating systems to use heat pumps already identified would create around a 9,000MWh reduction in gas consumption and generate carbon emission savings of over 1,000 tonnes CO<sub>2</sub>e.

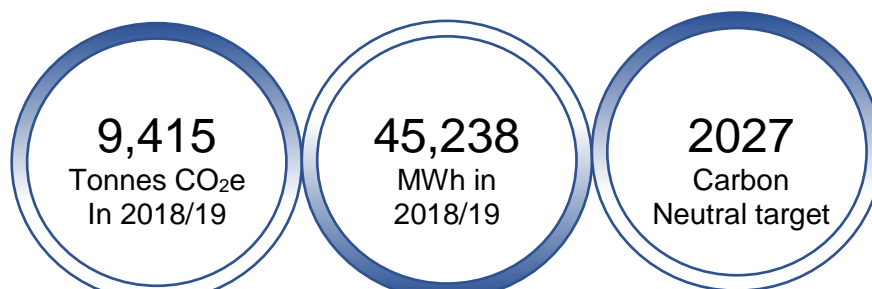
- Upgrades to catering equipment are being investigated with a view to reduce fossil fuel consumption
- Energy consumption within IT data centres and communication hubs are under review with early indications of up to 20% savings in emissions from consumption in these areas being possible.

These actions are an indication of the actions being taken in the short term with the expectation that the reviews and audits planned will generate still more opportunities to reduce the emissions loading.

There is a recognition that the logistics and practical constraints of implementing the volume of work planned may mean that there is a residual level of carbon emissions that will remain at the 2027 target date. The University plans to offset those emissions and will comply with the widely agreed principles the carbon offsetting;

- That the carbon reduction project would not have occurred without financing from offsets
- Emissions reductions must be permanent or for a minimum time (e.g. 100 years)
- The carbon reduction should be measurable and it must be possible to quantify the carbon savings accurately
- The project should be independently auditable and verifiable to provide transparency and to ensure the offset is traceable and cannot be double counted

The University will also explore the advantages offered by entering into power purchase agreements to ensure any residual energy it does need to consume from the national distribution grids comes from identified renewable sources.



## SPECIFIC ACTIONS

Description of action		Target date
M1.0	Audit current utilities metering provision and identify areas in need of development in order to achieve; <ul style="list-style-type: none"> <li>i. Building level sub-metering to allow accurate monitoring and analysis of individual building emissions levels</li> <li>ii. Automatic data collection from all building level and high load consuming plant</li> <li>iii. Accessibility and ease of use of consumption monitoring systems</li> <li>iv. Ability to report to University SLT on carbon emissions on a Faculty and building level</li> </ul>	Q2 2022
M2.0	Develop sub-metering systems to allow data to be disseminated and utilised within taught courses	Q3 2022
M3.0	Establish carbon emissions from university owner and operated vehicles	Q2 2022
M3.1	Establish carbon emissions from stand by power provision for the university	Q4 2022
M4.0	Ensure loads being metered are accurately identified so as to facilitate meaningful analysis.	Q2 2022
S1.0	Identify and continuously monitor Emissions due to gas consumption on site and the proportion due to space heating.	Ongoing
S1.1	Create and implement an audit programme to identify and evaluate potential consumption reductions in gas usage.	Q1 2022
S1.2	Create register of University vehicles and their fuel consumption.	Q4 2021
S1.3	Develop rolling 5-year strategy for university vehicles with the aim to ensure provision best matches the Universities needs and provides a clear plan for transmission to an EBV only fleet.	Q2 2022
S1.4	Create and maintain register of grounds and maintenance equipment and the fuel usage associated with that equipment. Using this register identify plant that can be replaced with electric/battery alternatives and a strategy to do so.	Q2 2022
S1.5	Conduct analysis of stand-by generator provision to confirm requirements and establish alternative methods to provide back-up power.	Q2 2023
S1.6	Audit current GHG register with a view to assessing its suitability to; <ul style="list-style-type: none"> <li>I. monitor and record any losses of gases and the quantity lost.</li> <li>II. identify GHG containing equipment and the quantities therein</li> <li>III. provide adequate linkage with PPM registers/schedules to minimise losses.</li> </ul>	Q4 2022

S1.7	Assess feasibility of replacing heating systems using gas fired boiler plant with heat pumps. To be conducted to match campus development plan programme	Q1 2023
S2.0	Create and implement an audit programme to identify and evaluate potential consumption reductions in electricity usage.	Q2 2022
S2.1	Identify all site IT data centres and comms rooms and audit associated HVAC systems to identify potential for consumption savings	Q3 2022
S2.3	Audit external lighting and identify where upgrades to fittings and controls would be appropriate	Q3 2022
S2.4	Implement strategy to replace grid supplied electricity supplies with power generated by renewables installed on the University estate	Q2 2023
S2.5		
S3.0	Create Transport strategy	Q2 2022
S3.1	Create strategy for integration of EV charge points into campus infrastructure	Q2 2022
S3.2	Review and create register of Bicycle parking storage provision on campus	Q3 2022
S3.3	Audit water supply infrastructure and documentation with the aim of identifying and implementing works to reduce water consumption.	Q2 2023
S3.4	Include rainwater harvesting systems in any new builds or major refurbishments	Q3 2023
S3.5	Create Waste strategy for the site with a view to minimising waster volumes and expanding recycling rates.	Q1 2022
S3.6	Include sustainability and carbon management as a selection factor in the selection of contractors	Q4 2022
S3.7	Implement strategy to convert catering equipment from gas to electricity as a heat source.	Q3 2023
S3.8		
P1.0	Create sustainability URS (User Requirement Specification) for buildings in line with campus development plan.	Q3 2022