



Harper Adams University

Carbon Management Plan 2020/25

Name of Document:	Carbon Management Plan 2020/25
Purpose of the Document:	Quantifies the University's carbon emissions and carbon reduction targets and sets out a strategic route map to reducing emissions through a range of policies, projects and initiatives
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Glossary of Terms / Abbreviations

Abbreviation	Description
BMS	Building Management System
CHP	Combined Heat and Power (engine)
CMP	Carbon Management Plan
CCL	Climate Change Levy
CRCEES	Carbon Reduction Commitment Energy Efficiency Scheme
DEC	Display Energy Certificates
DHN	District Heat Network
EAUC	Environmental Association for University and Colleges
EMR	Estates Management Records
EPC	Energy Performance Certificate
GHG	Greenhouse Gases
GIA	Gross Internal Area
HEFCE	Higher Education Funding Council for England
HESA	Higher Education Statistics Agency
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
Kg	Kilogram
kWh	Kilowatt Hour
LED	Light Emitting Diode (building lighting)
LPG	Liquefied Petroleum Gas
NFU	National Farmers Union
NIA	Net Internal Area
OfS	Office for Students
SECR	Streamlined Energy and Carbon Reporting
UN	United Nations

Foreword from the Vice Chancellor

Successfully addressing the challenge of climate change and its impact on natural resources is critical to the future of agriculture, the management of natural resources and the protection and promotion of biodiversity. These fields of enquiry lie at the heart of our University, so it is vital that we not only educate and research the effects of climate change, but that we also take practical steps to reduce them.

That is why we have sought to reduce our carbon impact over the last 15 years, whilst seeing our student numbers increase by 75% and our estate footprint grow. Our Carbon Management Plan 2015/20 set a minimum target to reduce the 2005 baseline by 20% with an aspirational target to achieve a 43% reduction by 2020. In response we implemented our Sustainable Transformation Energy Project (STEP): a 1 mW biomass boiler, a 650 kw solar photovoltaic array and a 400 kW gas powered Combined Heat and Power engine (CHP) providing both low carbon electricity and heat distributed via a 3.5km District Heat Network (DHN) across our campus. This project has been a success and has helped, with other measures, deliver a 36% reduction to the 2005 baseline. The STEP has been widely acknowledged as an exemplar project, winning the Times Higher Education Awards Outstanding Estates Strategy category in 2019.

Despite these transformational changes to our services infrastructure, there is still much to be done. We must continue to focus on investing in our estate and changing our behaviours to further reduce our carbon footprint. Our Carbon Management Plan 2020/25 is a roadmap for the next five years which will address the next steps, help improve the technology we use to control and improve our building services, implement improvements in energy management, and energy use, whilst leveraging further benefits from our STEP project. It sets a challenging target of a further reduction of scope 1 and 2 carbon emissions over the next five years.

Beyond our new Carbon Management Plan 2020/25, both our Farm and University operations need to begin the journey of planning for a Net Zero carbon future. To achieve our objective we need to understand and map fully our range of emissions. That is why we have set the challenge for colleagues to define, interrogate and report on the University's scope 3 emissions, notably travel, water, waste and procurement, by 2025. We will also scope emissions for our Farm whilst mapping potential mitigation projects against the National Farmers Union Net Zero Strategy over the same time period.

Our aim is for our Carbon Management Plan 2020/25 to make a significant contribution towards UK and global carbon reduction goals, and to assist the wider understanding of how modern UK farming and food production can contribute to this goal, to help to protect our natural resources and environment for future generations to come.

Dr David Lewellyn
Vice-Chancellor
June 2020

Executive Summary

This document outlines the University's Carbon Management Plan (CMP) for 2020/25, which sets out a strategy to reduce carbon dioxide emissions by financial year end 2025. The CMP has been approved by the University's Board of Governors.

The University's carbon emissions baseline was first calculated in 2005. Analysis of gas, electricity, oil, biomass and vehicle fuel consumption data indicated a carbon baseline of 3,414 tonnes. In financial year 2018/19, the University's carbon baseline had reduced to 2,198 tonnes as a result of the work undertaken in the CMP 2015/20. This is equivalent to a 36% reduction in carbon emissions from the 2005 baseline.

In this CMP 2020/25 the University has set a target of reduction of scope 1 and 2 carbon emissions by a further 637 tonnes. This target has been informed by a detailed estates fabric, building services and energy survey conducted during 2019. The plan focuses on practical and deliverable projects while continuing to leverage the ongoing benefits of the successful STEP project. It identifies a number of projects and activities that address behaviour, controls, building management systems, building services, lighting and building fabric. The estimated budget cost of implementing all projects identified in Appendix A is in the region of £1,454,681 (including VAT). It is forecast to deliver savings in utilities costs (benchmarked at May 2020) of £356,162 per year. Implementation and therefore investment will be phased over a 5-year programme.

This CMP 2020/25 aligns with the Estates Management Record annual reporting for the University and therefore excludes the Farm, the agricultural estate and its related activities – both commercial activity and supporting agricultural research. An emerging Environmental Sustainability Strategy (2020/25) will complement the CMP 2020/25, making a commitment to support the reduction of carbon emissions and reducing the impact of University operations across several key aspect areas including the Farm.

The implementation of this CMP 2020/25 and its endorsement by the Vice-Chancellor and Governors demonstrates that the University undertakes its corporate and social responsibility to manage carbon reduction in an environmentally responsible manner, thereby reducing the impact of the University's operational activities on the environment.

Introduction

Harper Adams University is a leading modern university with a tradition of providing academic excellence dating back to 1901. Set in a unique rural location on the edge of Newport, Shropshire, Harper Adams engages annually with more than 5,000 students (headcount), of which 2,976 (FTE) students are studying a range of undergraduate and postgraduate awards. The University aims to grow its student numbers to 3,500 FTE by 2025, in accordance with its strategic plan 2020-2025. With a 627-hectare farm, our mission is to provide: world leading higher education and research for the delivery of sustainable food chains and the protection of rural resources for future generations.

Carbon Management Plan Scope

Carbon dioxide along with other harmful gases are produced when fossil fuels such as gas, oil or diesel are burnt in air to produce energy for heating, electricity generation, or transport. The widely accepted definitions for carbon emissions, and those used for this CMP, are defined by the Greenhouse Gas Protocol, as follows:

Scope 1 Emissions	Direct emissions from sources owned or controlled by the University i.e. emissions produced directly by burning fuel on site such as gas for heating and diesel in vehicles
Scope 2 Emissions	Indirect emissions from purchased electricity i.e. those generated through the off-site generation of electricity that the University procures
Scope 3 Emissions	Indirect downstream emissions not owned or controlled by the University i.e. those arising indirectly due to core operations, including the procurement of goods, business travel and student and staff commuting.

The data in this CMP 2020/25 covers emissions from scope 1 and 2 activities associated with the University campus and University-owned transport fleet operations. All data reported will be for the University financial year end, that is 1 August to 31 July, annually. The scope specifically excludes the Farm's inputs, outputs and activities and whilst it is vitally important to fully understand the University's full carbon baseline, the CMP 2020/25 does not include any scope 3 data or related reduction targets/initiatives. Further work on mapping out scope 3 emissions for the University operations and full scope emissions for the Farm will be conducted over the next 5 years.

Context for Carbon Reduction

This CMP 2020/25 has been developed in response to a range of drivers, both internal and external. These are outlined in this section, taking account of their significance and the potential benefits for the University of progressing its carbon management reduction objectives.

Strategic Overview

The tertiary education sector has delivered a reduction in its carbon emissions over the last decade demonstrating compliance and leadership. Despite this, the sector is still responsible for a scope 1 and 2 carbon baseline of 1,634,903 tonnes of carbon dioxide equivalent, the generation of 511,000 tonnes of waste and consumption of 7.4 TWh of energy¹.

The carbon management agenda has also rapidly moved on during the last 18 – 24 months with many institutions having to shift their strategic outlook in response to the:

- United Nations IPCC declaring there is only 10-12 years left to deflect a climate emergency by arresting the acceleration of global temperatures to below 1.5 degrees as a minimum

¹ Source: HESA 2018/19

- United Nations Paris Agreement requiring global nations to reach 'net zero' greenhouse gas emissions within the second half of the 21st century, with wealthier developed countries striving to reach this goal earlier
- UK Governmental bodies increasingly declaring climate and biodiversity emergencies
- Increased media attention from change agents including Sir David Attenborough; Extinction Rebellion and Greta Thunberg leading proactive and disruptive campaigns on concerns such as the single use plastic items/micro plastic agenda and the global climate emergency
- Sector no longer being governed by HEFCE and the Office for Students (OfS) are not structured to oversee a prescribed road map for carbon management compliance.

National Farmers Union Net Zero Strategy

The National Farmers Union (NFU) have declared that farming can be carbon neutral across the whole of English and Welsh agriculture by 2040. It has recognised that farming and agriculture is uniquely placed as significant contributor - accounting for 10% of UK Greenhouse Gases (GHG) emissions (notably methane and nitrous dioxide) whilst having the potential to lead on substantial GHG abatement through careful land and soil management and through sequestration by changing land use to capture carbon. Three broad pillars are expected to deliver the Net Zero ambition:

- Boosting productivity and reducing emissions
- Farmland carbon storage
- Coupling bioenergy to carbon capture, utilisation and storage.

Whilst the ambitions of NFU Net Zero Strategy (and the University Farm) are outside of the scope of this CMP, it has been recognised as an important driver and work is underway to begin to understand the role the Farm can play in helping the University achieve net zero.

University Energy Policy

The current University Energy Policy will be revised to align with the CMP 2020/25. The policy will be expanded to include energy efficiency requirements of IT infrastructure and other electrically powered equipment. The revised policy will be actively promoted to provide renewed clarity supporting purchasing decisions for energy efficient equipment, inform the briefing and development stage of any new build or refurbishment and raise awareness with students and staff on the importance of minimising energy wastage.

Corporate Profile

HE institutions are increasingly ranked using public league tables and performance on carbon reduction is key to maintaining positive profile in these rankings. Carbon management elements carry significant weighting in the People and Planet University League, sourced via the Higher Education Statistics Agency Estate Management Records (HESA EMR). The EAUC and SOS-UK will also partner on a revised matrix during 2020, that will detail carbon management reduction targets, governance and staffing. Whilst not intended as a league table, it will make information readily available to students to ensure they can make an informed decision when choosing a University, a strong theme of the NUS Skills survey.

Recruitment and Reputation

There is a continuing need to meet student expectations that the University will maintain its action on sustainability and to support their learning and employability prospects in this area. The NUS Skills Survey (2018/19) revealed that 86% of students surveyed think Universities should actively promote sustainability in their teaching and learning. This is recognised in the University Environmental Policy (April 2020) and the Teaching & Learning Strategy reflects continued integration of sustainability into teaching and research.

Organisational Resilience

The outgoing CMP 2015/20 focussed on reducing the University's reliance on externally supplied energy by generating both heat and electricity on site. During this next phase of the CMP 2020/25, additional works will be undertaken to maximise the efficiencies of the STEP through a continued optimisation of secondary systems, more extensive feedback loops and control through the established Building Management System (BMS) as well as bringing more load onto the DHN. Some of this work will be supporting the CMP 2020/25 and other elements will be explored as separate investment. Together the aim is to allow the use of the biomass boiler for longer periods of the year as well as reducing the extent of dependency on grid supplied electricity.

Energy Security and Costs

Energy markets have been traditionally volatile over the recent years resulting in a difficulty to predict the price of fuel and utilities one year in the future, let alone during the five years of the CMP. The volatility of energy costs is expected to continue during the life of the 2020/25 CMP. The cost of electricity has risen the most, but much of that has been non-commodity costs. The sustained reduction in the cost of renewable energy, its intermittency of renewable generation and its impact on grid capacity planning have led to new pressures on the distribution network which will lead to additional costs in order to better balance supply and demand. Since 2011 the growth in third party non-commodity costs has been responsible for most of the rise in the price of energy and is expected to account for over two thirds of energy costs by 2020. In 2005/06 energy costs were approximately £336,000, combining electricity and gas price fluctuations, the University has experienced an approximate 241% increase between 2005 and 2019 in utility costs.

Value for Money

As the HE sector continues to come under scrutiny in terms of value for money, it is increasingly important that all areas of expenditure are assessed for cost saving potential. Annual energy costs represent a significant portion of the estates operating costs and there is a number of significant pressures on this which increase consumption year on year. In the period of this CMP, student numbers are expected to increase, the new Veterinary Education Centre will open and increase the net internal area of the University and it is likely that there will be an increase in the number of electronic devices on campus. The CMP must provide a catalyst for improved energy management.

Regulatory Drivers

EU Energy Performance of Buildings Directive (EPBD)

Since 2006, this directive sets out to promote the improvement of the energy performance of buildings through cost effective measures and to promote the convergence of building standards across the EU. Energy Performance Certification is required for all new buildings and when existing buildings are rented or sold, known as EPCs. There is also a requirement for all public buildings with a floor area over 250m² to display a Display Energy Certificate (DEC) in a prominent position within the building.

Building Regulations – Part L

Part L of the Building Regulations sets out requirements for energy efficiency and the effective control of buildings and associated plant. These Regulations apply to both new buildings and refurbishments, controlling factors such as the insulation values of building elements, air permeability of the structure, heating efficiency of boilers, and lighting efficiency. Part L guidance is currently the major driver for the increase in energy efficiency and carbon reduction in new and refurbished buildings.

The Climate Change Act

The UK Government had set a long-term goal to reduce CO₂ emissions by 80% by 2050 from a 1990 baseline to help the UK's transition to a low carbon economy. This has created a number of legislative and financial drivers. This includes DECs, the (former) Carbon Reduction Energy Efficiency Scheme (CREES), enhanced Building Regulations Part L and access to capital funding through the Salix Grant Scheme. In 2019, this long-term target has been revised to reduce UK carbon emissions to net zero by 2050.

Climate Change Levy

The Climate Change Levy (CCL) is a tax on electricity (including nuclear generation) and gas added to the energy bills of businesses in an effort to incentivise a reduction in energy use and to use or generate energy from renewable sources. In 2015, CCL was also expanded to apply to energy purchased from renewable sources. The 2019 phase out of the CRCEES emissions trading scheme led to an increase in certain CCL rates for all business energy users to bridge the loss in tax carbon trading revenue. From April 2021, the CCL will therefore rise by 15% for gas consumption whilst a fall of 4% for electricity reflects the decarbonisation of the National Grid. As the CCL is effectively a tax on energy from non-renewable sources, the impact of this rise can be partly mitigated by generating more energy from non-fossil fuel renewable sources.

Taxable commodity	Rate 1 April 2020	Rate 1 April 2021
Electricity (£ per kWh)	0.00811	0.00775
Gas (£ per kWh)	0.00406	0.00465
LPG (£ per Kg)	0.02175	0.02175

Streamlined Energy and Carbon Reporting

Coinciding with the abolishment of the CRCEES, the Streamlined Energy and Carbon Reporting (SECR) scheme was introduced in April 2019. The University is defined as an "Unquoted company incorporated in the UK meeting the definition of 'large'² under the Companies Act 2006". As result there is a legal requirement to report energy use from electricity, gas and transport fuel – as well as the associated GHG emissions – including at least one intensity metric. From April 2020, those businesses captured by SECR are required to report their returns and University metrics will be published in the Annual Financial statement from 1 August 2020 onwards. It is proposed to align this 2020/25 CMP with both the SECR reporting periods and the EMR reporting cycle, acknowledging that actual submission periods will be different for each requirement. The commencement date for the 2020/25 CMP will therefore be 1st August 2020. At the time of writing, the baseline figure for scope 1 and scope 2 carbon emissions for the 2019/20 financial year is unknown.

² 'Large' is defined as meeting two of the three criteria: turnover of £36 million or more; a balance sheet of £18 million or more; or more than 250 employees.

Carbon Reduction Performance

Historic Baselines

Harper Adams University carbon emissions baseline was first calculated using data from 2005/06 financial year end (1 August to 31 July). The table below shows the University's scope 1 and 2 total carbon emissions for the selected 2004/05 baseline year and subsequent baselining years.

Financial Year End	Baseline in tCO ₂ (scope 1 & 2)	Utilities Expenditure	tCO ₂ Change from 2005 baseline
2004/05	3,414	£336,000	-
2009/10	3,866	£493,000	+14%
2014/15	3,336	£742,771	-2%
2018/19	2,198	£1,146,618	-36%

Table 1 – Historic Baselines and Utilities Expenditure

This must be seen in the context of the total campus net internal area increased to 52,943m² in 2019 from 30,190m² in 2005, an increase of just over 75%. The above noted increases in absolute emissions between 2004/05 and 2014/15 can be normalised to show a reduction when compared against Student FTE numbers, as follows:

Financial Year End	Baseline in tCO ₂ (scope 1 & 2)	Student FTE	tCO ₂ per FTE Student
2004/05	3,414	1,359	2.51
2009/10	3,866	2,200	1.75
2014/15	3,336	1,968	1.69
2018/19	2,198	2,976	0.74

Table 2 – Carbon Baseline normalised by Student FTE

Historic Performance to Date

The 2010/15 CMP set an absolute target reduction of 32% based on the 2005 baseline. The CMP had identified projects to the value of £4.17m, the majority of which was the installation of an anaerobic digester plant, equating to £3.6m and was funded by a HEFCE Salix Finance fund. Other projects in the plan included a biomass boiler installation, IT thin client/virtual desktop migration, window upgrades and the adoption of a Building Management System.

The early investment in carbon reduction technologies allowed the University to significantly reduce its carbon baseline, but the anaerobic digester plant, the principal energy saving initiative, became technically unviable whereby emissions began to increase. In 2015, the CMP was revised to achieve an absolute reduction of 20% by financial year end 2019, from the 2005 baseline. Primarily, carbon reduction was delivered by reinvestment in the STEP: a 1-mW biomass boiler, a 650-kw solar photovoltaic array and a 400-kw gas powered CHP providing both low carbon electricity and heat distributed via a 3.5km DHN.

At a point during the last financial year 2018/19, the University's carbon baseline had reduced to 2,198 tonnes as a result of the CMP 2015/20. This is equivalent to a 36% reduction in carbon emissions from the 2005 baseline. A review of the 2015 project list, additional projects and those projects currently planned to be carried forward into the CMP 2020/25 is shown in Appendix C.

Progress to date on carbon savings from 2004/05 to 2018/19 is represented in the graph below.

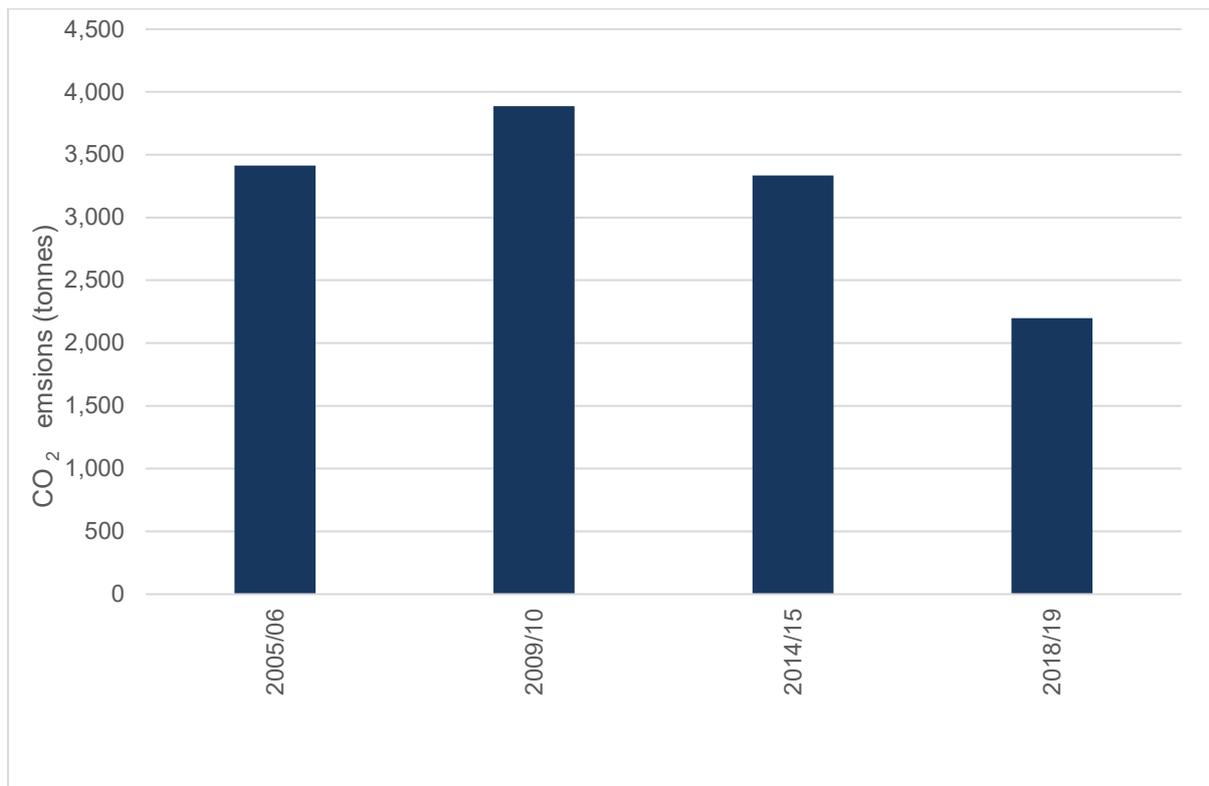


Chart 1 - Actual emissions (tonnes CO₂), footprint year

This shows clearly how the implementation of the 2015/20 CMP has realigned the University performance against longer term aspirational targets to minimise the carbon baseline in line with Government targets.

Carbon Management Plan 2020/25

This section identifies and outlines the projects that will need to be implemented in order to achieve the University's CO₂ emissions reduction target of over the next 5 years. Whilst 2015/20 CMP focused on heating infrastructure and low carbon renewable energy opportunities with longer returns on investment, the CMP 2020/25 will focus primarily on quick wins which were not previously pursued. In this CMP 2020/25 the University has set a target of reduction of scope 1 and 2 carbon emissions by a further 637 tonnes.

This reduction in scope 1 and 2 carbon emissions needs to be viewed in the context of student numbers and the expected size of the estate. Student numbers are expected to increase during the 2020/25 period by around 700 with a corresponding increase in staff numbers by around 35-38. Supporting that student growth will be opening of the new Veterinary Education Centre in late 2020. Based on the BRUKL excluding non-fixed equipment the impact on carbon emissions of the Veterinary Education Centre is expected to be c.31 tonnes carbon emissions to the University baseline, rising up to c.72 tonnes including an allowance for non-fixed equipment. No other capital development projects or change in the overall area of the estate are allowed for within this 2020/25 CMP.

Scope of Projects

The University commissioned an independent comprehensive carbon reduction opportunity review during 2019. The campus wide survey compiled an accurate register of lighting, heating and control changes to inform future funding applications, with carbon reduction opportunities categorised as:

- **Immediate operational/improvement measures** – including adjustments to BMS settings and advice regarding current energy management and operational strategies.
- **Fast payback measures** – minor investment programmes to improve controls and timers, typically delivering payback periods of less than 1 year.
- **Building services infrastructure development** - a major source of carbon savings will be “Invest to Save” measures. These will typically have payback periods up to 5 years and are likely to be subject to external funding mechanisms
- **Longer term technology opportunities** – a wide range of measures, particularly those improving the building (infra)structure, tending to have extended payback periods typically in excess of 7 years. These measures can be particularly important where (infra)structure is reaching the end of its existing life and hence investment is required to maintain the buildings operational reliability, or on health and safety grounds. Where ongoing facilities improvements are made the University will specify the latest energy efficient technologies.

CMP 2020/25 Projects Summary

The carbon reduction opportunity review identified a total of 67 projects broadly described as:

- Changing behaviour through improved monitoring and more visible reporting
- Upgrade local boilers where still required
- Extension to the Building Management System
- Optimisation of heating and hot water controls
- LED lighting upgrades and smarter controls
- Continued STEP optimisation – secondary systems
- Addressing aged estate – fabric & piping insulation
- Continued role out of more efficient computer technology

Schedule of Implementation

The exact phasing of project implementation will vary from project to project and will be subject to funding availability, particularly relevant where external funding sources are required. Where possible the projects will be integrated with any building refurbishment works to minimise disruption to students and staff. A schedule of these projects including capital investment, cost and carbon savings is shown in Appendix A.

Carbon Programme Management

Investment

This plan will require an estimated investment of £1,454,681 (including VAT). It is forecast to deliver savings in utilities costs (benchmarked at May 2020) of £356,162 per year when eventually completed. Implementation and therefore investment will be phased over a 5-year programme. The utility costs³ assumed for savings from projects are outlined below:

- Electricity – 15.5 p/kWh
- Gas – 2.8 p/kWh

These costs will change over the remaining period of the plan, with continued increases in unit costs likely. This may have the effect of reducing the payback period for some measures as cost savings increase, assuming that implementation costs do not suffer a corresponding increase.

The CMP saving project opportunities tool used to identify and monitor the progress of implementation allows changes in utility costs and carbon factors to be updated and reflect the financial return of the projects at any time. The projects list is held and managed by the University Environmental and Sustainability Manager.

Each project will be brought before the Senior Management team providing more information on project scope, stakeholders, programme, procurement methods, project risk, costs, payback and expecting carbon reduction savings for approval before proceeding with implementation.

Funding Sources

Overall, the implementation of this CMP is expected to produce significant financial benefits for the University. The projects listed in Appendix A are a structured investment approach in order to reduce environmental impact and reduce long term operational costs.

Given the likelihood of limited internal funding over the next five years, options for external funding to assist with carbon saving projects will be explored on a project by project basis, notably the Salix interest free loan scheme. Salix is an agency of the Department of Business, Energy and Industrial Strategy (BEIS) which provides interest free funding to the public sector to improve energy efficiency, reduce carbon emissions and lower energy bills. Salix offers two financing mechanisms, the preferred mechanism being interest free loans for prescribed energy efficiency measures. It is noted that not all initiatives will be Salix compliant and some will require top up capital funding.

Risk

Over the lifetime of the 2020/25 CMP there are likely to be risks affecting the likelihood of projects delivering the planned carbon savings due to technical, operational financial and legal changes. At point of issue there are a number of high-level risks and opportunities which might have a bearing on the successful delivery of this 2020/25 CMP and associated carbon reduction projects:

- Financial constraints as a result of reduced or capped student numbers limiting investment;
- Additional student numbers and/or additional capital projects leading to increase energy usage and increased carbon footprint;
- Changes to energy prices affecting the payback periods;
- Continued restrictions as a result of the COVID-19 pandemic leading to difficulty in delivery of specific projects;

³ Utility costs as of June 2020. Note that gas p/kWh varies depending on the metered supply with 0.28 p/kwh representing the lowest tariff price and an increase in gas p/kWh will only serve to increase potential savings.

- Changes in operational requirements of mechanical ventilation building services as a result of COVID-19 resulting in increased energy uses;
- Uncertainty on how the Office for Students will engage on the climate agenda.

The Environmental and Sustainability Manager will maintain a risk and issues register which will be reviewed and updated regularly for the overall 2020/25 CMP and hold project specific risk registers for non-capital works. The Estates and Facilities team will hold project specific risk registers for non-capital works.

Senior Management Team will be advised of any risks potentially affecting the carbon reduction targets as part of the regular reporting identified below.

Governance, Responsibility and Management

To ensure carbon management and reduction is embedded as a core business theme in University strategies and the day-to-day operational business activities of the University, the CMP has been subjected to the following governance cycle:

Governance	Purpose/Responsibility	Lead
Board of Governors	To approve the mission and strategic vision of the institution, long-term academic and business plans and key performance indicators, and to ensure that these meet the interests of stakeholders	Vice Chancellor
University Executive	The University senior management team consisting of Heads of Academic and Service Department teams	University Secretary
Finance and General Purposes Committee	Preparation of income and expenditure and annual financial accounts for approval by the Board of Governors Ensure that a capital budget is prepared, against which projects can be prioritised and to assist the University identifying necessary funding sources and strategies to undertake such projects Ensure that clear policies are in place on treasury management, investment management, risk management and insurance, debt collection, the claiming of grants and other financial processes and that these policies are periodically reviewed	University Secretary, Chief Financial Officer
Environmental Sustainability Working Group	Act as a forum for the consideration of ideas and initiatives in the promotion of sustainability, environment improvements and carbon management Monitor and report on progress on the implementation of environmental, sustainability and carbon management initiatives Communicate and promote environmental and sustainability activities, initiatives and policies to the wider University	Environmental and Sustainability Manager

To ensure this CMP successfully achieves its objective of cutting carbon, reducing energy demand and expenditure it is important that the CMP is owned and communicated effectively within the University and adequately resourced. The next table outlines the responsibilities of key staff:

Key Personnel	Responsibilities
(Deputy) Secretary	Reporting to the University Secretary. This new role focuses on supporting the successful delivery of the University's strategic plan including its future sustainability goals. It will involve leading and managing the delivery of key strategic projects, supporting effective governance, and engaging with a wide range of internal and external stakeholders.
Head of Estates and Facilities	Responsible for the ongoing maintenance and operation of the University estate and any capital works. Overall responsibility for the reduction of carbon emissions in the management, development and refurbishment of the University's estate.
Environmental and Sustainability Manager	Responsible for the development of the CMP, monitoring and reporting of progress in carbon reduction. Responsible for overall environmental management and reporting operational performance.
Facilities, Utilities and Waste Manager	Responsible for collation and coordination of energy consumption and metering data to inform carbon baseline reduction targets and related key performance indicators.
University Engineer	Managing the University energy and utilities infrastructure including the day to day operation of the Sustainable Transformational Energy Project (STEP), the scheduling of energy assets and the Building Energy Management System.

Communication

The publication of this 2020/25 CMP will be notified via the weekly newsletter email, circulated to all staff. In discussions and in collaboration with the Students Union, a targeted message will be also be sent to all students. The plan will also be publicly available via the Harper Adams University website and social media channels to increase visibility to external stakeholders.

Engagement

This CMP has a challenging and ambitious target over the next five years, building on the successful implementation of the previous 2015/20 plan. To ensure meaningful contributions, all staff and students share a responsibility to reduce unnecessary energy use and are required to adopt and adhere to the principles of the CMP and any relevant initiatives and campaigns. To facilitate this, all staff and students will be engaged with information on what the University is doing, how they can help and the results of any actions taken. The principle engagement methods will include:

- Revised staff induction process for new starts
- University environmental e-learning modules
- STEP tours for internal/external parties
- Sustainability environmental awareness training sessions

Monitoring, Reporting and Evaluation

Monitoring

The University will continue to invest in a comprehensive automatic metering system to monitor and record building energy use and performance. To ensure the 2020/25 CMP maintains momentum and the targets are met, there will remain a continuous monitoring and evaluation process, actively working to improve and develop future projects.

Key Performance Indicators

The University carbon footprint will be recorded as scope 1 and 2 emissions and will be published annually (financial year), compiling tonnes CO_{2e} emissions from the following sources:

- Biomass heat energy (kWh)
- Natural gas heat energy (kWh)
- Grid electricity (kWh)
- Liquefied petroleum gas heat energy (kWh)
- Onsite photovoltaic electric (kWh)
- Diesel consumption, estates operated vehicles (litres, converted by fuel emissions factor)
- Petrol consumption, estates operated vehicles (litres, converted by fuel emissions factor)
- Burning oil heat energy (kWh)

The latest year/reporting period conversion factors will be sourced from Gov.uk GHG reporting publication. Emissions sources that are not included in this plan fall within Scope 3 and do not include emissions from water consumption/disposal and waste generation/end disposal. Scope 3 emission target reductions and associated KPI's will be referenced in the new Environmental Sustainability Strategy (in development).

Reporting

The technical programme will be overseen by the Head of Estates and Facilities, supported by the University Engineer and Estates Maintenance Services Manager. Progress of the CMP will be monitored and reported through a number of routes.

Method	Description	Responsibility
Finance & General-Purposes Committee	Annual update will be submitted to F&GP following a review at the ESWG. Report format will include: Annual carbon baseline (scope 1 & 2, as per EMR returns) including the following KPIs listed in Appendix D. Annual update of carbon emission reduction project list status Update on scope 3 emissions (University) and all scope emissions (University Farm)	Environmental and Sustainability Manager (lead) Facilities, Utilities and Waste Manager
Annual Sustainability Report	This new report will be the key means by which institutional progress on sustainability and carbon reduction is reported to internal and external stakeholders. The report will cover a number of academic and operational metrics including water use, waste produced, scope 1 and 2 carbon emissions, use of grid supplied energy and energy generated on site.	Environmental and Sustainability Manager (lead) Environmental Sustainability Working Group
Estates Management Record	Energy use, water use, waste statistics and scope 1, 2 and 3 (when known) carbon emissions are reported to the HESA each year. This information is publicly available	Facilities, Utilities and Waste Manager (lead) Environmental and Sustainability Manager
Sustainability webpages	The University makes a range of environmental performance information available via the web, such as information, policies and procedures on energy and carbon, investment and purchasing, catering, waste and water, travel and engagement	Environmental and Sustainability Manager

Appendix A: Carbon Emission Reduction Project List

Ref	Building/Area	Initiative	Estimated Budget Cost (£)	Annual Savings		
				Quantity (kWh)	Financial (£)	CO ₂ (tonnes)
1	Whole site	Staff and student awareness campaigns	100,000	348,647	54,040	78
2	Whole site	Improve monitoring and targeting systems and operational procedures	120,000	200,000	18,300	44
3	Whole site	Improve reporting procedures to record and disseminate information on implemented projects and make energy and carbon data more openly available to staff and students	29,500	Included in behaviour and M&T savings		
4	Whole site	Review operating strategy for heating from DHN to ensure systems are working for optimum energy efficiency including effects on DHW provision and pump operating times and upgrade of plate heat exchangers where necessary	250,000	170,000	141,350	209
5	Whole site	Review set-points including OAT hold-off and time schedules to optimise BEMS settings	7,200	25,000	700	5
6	Main Building	Upgrade existing heating controls to BEMS	6,600	95,760	2,681	18
7	Students Union	Upgrade existing heating controls to BEMS	4,200	13,700	384	3
8	Residences	Install smart controls in residence bedrooms with electric heating	72,000	60,000	9,300	15
9	All Plant rooms	Insulate exposed heating distribution pipe and fittings in plant rooms	7,260	50,000	1,400	9
10	Darby	Upgrade lighting to LED	11,649	5,140	797	1
11	Silcock	Upgrade lighting to LED	11,649	5,140	797	1
12	Darwin A	Upgrade lighting to LED	9,296	4,277	663	1
13	Darwin B	Upgrade lighting to LED	8,654	4,293	665	1
14	Jeb	Upgrade lighting to LED	9,052	5,267	816	1
15	Jerman	Upgrade lighting to LED	18,682	8,395	1,301	2
16	Leverhulme	Upgrade lighting to LED	18,682	8,395	1,301	2
17	Princess Royal	Upgrade lighting to LED	18,682	8,395	1,301	2
18	Boughey	Upgrade lighting to LED	12,830	4,009	621	1
19	Gloucester	Upgrade lighting to LED	23,576	8,358	1,295	2
20	Harris	Upgrade lighting to LED	24,267	7,345	1,138	2
21	Ward	Upgrade lighting to LED	7,569	2,813	436	1
22	Bradford	Upgrade lighting to LED	9,441	3,733	579	1
23	Flatt Road Houses	Upgrade lighting to LED	12,106	6,450	1,000	2
24	Main Building	Upgrade lighting to LED	32,590	25,269	3,917	6
25	Jubilee Adams	Upgrade lighting to LED	44,476	31,317	4,854	8
26	Aspire CETL	Upgrade lighting to LED	11,394	5,837	905	1
27	Laundry	Upgrade lighting to LED	7,369	6,078	942	2
28	Regional Food Academy	Upgrade lighting to LED	31,070	19,609	3,039	5
29	Agricultural Engineering	Upgrade lighting to LED	53,266	49,329	7,646	13
30	Foulkes Crowther Building	Upgrade lighting to LED	40,859	27,242	4,223	7
31	Princess Margaret Building	Upgrade lighting to LED	29,683	26,965	4,180	7
32	Sports Hall	Upgrade lighting to LED	16,271	15,574	2,414	4
33	Student Union Bar	Upgrade lighting to LED	12,635	11,869	1,840	3
34	Welly Inn	Upgrade lighting to LED	1,204	692	107	0
35	Squash Courts	Upgrade lighting to LED	1,313	819	127	0
36	Queen Mother Hall	Upgrade lighting to LED	15,371	9,820	1,522	3
37	NPH B Block	Upgrade lighting to LED	4,766	2,603	403	1
Ref	Building/Area	Initiative		Annual Savings		

			Estimated Budget Cost (£)	Quantity (kWh)	Financial (£)	CO ₂ (tonnes)
38	NPH C Block	Upgrade lighting to LED	11,528	8,879	1,376	2
39	NPH A Block	Upgrade lighting to LED	10,361	8,626	1,337	2
40	Anatomy Lab	Upgrade lighting to LED	4,742	4,175	647	1
41	Veterinary Services Centre	Upgrade lighting to LED	17,706	12,833	1,989	3
42	CERC	Upgrade lighting to LED	10,714	6,864	1,064	2
43	Bamford Library	Upgrade lighting to LED	80,897	63,065	9,775	16
44	Companion Animal House	Upgrade lighting to LED	6,664	5,671	879	1
45	Postgraduate Centre	Upgrade lighting to LED	14,021	7,598	1,178	2
46	Faccenda Building	Upgrade lighting to LED	57,102	25,728	3,988	7
47	Weston Building	Upgrade lighting to LED	28,954	17,297	2,681	4
48	AEIC Engineering	Upgrade lighting to LED	28,686	22,152	3,434	6
49	Whole site	Ongoing repair of window latches and replacement of worn draught proofing where necessary	From maintenance budget	38,430	1,076	7
50	Whole site	Ensure loft insulation is up to building regulation standards during any building refurbishment	Included in refurbishment budgets	165,000	4,620	30
51	Whole site	Implement site wide cooling set-point strategy with a minimum cooling set-point of 24°C. Use BEMS to restrict where possible.	0	2,000	310	1
52	Server Rooms	Move more storage into cloud as appropriate	ICT Budget	93,750	14,531	24
53	Site wide ICT	Continue move toward single device policy for all users as appropriate	ICT Budget	7,500	1,163	2
54	Site wide ICT	Encourage staff to opt for thin client work stations or laptops rather than PCs	ICT Budget	15,000	2,325	4
55	Site wide ICT	Encourage staff to give up individual desk printers and use centralised printing services	ICT Budget	8,000	1,240	2
56	Site wide electric water heaters	Install timers to fused spur where necessary (i.e. No time controls)	240	450	70	0
57	Site-wide refrigerated vending	Install plug-in timers to vending machines to switch off when buildings are closed.	330	3,000	465	1
58	Residences	Switch off refrigeration in residences when not in use	0	15,000	2,325	4
59	Silcock	Add heating and hot water services to BEMS	4,200	14,000	2,170	4
60	Darby	Add heating and hot water services to BEMS	4,200	14,000	2,170	4
61	Darwin A	Add heating and hot water services to BEMS	4,200	12,000	1,860	3
62	Darwin B	Add heating and hot water services to BEMS	4,200	12,000	1,860	3
63	Jebb	Add heating and hot water services to BEMS	4,200	11,000	1,705	3
64	Jerman	Add heating and hot water services to BEMS	4,200	20,000	3,100	5
65	Leverhulme	Add heating and hot water services to BEMS	4,200	20,000	3,100	5
66	Princess Royal	Add heating and hot water services to BEMS	4,200	20,000	3,100	5
67	Harris & Gloucester residences	Replace old ACV Heatmaster Combi boilers	53,974	130,000	3,640	24
Total			1,454,681	2,062,158	356,162	637

All figures include VAT.

Appendix B: CMP Project Support Data

Project Reference:	Staff and Student Awareness campaign (engagement and training) 1
Owner	Environmental and Sustainability Manager
Department	This initiative covers all academic departments and professional services
Description	<p>Although measures have been taken to increase staff/student awareness of energy consumption, engagement should be on a continuous basis.</p> <p>With the proliferation of personal ICT devices, the project should initially focus on the management of devices and chargers in teaching rooms, offices and particularly in student accommodation and focus on ensuring that equipment is wherever possible switched off and/or unplugged when not in use.</p> <p>Consider the use of a limited amount of SMART energy monitors, available for an average cost of £50, they are easy to install and will enable the students to keep track of their energy usage, set daily targets, discover how using different appliances affects the energy bill and help reduce or ideally cut out needless energy consumption. If the project is successful, the students report interest and improvement in the matter of energy awareness and the university sees a reduction in electricity bills, a larger roll-out of energy monitors can be considered.</p> <p>Other initiatives to be considered include the re-introduction of a residential energy saving campaign/competition and environmental sustainability awareness workbook or pledge schemes,</p>
Benefits	<p>Payback period is expected to be 2 years</p> <p>Emissions reduction is estimated at 78 tonnes of CO₂</p>
Resources	Staff time will be required from across HAU to deliver the savings.
Ensuring Success	Continued engagement of all staff and students across HAU will be required if the carbon reduction is to be achieved and maintained. This will require regular reviews and development of new approaches to maintain staff/student engagement.
Measuring Success	Through a reduction in electricity consumption.
Timing	Focus on achievement commencing in academic year 2020/21
Notes	Assuming that 5% of electricity consumption and 2% gas consumption can be saved through improved awareness by staff and students.

Project:	Monitoring and Targeting (M & T)
Reference:	2
Owner	Facilities, Utilities & Waste Manager
Department	Estates and Facilities
Further Information	Automatic Meter Reading (AMR) allows utility meters to be read on an automatic basis every half-hour. This data can be analysed to provide early warning of faults and unusual consumption levels enabling prompt action to be taken. This results in more efficient operations and lower carbon emissions through less utility wastage.
Description	Phase 2 metering project under development to further migrate the remaining 40% of building energy meters into the AMT software system, Enteliweb. This should enable to the tracking, viewing and analysis of consumption of different energy supplies within the university buildings. Being able to analyse such data is a key to a successful energy reduction campaign, as it enables to identify unusually high baseloads, unnecessary overnight consumption and therefore provide additional savings.
Benefits	This is an enabling measure and as such does not provide direct savings, but will enable other areas such as awareness and BMS to work more effectively. Savings of 44 tonnes have been attributed to this measure.
Resources	No additional resources are required to implement the project, but staff time will need to allocated to take advantage of the emissions savings opportunities presented by analysis of the data.
Ensuring Success	Staff time to take advantage of the emissions savings opportunities presented by analysis of the data is the key success factor.
Measuring Success	Installation of (new) meters and connection of existing infrastructure to AMT software. Success will be achieved when staff regularly use the data available.
Timing	The project should be implemented promptly to drive energy management campaigns and provide data for reporting success.
Notes	

Project: Reference:	Reporting 3
Owner	Environmental and Sustainability Manager, supported by Facilities, Utilities and Waste Manager
Department	Covers all aspects of HAU energy use
Description	Another opportunity to show initiative towards emissions reduction is to provide regular reports, visible to all staff and students, showing the University's progress on carbon reduction, highlighting the work that is being done and demonstrating the success of carbon reduction policies and investment.
Benefits	Embedding of carbon reduction reporting into ways of working across HAU. Making carbon reduction initiatives visible to all. This is an enabling measure and as such does not provide direct savings, but will show success and help to drive future energy management initiatives.
Resources	Staff time will be required to implement initial systems and maintain reporting procedures
Ensuring Success	Staff time to gather appropriate information and produce meaningful analysis Delivering information to various stakeholders in the most effective media.
Measuring Success	Regular (monthly reporting) of energy consumption against targets and specific projects being undertaken
Timing	This should be completed set-up in conjunction with M&T systems
Notes	Savings included within M&T estimates.

Project:	Controls & BEMS (DHN Secondary systems)
Reference:	4
Owner	Head of Estates and Facilities
Department	Estates and Facilities
Description	Project underway following implementation of STEP heat and power strategy in 2019. Will require optimisation of secondary system settings on both BEMS and stand-alone controls plus some secondary system equipment changes to optimise energy efficient operation of systems. Specific focus on pump operation and DHW provision and plate heat exchanger optimisation
Benefits	Financial savings estimated to be about £141,350 pa Saving about 170,000kWh electricity pa Emissions reduction: 209 tonnes of CO ₂
Resources	Additional resource (staff time) is required for monitoring and acting upon BEMS data.
Ensuring Success	Systems operating as expected to optimum energy efficiency following the STEP heat and power strategy review.
Timing	Complete by end of 2020/21
Notes	

Project:	Controls & BEMS Improvements and upgrades
Reference:	5-8, 59-66
Owner	Head of Estates and Facilities
Department	Estates and Facilities
Description	Review overall strategy including OAT hold-off temps, remote monitoring of temperatures and time schedules to optimise energy efficiency. This will require some updating of existing equipment and controls and extension of the BEMS into plant rooms such as in the main building and students' union plus linking electric space and water heating in new halls to BEMS.
Benefits	Financial savings estimated to be about £32,130 pa Saving about 317,460kWh pa Emissions reduction: 72 tonnes of CO ₂
Resources	Additional resource (staff time) is required for monitoring and acting upon BEMS data.
Ensuring Success	Systems operating as expected to optimum energy efficiency.
Timing	Complete by 2024

Project:	Insulation improvements (risers, valves and flanges)
Reference:	9
Owner	Head of Estates and Facilities
Department	Estates and Facilities
Description	Installation of insulation covers for valves and flanges and exposed pipe in plant rooms
Benefits	Financial savings: £1,400 Saving 50,000kWh gas pa Emissions reduction: 9.2 tonnes of CO ₂
Resources	This project will be delivered within current resources.
Ensuring Success	All exposed heating components to be insulated Ensure insulation is re-fitted repaired after maintenance procedures
Measuring Success	The project will be successful when all areas have been insulated.
Timing	Installation projects should be completed by end of 2020.
Notes	Assuming that installation of insulation covers for valves, flanges and exposed pipe in all plant rooms is carried out.

Project:	Lighting refurbishments
Reference:	10 – 48
Owner	Head of Estates and Facilities
Department	Estates and Facilities
Description	Completion of a rolling programme of replacement of lighting fittings with more energy efficient LED fittings.
Benefits	Financial savings estimate: £77,178 Saving estimate 497,921kWh electricity Emissions reduction: 127 tonnes of CO ₂
Resources	This project will be delivered within current resources.
Ensuring Success	Principal risks: continued funding required.
Measuring Success	The percentage of lighting refurbished is the appropriate measurement of project implementation. The project will be successful when all lighting has been refurbished.
Timing	This is an ongoing project, expected to take five years to complete.
Notes	Assuming an average 55% energy saving per fitting saved with LED replacement

Project:	ICT Projects
Reference:	52 – 55
Owner	IT/AV Service Delivery Manager and Head of Infrastructure
Department	IS
Description	Increased use of cloud storage rather than on site servers Continue move toward single device policy for all users as appropriate Move towards thin client or laptop rather than PC for staff Reduce/phase out non-essential individual desk printers.
Benefits	Financial savings estimate is: £19,259 Estimated savings are 124,250kWh pa Emissions reductions: 32 tonnes of CO ₂
Funding	From existing ICT budget
Resources	This project will be delivered within current resources.
Ensuring Success	Principal risks: continued funding required. Staff buy-in
Measuring Success	Reduction in electricity consumption
Timing	This is an ongoing project, expected to take five years to complete.
Notes	Assumes 20% reduction in server room consumption and device consumption.

Project:	Harris and Gloucester Residences – New Boilers
Reference:	67
Owner	Head of Estates and Facilities
Department	Estates and Facilities
Description	Replacing 2 no current ageing ACV heatmaster combi-boilers (1 in each residence boiler room) with modern replacement boiler
Benefits	Financial savings: £3,640 Estimated savings of 130,000 kWh Emissions reduction: 24 tonnes of CO ₂
Resources	This project will be delivered within current resources.
Ensuring Success	Principal risks: securing the funding required.
Measuring Success	The project will be successful when the boilers have been replaced.
Timing	The boiler replacement timescale 2-3 years
Notes	Assumed savings of 20% heating gas consumption, accounting for other consumption reduction measures.

In addition to the above project detail a project register and tracking tool including comprehensive lighting replacement and valve insulation spreadsheets are held by the Estates and Facilities department.

Appendix C: Review of completed (2015 -2019/20) and on-going (2020 – 2024/25) projects

Below is a list of project proposals and status from the 2015/20 CMP. There are 21 initiatives that will be carried forward into the CMP 2020/25, as identified by the 'project stage' column. Where carried forward, the responsible staff member is identified 'Comments (Responsibility)' column.

Building/Area	Category	Building/Area: Description of Recommendation	Project Stage	Date for Completion	Comments (Responsibility)
Organisation Wide	Behaviour	Uniform recycling units in all areas to improve recycling rates	Complete	n/a	Zero waste to landfill. 100% waste is recycled. Complete.
Bamford Library	Building fabric	Replace library windows	Complete	n/a	Window master opening actuators installed to improve ventilation.
Harris	Building Fabric	Harris: Refurbish Windows	Complete	n/a	
Gloucester	Building Fabric	Gloucester: Refurbish Windows	Complete	n/a	
Organisation Wide	CHP	Organisation Wide: Investigate Reinstating AD Plant Engine to run on Natural Gas	Rejected	n/a	N/A. AD unit sold.
Organisation Wide	CHP	Energy project: CHP and heat main - heat	Complete	n/a	
Organisation Wide	CHP	Energy project: CHP and heat main - electricity	Complete	n/a	
Organisation Wide	CHP	Energy project: CHP and heat main - heat	Complete	n/a	
Organisation Wide	Controls and BMS	Organisation Wide: BMS - Reduce OAT hold off Setpoints	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 CMP (University Engineer)
Gloucester	Controls and BMS	Gloucester: Upgrade existing heating controls to BMS	Complete	n/a	
Harris	Controls and BMS	Harris: Upgrade existing heating controls to BMS	Complete	n/a	
QMH	Controls and BMS	QMH: Remove Weekend DHW from BMS Schedules	Rejected	n/a	Investigation showed that kitchens / Ward / Bradford require DHW weekends so works stopped.
Bradford	Controls and BMS	Bradford: Upgrade BMS controls to prevent space heating overshooting	Complete	n/a	
Boughey	Controls and BMS	Boughey: Upgrade existing heating controls to BMS	Complete	n/a	
AEIC	Controls and BMS	AEIC: Recommission BMS	Complete	n/a	
Main Building	Controls and BMS	Main Building: Upgrade existing heating controls to BMS	Rejected	n/a	Technically difficult. Requires mechanical interventions to "Zone" the building before any additional sensors are fitted. Building has an elderly single pipe wet system that isn't easily zoned without having negative effects without additional valves etc.
Main Building	Controls and BMS	Main Building: Investigate electric heating for guest suites	Complete	n/a	All guest suites are fitted with supplementary electric panel heaters

Building/Area	Category	Building/Area: Description of Recommendation	Project Stage	Date for Completion	Comments
RFA	Controls and BMS	RFA: Remove Weekend DHW from BMS Schedules	Rejected	n/a	Post-Graduate Centre used at weekends, so project stopped.
Ancellor Yard	Controls and BMS	Ancellor Yard: Revise BMS Schedules to eliminate 24/7 firing of Biomass Boiler	Complete	Complete	Scheduled off at weekends.
NIPH Vet Centre	Controls and BMS	NIPH Vet Centre: Revise BMS Schedules to eliminate 24/7 firing of Biomass Boiler	Complete		Scheduled off for weekends unless requested by Vet staff for conferences
Organisation Wide	Controls and BMS	Conduct BMS survey, review set points and review non-bms controls	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 CMP. (University Engineer)
Organisation Wide	Controls and BMS	Automatic active management of set points to respond to external temperatures	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 CMP. (University Engineer)
Halls	Controls and BMS	Install smart controls in halls of residence	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 Carbon Management Plan. BEC (BMS contractor) have supplied quote for several Halls. (University Engineer)
Organisation Wide	Engineering standards	Develop documented engineering standards for BMS, metering, refurbishment and new buildings	Carry forward (CMP 2020/25)	2025	To be developed as part of the CMP/ESS 2020/25 Strategy. (University Engineer (Lead) Environmental & Sustainability Manager)
Farm	Engineering standards	Adhere to carbon trust standards for pig units, dairy and library	Carry forward (CMP 2020/25)	2025	Developed as response to CMP 2020/25: Farm based Activities - define, interrogate & report on Scope 1, 2 & 3 emissions - water, waste & supply chain – by 2025 latest Farm - map potential mitigation projects against NFU - Achieving Net Zero Three Pillars by 2025 Farm Manager (Lead) (Livestock Manager (Lead) Environmental & Sustainability Manager)
Farm	Farm	Precision farming processes	Carry forward (CMP 2020/25)	2025	The Farm/Estate continue to demonstrate the viability of precision farming, through the SMART diary and the 35Ha Hands Free Farm. (Farm Manager Livestock Unit Manager Research Leads)
Farm	Farm	Fuel use monitoring technology on farm equipment	Carry forward (CMP 2020/25)	2025	Developed as response to CMP 2020/25: Farm based Activities - define, interrogate & report on Scope 1, 2 & 3 emissions - water, waste & supply chain – by 2025 latest Farm - map potential mitigation projects against NFU - Achieving Net Zero Three Pillars by 2025 (Farm Manager (Lead) Environmental & Sustainability Manager)

Building/Area	Category	Building/Area: Description of Recommendation	Project Stage	Date for Completion	Comments (Responsibility)
Organisation Wide	Fuel switch	Install charging points for electric vehicles	Implementati-on	2020	Charging points to be installed with the new Veterinary Education Centre
Farm	Heat recovery	Heat recovery on the pig weeing unit and heat recovery from other pig unit buildings	Carry forward (CMP 2020/25)	2025	Developed as response to CMP 2020/25: Farm based Activities - define, interrogate & report on Scope 1, 2 & 3 emissions - water, waste & supply chain – by 2025 latest Farm - map potential mitigation projects against NFU - Achieving Net Zero Three Pillars by 2025 (Livestock Manager (Lead) University Engineer)
Organisation Wide	Human Resource	Organisation Wide: Staff Awareness Scheme	Carry forward (CMP 2020/25)	n/a	Developed as response to Environmental Strategy 2020/25: Staff induction slides (revised inc. Environmental Policy, May 2020); Two new environmental e-learning modules (voluntary, SkillsGate, March 2020); STEP tours for internal/external parties; Face to Face Training (September 2020) STEP Project Exemplar (AUDE/CIBSE/AUE) (Environmental & Sustainability Manager (Lead) Facilities, Waste & Utilities Manager, University Engineer)
Organisation Wide	Human Resource	Set up a living labs project and provide HAU (or other institution) with data and resources to reduce energy and carbon	Ongoing	n/a	14 research centres (and associated outputs) focus on improving sustainable land/environment use for food production and rural industries. STEP Project - hosted exemplar project in partnership with AUDE/CIBSE/AUE and industry partners (50 delegates). STEP Project awarded THE Outstanding Estates Strategy (2019).
QMH	Insulation	QMH: Refurbish pipework in Plantroom	Complete	n/a	
Sports Hall	Insulation	Sports Hall: Improve Insulation on DHW cylinder	Complete	n/a	
Organisation Wide	IT	Organisation Wide: IT Shutdown Procedure	Complete	Phased, from 2016/17	All student workstations with the exception of Engineering workstations are thin clients and small form factor to save energy; Auto switch-off of workstations has been partially successful: Staff workstations: Switch to standby mode after 30 mins; Auto switch off at specific hours trialed and abandoned due to staff complaints re policy hampering pc simulations and other programs that were running; switching to hibernation mode also abandoned due to same reasons (simulation interference) Student workstations: pre-virtual client, forced shutdowns overnight, weekends, and holidays saved an

Building/Area	Category	Building/Area: Description of Recommendation	Project Stage	Date for Completion	Comments (Responsibility)
					estimated 3.2 million PC hours/year; over the past 2-4 years due to the virtual client roll out, all virtual clients switch off after being idle for 10 mins
QMH	Lighting	QMH: Upgrade Halogen spots to LED and T8 Lighting to T5	Complete	from 2016	Dining room - all led spots and T5 tubes in alcoves
Sports Hall	Lighting	Sports Hall: Upgrade T12 lighting to T5	Carry forward (CMP 2020/25)	2025	Not complete. Site wide review of move to LED lighting will be rolled out as part of 2020/25 CMP. (University Engineer)
Bamford Library	Lighting	Bamford Library: Upgrade Halogen spots to LED	Carry forward (CMP 2020/25)	2025	Not complete. Site wide review of move to LED lighting will be rolled out as part of 2020/25 CMP (University Engineer)
Foulkes Crowther	Lighting	Foulkes Crowther: Upgrade Halogen spots to LED and T8 Lighting to T5	Carry forward (CMP 2020/25)	2025	Not complete. Site wide review of move to LED lighting will be rolled out as part of 2020/25 CMP (University Engineer)
Weston	Lighting	Weston: Upgrade Halogen Spots to LED	Complete	n/a	
Main Building	Lighting	Main Building: Upgrade T8 Lighting to T5	Carry forward (CMP 2020/25)	2025	Not complete. Site wide review of move to LED lighting will be rolled out as part of 2020/25 CMP (University Engineer)
Organisation Wide	Load management	Active management of loads and triad periods	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 CMP (Facilities, Utilities & Waste Manager (Lead) University Engineer)
Organisation Wide	M&T	Organisation Wide: Improve Monitoring and Targeting	Carry forward (CMP 2020/25)	2025	Being reviewed as part of the Briar Associates revisiting of the STEP project with the 2020/25 CMP (Facilities, Utilities & Waste Manager)
Organisation Wide	Onsite generation and renewables	Energy project: solar PV	Complete	n/a	
Organisation Wide	Onsite generation and renewables	Energy project: Biomass boiler	Complete	n/a	
Organisation Wide	Onsite generation and renewables	Ground mounted solar	Complete	n/a	
Organisation Wide	Onsite generation and renewables	Explore opportunities for on and off-site wind	Rejected	n/a	Rejected - studies undertaken demonstrated this was not feasible as a large-scale project.
Organisation Wide	Onsite generation and renewables	Explore energy storage opportunities	On hold	2030	Current 2020/25 CMP does not include for this but might be revisited as part of a wider strategy. Potential solution for Net Zero ambitions by 2030.
Organisation Wide	Reporting	Make energy and carbon data available to staff and students	Ongoing	n/a	EMR information submitted annually. Detail to be included in Sustainability web pages (Facilities, Waste & Utilities Manager (Lead) Environmental & Sustainability Manager)

Building/Area	Category	Building/Area: Description of Recommendation	Project Stage	Date for Completion	Comments (Responsibility)
Reporting	Reporting	Report carbon emissions annually	Ongoing	n/a	Estates Management Record information submitted annually. Participation required in SERC.
Reporting	Reporting	Data validation and third-party assurance	Ongoing	n/a	Ongoing part of EMR and DEC annual processes. Independent consultant retained to produce annual reports on progress against the 2020/25 CMP
Organisation Wide	Surveys and assessments	Conduct infrared survey of buildings	Complete	n/a	
Organisation Wide	Training and awareness	Staff training on "switch off"	Carry forward (CMP 2020/25)	Ongoing	Developed as response to Environmental Sustainability Strategy 2020/25: Staff induction slides (revised inc. Environmental Policy, April 2020); Two new environmental e-learning modules (voluntary, SkillsGate, March 2020); STEP tours for internal/external parties; Face to Face Training (Sept 2020) (Environmental & Sustainability Manager (Lead), Facilities, Waste & Utilities Manager)
Organisation Wide	Training and awareness	Annual staff and student survey to identify issues / good possible projects	Carry forward (CMP 2020/25)	Oct-20, annually	To be developed as part of the CMP/ESS 2020/25 Strategy (Environmental & Sustainability Manager (Lead), Facilities, Waste & Utilities Manager)
Organisation Wide	Training and awareness	Energy competitions in Halls of residence	Carry forward (CMP 2020/25)	Jan-21	Subject to funding and global pandemic, consideration being given to running NUS Student Switch Off (or similar) for 2020/21. Discussions ongoing with SU and accommodation team. (Environmental & Sustainability Manager (Lead), Accommodation Manager, Students' Union Director)
Organisation Wide	Training and awareness	Introduce incentives to encourage students and staff to walk/cycle	Carry forward (CMP 2020/25)	Ongoing	Rural Location results in higher levels of SOV. Current incentives to include sustainable travel inc. cycle to work scheme (staff); taxi shuttle bus service (students, Newport-Edgmond); JVS EV charge points (completion Q4 2020) and a new sustainable campus map details shower/change facility, cycle parking etc. Student cycle hire packages available for loan subject to small fee. (Environmental & Sustainability Manager (Lead), Organisational Development Manager, Assistant Head of Student Services)
Organisation Wide	Training and awareness	Staff and student "energy and carbon champions"	Carry forward (CMP 2020/25)	Jan-21	Developed as response to Environmental Strategy 2020/25; review of ESWG/ sustainable governance (Environmental & Sustainability Manager (Lead), Facilities, Waste & Utilities Manager)

Appendix D: Carbon Emissions Key Performance Indicators

Indicator Profile Record

KPIs will align with emissions captured as per scope 1 and 2, therefore excluding any scope 3 emissions, notably water consumption/disposal and waste generation. The latest year/reporting period conversion factors will be sourced from Gov.uk GHG reporting publication⁴.

Carbon Emissions (Electricity)

Indicator reference	Set	Carbon Emissions (Electricity)	Indicator(s)	Tonnes CO ₂ Tonnes CO ₂ / per student/staff FTE	
Indicator details	Annual kWh consumption, converted to tonnes CO ₂ , normalised by HESA student/staff FTEs				
Topic area	Electricity consumption and management				
Interested parties	Environmental Sustainability Manager / Facilities, Utilities and Waste Manager				
Intended purpose	Reduce carbon baseline / achieve Carbon Management Plan reduction targets				
Data required	Timing	Location	Scope	Measurement (unit)	Type
	Monthly (report financial year)	Whole University Estate	Campus and non-campus buildings (residences)	kWh	A
Data source	Electricity utility bills, Supplier HHD meter reads, University AM&T system				
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities Inclusive of generation and transmission & distribution factors (as per GHG protocol definitions) Where normalised (staff/student FTE), datasets from EMR will be applied				

⁴ <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

Carbon Emissions (Gas)

Indicator reference	Set	Carbon Emissions (Gas)	Indicator(s)	Tonnes CO ₂ Tonnes CO ₂ / per student/staff FTE	
Indicator details	Annual kWh consumption, converted to tonnes CO ₂ , normalised by HESA student/staff FTEs				
Topic area	Gas consumption and management				
Interested parties	Environmental Sustainability Manager / Facilities, Utilities and Waste Manager				
Intended purpose	Reduce carbon baseline / achieve Carbon Management Plan reduction targets				
Data required	Timing	Location	Scope	Measurement (unit)	Type
	Monthly (report financial year)	Whole University Estate (Cedar and University)	Campus and non-campus buildings (residences)	kWh	A
Data source	Gas utility bills, AMR meter reads, site AM&T system				
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities Where normalised (staff/student FTE), datasets from EMR will be applied				

Carbon Emissions (LPG)

Indicator reference	Set	Carbon Emissions (LPG)	Indicator(s)	Tonnes CO ₂	
Indicator details	Annual kWh consumption, converted to tonnes CO ₂				
Topic area	LPG consumption and management				
Interested parties	Environmental Sustainability Manager / Facilities, Utilities and Waste Manager				
Intended purpose	Reduce carbon baseline / achieve Carbon Management Plan reduction targets				
Data required	Timing	Location	Scope	Measurement (unit)	Type
	Monthly (report financial year)	Whole University Estate	Campus and non-campus buildings (residences)	kWh	A
Data source	LPG utility bills, supplier invoices, site AM&T system				
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities				

Carbon Emissions (University owned / operated fleet fuel)

Indicator reference	Set	Carbon Emissions (University owned / operated Fleet Fuel)	Indicator(s)	Tonnes CO ₂	
Indicator details	Annual total litres (diesel/petrol, where appropriate) consumption, converted to tonnes CO ₂				
Topic area	Fleet fuel consumption and management				
Interested parties	Environmental Sustainability Manager; Facilities, Utilities & Waste Manager				
Intended purpose	Benchmarking; target improvements; reduce associated carbon baseline				
Data required	Timing	Location	Scope	Measurement (unit)	Type
	Monthly (report financial year)	Whole University Fleet	All Estates owned/operated fleet vehicles	Litres	A
Data source	Farm banded (white diesel) pump metered supply. Fuel card data reports, where appropriate (All Star)				
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities				

Total Renewable Energy Generation

Indicator reference	Set	Total Renewable Energy Generation (on site)	Indicator	Tonnes CO ₂	
Indicator details	Total annual energy generated through renewable energy sources for the whole estate. Annual kWh consumption, converted to tonnes CO ₂				
Topic area	Renewable low carbon energy generated on site				
Interested parties	Environmental Sustainability Manager; Facilities, Utilities & Waste Manager				
Intended purpose	Benchmarking; target improvements; reduce associated carbon baseline				
Data required	Timing	Location	Scope	Measurement (unit)	Type
	Monthly (report financial year)	Whole University Estate (Cedar and University)	Total Renewable energy (kWh) generated on site (aggregated from biomass heat energy; solar PV electrical energy)	kWh	A
Data source	Bill Validation, Enteliweb A&MT				
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities Inclusive of biomass pellets & woodchips (as per GHG protocols)				

Total Generation of Electricity Exported to Grid

Indicator reference	Set	Total generation of electricity exported to grid	Indicator	kWh		
Indicator details	Total generation of electricity exported to the National Grid for the whole estate					
Topic area	Renewable low carbon energy generated on site exported to grid					
Interested parties	Environmental Sustainability Manager; Facilities, Utilities & Waste Manager					
Intended purpose	Benchmarking; target improvements; reduce associated carbon baseline					
Data required	Timing	Location	Scope	Measurement (unit)	Type	
	Monthly (report financial year)	Whole University Estate (Cedar and University)	Total Renewable energy exported (kWh) generated on site (aggregated from solar PV electrical energy and CHP electrical energy)	kWh	A	
Data source	Enteliweb A&MT					
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities					

Heat Consumed from Onsite CHP

Indicator reference	Set	Heat consumed from onsite CHP	Indicator	Tonnes CO ₂		
Indicator details	Annual kWh consumption, converted to tonnes CO ₂					
Topic area	Low carbon energy generated on site					
Interested parties	Environmental Sustainability Manager; Facilities, Utilities & Waste Manager					
Intended purpose	Benchmarking; target improvements; reduce associated carbon baseline					
Data required	Timing	Location	Scope	Measurement (unit)	Type	
	Monthly (report financial year)	Whole University Estate (Cedar and University)	Total heat energy generated by CHP onsite	kWh	A	
Data source	Enteliweb A&MT					
Additional notes	Tableau Visualisation developments during 2020 will generate automated dashboards Excludes Farm and related activities This will be included in the energy consumption totals but excluded from the scope 1 and 2 carbon emissions.					