

## The Estates Department's Carbon Strategy 2017/18-2020/21

### Statement of Support

We support the commitment of the University to be a low carbon organisation and to reach our target to reduce our carbon emissions by 23% by 2020 against our 2005 consumption.



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Director of Estates

### 1.0 Introduction

The Estates Carbon Strategy document is designed to support the Estates Department's 2010 Carbon Management Plan. The Carbon Management Plan sets out the University's objective to reduce its scope 1 and 2 carbon emissions by 23% in absolute terms by 2020, against a 2005 baseline.

The University's target reduction between 2010/11 and 2016/17 was to reduce carbon emissions to 14,998 tCO<sub>2</sub>. The actual emissions as at 31 July 2017 was 14,657 tCO<sub>2</sub> per annum.

The Carbon Strategy provides an oversight of the reasons why it is necessary to reduce carbon emissions, and an update on how the Carbon Management Plan is progressing. Further the Strategy details the wide ranging methodologies used, together with the underlying targets, to achieve the required reduction in carbon emissions.

As we approach 2020 we continue to acknowledge that lower carbon emissions will be achieved by reducing demand, improving energy efficiency, investing in renewable energy sources and promoting environmental awareness.

### 2.0 Drivers for Carbon Management

The University is one of the largest regional providers of higher education in the South East with two main campuses in Canterbury and Medway. The day to day operation of buildings uses large amounts of energy through heating, lighting and cooling and thus the effective management of the estate plays a major part in improving efficiency through carbon reduction. The challenges include making improvements and modifications to infrastructure and facilities and introducing behavioural change which continue to meet the needs of students, staff and

stakeholders and support the University's reputation and strategy for carbon reduction.

The following drivers are fundamental influences to the way in which we currently manage carbon, and how they will be managed in the future.

## **2.1 Environmental drivers**

Climate change, resulting from carbon emissions is one of the major global challenges facing us today. Across the higher education sector universities are putting in place strategies to reduce carbon emissions issue in their long-term business planning.

The second major issue driving carbon management policies is resource depletion, particularly of fossil fuels such as oil, gas and coal and the subsequent volatility of prices.

## **2.2 Legal Drivers**

In the Climate Change Act 2008 the UK Government agreed legally binding carbon reduction targets of 34% by 2020 and 80% by 2050 for the UK, with 1990 as the baseline year. To achieve these ambitious targets organisations are required to report on carbon emissions and to comply with an ever increasing number of legal requirements.

### **2.2.1 Carbon Reduction Commitment (CRC)**

The CRC was introduced as part of the Climate Change Bill and imposes a mandatory carbon trading and 'cap and trade' systems for large businesses and public sector organisations. The University of Kent is required to report annually on carbon emissions from gas, electricity and other fuel types and to purchase carbon emissions allowances. The Carbon Reduction Commitment Scheme will come to an end on 31<sup>st</sup> March 2019. The Climate Change Levy will be increased at this point to ensure that the overall cost of carbon will be the same nationally as when both the CRC and CCL charging schemes were in place.

### **2.2.2 Climate Change Levy**

The Climate Change Levy (CCL) is a tax based on the use of electricity and gas. The aim is to encourage organisations to improve energy efficiency. The CCL charge is included on the invoices from the energy supply companies. The Climate Change Levy will increase from 1<sup>st</sup> April 2019 to compensate for the closure of the CRC scheme as noted above.

### **2.2.3 Display Energy Certificates and Energy Performance Certificates**

The energy performance of buildings directive introduced a certification scheme for existing and new buildings, so their energy performance can be easily assessed. Buildings are ranked A – G, A being the most energy efficient. For the year 2016/17 60% of the University's buildings are graded at C or above. Display energy certificates are displayed in all University of Kent buildings above 250m<sup>2</sup>.

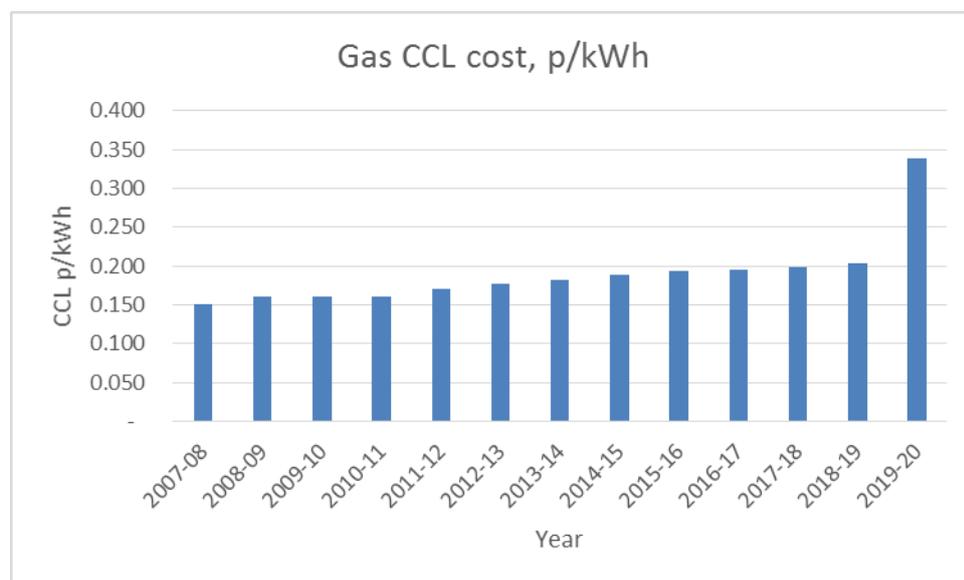
## 2.2.4 Energy Saving Opportunity Scheme (ESOS)

ESOS requires relevant organisations to audit their energy use in four-yearly cycles. This must be done by an approved ESOS assessor.

## 2.3 Financial Drivers

The total cost of electricity and gas purchased by the University in 2016/17 was £3.2M. The overall cost of energy is therefore a significant driver to control usage of energy.

Further the financial charges for carbon emissions are increasing. The graph below shows the cost of the climate change levy (CCL) and how it has increased over time. The large increase in 2019/20 is because the CRC scheme is being phased out and the charges associated with this are being incorporated in the CCL charge.



## 2.4 Sector Drivers

In January 2010 the Higher Education Funding Council for England (HEFCE) adopted carbon reduction targets on behalf of the higher education sector. HEFCE recalculated the UK national targets using the baseline year of 2005 to generate carbon reduction targets for the Higher Education sector of 43% by 2020, 83% by 2050 and intermediate carbon reduction targets of 12% by 2012 and 29% by 2017.

In accordance with the UK Government and HEFCE Guidance, the University of Kent's Carbon Management Plan set an institution specific carbon reduction target of 23% by 2020. This target reduction rate is slightly ahead of the reduction rate required to hit the long term requirement to achieve an 83% reduction in carbon emissions by 2050. All Higher Education Providers are required to submit an annual return to HESA which includes data on utilities consumption, scope 1, 2 carbon emissions, and some scope 3 carbon emissions. The record was established to provide the Higher Education sector with standardised, reliable and useful information to help managers understand current performance, promote sharing of best practice and drive improvements.

## **2.5 Local Drivers**

### **2.5.1 Environment Policy**

The University of Kent's Environment Policy was last updated and signed by the Vice Chancellor and Chair of Council in October 2016 and sets out our objectives and commitments to environmental management including:

- Reduce carbon emissions in accordance with the University's Carbon Management Plan
- Improve energy and water efficiency and reduce reliance on fossil fuels

### **2.5.2 ISO14001:2015**

The University of Kent operates an Environmental Management System (EMS) certified to ISO14001:2015. This system requires us to identify our significant environmental aspects and develop a programme of improvement, identify relevant legislative requirements and ensure operational control in order to achieve continuous improvement in environmental performance.

### **2.5.3 Carbon Trust Standard**

The Carbon Trust Standard is a voluntary certification awarded to organisations that take a best practice approach to measuring and managing their environmental impacts, achieving real reductions in year on- year. The University works with this scheme as this provides an external assessment of the University's performance.

### **2.5.4 Reputation and Image**

The University of Kent prides itself on its reputation for being a forward-thinking institution within the top 20 universities in the country. Much of the information regarding environmental performance within the sector is in the public realm and there are a number of national and international league tables for environmental performance in higher education which are pushing forwards improvements across the sector.

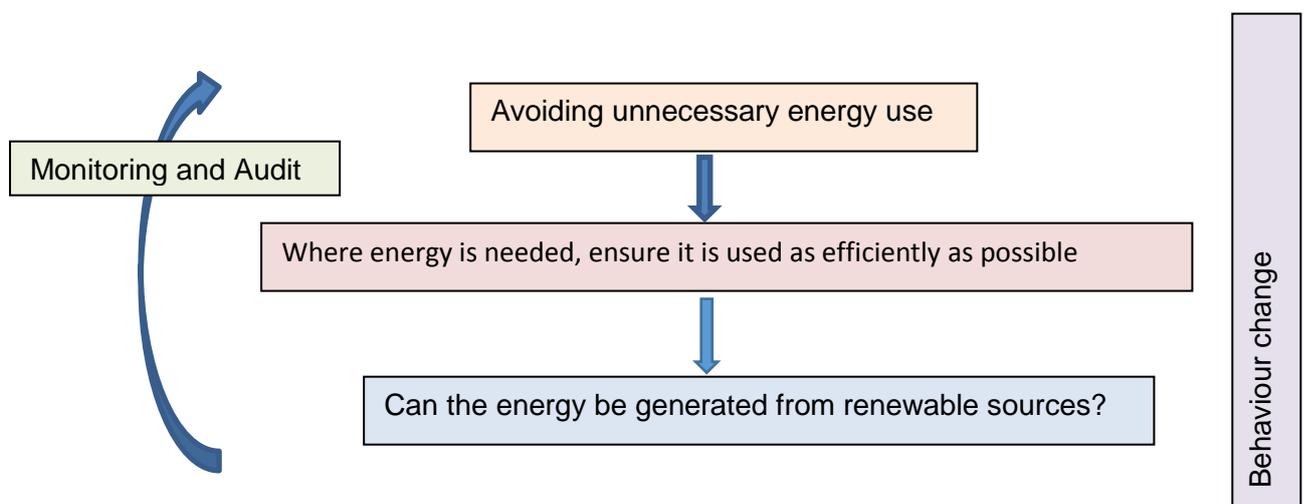
### 3.0 Principles of the Carbon Management Strategy

#### 3.1 Key Elements

The key elements of the University's Carbon Management Strategy are as follows:

1. Reduce the demand for energy – e.g. avoid unnecessary heating and cooling and improve insulation
2. Efficient use of resources – e.g. optimising performance of the Building Management Systems (BMS) investing in low energy heating and lighting systems
3. Decarbonising – e.g. renewable energy systems

This approach can be considered an energy use hierarchy.



When embarking upon a carbon reduction programme, actions from the top of the hierarchy should be prioritised over those lower down. Behaviour change should not be considered as a separate 'step' in the hierarchy but rather should be considered at every stage of Carbon reduction.

#### 3.2 Emissions Scopes

Carbon Emissions are referred to as scope 1, 2 or 3 and are defined as follows:

Scope 1: Emissions that arise directly from sources that are owned or controlled by the University, for example from fuels used in our boilers or vehicles owned by the university

Scope 2: Emissions generated by purchased electricity consumed by the University

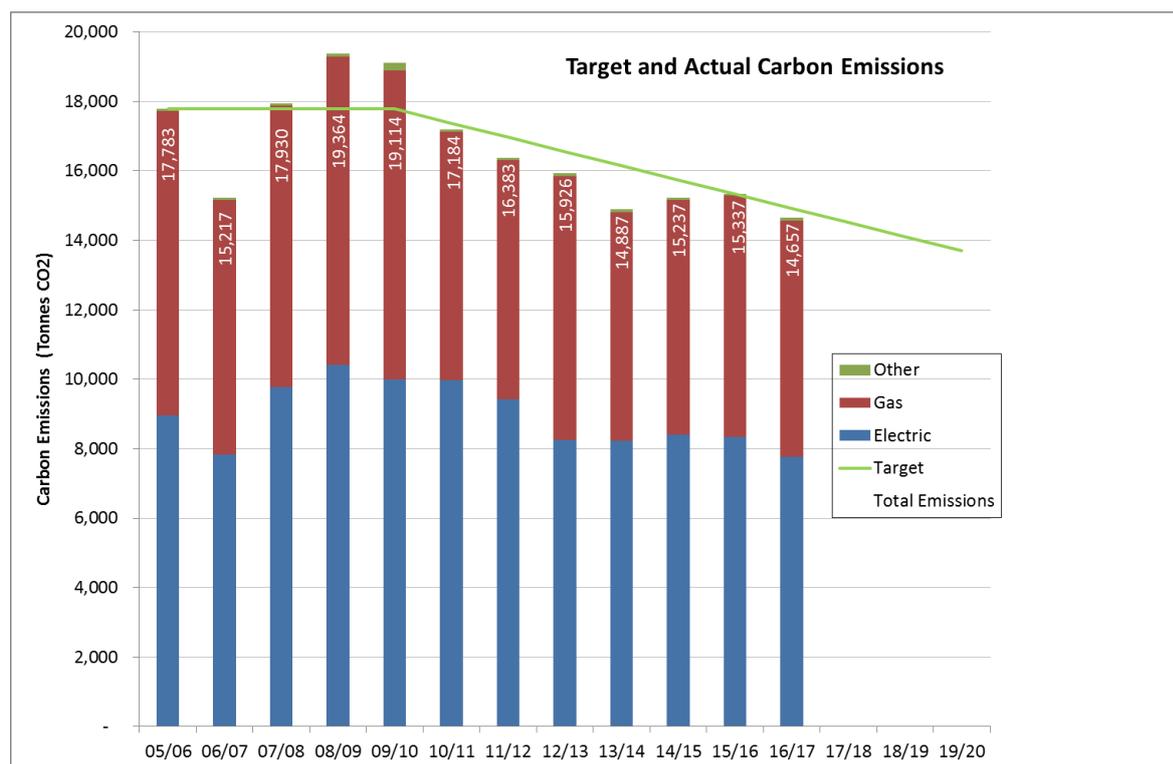
Scope 3: Emissions that arise as a consequence of the activities of the University but occur from sources not owned or controlled by the organisation. This includes emissions associated with business travel, procurement, commuting and waste.

### 3.3 Emissions baseline and targets

In line with the HEFCE reduction target and strategy for higher education in England, the University of Kent’s emissions (scope 1 & 2) baseline year is taken as 2005.

Our overall target as expressed in the Carbon Management Plan is for a 23% absolute reduction in carbon emissions by 2020 compared to the baseline year. This means we will need to achieve a reduction of 4,156 tCO<sub>2</sub> by 31 July 2020.

Our progress to date is shown in the graph below.



We are currently on track to meet our target for 2020.

Based on a 2.3% reduction per year (2010-2020) our target carbon emissions for the next 3 years are as follows.

Year	Carbon Emissions (Tonnes/CO <sub>2</sub> )
2017/18	14,582
2018/19	14,167
2019/20	13,751

### 3.4 Key Performance Indicators

In addition to the overall carbon emissions targets, a number of KPIs will be used to monitor carbon emissions on an annual basis. For each KPI, a trigger point will be determined whereby an increase of a specified amount within a specified timeframe will trigger further investigations or actions to take place. These KPIs are detailed in Appendix 1.

#### **4.0 Progress against the Carbon Management Plan 2010-2017**

The University's Carbon Management Plan was published in 2010. The plan included a series of measures and the University has implemented a number of these including:

##### Building Management System (BMS)

The BMS System provides central control of the heating and cooling system across the Canterbury and Medway Campuses. It is overseen by the Head of Energy & Environment and monitored on a daily basis by the Maintenance section of the Estates Department to ensure optimum levels of heating and cooling across the University's estate.

##### Insulation

The thermal performance of buildings has been improved by fitting loft insulations. Heat losses from heating systems have been reduced by fitting insulation to pipework, valves and heat transfer units.

##### Metering/Sub metering of gas, electricity and water consumption

By taking regular monthly meter readings, areas of excess consumption have been identified, monitored and where appropriate, action taken to reduce consumption. The main area of improvement has been in identifying water leaks.

##### Lighting

The University has invested in more efficient LED lighting and automatic lighting controls. These two measures have significantly reduced electricity consumption from lighting.

##### Boilers and Calorifiers

Obsolete and/or inefficient boilers have been replaced with condensing boilers, reducing the energy consumption required for heating. Similarly, some calorifiers have been replaced with plate heat exchanges which are more efficient and minimise heat loss.

##### Renewables

Solar panels have fitted as part of the construction of new buildings which generate electricity with zero carbon emissions. The total installed PV capacity on the Canterbury campus exceeds 150KW.

#### **5.0 The Vision for Carbon Management 2017-2020**

The Estates Department's Carbon Management strategy has been broken down into three key categories which reflect the carbon management hierarchy:

- a) Monitoring, measurement and behaviour change
- b) Systems and Processes
- c) Infrastructure

Together they address sustainable carbon management through:

- identifying where energy is used excessively, changing user behaviours to reduce usage and monitoring the effectiveness of energy use strategies
- ensuring that University systems and procedures are in place to ensure efficient use of energy
- investing in energy efficiency and renewable energy technologies.

All aspects of energy consumption at the University can be controlled through one of the three key categories and in many cases across two or more. Furthermore, it is helpful to understand the difference between how energy is used in residential versus non-residential buildings. The table below shows the focus for carbon reduction for each aspect of energy use.

Aspect	Area		Focus for Carbon reduction		
	Residential	Non-residential	Infrastructure/equipment	Systems/Processes	Behaviour Change
BMS	✓	✓	✓		
Boilers	✓	✓	✓		
Construction		✓	✓	✓	
Local heating, cooling and ventilation	✓	✓	✓		✓
Lighting (indoor)	✓	✓	✓		✓
Lighting (outdoor)	✓	✓	✓		
Personal IT equipment		✓		✓	✓
Communal IT equipment (teaching space, study hubs)	✓	✓		✓	✓
Other electrical equipment	✓	✓			✓
Printing		✓	✓	✓	✓
University fleet		✓	✓		✓
Hot water usage	✓	✓			✓
Catering areas and equipment	✓	✓	✓		✓
Laboratories		✓	✓		✓
Business travel		✓		✓	✓
Commuting		✓			✓
Water consumption	✓	✓	✓		✓
Waste disposal	✓	✓			✓
Procurement		✓		✓	
Monitoring x	✓	✓	✓	✓	✓

x Although not technically a method in itself for reducing demand, effective monitoring of usage is an essential tool for further developing reduction plans. Ideally this data should be accessible to building users and used both as a tool to identify areas of inefficiency and as a powerful visual awareness raising tool.

## 6.0 Implementation of Carbon Reduction at the University

Carbon emissions arise from a wide range of activities undertaken by the University's operations. The sections below set out the areas the University is currently focusing on. Each section details the aims and objectives with regard to reducing carbon emissions. The individual sections are interlinked and support each other to give a good overall methodology to address the issue of carbon emissions.

### 6.1 Metering

**Aim:** To introduce remote, smart metering across the Canterbury and Medway campuses to produce real-time data on consumption which is available centrally and at the point of use.

#### Key Objectives:

- Develop a timescale for the installation of remote, smart metering across campus with full coverage by 2020.
- Investigate and purchase software to collect, store and visually represent consumption data.
- Work with the Information Services Department to develop a platform which enables building users to access and display real-time energy data.

### 6.2 Monitoring

**Aim:** To use detailed consumption data to identify issues, target energy efficiency investment and behaviour change programmes and raise user awareness of energy consumption.

#### Key Objectives:

- Develop monitoring systems to identify unexpected or significant increases in energy use over short, medium or long-term timescales.
- Compare building consumption and usage patterns to sector benchmarking data to identify opportunities for improvement.
- Develop reporting mechanisms to raise issues around utility consumption in building with senior managers based in those buildings.
- Develop and monitor KPIs for energy use at the campus and building level.
- Begin monitoring of scope 3 emissions and develop KPIs and objectives where appropriate.

### 6.3 Behaviour change

**Aim:** To develop and implement a culture change programme aimed at raising awareness, influencing School and Department activities and changing individual behaviours.

**Key Objectives:**

- In line with the Sustainability Engagement and Communication Strategy, develop the 'FutureProof' programme, rolling out to new cohorts of Schools or Professional Services Departments every 4 months
- Informed by energy data, building audits or other indicators, develop bespoke behaviour change actions targeting specific individuals or behaviours
- Use real-time energy monitoring to develop residential building energy competitions

## 6.4 Communication

**Aim:** To raise awareness of carbon management activities and celebrate success through formal reporting, publications and social media.

**Key Objectives:**

- Report termly to the Environmental Sustainability Team on progress against key objectives, KPIs and targets.
- Ensure significant energy efficiency projects and achievements are submitted to campus online for publication to the wider university community.
- Share carbon management information with the Sustainability team for inclusion in twitter updates and sustainability blog articles.
- Develop carbon management web pages and keep up-to-date with data, progress and news relating to carbon management activities.
- Produce annual update for the University's annual Sustainability successes report.

## 6.5 Systems and processes

Review existing University systems, policies and procedures with the objective of reducing energy consumption. Introduce new systems, policies and procedures with other Schools and Departments which will assist with energy consumption. Examples of these include working with Information Services to develop shut-down systems for communal IT equipment and with Finance to confirm policies for business travel modes.

## 6.6 Information Technology

**Aim:** To work with Information Services, Procurement and Design and Print to deliver sustainable IT and printing services across the University.

**Key Objectives:**

- Put into place systems and processes to ensure that IT equipment in communal spaces is used as efficiently as possible including exploring options for remote switch-off of equipment.

- Work with Information Services to ensure that energy efficiency options are enabled during the set-up of managed desktop computers.
- Contribute to the development of a University-wide printing strategy
- Work with Procurement to develop minimum specification and best practice standards for personal IT equipment.

## 6.7 Building Performance

**Aim:** To ensure that new and existing building performance is maximised with respect to energy use and that issues are investigated and acted upon accordingly.

### Key Objectives:

- Define and implement a process of investigating discrepancies between Energy Performance Certificates (EPC) and Display Energy Certificates (DEC).
- Review building user guides for new and refurbished buildings to ensure they include details of energy efficiency measures and efficient operation of heating and lighting systems.
- Conduct audits of all buildings where the DEC falls below D rating and develop actions plans to improve performance.
- Review O&M Manuals to identify all energy efficient systems of new and refurbished buildings.
- Obtain external advice on improving the energy efficiency of laboratories including the efficient operation of fume cupboards and air circulation equipment.

## 6.8 Compliance

**Aim:** To clearly demonstrate pro-active compliance with all relevant environmental legislation and to plan work accordingly.

### Key Objectives:

- Develop a 5-year timetable for legal requirements to include all time-sensitive compliance obligations.
- Cross reference above timetable with EMS-requirements to ensure compliance can be effectively audited within the Environmental Management System
- Identify those individuals with operational responsibility for delivery of actions for legal compliance and identify any training needs.
- Develop effective F-Gas procedure to ensure compliance within the Estates department and roll this procedure out to Kent Hospitality.

## 6.9 Infrastructure

Promote the investment of energy efficiency technologies across the estates and in the design of new buildings and infrastructure projects. Where financially viable introduce these technologies in existing buildings and infrastructure.

## 6.10 Energy Investment

**Aim:** Continue to utilise the Salix Revolving Green Fund, together with University direct funding, to deliver energy efficiency and water saving projects across the campus. Identify and where possible access additional grants and interest free loan funding from external bodies.

### Key Objectives:

- Replacement of boilers in the Central Boiler House at the Canterbury Campus.
- Installation of a Combined Heat and Power plant at the Canterbury Campus which supports the District Heating system.
- Identify and implement energy efficiency measures in line with the Salix Revolving Green Fund.
- Identify and implement carbon saving measures in line with available budget and optimise the spend.

## 6.11 New buildings and Infrastructure

**Aim:** Ensure that all equipment, fixtures and fittings installed as part of a capital project build/refurbishment meet a minimum standard for energy efficiency.

### Key Objectives:

- Develop, in conjunction with the Projects team, a suite of standard specifications for provision of lighting, water fittings, boilers, meters, ventilation and cooling equipment and other energy plant.
- Ensure effective communication with the Projects team and the Energy and Environment team.

## 6.12 Existing building and infrastructure

**Aim:** Identify and implement energy efficiency and carbon saving measures in existing buildings and site infrastructure.

### Key Objectives:

- Head of Energy & Environment to ensure the Energy and Water Management Action Plan is updated and developed annual.

## 6.13 Procurement of utilities

**Aim:** Ensure utilities are procured in line with Value for Money principles.

**Key Objectives:**

- Recommendations on the purchase of utilities to be made by the Energy Risk Management Group. Head of Energy & Environment to ensure the ERMG have access to current and accurate information on the energy market and University consumption data.

## 7.0 2020 and Beyond

The current Estates Department's Carbon Strategy 2017/18- 2020/21 will operate until summer 2021. A new Carbon Strategy will be produced in 2020-21 ready to support Phase 2 of the Carbon Management Plan which will outline the University's commitments up to 2030.

The Estates Department will ensure that consideration is given to what happens beyond 2020 throughout the lifetime of this strategy by:

- Keeping up-to-date on what is happening across the sector and through the Office for Students.
- Regularly reviewing improvements in renewable energy technologies and costs of renewable energy systems to determine suitability for use at the University.
- Ensuring that carbon emission reduction remains an ongoing objective for the University.
- Including carbon management considerations in the development of the University's campus masterplan.

## Appendix 1. Carbon Management KPIs

KPI	Type	Units	Residential	Non-Residential	Total	Trigger Point	Action
Total Electricity	Absolute	kWh	✓	✓	✓	Increase in annual consumption	Identify where the increase arises from, and whether it is due to change in use, or take action to fix the cause
Total Electricity	Relative	kWh/m2	✓	✓	✓	N/A	The change in absolute electricity annual consumption is the trigger
Total Gas	Absolute	kWh	✓	✓	✓	Increase in annual consumption	Identify where the increase arises from, and whether it is due to change in use, or take action to fix the cause
Total Gas	Relative	kWh/m2	✓	✓	✓	N/A	The change in absolute gas annual consumption is the trigger
Total Fuel	Absolute	litres			✓	25% Increase in annual consumption	Identify where the increase arises from, and whether it is due to change in use, or take action to fix the cause
Total Renewables	Absolute	kWh			✓	25% reduction in output	Identify where the reduction arises from, and whether it is due to change operating conditions, or take action to fix the cause
DEC A	Absolute	m2	✓	✓	✓	Decline of 2 rating positions or 75 points whichever is least (applies to individual buildings)	Building audit
DEC B			✓	✓	✓		
DEC C			✓	✓	✓		
DEC D			✓	✓	✓		
DEC E			✓	✓	✓		
DEC F			✓	✓	✓		
DEC G			✓	✓	✓		

<b>KPI</b>	<b>Type</b>	<b>Units</b>	<b>Residential</b>	<b>Non-Residential</b>	<b>Total</b>	<b>Trigger Point</b>	<b>Action</b>
F-Gas Emissions	Absolute	tCO <sub>2</sub> equivalent			✓	Emissions exceed 250 tonnes CO <sub>2</sub> equivalent in a year	Identify where the increase arises from, and take action to fix the cause
Total air travel	Absolute	km			✓	N/A	This is outside Estates area of control
Total rail travel	Absolute	km			✓	N/A	This is outside Estates area of control
Total grey fleet	Absolute	km			✓	N/A	This is outside Estates area of control