



The Centre for Sustainable Design

Carbon Management Plan 3.0
University for the Creative Arts
2015 to 2020

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The Centre for Sustainable Design®

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Summary

This report is the third Carbon Management Plan (CMP3) of The University for the Creative Arts (UCA). It details plans from academic year 2015/16 to 2019/20 to continue to reduce carbon emissions resulting from University operations. The document also outlines the University's progress in managing and reducing carbon emissions since the publication in 2013 of its second Carbon Management Plan (CMP2).

Between 2011/12 and 2014/15 there has been a 16% reduction in carbon emissions from buildings (gas consumption and electricity use). UCA's withdrawal from Maidstone campus in 2012/13, the completion of six carbon reducing projects and the partial completion of eleven further projects contributed to the reduction. Projects included the installation of new efficient boilers and new lighting and lighting controls at Farnham and Epsom campuses.

The progress of UCA's Carbon Management Plan has been recognised in an independent report published in September 2015 (*2020 Carbon Target Progress Report for Academic Year 2013/14 completed by BriteGreen Consultancy*). The report ranks one hundred and twenty-seven English Universities against their 2020 emissions reductions targets. UCA is ranked in 21st place in terms of percentage change in absolute emissions in 2013/14 compared to 2005. This is the highest ranking for any English specialist creative arts university.

CMP3 establishes a 2014/15 baseline for carbon emissions from buildings of 4,576 tonnes and sets the key reduction targets;

- The University aims to reduce CO₂ emissions from University buildings (gas consumption electricity use) by 14.5% by 2019/20 against the new 2014/15 (CMP3) baseline figure
- The University aims to reduce Scopes 1 and 2, and measured Scope 3 (gas consumption and electricity use), CO₂ emissions by 37% by 2019/20 (3,912 tonnes) against the 2005 baseline (6,188 tonnes).

In order to meet the targets CMP3 outlines a series of carbon reducing projects and activities between 2015/16 and 2019/20. Projects that are expected to be undertaken from 2015/16 will contribute a reduction of 559 tonnes of carbon per year by 2019/20 at a cost of £6.6 million; £6.02 million from Planned Maintenance Projects (PMP) with carbon reducing potential and £0.58 million from Carbon Reduction Projects (CRP). These projects are expected to achieve a total saving on energy bills of £0.64 million between 2015/16 and 2019/20.

These projects on their own will not enable UCA to meet the 2019/20 absolute carbon target of 3,912 tonnes, because of expected 'step changes' in energy consumption by Estates & Facilities and projected annual increases in energy demand between 2015/16 and 2019/20.

Additional carbon reducing projects are described although the likelihood of these being undertaken is to be confirmed. The additional projects have an expected cost of £2.08 million and if all are implemented, the deficit against the 2019/20 target is expected to be just 9 tonnes, taking into account the increase in energy demand described above. Decisions on if and when these projects will be undertaken will be made in 2015/16.

CMP3 will be reviewed annually and progress reported in the UCA Annual Energy and Environment Report.

This report expands upon previous UCA Carbon Management Plans by introducing initial data on other Scope 3 indirect emissions including emissions from purchased goods and services and staff and student travel. However these data are not currently part of UCA's emissions target.

A broader Sustainability Strategy will be developed to cover the next 3-5 years. The new working model to deliver internal sustainability activities and projects will continue to be developed between Estates & Facilities and The Centre for Sustainable Design ® at UCA.

UCA will need to ensure the availability of appropriate budgets and/or finance for the delivery of CMP3 and other sustainability projects and activities.

1. Introduction

1.1 Climate Change

Climate change resulting from increasing carbon emissions is acknowledged as a critical threat to the environment. Its likely impact over the next 100 years has been set out by the Inter-Governmental Panel on Climate Change (IPCC). Under the Climate Change Act (2008), the government has set legally binding targets for the UK to cut greenhouse gas emissions by at least 80% by 2050 and at least 34% by 2020. At the United Nations Conference of Parties (COP21) Framework Convention on Climate Change in Paris in November 2015 over 200 countries reached agreement to aim to keep global temperatures from rising more than 2°C by 2100 with an ideal target of keeping temperature rise below 1.5°C. It is not yet known how the Paris Agreement will influence the development of European and UK regulation on public and private sector organisations.

1.2 Carbon Management Plans and definition of carbon emissions scope

Carbon Management Plans provide direction, management responsibilities and defined projects to achieve an organisational goal to reduce carbon emissions, over a set number of years measured against a baseline year. The term 'carbon emissions' is used throughout this document as shorthand for emissions of carbon dioxide gas equivalent (CO₂e).

Carbon emissions can arise from the direct and indirect activities of an organisation. The Greenhouse Gas Protocol classifies direct and indirect carbon emissions in terms of scope;

Scope 1, Direct emissions from the burning of gas, oil and other fuels including emissions from vehicles owned or controlled by the organisation

Scope 2, Indirect emissions, generated in the production of electricity consumed

Scope 3, Other indirect emissions that are a consequence of the activities of the organisation, but occur from sources not owned or controlled by the organisation. This includes activities such as commuting, business travel, air travel associated with the organisation's activities and waste disposal. It also includes the embodied carbon emissions from purchased goods and services.

1.3 UCA Carbon Management Plans

This report is UCA's third Carbon Management Plan (CMP3) and details the University's plans from academic year 2015/16 to 2019/20 to continue to reduce the carbon emissions resulting from its operations. CMP3 also outlines the university's progress in managing and reducing carbon emissions since the publication in 2013 of its second Carbon Management Plan (CMP2).

In line with requirements of the Higher Education Council for England (HEFCE), UCA published its first Carbon Management Plan (CMP1) in 2010, which established a 2007/08 total carbon emissions baseline of 6,714 tonnes. Total emissions comprised emissions from energy use (gas and own-vehicle fuel consumption (Scope 1), electricity use (Scope 2), and waste disposal and water supply and waste water treatment (Scope 3)).

CMP1 set a target for total emissions reduction of 36% by 2020 against actual recorded emissions in 2007/08 and a 37% reduction target for buildings emissions (gas (Scope 1) and electricity (Scope 2)) compared an estimated baseline in 2005.

Between the publication of CMP1 and the publication of CMP2 in 2013 a total of fifteen energy reduction projects were implemented by the university which delivered a 14% decrease in carbon emissions against the 2007/08 baseline.

CMP2 stated recorded total emissions of 5,995 tonnes of carbon in 2011/12 and set a total emissions reduction target of 28% by 2020 to 4,317 tonnes. This target equates to a 37% reduction in buildings emissions (gas and grid electricity) between 2020 (3,912 tonnes) and the 2005 estimated buildings baseline (6,188 tonnes).

CMP3 sets a measured carbon baseline of 4,576 in 2014/15 for grid electricity and natural gas. However, data for waste (Scope 3) are deemed to be an underestimate of actual waste disposed at UCA. Challenges with data accessibility have not been resolved at the time of writing. An internal project on waste at UCA will commence in February 2016 to further characterise waste arising, improve the accuracy and validation of waste data and establish a new approach to waste management and reduction based upon 'Circular Economy' thinking and in line with European policy development.

This report, however, expands upon previous UCA Carbon Management Plans by introducing initial data on other Scope 3 indirect emissions including emissions from purchased goods and services and staff and student travel.

2. Governance of CMP3

2014/15 has been a period of transition in the management of the UCA environmental programme, following the dis-establishment of the roles of Environmental and Energy Manager (E&EM) and Buildings Manager (BM) in 2014. Following dialogue with UCA Deputy Vice-Chancellor in July 2014, The Centre for Sustainable Design®, (CfSD), School of Craft and Design, UCA Farnham developed an internal consultancy model to support the strategic development of sustainability activities at UCA. In December 2014, CfSD was engaged by UCA Estates & Facilities to implement the model to address sustainability related projects and to specifically undertake a series of projects including a review of CMP2 and the delivery of CMP3.

The CMP3 has been developed by CfSD in conjunction with UCA Estates & Facilities and ongoing strategic advice relating to CMP3 and other elements of UCA's environmental and broader sustainability programme is being provided by CfSD to the Director of Estates & Facilities who is project manager of the Carbon Management Plan.

Progress on the plan implementation is reported within the UCA Energy and Environmental Report and presented annually to the Board of Governors. The report will include details on development of the CMP and will detail reductions achieved to date and progress against targets.

The Deputy Vice Chancellor is project sponsor for the CMP with responsibility at senior management level for the implementation of the CMP and reports regularly to the Leadership Team on progress of the overall programme.

The Environmental and Social Sustainability Working Group (ESSWG) chaired by the Director of The Centre for Sustainable Design® since November 2015, comprises representatives from the university leadership team and a range of disciplines within UCA, and is the primary forum for all matters relating to sustainability within the University. Regular reports on progress of the CMP will be provided to the ESSWG.

Other key staff with responsibility for delivering the Carbon Management Plan are set out in Appendix A and UCA Vision for Sustainability, Strategy for the Achievement of CMP3 and the Working Process for CfSD and Estates and Facilities are highlighted in Appendix B.

3. Objectives and Targets for CMP3

UCA has set the following key reduction targets.

- The University aim to reduce CO₂ emissions from University buildings (gas consumption electricity use) by 14.5% by 2019/20 against the new 2014/15 (CMP3) baseline figure
- The University aim to reduce Scope 1 and 2, and measured Scope 3 (gas consumption and electricity use), CO₂ emissions by 37% by 2019/20 against a 2005 baseline figures.

As highlighted above, the UCA Vision for Sustainability and Strategy for the achievement of CMP3 are given in Appendix B. It is important to note that a project on UCA Sustainability Strategy will be undertaken by The Centre for Sustainable Design® in 2016. Any changes to strategy relevant to the CMP will be communicated separately as an addendum to the Plan.

4. Review of progress since CMP2

This section examines progress against the key targets and objectives set out in CMP2.

4.1 CMP2 Baseline

CMP2 established a baseline of 5,995 tonnes of carbon for 2011/12. This comprised emissions from energy use, waste and vehicle fleet.

4.2 Review of Projects with carbon reducing potential

CMP2 identified forty-six projects between 2012/13 and 2019/20 that were predicted to contribute an annual reduction of 1,300 tonnes of carbon by 2019/20 (CMP 2 Appendix F). A review of project status in June 2015 involved the removal from the plan of three solar PV/thermal projects and three biomass boiler projects. The solar PV/thermal projects were removed from the plan because expected changes to *Feed In Tariffs* which made the schemes less financially viable and biomass projects were deemed not to be fit for purpose due to space constraints for boilers and fuel storage and delivery. Delivery dates for the majority of remaining projects were revised to reflect changes in priorities and expenditure on essential maintenance. The consequence of these revisions to planned projects from

2012/13 to 2019/20 is that the expected contribution of projects to carbon reduction over the eight year period is reduced from the original expectation of 1,300 tonnes to 747 tonnes of carbon.

Since CMP2 in 2011/12 six projects with carbon reducing potential have been completed at a cost of £954,274 (Appendix C). Over the three year period 2012/13 to 2014/15 the projects are estimated to have delivered cumulative financial savings on energy expenditure of £102,610 and carbon savings of 371 tonnes. In addition nine projects were partially completed, although the expected savings are not yet quantified (Appendix D)

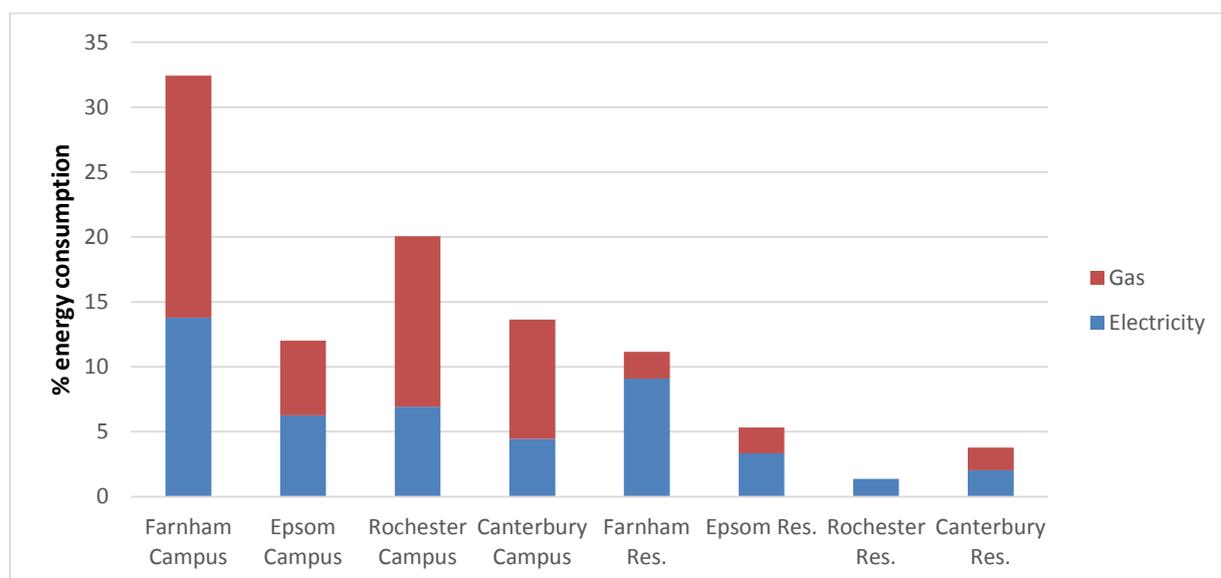
Many of the completed projects have included essential repairs and maintenance and as such have delivered an enhanced student and staff experience as well as improved energy efficiency and reduced carbon emissions.

Projects have included the replacement of the boiler and the installation of new lighting and lighting controls in Farnham’s John Luard Building, boiler replacement in the main building at Epsom and the phased installation of new energy efficient electric heating in Farnham’s student village. Further details of projects completed are given in Appendix C and projects partially completed in Appendix D.

4.3 Energy monitoring

Farnham is the largest UCA campus and together with its associated Halls of residence accounted for 44% of UCA energy consumption in 2014/15 (Graph 1). UCA took over the management of a student hall of residence in Rochester in 2014/15 and data in graph 1, shows energy consumption during the first four months of UCA management from April to July 2015.

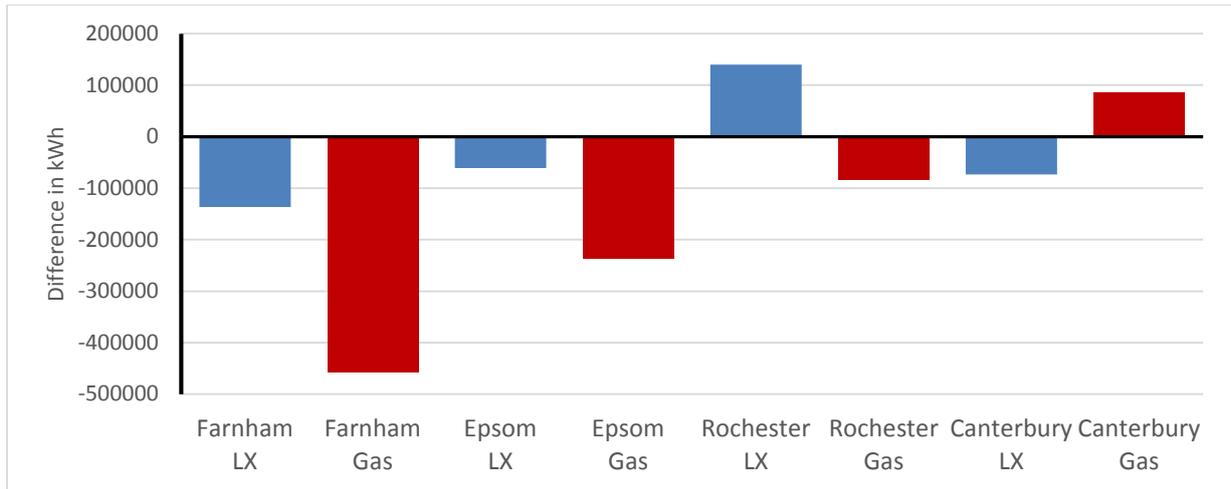
Graph 1. Relative (%) energy consumption (kWh) in 2014/15 of gas and electricity at each UCA campus and halls of residence.



The progress of CMP2 has been monitored and progress reported in Annual Energy and Environment reports for 2012/13 and 2013/14. The implementation of projects from CMP2 has delivered a significant reduction in the consumption of electricity and gas at the majority of campuses (Graph 2), with two exceptions. Electricity consumption at

Rochester has increased as UCA took over management responsibility for student hall of residence in 2015 and gas consumption has increased at Canterbury campus where it is expected that there are issues related to inefficient control of the Building Management System for heating in 2014/15. It is also important to note that in 2012 UCA divested from Maidstone campus, which had the effect of reducing overall UCA gas consumption by 15% and electricity consumption by 8%.

Graph 2. Comparison of energy consumption (kWh) in 2014/15 and 2011/12. Differences in electricity and gas consumption at each campus are shown.

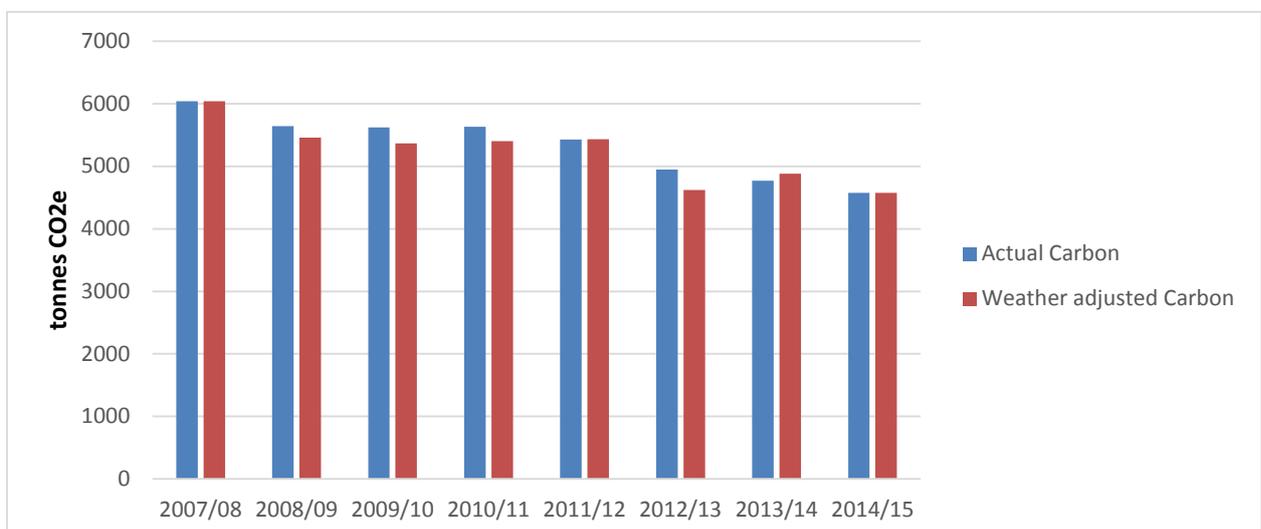


4.4 UCA Carbon emissions

The 2014/15 emissions of 4,576 tonnes from grid electricity and gas consumption demonstrate that UCA has made considerable progress towards meeting its 2019/20 building emissions target of 3,912 tonnes.

Carbon emissions in 2014/15 were 16% lower than the baseline set in CMP2 2011/12.

Graph 3. Annual carbon emissions (tonnes CO₂e) from energy consumption (natural gas and grid electricity) in buildings. Actual consumption and weather corrected emissions are shown. Weather corrections are calculated using 2007/08 as the base year.



Graph 3, shows actual carbon and weather corrected carbon emissions. The weather, in particular the external temperature, can have a significant effect on the annual energy consumption of a building. In years where the winter is colder than normal, the heating energy consumption will tend to be higher. Conversely when winters are milder, the annual energy consumption is likely to be lower than normal. So to compare the energy consumption of a building or organisation over time it is desirable to adjust the heating energy consumption to exclude the effects of variations in the external temperature and so give a better reflection of changes in underlying energy efficiency over time.

Annual Heating Degree Days recorded at the Heathrow (EGLL) weather station were used as the source of data for winter weather conditions using conditions in 2007/08 as the base year and all subsequent years as reference years. The method is used by UK government and endorsed by the Buildings Research Establishment (BRE).

Heating Degree Days in each of the years in which UCA has published a baseline (CMP1, CMP2 and CMP3) have been very similar. Hence the actual carbon emissions in 2007/08, 2011/12 and 2014/15 are directly comparable and the reduction in absolute emissions clearly evident.

4.5 Benchmarking UCA Carbon Reduction against other English Universities

An independent report was published in September 2015 (*2020 Carbon Target Progress Report for Academic Year 2013/14 completed by BriteGreen consultancy in collaboration with HEFCE*). The report, which attracted significant media attention assesses the progress in 2013/14 of one hundred and twenty seven English universities in against their 2020 emissions reduction targets. The *BriteGreen* report is based on emissions data in 2013/14 supplied by the Higher Education Statistics Agency (HESA) Estates Management Record (EMR).

UCA is ranked in 21st place in terms of percentage change (26.7% reduction) in absolute emissions in 2013/14 compared to 2005. This is the highest ranking for any English specialist creative university. For comparison, Norwich University of the Arts is ranked 24th, with a reduction of 25.99% and University of the Arts, London is ranked at 70th, with a 7.10% reduction in absolute emissions.

UCA's positioning in the report's other two rankings is even higher. UCA was placed in 8th position for the percentage change in emissions by metre-squared of floor area and in 12th position for % change in emissions by income.

Overall, however the university sector has fallen behind on carbon emissions reduction, with absolute emissions for the sector as whole rising by 14,500 tonnes and it is projected that by 2020 the sector as whole will have reduced absolute carbon emissions by 12%. This is well below the overall universities sector target of 43% reduction against the 2005 baseline, set by HEFCE.

5. Context and Drivers for CMP3

The effects of climate change can be clearly seen in the increase of extreme weather events in the UK and across the world. Meteorological recording shows that global land and sea temperatures are increasing, heat-waves and droughts globally are becoming more severe and that sea level is rising more rapidly than had been previously predicted.

December 2015 was the wettest month ever recorded in the UK, with almost double the average rain fall. December 2015 was also the warmest December ever recorded in the UK, at 4.1C higher than the long-term average.

A review of the existing Plan is also necessary in order to take account of key external and internal developments since the CMP2 was produced.

5.1 Financial Drivers

Whilst carbon reduction is the key driver behind this plan, other elements such as the financial impacts of increasing energy costs, increasing regulatory requirements, leadership and reputation cannot be ignored.

The cost of both electricity and gas is predicted to increase year on year, with the cost of electricity expected to rise more steeply due to a shift away from the use of coal in energy production and the need for increased generating capacity in the UK.

In addition to this, regulatory requirements such as the Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES) place a price on carbon emissions. Currently this is £16.40 per tonne CO₂ and this is also expected to rise. In the first year of stage 2 of the scheme between April 2014 and March 2015, UCA spent £72,142 on the purchase of allowances for its carbon emissions in compliance with CRCEES.

5.2 HEFCE Requirements for Carbon Management Plans and Reporting

The higher education sector is seen as vital to the overall success of meeting the UK's reduction targets and HEFCE has issued guidance which sets a reduction target for the sector of 43% by 2020 based on a 2005/6 baseline.

The published HEFCE strategy "Carbon Reduction Target and Strategy for Higher Education in England" requires all HEIs to develop individual carbon reduction strategies, targets and associated Carbon Management Plans, which include the following elements:

A carbon baseline for 2005 that covers all Scope 1 and 2 emissions;

- Carbon reduction targets covering Scope 1 and 2 emissions (as a minimum);
- Reduction targets to be set against a 2005 baseline;
- Reduction targets to be set to 2020;
- Reduction targets be publicly available;
- An implementation plan to achieve absolute carbon emission reductions across Scopes 1, 2 and 3 including timescales and resources;
- Clear responsibilities for carbon management;
- A commitment to monitor progress towards targets regularly and to report publicly annually; and

- The Carbon Management Plan and targets must be signed off by the Governing body.

5.3 University Strategic Priorities

UCA published a revised Strategic Plan in 2013, which contains a commitment to enhancing environmental sustainability.

5.4 Leadership and Reputation

As an accountable, values-driven public body, UCA recognises that it has an obligation to contribute to the development of a low carbon future and to ensuring that current and prospective students understand the need for sustainable development and conservation of resources.

5.5 Awareness, behaviour change and the curriculum

A survey of UCA students and staff in May 2015 (The UCA Sustainability Survey, 2015) found that 75% of respondents want to 'do more to help the environment'. Furthermore 44% of staff and 30% of students cited 'Climate Change' as the biggest challenge facing the planet. UCA will continue to develop full staff and student behavioural change campaigns and encourage individual engagement in carbon reduction. In 2015, a series of awareness raising events and activities were run for staff and students.

In 2014 the UCA Academic Board agreed that environmental sustainability would be included in all course curricula and the Learning and Teaching Committee was given responsibility in 2015 for developing integration plans over a two-year period. This decision is reinforced by the findings of the UCA Sustainability Survey, which found that 72% of students want to learn more about sustainability and over 60% of students are amenable to including education for sustainability into their courses.

6. CMP3 Baseline

The CMP3 baseline emissions for 2014/15 for electricity and gas use in buildings is 4,576 tonnes. The carbon conversion factors (DEFRA Carbon Factors, 2015) used in the calculation of this baseline are given in table 1.

Table 1, Emissions, Conversion factors and Data Source (2015)

Emissions source	Conversion factor	Data Source
Electricity use	0.50 (kg/CO ₂ e/kWh) Note: comprising 0.462 from generation and 0.038 from transmission and distribution	Utility bills and meter readings
Natural Gas use	0.184 (kg/CO ₂ e/kWh)	Utility bills and meter readings
Waste to landfill	447 (kg/CO ₂ e/kWh)	Conveyance notes from contractors

Table 2 provides a summary of the baselines and targets for UCA across its three Carbon Management Plans. The data available for waste and UCA fleet/vehicle emissions in 2014/15 are expected to be an underestimate due to challenges with data accessibility. Although data on waste and UCA owned vehicles are shown in Table 2, waste and owned-vehicle data do not feature in the remainder of Carbon Management Plan 3.

Table 2. Summary of UCA carbon emissions in key years from the 2005 HEFCE baseline year to latest actual data in 2014/15 (CMP3) and targeted emissions in 2019/20. * Waste and vehicle emissions for 2014/15 are expected to be underestimated due to data acquisition challenges.

Year:	2005 (HEFCE/UCA Baseline year)	2007/08 (CMP 1)	2011/12 (CMP 2)	2014/15 (CMP3)	2019/20 (HEFCE/UCA Target year)
Total Emission (tCO₂)	N/A	6,714	5,995	4,747*	4,317
Comprising:					
Grid Electricity	3,983	3,884	3,696	3,244	2,661
Gaseous Fuels	2,205	2,156	1,738	1,332	1,251
Vehicle Fleet		22	22	5.8*	16
Waste		635	540	181*	389
Buildings emissions (grid electric + gas)	6,188	6,040	5,434	4,576	3,912
Buildings emissions reduction (tCO₂) v 2005 (HEFCE base)		148	754	1,612	2,273
Total emissions reduction (tCO₂) v 2007/08 (CMP1 base)			719	1,967	2,397
CMP2 vs Target: Total emissions reduction 2019/20 v 2011/12					28%
CMP3 vs Target: Total emissions reduction 2019/20 v 2014/15					9%*
CMP3 vs Target: Buildings emissions reduction 2019/20 v 2014/15					14.5%
Target year vs HEFCE/UCA Base year: Buildings emissions reduction 2019/20 vs 2005					37%

7. CMP3 Projections and Value at Stake

Having established a 2014/15 carbon emissions baseline of 4, 576 tonnes (from the use of electricity and gas in buildings) and set a reduction target between 2015/16 and 2019/20 of 14.5% (3,912 tonnes by 2019/20) it is possible to develop future scenarios comparing;

- The Business As Usual Scenario (BAU) shows the annual effects on carbon emissions and cost incorporating predicted price and energy demand increases if no further action is taken between 2015/16 and 2019/20 to reduce carbon emissions
- The Target Emissions Scenario (TES) shows the annual effects on carbon emissions and cost incorporating predicted price increases and an annual decrease in energy consumption from 2015/16 in order to meet the 2019/20 reductions target.

The difference between the two scenarios is referred to as the *Value at Stake* and is expressed in terms of financial saving and carbon saving.

Understanding the *Value at Stake* helps UCA to quantify the savings that can be made over the five year period of the plan to meet the 2019/20 target. BAU and TES scenarios are also important in measuring the combined effectiveness of planned carbon reduction projects throughout the five year period and are used for this purpose later in the document in section 8.1, Graph 6.

The assumptions used in calculating the BAU and TES scenarios and *Value at Stake* are described below.

7.1 Energy Use and growth assumptions

Research from The Department for Business, Enterprise and Regulatory Reform (DBERR) shows that energy consumption will increase steadily if left unchecked. This is due to both increased use of energy consuming devices and inefficient behaviour. The DBERR estimate this growth as 0.7% per annum.

In addition the step changes in Table 3, have been identified which will alter annual electricity use and emissions within the University.

These step changes relate to the provision of additional UCA managed student residence places in 2015/16 and 2016/17. There are no anticipated step changes in gas consumption over the five year period

Table 3. Step changes in overall energy consumption at UCA

		Electricity
2015/16	First full year of UCA management responsibility for Doughty Way Hall of Residence Rochester	+5.9% <i>Note: In 2014/15 UCA had management responsibility for just four months of electricity</i>
2016/17	Net addition of rooms to student residential accommodation in Epsom	+1.5% <i>Note: An additional 38 rooms are to be made available from 2016/17</i>

7.2 Projected energy cost increases

Scenarios for future energy costs are published regularly by various sources. DECC price projections (services reference case) suggest a 26% increase for electricity costs per kilowatt hour and an 11.5% increase for gas of 26% between 2015 and 2020. On average this equates to an annual price increase of 5.3% for electricity and 1.03% increase for gas. These annual percentage increases are used in the projections below. The cost of allowance certificates purchased in compliance with the CRCEEC are not included in energy price projections.

7.3 Business as usual scenario

The BAU scenario factors in an annual increase in energy demand of 0.7% and the step changes in electricity consumption in Table 3. There are no anticipated step changes in gas consumption over the five year period.

7.4 Target emissions scenario

A 14.5% reduction in carbon is required from 2015/16 to 2019/20 to meet the 2020 carbon reduction target for buildings. This equates to an average 2.9% annual reduction over the five year period.

The TES then, is based upon a 2.9% annual decrease in energy demand over the five year period.

7.5 Financial value at stake

The Financial *Value at Stake* based upon increased energy demand and price projections is shown in Graph 4 and Table 4. BAU energy costs are predicted to increase from £1.09 million in 2014/15 to £1.5 million in 2019/20. Actions to reduce energy consumption, by following the TES are predicted to save £1.01 million over the five year period.

The cumulative financial *Value at Stake* is therefore estimated at £1.01 million.

Graph 4. Financial value at stake (£ thousands). Predicted annual energy costs of the Business As Usual (BAU) and Target Emissions Scenario (TES) are shown. Value at stake is the area between BAU and TES.

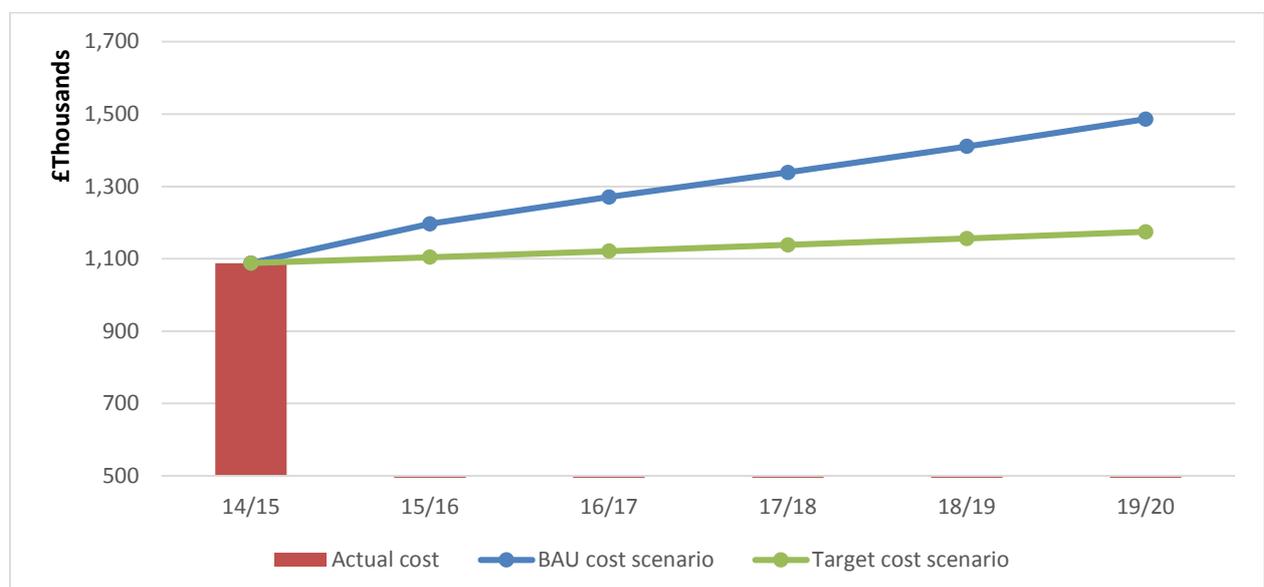


Table 4. Financial Value at stake (£ thousands)

	14/15	15/16	16/17	17/18	18/19	19/20
	Base year					Target year
BAU	1088	1196	1271	1339	1410	1486
TES	1088	1104	1121	1138	1156	1174
Annual Value at stake	0	92	150	200	254	312
Cumulative Value at stake	0	92	242	442	696	1008

7.6 Carbon value at stake

The Carbon *Value at Stake* based upon increased energy demand is shown in Graph 5 and Table 5. BAU carbon emissions are predicted to increase from 4,576 tonnes in 2014/15 to 4,988 tonnes in 2019/20. Actions to reduce energy consumption, by following the TES are predicted to save 3,620 tonnes of carbon emissions over the five year period.

The cumulative carbon *Value at Stake* is therefore estimated at 3,620 tonnes.

Graph 5. Carbon value at stake (tonnes). Predicted annual carbon emissions of the Business As Usual (BAU) and Target Emissions Scenario (TES) are shown. Value at Stake is the area between BAU and TES.

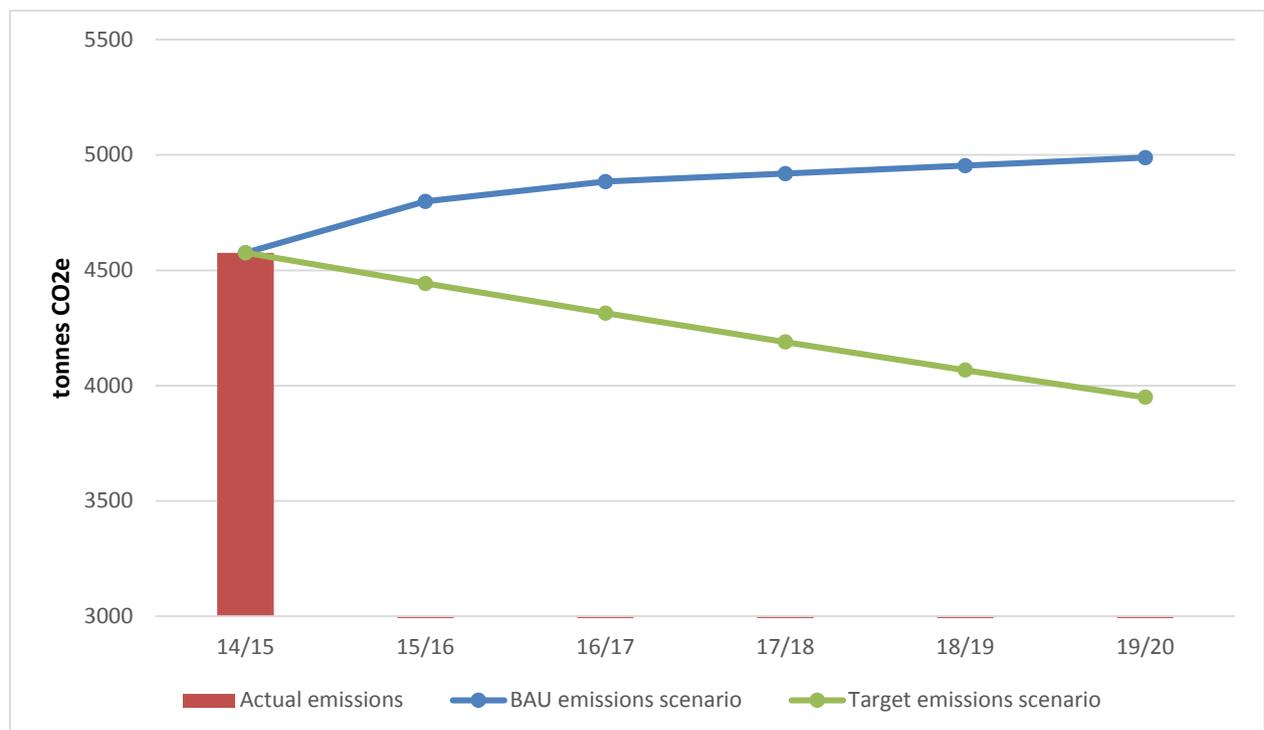


Table 5. Carbon Value at stake (tonnes CO2)

	14/15	15/16	16/17	17/18	18/19	19/20
	Base Year					Target Year
BAU	4576	4799	4885	4919	4954	4988
TES	4576	4443	4314	4189	4067	3912
Annual Value at stake	0	356	571	730	886	1076
Cumulative Value at stake	0	356	927	1657	2544	3620

8 Carbon Reduction Projects 2015/16 to 2019/20

8.1 Costs and estimated savings

CMP2 described 46 projects between 2012 and 2020 which would contribute to the reduction in carbon emissions between 2012 and 2020. Carbon Reduction Projects (CRP) and Planned Maintenance Projects (PMP) were expected to deliver a cumulative carbon reduction of 1,300 tonnes over the eight year period of the plan. Revisions to the plan in June 2015 (described in section 4.2) decreases the expected carbon reduction to 747 tonnes over the eight year period 2012 to 2020. Details of projects expected to be undertaken between 2015/16 and 2019/20 (Tables 6 and 7) are provided in Appendix E, and projects with status to be confirmed are given in Appendix F.

Table 6. Project costs and savings (£). Planned Maintenance Projects (PMP) and Carbon Reduction Projects (CRP) expected to go ahead between 2015/16 and 2019/20 are shown.

	15/16	16/17	17/18	18/19	19/20
PMP cost	£280,628	£733,546	£4,984,471	£0	£30,624
CRP cost	£0	£438,239	£139,200	£0	£0
Total cost	£280,628	£1,171,784	£5,123,671	£0	£30,624
PMP annual savings	£6,426	£40,296	£49,826	£0	£1,564
CRP annual savings	£0	£50,550	£30,124	£0	£0
Total annual savings	£6,426	£90,846	£79,950	£0	£1,564
Cumulative savings	£6,426	£97,272	£177,222	£177,222	£178,786

Table 7. Projected Carbon savings (tonnes) from Planned Maintenance Projects (PMP) and Carbon Reduction Projects (CRP) which are expected to go ahead between 2015/16 and 2019/20 are shown.

	15/16	16/17	17/18	18/19	19/20
PMP annual Carbon saving	15.7	138.4	122	0	3.8
CRP annual Carbon saving	0	192.1	87.1	0	0
Total annual Carbon savings	15.7	330.5	209.1	0	3.8
Cumulative Carbon savings	15.7	346.2	555.3	555.3	559.1

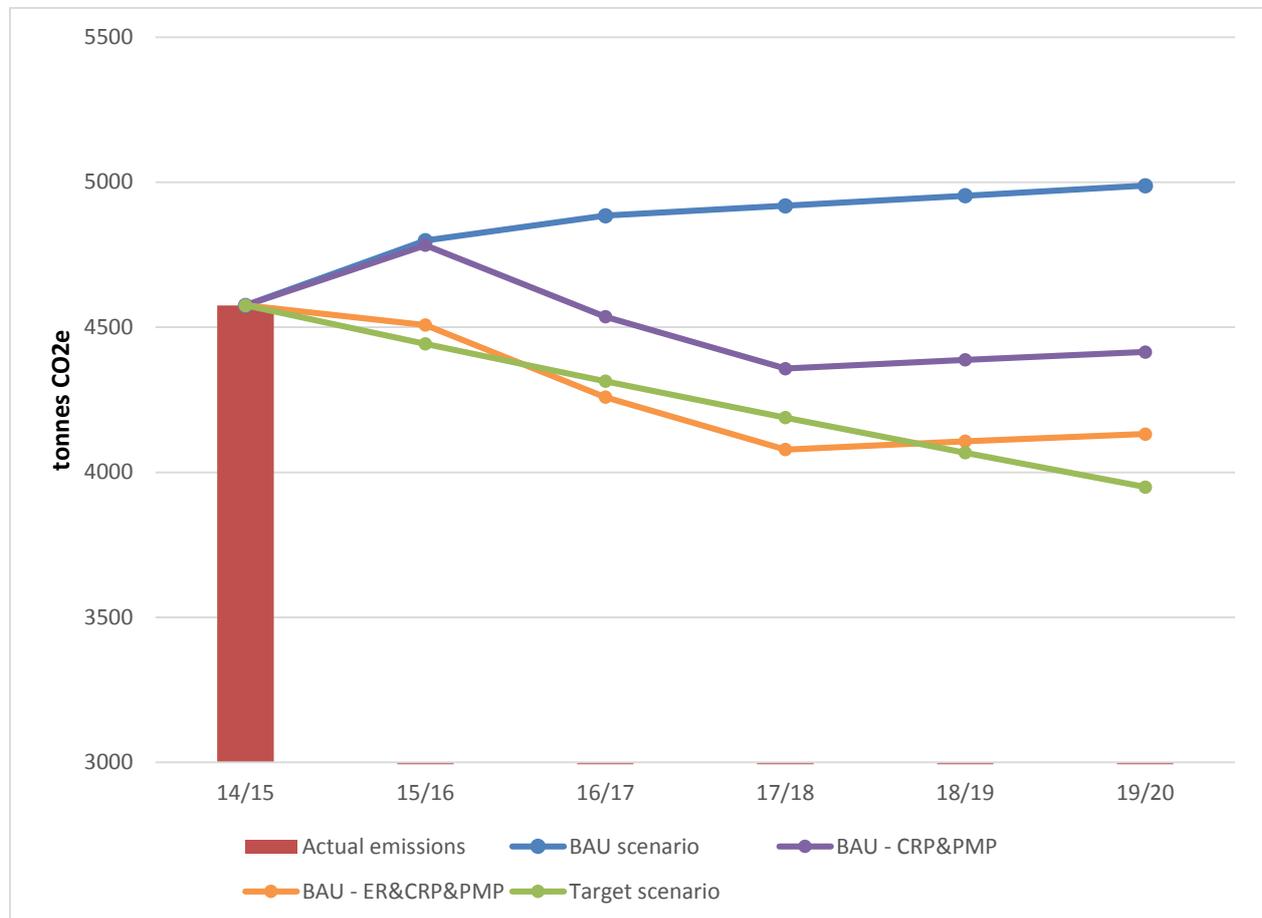
The CRP and PMP projects quantified in Table 7 above are expected to deliver a 559.1 tonne reduction in carbon emissions between 2015/16 and 2019/20. The reductions solely from these projects will achieve a 12.2% reduction in carbon emissions by 2019/20 compared with the base year of 2014/15, falling short of the 14.5% reduction target by 105 tonnes of carbon.

However as described in Section 7, carbon emissions are predicted to increase annually in line with the Business As Usual Scenario (Graph 5). To more accurately understand how the CRP and PMP projects summarised in Table 7 are expected to affect carbon emissions between 2015/16 and 2019/20, carbon savings from projects should be subtracted from the Business As Usual Scenario (BAU) scenario. Graph 6 replicates Graph 5 from section 8 but also includes the scenario BAU minus CRP and PMP projects (BAU-CRP&PRP).

In 2019/20 the BAU-CRP & PRP scenario shows that there will be a deficit of 503 tonnes (4,414-3,912) in carbon reduction against the 2019/20 reductions target (Target Emissions Scenario).

Further no cost/low cost carbon reduction opportunities were identified in June 2015 in an Environmental Review of UCA campuses completed by CfSD. These reduction opportunities given in Appendix G, are related to improvements in the scheduling of heating and power in university buildings using existing Building Management Systems and reductions in electricity consumption from the implementation of more efficient hibernation and power-down schedules on university computers. Together, these opportunities are predicted to reduce carbon emissions in 2015/16 by 275 tonnes. The combined reductions of CRP, PMP and reductions identified in the Environmental Review (ER) are shown in the scenario BAU-ER&CRP&PMP in Graph 6.

Graph 6 - Carbon value at stake (tonnes). Predicted annual carbon emissions of the Business As Usual (BAU) and Target Emissions Scenario (TES) are shown. Two further scenarios are shown. The BAU minus the reductions from CRP and PMP projects scenario and the BAU minus ER opportunities and PMP and CRP projects scenario.



The combination of carbon reductions from opportunities identified in the Environmental Review 2015 and CRP and PMP projects (scenario BAU – ER&CRP&PMP) is expected to deliver carbon emissions of 4,132 tonnes in 2019/20, which leaves a reduced deficit of 220 tonnes of carbon against the 2019/20 target of 3,912 tonnes.

8.2 Additional carbon reduction opportunities

The additional CRP and PMP projects identified in CMP2, which at the time of writing have an unconfirmed status in terms of their likelihood of being undertaken (Appendix F), together could deliver an additional carbon reduction of 211 tonnes at a total cost of £2.08 million. Implementation of these projects would reduce the deficit to 9 tonnes of carbon against the 2019/20 target of 3,912 tonnes. Decisions on if and when each of these projects will be delivered will be made in 2015/16.

Further carbon reduction opportunities will also be developed through an on-going programme of communications and engagement with staff and students to encourage energy saving behavioural change.

9. Other Scope 3 indirect Emissions

This section includes Scope 3 data for 2014/15 on staff and student travel and embedded carbon in purchased good and services. These data do not currently form part of UCA's carbon reduction targets. They are included in this Carbon Management Plan as an initial description of impact. Some data acquisition and verification issues need to be addressed in order for UCA to develop plans for reduction and management of these impacts. It is anticipated that further work will be undertaken in 2015/16 to further develop approach and plans in these areas of indirect Scope 3 emissions.

9.1 Staff and Student travel

Staff travel for business and student travel in fulfilment of their course/studies are either booked via a university approved travel agent or claimed back by staff as an expense. Data from travel agents is considered to be the most reliable data. However, further validation is required of carbon conversion factors used by travel agents. In addition a small number of travel agents have not provided carbon emissions data on request. Staff expense claims for mileage in their own vehicles for business travel is reliable as reimbursement is based on mileage, but expense claims for taxi, bus and coach use is less reliable and dependent upon estimates by the claimant of mileage undertaken in each trip. Data on commuting to place of study or work are not currently collected.

Table 8. Staff and student travel – scope 3 carbon emissions 2014/15

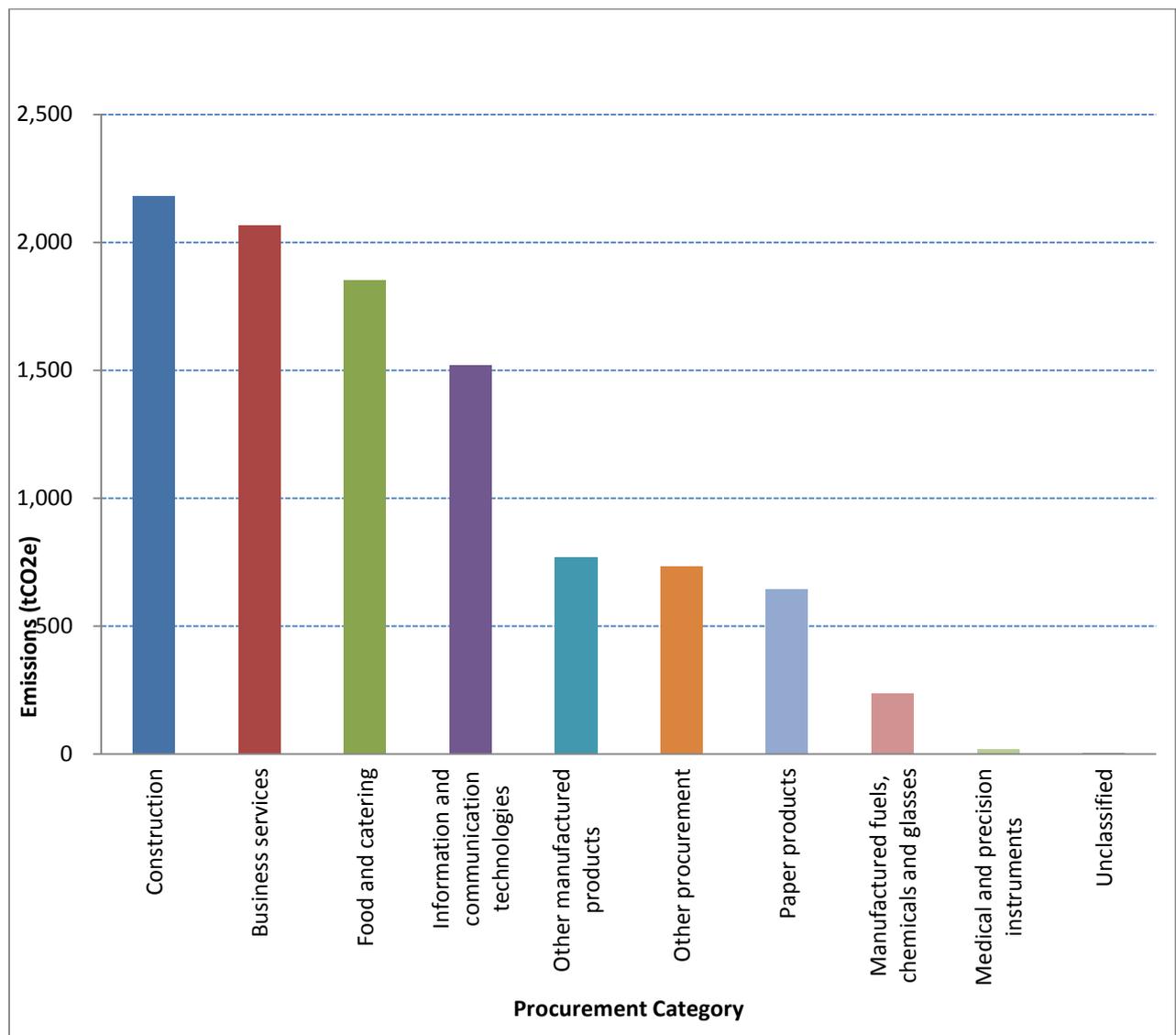
	Scope 3 Carbon emissions (tonnes)	Data Source	Notes
Staff business travel (car/motorbike)	136	Staff own-vehicle mileage expense claims	Conversions factors =Scope 3 Well To Tap (WTT) + Activity (vehicle size)
Staff business travel (taxi/bus/coach)	0.6	Staff expense claims with indicative mileage	Conversions factors =Scope 3 Well To Tap (WTT) + Activity (vehicle type)
Staff Air & Rail travel (expenses)	No data	Staff expense	Small proportion of Rail and travel, only available as cost.
Staff Air (travel agent)	424.5	Carbon emissions provided by travel agent	All data available
Staff Rail (travel agent)	8.2	Carbon emissions provided by travel agent	One supplier did not provide information
Student Air (travel agent)	130	Carbon emissions provided by travel agent	One supplier did not provide information
Student Rail (travel agent)	0.7	Carbon emissions provided by travel agent	Two suppliers did not provide information
Total Emissions	700		

As shown in Table 8, total carbon emissions from staff and student travel in 2014/15 was 700 tonnes. This will be an underestimate for the reasons outlined above but does provide a starting point for planning and improved measurement going forward.

9.2 Procurement Emissions

UCA Procurement analysed their purchasing of goods and services in 2014/15 using the Higher Education Supply Chain Emissions Tool (HESCET), which analyses spend and reports on aggregated carbon emissions across 75 DEFRA –defined sectors. The Tool further aggregates the data into ten categories as shown in Graph 7 and Table 9.

Graph 7 UCA Emissions from procured goods and services in 2014/15



The total emissions from procurement in 2014/15 of 10,025 tonnes significantly exceed emissions from energy consumption by buildings. Further work will be undertaken in 2015/16 to develop plans to reduce emissions from procured products and services.

Table 9 UCA Emissions from procured goods and services

	Tonnes CO2e
Construction	2,182
Business services	2,065
Food and catering	1,851
Information and communication technologies	1,519
Other manufactured products	770
Other procurement	735
Paper products	644
Manufactured fuels, chemicals and glasses	236
Medical and precision instruments	19
Unclassified	4
Total	10,025

10. Risk Assessment and Mitigation

The Carbon Management Plan is included within the Universities internal audit process. The risk assessment in Appendix H was carried out for this version of the Carbon Management Plan.

11. CMP3 Activity Plan

The following activities and tasks should be undertaken to ensure the delivery of CMP3 and the attainment of targets. Task implementation will be monitored over time and progress measured.

Strategy, budgets and management

1. CfSD and Estates & Facilities (E&F) to develop a broader sustainability strategy to cover the next 3-5 years to take account of external trends, opportunities and risks, and internal capabilities, strengths and weaknesses.
2. UCA to ensure the availability of appropriate budgets and/or finance for the delivery of CMP3 and other environmental and broader sustainability projects and activities.
3. E&F and CfSD to continue to build on and improve the working model to deliver environmental (including CMP3) and broader sustainability related projects and activities

Projects with Carbon Reducing Potential and budget

4. Carbon Reduction Projects (CRP) and Planned Maintenance Projects (PMP) summarised in Appendix E are expected to be undertaken in CMP3. Budgets to be reviewed annually by E&F and projects implemented contingent on budget

availability. Changes in budget availability and expected or actual deviations in project implementation, scale or timing to be communicated by E&F to the UCA ESSWG & CfSD. Changes to be incorporated into CMP3 carbon reduction expectations.

5. CRP and PMP projects in Appendix F have unconfirmed status, regarding if and when they might be implemented. E&F to confirm project status at the earliest opportunity. This may be on a project by project basis, determined by the availability of budget and the potential for implementation considering other operational priorities/plans. The inclusion or exclusion of Appendix F projects from the plan are to be reported by E&F to the ESSWG and CfSD. Changes to be incorporated into CMP3 carbon reduction expectations.
6. E&F to confirm at the earliest opportunity the status and expectations for completion of projects described as partially completed in Appendix D. Estimates of the contribution to carbon reduction of each project to be provided by E&F to the ESSWG & CfSD. Changes to be incorporated into CMP3 carbon reduction expectations.
7. E&F and IT departments to explore feasibility of implementing 'no cost/low cost' opportunities for Carbon Reduction as identified in UCA Environmental Review 2015 (Appendix G). Where feasible opportunities to be implemented. Changes to be incorporated into CMP3 carbon reduction expectations.

Data and monitoring

8. Data from all waste service providers (ad hoc and contracted) to be requested for academic year 2014/15 for all waste types (tonnage) and treatment types (eg, recycling, incineration, landfill) across all sites. A system to be established by CfSD, E&F and Procurement to ensure that waste service providers provide data in subsequent academic years. Accurate and complete data on waste will be incorporated into the CMP.
9. The electricity, gas and water sub-meter network across all campuses to be maintained to ensure an accurate means to identify inefficiencies/carbon reducing opportunities and to more accurately assess the actual carbon reduction from implemented projects.
10. Scope 3 emissions data to be requested from all framework agreement travel agents, together with information on carbon conversion factors used by each company.
11. Facilities managers to be briefed and responsibilities clarified on data requirements for carbon reporting for UCA owned-vehicles and some aspects of ad hoc waste collections.

Step changes (estates, regulation and energy price)

12. Material changes between 2015/16 and 2019/20 in the UCA estate/service agreements for leased properties and/or to UCA operations to be communicated by E&F to CfSD at the earliest opportunity so that expected 'step changes' in energy consumption can be incorporated into BAU projections and carbon reduction expectations.
13. Changes in regulatory requirements relevant to carbon reduction and energy consumption are to be incorporated into BAU projections and carbon reduction expectations.
14. Energy price forecasts to be monitored and incorporated into BAU projections and carbon reduction expectations.

Carbon Management Plan

15. Annual review of CMP3 to be produced in November each year, based on data for the preceding academic year. Summary of CMP3 review and status of progress to achieving 2019/20 targets to be included in the annual UCA Environment and Energy Report.
16. A plan for Scope 3 data collection and emissions reduction plan for staff and student travel and from procured goods and services to be developed and referenced in the Annual Environment and Energy Report.
17. A full CMP4 will only be produced before the target year of 2019/20 in the event that there are material changes in the expectations of CMP3.

Appendix A - Governance and Management of the Carbon Management Plan

Vice-Chancellor (VC)

- High level support of the CMP
- Promoting the CMP internally to ensure support and buy-in from all levels and groups within the University

Deputy Vice-Chancellor (DVC)

- Leadership of the CMP as Project Sponsor;
- Championing the CMP within the Leadership Team and to Governors;
- Responsible for the Professional Services' Departments that have key responsibility for delivering the CMP;
- Ensuring the appropriate level of funding is made available to implement the Programme;
- Planning and oversight of PMP and CMP projects' budgets;
- Line management of key personnel responsible for delivering CMP projects: Finance Director and Director of Estates & Facilities.

Director of Finance (DoF)

- Approval of bids for external funding;
- Approval of project financing;
- Line management of key staff for carbon reporting.

Director of Estate & Facilities (DEF)

- Overall responsibility for reducing carbon impact of the management and maintenance of the University Estate;
- Planning and strategic management of carbon reduction projects;
- Ownership of the Estates Strategy.

Director of The Centre for Sustainable Design® (DCfSD)

- Development of the CMP and strategic advice on sustainability issues to DEF and DVC
- As Chairman of UCA's Environmental and Social Sustainability Working Group (ESSWG) to ensure that ESSWG regularly review progress on the CMP
- To appraise VC on progress of CMP and other Sustainability matters arising from the ESSWG
- Line management of key CfSD staff involved in development and appraisal of the CMP

Appendix B - UCA Vision for Sustainability, Strategy for the Achievement of CMP3 and Working Process for Estates & Facilities and The Centre for Sustainable Design®

UCA Vision for Sustainability

The University for the Creative Arts will be a sector leader in sustainability and will act to systematically reduce its greenhouse gas emissions.

We will encourage all sectors of the University to take ownership and responsibility for reducing greenhouse gas emissions through efficient use of resources, innovation and changes in operational procedures.

Investment opportunities for carbon saving will be regularly reviewed in order to support the development of a low carbon estate.

UCA will use its position of leadership and expertise within the creative arts to promote the practice of sustainable development and influence positive change within the wider creative community to achieve a low carbon future.

Strategy for the Achievement of CMP3

In order to meet the aims of the Carbon Management Plan, the University will look at all areas of its operations with specific focus on its built estate, information technology, procurement and transport. It will also look to develop more stringent policies that have an impact on carbon emissions.

It will continue to promote a low-carbon University culture through awareness raising and behavioural change, and work in partnership with key stakeholders to deliver this.

Energy Efficiency

- Implement new energy management policies;
- Implement identified energy saving projects;
- Continued monitoring, targeting and reporting of consumption, cost and carbon emissions and ensure that the energy sub-meter network is operating to enable efficient scheduling of heat and power
- Continued installation of automatic controls for building services across the estate.

Waste, Resources and the Circular Economy

- Undertake research on characterisation and waste prevention, through a programme to reduce materials consumption, reuse and upcycling of waste and increased rates of recycling for non-preventable waste

Master-planning and sustainable construction

- Develop standard specifications for energy using equipment to include energy efficiency and whole life costing;
- Develop a sustainable construction and refurbishment toolkit to ensure low-carbon opportunities are considered in all projects;
- Thoroughly scrutinize and challenge design proposals;

- Reduce construction impacts through the use of sustainable materials and reduce construction waste;
- Ensure wider impacts of waste, travel and water use are considered in projects.

Estates Strategy

- Reduce energy use through efficient space utilisation.
- Continue to provide increased opportunities for waste recycling and seek to minimize waste.

IT Services

- Work closely with IT Services to reduce energy use by implementing energy efficient technologies and developments such as server virtualisation and externally hosted services;
- Continue to purchase energy efficient technology;
- Implement software to switch off computers automatically when not in use;
- Examine how technology can be used to reduce business travel.

Procurement

- Work closely with Procurement Department on the continued development of sustainable procurement policy, and guidelines;
- Continue to develop the methodology to measure and monitor procurement emissions Scope 3 emissions from procurement, business travel, and commuting;
- Develop an implementation plan to reduce identified scope 3 emissions.

Awareness and Behavioural Change

- Continue to develop full staff and student behavioural change campaign and encourage individual engagement in carbon reduction.
- Work with stakeholders and academic colleagues to continue the process for the inclusion of education for sustainability within all courses in the curriculum. In 2014 the UCA Academic Board agreed that environmental sustainability would be included in all course curricula and the Learning and Teaching Committee was given responsibility in Jan/Feb 2015 for developing integration plans over a two-year period.

Working Process: Estates & Facilities (E&F), The Centre for Sustainable Design ® (CfSD) and DVC

- Agree annual budget (DVC/CfSD/E&F)
- Planning meeting (CfSD/E&F)
- Start of the process (e.g. new year/reporting period) - discuss areas of action (CfSD/E&F)
- Prepare project proposals (CfSD)
- Agree project proposals and expenses budget (E&F/CfSD)
- Regular planning/progress/update meeting (CfSD/E&F)
- Bi-monthly reporting on progress and budget transfer request - based on timesheets (CfSD/E&F)
- Develop project outputs based on agreed project proposals e.g. interviews, meetings, requests for information, report production, event organisation, etc (CfSD)
 - Series of internal planning/development/progress meetings - overall & specific projects (CfSD)
 - Draft report production (CfSD)
 - Internal working drafts and meeting discussed/checked/edited (CfSD)
 - Draft reports sent for internal comments (DVC/E&F/CfSD)
 - Reports amended (CfSD)
 - Final report produced and sign-off (DVC/E&F/CfSD)
- Extract key issues from each report and update a master document (CfSD)
 - Actions
 - Risks
 - Opportunities (cost/other)
- Planning/update/progress meeting to progress the above (CfSD/E&F)
- Actions agreed and operationalized (CfSD/E&F)

Appendix C - CRP and PMP projects completed between 2012/13 and 2014/15

Carbon Reduction Projects (CRP) and Planned Maintenance Projects (PMP) completed between 2012/13 and 2014/15. The projects were previously included in Appendix F of CMP2. Each project is identified as either CRP or PMP and CMP2 reference number.

	CMP2 Ref #	Campus	Project	cost	Annual Saving – Year 1 Financial	Annual saving Year 1 tCO2	% 2020 target	CMP2 Implementation year
CRP	26	Epsom	Boiler Replacement - Modulating & sequencing boiler Main Building	£234,000	£24,150	59.1	3.52%	2013/14
CRP	15	Farnham	Energy Efficient Electric Heating - Phase 1.Farnham Student Village	£134,041	£25,653	104.7	6.24%	2013/14
CRP	16	Farnham	Energy Efficient Electric Heating - Phase 2.Farnham Student Village	£134,041	£25,653	104.7	6.24%	2014/15
PMP	17	Farnham	Lighting Replacement & occupancy control. John Luard Building	£100,000	£7,525	30.7	1.83%	2012/13

PMP	8	Farnham	Boiler replacement- Gas fired condensing boilers. John Luard Building	£81,120	£1,294	3.2	0.19%	2013/14
PMP	5	Farnham	Roof replacement (incl. improve insulation) Refectory	£271,072	£1,035	2.5	0.15%	2013/14

Appendix D - CRP and PMP projects partially completed between 2012/13 and 2014/15

Carbon Reduction Projects (CRP) and Planned Maintenance Projects (PMP) partially completed between 2012/13 and 2014/15. The projects were included in Appendix F of CMP2. Each project is identified as either CRP or PMP and CMP2 reference number. The project cost and carbon and cost savings are those that were expected on full completion of projects. Actual costs and savings based on their partial fulfilment are not available.

	CMP2 Ref #	Campus	Project	cost	Annual Saving – Year 1 Financial	Annual saving Year 1 tCO2	% 2020 target	Start year	Completion year
CRP	3	Epsom	Lighting Replacement (T8-T5) & occupancy control. 2nd Floor Main Building	£64,435	£5,449	22.2	1.33%	2012/13	2016/17
CRP	18	Farnham	Upgrade lighting and install automatic lighting controls.IT Building	£62,640	£9,967	40.7	2.42%	2012/13	TBC
CRP	24	Farnham	Energy Efficient Water Heating - Phase 1Farnham Student Village	£108,506	£6,871	28.1	1.67%	2014/15	TBC
CRP	25	Farnham	Energy Efficient Water Heating - Phase 2 Farnham Student Village	£108,506	£6,871	28.1	1.67%	2014/15	TBC
CRP	19	Farnham	Upgrade lighting and install automatic lighting controls. Green Zone	£70,320	£10,637	43.4	2.59%	2012/13	TBC

CRP	20	Farnham	Upgrade lighting and install automatic lighting controls. Yellow Zone	£89,880	£14,843	60.6	3.61%	2012/13	TBC
PMP	4	Farnham	Roof light replacement. Refectory	£155,602	£3,116	7.6	0.45%	2012/13	TBC
PMP	6	Farnham	Roof replacement (incl. improved insulation) Blue Zone	£494,214	£8,685	21.2	1.27%	2014/15	TBC

Appendix E - CRP and PMP projects expected to be undertaken in CMP3

These projects are expected to go ahead between 2015/16 and 2019/20. Costs are those presented in CMP2 with an uplift of 16% to reflect expectations of cost increases (as advised by Director of Estates Services).

	CMP2 Ref #	Campus	Project	Cost	Annual Saving – Year 1 Financial	Annual saving Year 1 tCO2	% 2020 target	CMP3 Implementation year
PMP	7	Farnham	Replace high level high level north-lights. Blue Zone	£280,628	£6,426	15.7	0.94%	15/16
CRP	17	Canterbury	Energy Efficient Electric Heating. Ian Dury House	£59,913	£23,436	95.7	5.70%	16/17
CRP	13	Canterbury	Automatic lighting controls. Blocks A – E	£224,460	£13,667	55.8	3.32%	16/17
CRP	21	Canterbury	Install automatic lighting controls. Block G	£37,514	£4,702	19.2	1.14%	16/17
CRP	23	Farnham	Upgrade Melters in Glass Workshop	£59,511	£4,370	10.7	0.64%	16/17
CRP	22	Farnham	Upgrade Gas Furnaces in Glass Workshop	£56,840	£4,375	10.7	0.64%	16/17
PMP	12	Rochester	Boiler replacement - gas-fired condensing boilers.	£461,448	£15,912	38.9	2.32%	16/17
PMP	14	Rochester	T8/T12 lighting and install automatic lighting controls.	£272,098	£24,384	99.5	5.93%	16/17

CRP	14	Rochester	BEMS Control. North and South Blocks	£139,200	£30,124	87.1	5.19%	17/18
PMP	13	Rochester	Replace heating distribution system and heat emitters and install and zone controls and TRVs. Phase 1	£1,780,716	£18,048	44.2	2.63%	17/18
PMP	16	Rochester	Replace heating distribution system and heat emitters and install and zone controls and TRVs. Phase 2	£1,780,716	£9,400	23	1.37%	17/18
PMP	18	Rochester	Install Double Glazing Phase 2	£711,520	£11,189	27.4	1.63%	17/18
PMP	15	Rochester	Install Double Glazing Phase 1	£711,520	£11,189	27.4	1.63%	17/18
PMP	9	Farnham	Boiler replacement gas-fired condensing boiler.IT Building	£30,624	£1,564	3.8	0.23%	19/20

Appendix F - Potential CRP & PMP projects – status unconfirmed

Carbon Reduction Projects (CRP) and Planned Maintenance Projects (PMP) not yet undertaken and with unconfirmed delivery status. Costs are those presented in CMP2 with an uplift of 16% to reflect expectations of cost increases (as advised by Director of Estates Services).

	CMP2 Ref #	Campus	Project	Cost	Annual Saving – Year 1 Financial	Annual saving Year 1 tCO2	% 2020 target	Actual or Expected start date
CRP	8	Epsom	Convert AHU to LTHW heating. Refectory	£13,920	£961	6.9	0.41%	TBC
CRP	1	Epsom	Lighting Replacement (T8-T5) & occupancy control. Ground Floor Main Building	£187,517	£10,455	42.7	2.54%	TBC
CRP	6	Epsom	PV Array. Main building 1st floor Studio roof	£72,106	£2,324	9.5	0.57%	TBC
CRP	28	Farnham	Energy Efficient Electric Heating. Estates Office	£9,767	£2,181	8.9	0.53%	TBC
CRP	4	Epsom	Lighting occupancy control. Epsom LLRC	£41,760	£8,578	35	2.09%	TBC
CRP	7	Student Residences Worple Rd. Epsom	Install BMS Controls	£30,624	£4,299	11.2	0.67%	TBC
CRP	5	Epsom	PV Array. Main building 2nd floor	£504,322	£16,268	66.4	3.96%	TBC

CRP	12	Canterbury	Install VSDs to heating circulation pumps.	£7,934	£1,452	5.9	0.35%	TBC
PMP	3	Epsom	Renew Design Studio asphalt roof. Main Building	£78,343	£1,487	3.6	0.22%	TBC
PMP	1	Epsom	Replace heating distribution & Heat emitters. Main building	£851,707	£7,533	18.4	1.10%	TBC
PMP	2	Epsom	Upgrade insulation to high level roof.	£286,301	£1,003	2.5	0.15%	TBC

Appendix G - Carbon reduction opportunities from UCA Environmental Review 2015

Summary of No cost / low cost opportunities for annual carbon reduction and estimated cost savings at UCA from UCA Environmental review 2015

No Cost / Low cost opportunities to reduce carbon	Carbon Saving 2015/16	Energy cost saving 2015/16
All Campuses		
TREND and Building Management Systems – Modest 5% improvement in energy consumption efficiency <ul style="list-style-type: none"> • Opportunities were identified at each campus for more efficient scheduling of heating and power • Proposal for half to one hour reduced AM heating and power consumption • Heating off or reduced for one hour at the end of Applicant Days/Wednesdays to reflect low occupancy 	237t	£53,169
Powerdown & hibernation mode on Staff PCs <ul style="list-style-type: none"> • Of the approximately 550 staff PCs at UCA it is estimated that 40% (220) do not go into hibernation mode when not in use/at the end of day. • In a year a single desktop PC (<i>Viglen Genie</i>) that is set to go into hibernation consumes 233 kWh less electricity and produces 0.12 tonnes less carbon than a desktop with just the screen turned off. 	26t	£4,600
Farnham campus		
Blue zone – increase incoming gas pressure to significantly reduce winter weekend and holiday gas consumption.	12t	£2,286
TOTAL	275t	£60,055

Appendix H - Risks to achieving the absolute carbon reduction target for 2019/20 and proposed actions to mitigate against these risks

Risk	Mitigation
Management -The absence of a dedicated CMP project manager is a significant issue for the ongoing management of the CMP3.	It is recommended that there is transition to a matrix management model for day to day management, monitoring and data analysis. This should be supported through ongoing strategic advice from CfSD.
CRP and PMP cancellation/postponement – CRP and PMP are expected to achieve a 747 tonne reduction in carbon emissions. Removal of projects from the plan puts the 2019/20 target for buildings at risk. Delays in the implementation of planned projects could render the achievement of the target unrealistic if too much work is left to the final few years.	It is recommended that progress in implementing planned CRP and PMP projects is reported to the ESSWG twice per year. Remedial action should be recommended if deviations from planned activity impact upon the expected achievement of the 2019/20 target.
Sub-meter network - Assessment of the effectiveness of CRP, PMP or other projects would be facilitated through the development of a reliable and accurate series of sub-meters for electricity and gas consumption.	In order to use the existing network effectively, communications issues between sub-meters and servers should be resolved.
Incomplete data on waste - The current data on waste arisings at all campuses are deemed to be incomplete and so do not provide an accurate measurement of carbon emissions.	It is recommended that waste service providers supply annual data on waste collected at each site. This should be supplied unprompted and as a condition of doing business with UCA. In addition data from non-contracted suppliers should be requested, collated and analysed centrally.
Annual weather conditions - As discussed above the winter weather conditions can significantly affect energy consumption. If the winter in 2019/20 is relatively cold compared to the baseline year of 2005, then gas consumption and subsequent emissions may mask the effects of actions undertaken to reduce carbon emissions	The use of weather correction factors is recommended as a means 'factoring out' the relative effects of weather conditions between years.
Energy to carbon conversion factors – These are published by DEFRA and based on the average mix of energy generation across the UK in any one year. If these factors are greater in the target year than in the base year of 2005, then reductions in energy consumption may still yield increases in carbon emissions	UCA can only use the factors provided by government The development of onsite generation of renewable energy is one way to reduce carbon emissions and calculate carbon without using UK average conversion factors. The development of onsite renewables capability should be considered.
New buildings - The HEFCE requirement for targeting and reporting is based on absolute carbon emissions. Major acquisitions of new premises or new additional builds will increase absolute energy consumption and carbon emissions, thereby reducing the likelihood of meeting the 2019/20 target for carbon emissions from buildings.	In this case further emissions reductions projects would be required to meet the 2019/20 reduction target for absolute carbon. In addition carbon intensity measurements should be used, to track for example, carbon emissions per student, per metre squared of floor space or per £ turnover. Although intensity measurements are not required by HEFCE, they do provide a powerful means of assessing the effects of efficiency measures in dynamic institutions/organisations.