

University College Birmingham

Carbon Management Plan (CMP)



Approved by Corporation July 2010

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Foreword from Professor Ray Linforth, Principal UCB



University College Birmingham acknowledges that it should develop in such a way that its activities, plans and policies address its Corporate Social Responsibility obligations. This obligation is two-fold. The first part is that we must be responsible as an organisation for our own CO₂ emissions and responsible for developing plans which will, over time, significantly reduce them. This will mitigate the effects of climate change.

The second part is that we must also lead the way for our students, staff and local community, through education and demonstration. We will show that CO₂ emissions can be reduced, and which are the successful routes to do so. This carbon management plan represents our plan to address this need.

UCB however has not just started this process. There has been an ongoing programme of refurbishments at our main teaching sites Summer Row and Richmond House which have significantly reduced their CO₂ emissions and many energy efficiency measures were designed into the Maltings Halls of Residence from the start. In addition, areas such as Marketing and IT have been implementing more efficient working practise.

However, with plans currently being developed for Phase 1 of our new buildings, some 80,000 square feet of new H.E. teaching facilities, we are going to take advantage of the opportunity that this presents to formalise these processes in a strategy going forward. We intend to integrate the latest environmental technologies into our design for the new campus in addition to continuing our programme of measures in our existing buildings.

We also acknowledge that it is particularly important, given the current economic climate, that we provide value for money through efficient use of resources. The Government's Carbon Reduction Commitment (CRC) will provide a direct measure of our emissions reduction performance through its league table, together with the risk of cost penalties for poor performance. Funding will also increasingly be correlated to carbon reduction, with HEFCE already linking capital allocations to carbon management.

Increasingly environmental issues matter to students and they look to see this reflected in their choice of institution. By developing and implementing this carbon management plan we will ensure that we continue to meet their expectations whilst also playing our part in tackling climate change.



Professor Ray Linforth

Management Summary

This document outlines the UCB's Carbon Management Plan (CMP), which sets out the strategy to achieve the commitment to carbon reduction which has been endorsed by Professor Ray Linforth, Principal of UCB. The implementation of this CMP, will deliver our CO_{2e} target emissions reduction from our activities by 22% by the end of academic year 2014/15, compared with the 2005/6 base year. This is the intermediate step in our target to achieve a 34% reduction by 2020 compared to our 2005/6 baseline. This plan identifies a number of projects which, when implemented, will enable UCB to reduce our emissions by approximately 1,617 tonnes CO_{2e} by the end of academic year 2014/15. The plan sets out the organisational changes required to ensure that the necessary changes in policy, procedures and working practise are made.

The carbon emissions baseline will be calculated using data from 2005/6 academic year, in line with HEFCE's best practise advice, as well as including the most recent data from the 2008/9 academic year. In determining the University's carbon footprint analysis of gas, electricity and water consumption have been undertaken, together with quantification of its waste streams and an estimation of travel conducted. This produced an estimated carbon footprint of 5,795 tonnes CO_{2e} in 2005/6 and 5,983 in 2008/9.

Section 3: of this report demonstrates the financial savings likely to be achieved, assuming that a 22% reduction in emissions against the 2005/6 baseline is achieved by 2014/15. This model assumes a conservative increase in energy costs of 5% pa over the five year period. This illustrates that potentially cumulative savings of about £1 million can be achieved by 2014/15, if the target reductions are achieved.

Section 4: of the plan identifies 15 individual projects designed to deliver the above savings. If all projects identified are completed UCB will be able to reduce its emissions such that by 2014/15 the emissions are reduced to 4,621 tonnes CO_{2e}, which is 105 tonnes above the target emissions of 4,516 tonnes CO_{2e}. This means that a 20% reduction has been identified. The projects include seven feasibility studies as well as other areas where savings have not yet been fully quantified, therefore allowing sufficient scope to exceed this target. The estimated cost of implementing all projects identified in section 4.0 is in the region of £ 506,970 and is forecast to achieve £241,546 in financial savings per annum by 2014/15.

The delivery of UCB's CMP identified in section 4 will be closely monitored by the Carbon Management Strategy Working Group, with the Vice Principal (Corporate Services) responsible for reporting to the Senior Management Team. Whilst the effective delivery of projects identified in the programme is essential, the need for continued funding approval is required.

The development and implementation of this Carbon Management Plan and its endorsement by the Principal and the Corporation will demonstrate that the College takes seriously its corporate and social responsibilities, and aims to reduce the impact of UCB's carbon emissions, mitigating climate change.

1 Introduction

1.1 Purpose of this Carbon Management Plan

This carbon management plan provides the details of the steps required to measure, reduce and monitor our carbon footprint over the next five years. It is intended to provide the basis for the detailed work which will be implemented both in terms of infrastructure improvement but also by achieving efficiency savings from engaging the College's stakeholders and changing working practise.

Despite a difficult economic climate it is an exciting time for the College, and we remain confident about the future, as demonstrated in our plans for a new development of approximately 80,000 square feet of primarily HE facilities. As food is a strong feature of the College, issues such as local procurement can potentially be linked to the new development through the inclusion of a roof garden. This carbon management plan is therefore timely, as it corresponds with our review of Estates Strategy and development plans.

1.2 Process of producing the Carbon Management Plan

The College has worked through a process in producing this carbon management plan comprising:

1. Mobilisation - a cross-cutting team has been developed within the College to drive carbon reduction activities within their respective areas.
2. Carbon Footprint - a carbon footprint has been produced which reflects the activities of the College. The team agreed that the level of emissions reduction should be in line with Government Policy and targets were chosen accordingly. Projections of the levels of emissions reduction required to achieve the target were produced.
3. Options to reduce carbon emissions - a programme of carbon reduction measures were agreed covering all areas of the College's activities, providing a cost effective route to emissions reduction.
4. Carbon Management Plan - this carbon management plan has been produced to summarise the above steps and provide a record of our carbon reduction activities.

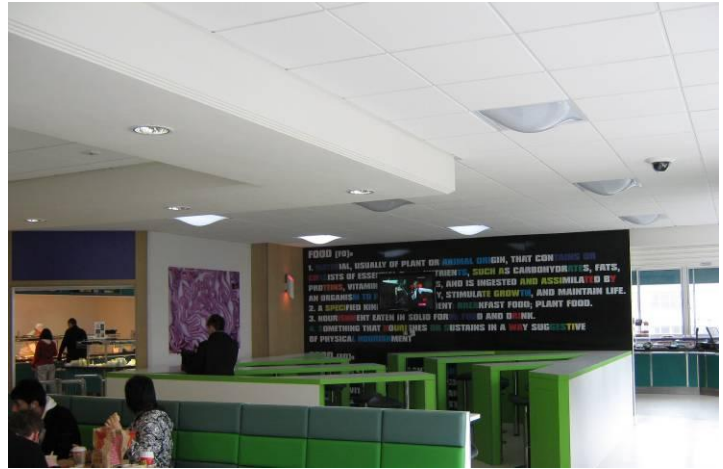
1.3 Past achievements

The College has been investing to achieve efficient building fabric and undertaking measures to improve the efficiency of its operations and reduce its carbon emissions on an ongoing basis. Recent achievements include:



- Installation of energy efficiency measures as part of building refurbishments (lighting, TRVs, energy efficient kitchen equipment) at Summer Row and Richmond House.
- Installation of water efficiency measures as part of refurbishments (toilets, beauty, kitchens) at Summer Row and Richmond House.

- Energy efficiency measures were included in the building of Maltings Halls of Residence.
- Recycling of cardboard, paper and glass introduced.
- Approvals processes and planning to improve efficiency of business travel for marketing, staff development and student placements (UK and overseas).



- A range of IT improvements including charging students for printing, the introduction of new printers, and software to control computers on standby and switch them off overnight.
- Reduction in production of marketing materials including a switch to electronic distribution of the prospectus, the use of CDs/USB drives as alternative methods of distribution and reducing giveaways. These measures have significantly reduced by postage and freight costs as well as resource usage.

2 Carbon Management strategy

UCB has developed this carbon management plan to respond to a range of drivers, both internal and external. These are outlined in this section and their significance discussed. Also outlined are our strategic themes, which explain the key areas in which we will respond to the drivers for carbon management. Finally, the target we will adopt for carbon reduction which quantifies our response is explained.

2.1 Context and drivers for Carbon Management

The scientific evidence indicates that global average temperature is continuing to rise in a manner that is causally related to elevated atmospheric concentrations of “greenhouse” gases, most notably carbon dioxide, CO₂. This threat to global climate posed by increasing CO₂ emissions is already defining new policy, regulation and legislation locally, nationally and internationally, a trend we can expect to accelerate.

Internationally, at the Copenhagen Climate Summit in December 2009, it was resolved that the world treaty on climate change will be delayed by up to a year. This should allow all countries to fully establish the level of emissions that they are able to commit to through legally binding reductions.

Nationally, the UK Government has set legally binding targets through the Committee on Climate Change for reductions in UK CO₂ emissions of 34% by 2020 and 80% by 2050 against a 1990 baseline. To achieve these further drivers have been introduced, these are:

- EU Energy Performance of Building Directive (EPBD)
 - came into force on 4th January 2006
 - sets out to ‘promote the improvement of the energy performance of buildings within the EU through cost effective measures’ and to ‘promote the convergence of building standards towards those Member States which already have ambitious levels’ implemented through specific measures and standards in the UK.
 - There is a set methodology for calculating the energy performance of buildings, the introduction of regular inspections of cooling, heating and boiler installations, a set of performance standards applicable to both new and existing buildings, and a certification scheme for both new and existing buildings.
 - Energy Performance certification is required for all new buildings and when existing buildings are rented out or sold on. There is also a requirement for larger public buildings (over 1000m²) to show a display energy certificate (DEC) in a prominent position within the building. This certificate must be renewed annually.
- Carbon Reduction Commitment (CRC)
 - Since April 2010 any organisation that consumed more than 6,000 Mega Watt hours of half hourly monitored electricity during 2008 (which will include UCB) has been legally obliged to participate in the CRC, the Government’s new carbon trading scheme.
 - Participants in the CRC will need to buy carbon allowances each year, based on their energy consumption, to cover their emissions. The money is then paid back to participants based on their organisation’s performance in respect of carbon reduction during the year, as ranked in a mandatory league table which will be publicly available.

- Climate Change Levy (CCL)
 - This is payable on all gas and electricity consumption, and recently increased from 0.441p/kWh to 0.456p/kWh for electricity and from 0.154p/kWh to 0.159p/kWh for gas. Low and zero carbon technologies, are CCL exempt (such as good quality Combined Heat and Power and electricity from photovoltaic's).
- Building Regulations 2006 – Part L
 - They set out requirements for energy efficiency and the effective control of buildings and associated plant. These regulations apply to both new buildings and refurbishments.
- Waste management
 - Policy levers such as site waste management plans, the landfill tax escalator and the need to manage Waste Electrical & Electronic Equipment and batteries are designed to drive the management of waste up the “waste hierarchy”. The waste hierarchy prioritises: Waste Reduction; followed by Reuse; Recovery (recycling, composting and energy from waste); then disposal in landfill as the least preferred option.
- Future Funding
 - HEFCE has committed the Higher Education Institutions (HEIs) to Government targets in respect of scope 1* and scope 2* emissions and, further, is recommending that HEIs aspire to reductions of 50% (by 2020) and 100% (by 2050) against 1990 baselines [NB related to a 2006 baseline, 50% becomes 57%]. HEFCE also proposes that the HE sector commits to making reductions in scope 3* emissions, with the intention of setting targets for these emissions when measurement technology permits.
 - The Department for Education and Skills mandated HEFCE to promote sustainable development actively and to reflect it in the capital funding allocation for Universities and Colleges. As UCB aspires to develop phase 1 on its new site, this is particularly significant.
 - The HEFCE consultation on carbon reduction strategy (July 2009) regarded carbon management as part of the risk management process for an institution and HEFCE produced further best practise guidance on producing a carbon management plan.

There are in addition other significant drivers which impact upon the College:

- Raising Awareness
 - The idea of raising the awareness of energy, carbon and waste minimisation, works in tandem with corporate and social responsibility commitment. In order to fulfil this commitment, it is necessary to raise awareness and educate staff, students and visitors on these issues, and measures to achieve this are included in this plan. The College's teaching and learning strategy 2010 to 2015 has been developed to include sustainability and ensure that curriculum is developed which addresses these issues.

- Value for money
 - As the public sector finances tighten, it is important that efficient use of public funds is made and cost savings are made wherever possible. Many carbon reduction measures correspond to efficiency improvements, yielding cost savings.
- Volatility of the energy markets
 - Over recent years the energy market has become increasingly volatile. Despite forecasts that energy markets will stabilise they have not and the underlying trend is for the costs to rise. In order to manage this risk, it is necessary to ensure that all energy is used as efficiently and effectively as possible.
- Reputation and Image
 - It is important that institutional reputation and appeal for future recruitment of both students and staff is considered. Further, the reputation to external stakeholders in taking action to reduce carbon emissions, should be promoted going forward through effective communication of a coherent strategy.

2.2 Strategic themes

The strategic themes in reducing our carbon emissions are:

- Ensuring our planned new development is as low carbon as possible.
- Ensuring that our retained existing building stock is maintained so that the buildings emissions are minimised.
- Raising awareness across the College so that everyone can play their part in reducing our emissions.
- Integration of carbon reduction into existing College policies and procedures and development of new ones where required.

2.3 Targets

Our target is to reduce our carbon emissions in absolute terms from our energy, water, waste, fleet and travel by 34% by 2020 compared to our 2005/6 baseline. We also have the intermediate target of reducing our carbon emissions in absolute terms from energy, water, waste, fleet and travel by 22% by 2014/15 compared to our 2005/6 baseline, which is the end of our five year plan.

3 Emissions baseline and projections

Data was collected to cover the emissions sources of the College and the corresponding carbon emissions calculated to produce our carbon footprint. The effect of reducing our emissions to meet our reduction target was then evaluated providing an estimate of the value at stake to the College if the emissions could be reduced.

3.1 Scope

The emissions sources included in the baseline carbon footprint are:

- gas consumption;
- electricity consumption;
- water consumption;
- waste disposal and recycling;
- owned vehicle fuel use; and
- business travel.

Additionally the scope of emissions will be expanded to cover staff and student commuting once data is collected by the College. The measures to do this are outlined in section 4.2. The quality of the data used is sufficient for the purposes of producing this CMP, however, there are known to be areas in which data capture procedures can be improved, removing the need to estimate data in the areas shown in the previous tables. The data capture improvements are outlined in section 6.2.

3.2 Sources of data

The following table outlines the data and its source used to produce the baseline emissions footprint:

Data type	Source 2005/6	Source 2008/9	Data used 2005/6	Data used 2008/9
Gas	EMS returns	EMS returns Plus estimate of Postgraduate centre.	4,489,871 kWh 220,800 kWh	6,287,297 kWh 220,800 kWh
Electricity	EMS returns	EMS returns Plus estimate of Postgraduate centre.	6,384,303 kWh 73600kWh	6,070,975 kWh 73600kWh
Water	EMS returns	EMS returns - with consumption corrected	75,992 m ³	73,815 m ³
Waste disposal and recycling	Estimated from data collected from College records	EMS returns	1,693 tonnes waste to energy generation 41 tonnes recycled	1,610 tonnes waste to energy generation 124 tonnes recycled
Owned vehicle fuel use	Estimated from data collected from College records	EMS returns	2,900 litres diesel and 300 litres petrol	3,000 litres diesel

Business travel	Estimated from data collected from College records	Estimated from data collected from College records	Full details in appendix.
Student travel exchange, visit or placement	Estimated from data collected from College records	Estimated from data collected from College records	
Air travel international students	Estimated from data collected from College records	Estimated from data collected from College records	
Staff and student commuting	Data currently unavailable		

The following table outlines the data and its source used to produce the cost profile associated with the baseline emissions footprint:

Data type	Source 2008/9	Data used 2008/9 (£)
Gas	EMS returns	248,000
Electricity	EMS returns	793,000
Water	Estimated from data collected from College records	160,000
Waste disposal and recycling	Estimated from data collected from College records	13,200
Owned vehicle fuel use	Estimated from data collected from College records	3,200
Business travel	Data currently unavailable	
Staff and student commuting		

3.3 Assumptions

The following table outlines the emissions factors used to produce the baseline emissions footprint and their source:

Data type	Emissions factor	Source
Gas	0.20417 kg CO _{2e} /kWh	2009 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting
Electricity	0.54418 kg CO _{2e} /kWh for 2008/9 0.53729 kg CO _{2e} /kWh for 2005/6	

Water	0.969 kg CO _{2e} /kWh
Waste to energy generation	97 kg CO _{2e} /kWh
Recycling*	-514 kg CO _{2e} /kWh
Diesel	2.6694 kg CO _{2e} /kWh
Petrol	2.3307 kg CO _{2e} /kWh
Average UK car	0.20282 kg CO _{2e} /km
Taxi	0.15835 kg CO _{2e} /pkm
Rail	0.05774 kg CO _{2e} /pkm
Bus	0.10351 kg CO _{2e} /pkm
Underground	0.07801 kg CO _{2e} /pkm
Short haul flights	0.09826 kg CO _{2e} /pkm
Long haul flights	0.1122 kg CO _{2e} /pkm

*The emissions factor for recycling is negative as this is the amount of emissions saved by the recycled materials being used in place of virgin sourced materials.

3.4 Baseline

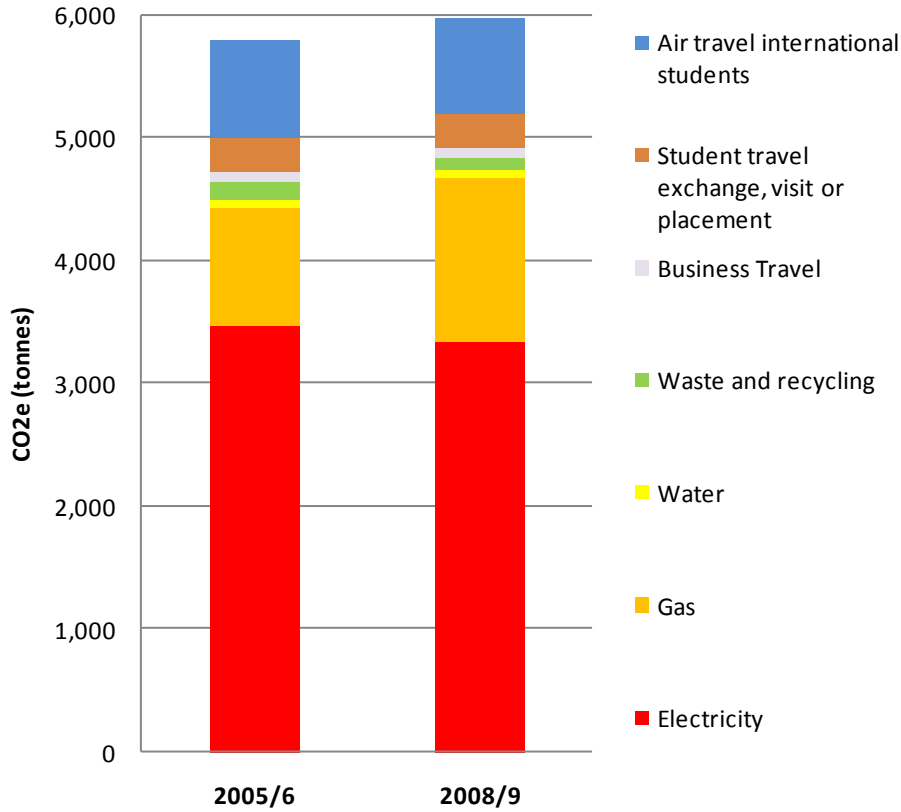
The baseline carbon footprint is 5,795 tCO₂ and is for academic year 2005/6.

The carbon footprint for academic year 2008/9 is 5,983 and has also been calculated as this is the latest year for which complete data is available.

The following table illustrates the composition of the carbon footprint:

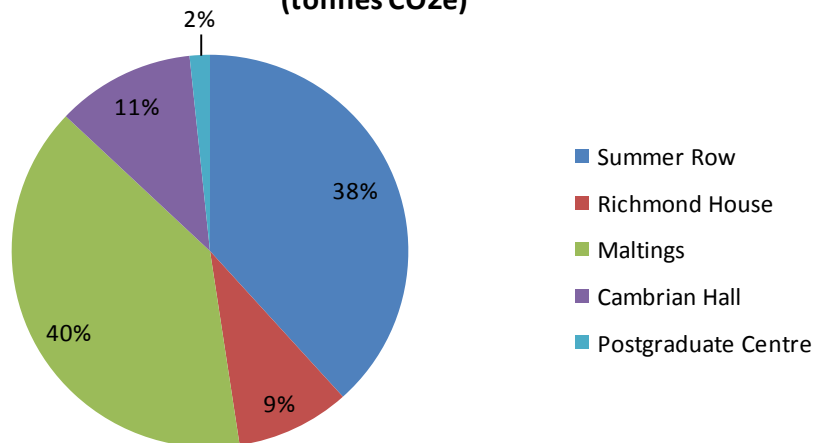
Emissions source	Emissions (tonnes CO ₂) 2005/6	Percentage 2005/6	Emissions (tonnes CO ₂) 2008/9	Percentage 2005/6
Electricity	3,470	60	3,344	56
Gas	962	17	1,329	22
Water	74	1	72	1
Waste and recycling	143	2	92	2
Business Travel	85	1	84	1
Student travel exchange, visit or placement	277	5	277	5
Air travel international students	785	14	785	13
Total	5,795	100	5,983	100

The majority of the emissions relate to electricity, with emissions arising from gas and air travel by international students to UCB as the second and third largest sources respectively, as shown in the following bar chart.



The only emissions source to increase between 2005/6 and 2008/9 is gas, which is substantially due to the acquisition of Cambrian Hall between 2005/6 and 2008/9 which added about 418 tonnes of emissions. Electricity consumption, however, fell over the same period due to a range of efficiency measures (such as motion sensors for lighting control) being installed during refurbishments. The following chart shows the emissions from building energy consumption by building for 2008/9. This shows that the Maltings and Summer Row between them account for 78% of the emissions from building energy consumption.

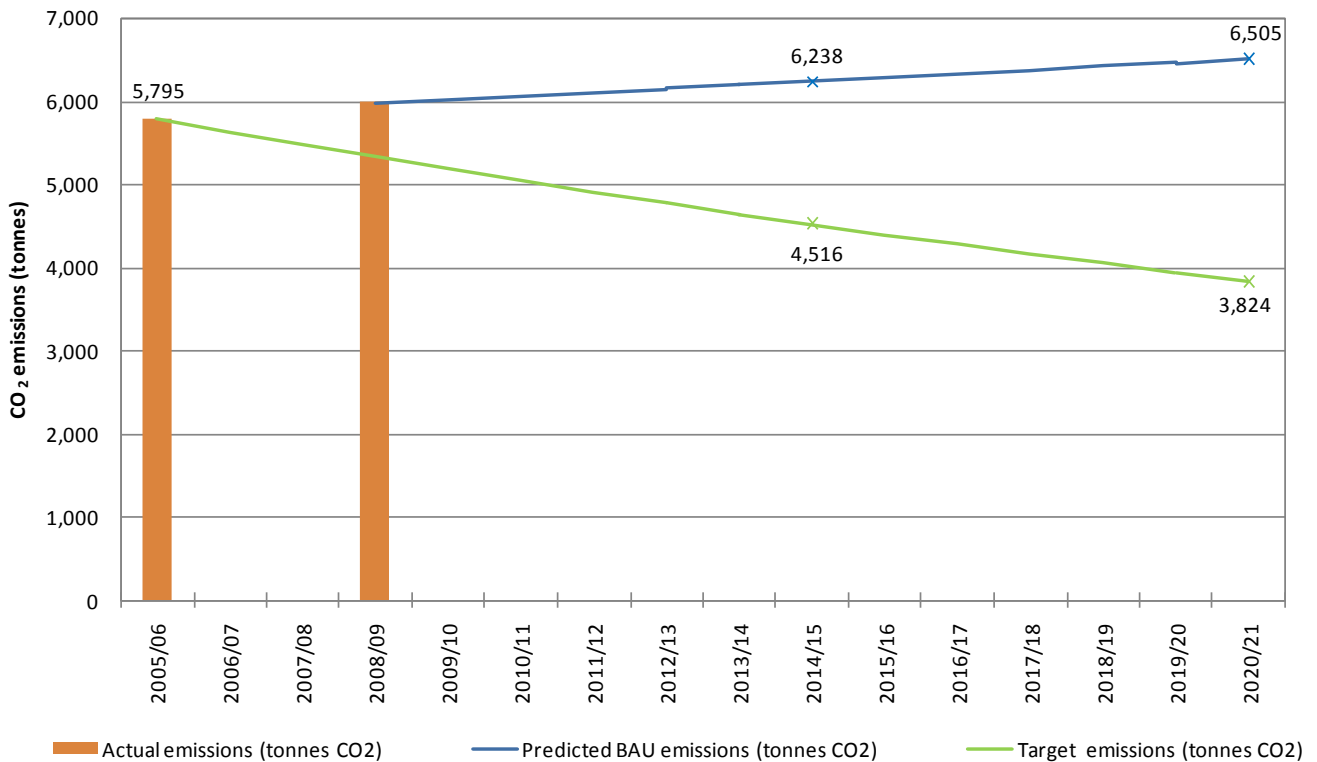
Emissions from building energy consumption for 2008/9 (tonnes CO2e)



3.5 Emissions projections

There is tendency for emissions from a building to increase over time due to increasing pressure for more energy intensive services, such as air conditioning, and also through increasing use of electrical items to assist in day to day work. The Business As Usual (BAU) growth for CO₂ emissions for the College assumes that there will be 0.7% increase in emission per annum. The continuing applicability of this assumption should reviewed annually.

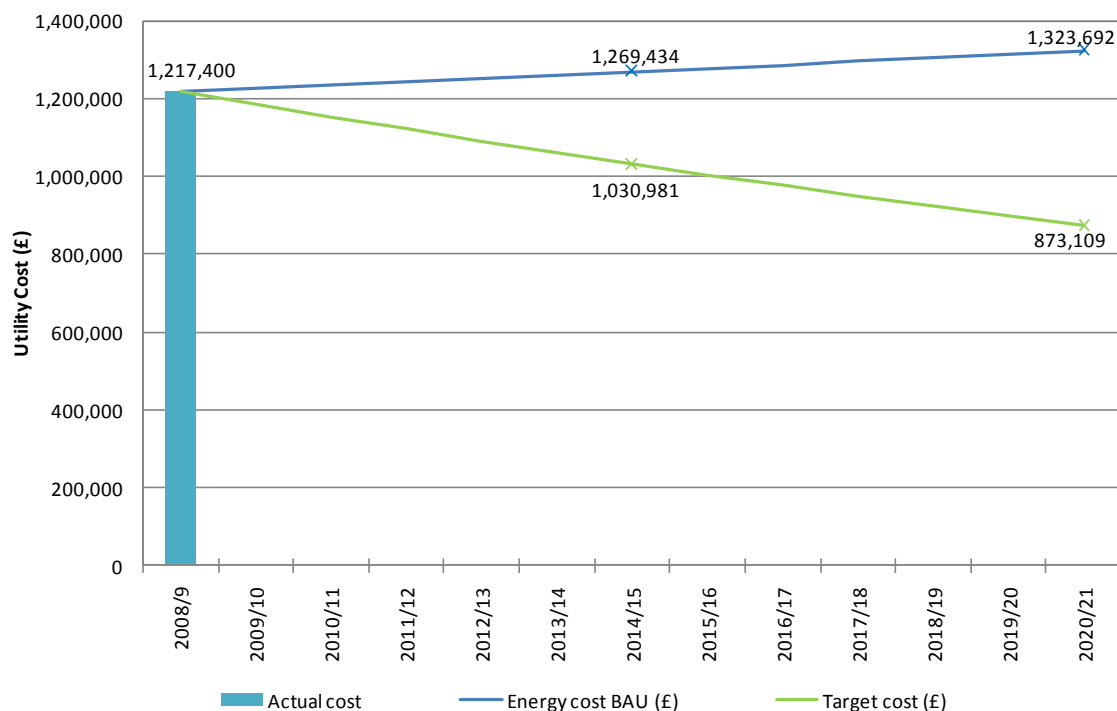
The projected carbon emissions for the BAU scenario have been calculated. They show the 2005/6 base year, carbon footprint for 2008/9, the latest year for which data is available and how, assuming a 0.7% BAU growth rate, the emissions will grow. This is also compared to the reduction in emissions required for the target scenario (which is: (a) a reduction in emissions in absolute terms by 34% compared to the 2005/6 baseline, by 2020 and (b) for the five year plan target emissions, a reduction in emissions in absolute terms by 22% compared to the 2005/6 baseline). These can be seen in the following graph:



The graph shows that to achieve the target 34% reduction, total emissions will need to reduce by 1,971 tonnes by 2020/21 and 1,279 tonnes by 2014/15, the end of this plan.

3.6 Value at stake

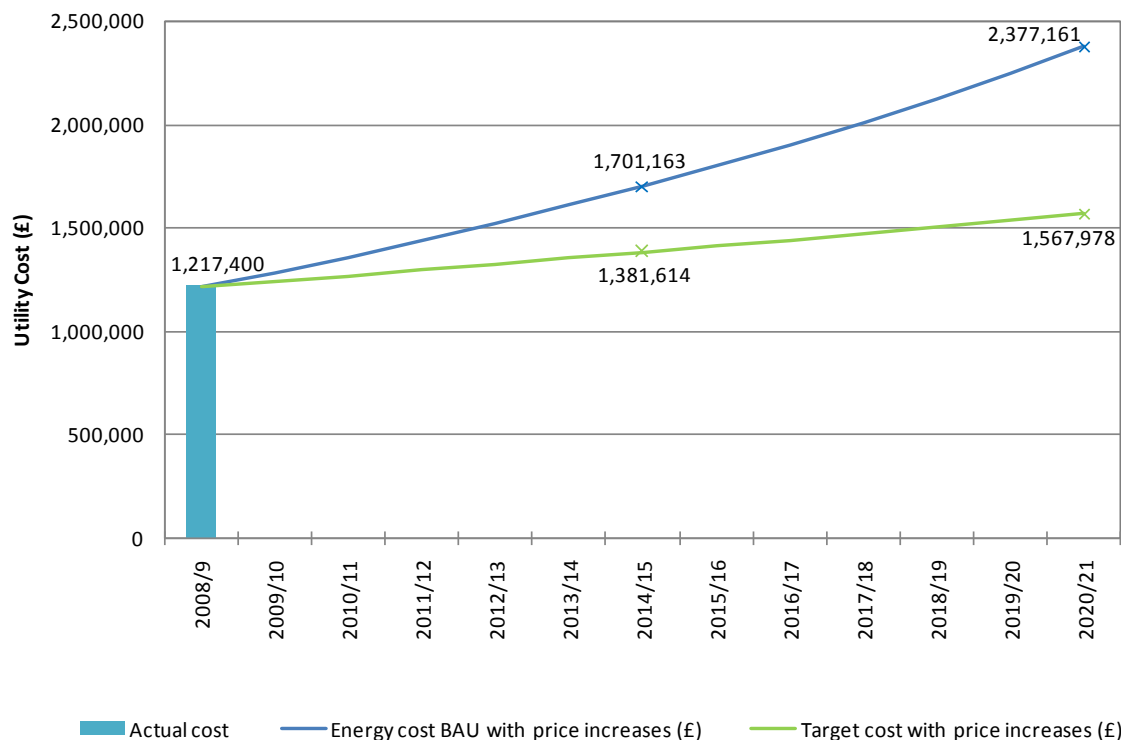
The effect these scenarios should also be considered for utility costs. The following graph illustrates the effect of increasing BAU consumption at 0.7% per year on utility costs (gas, electricity, water, waste disposal and recycling, and owned vehicle fuel use) compared to the target scenarios. The current costs are used:



The graph shows that if the Government target reduction can be achieved, then by 2020/21 a there will be a difference of £450,583 between these costs and BAU costs in that year. The cost savings are shown in the following table and amount to about £3 million in total if the 2020/21 target is achieved:

	Year	Cost BAU (£)	Target cost (£)	Cost saving (£)
	2008/9	1,217,400	1,217,400	0
1	2009/10	1,225,922	1,184,140	41,782
2	2010/11	1,234,503	1,151,788	82,715
3	2011/12	1,243,145	1,120,320	122,825
4	2012/13	1,251,847	1,089,712	162,135
5	2013/14	1,260,610	1,059,940	200,670
6	2014/15	1,269,434	1,030,981	238,452
7	2015/16	1,278,320	1,002,814	275,506
8	2016/17	1,287,268	975,416	311,852
9	2017/18	1,296,279	948,767	347,512
10	2018/19	1,305,353	922,846	382,507
11	2019/20	1,314,491	897,633	416,857
12	2020/21	1,323,692	873,109	450,583
	Total	16,508,263	13,474,867	3,033,397

However, prices are unlikely to remain at 2008/9 prices. The cost increases are assumed to be driven by rising oil prices over the period of the plan. This is estimated to result in an average 5% pa increase in unit price. This cost increase is then applied to the corresponding year's projected BAU consumption and target consumption values to produce the estimated costs. This is shown in the following graph.



The graph shows that if the target reduction can be achieved, then by 2014/15 there is estimated to be a difference of £319,549 between these annual costs and BAU costs. The cost savings are shown in the following table and amount to about £4.6 million in total if the 2020/21 target is achieved:

	Year	Cost BAU with price increases (£)	Target cost with price increases (£)	Cost saving with price increases (£)
	2008/9	1,217,400	1,217,400	0
1	2009/10	1,287,218	1,243,347	43,871
2	2010/11	1,361,040	1,269,846	91,194
3	2011/12	1,439,095	1,296,910	142,185
4	2012/13	1,521,628	1,324,552	197,076
5	2013/14	1,608,893	1,352,782	256,111
6	2014/15	1,701,163	1,381,614	319,549
7	2015/16	1,798,725	1,411,060	387,664
8	2016/17	1,901,882	1,441,134	460,747
9	2017/18	2,010,954	1,471,849	539,105
10	2018/19	2,126,283	1,503,219	623,064
11	2019/20	2,248,225	1,535,257	712,968
12	2020/21	2,377,161	1,567,978	809,182
	Total	22,599,665	18,016,949	4,582,717

This illustrates that potentially cumulative savings of about £1 million can be achieved by 2014/15, corresponding to a reduction in emissions of 1,279 tonnes if the target reductions are achieved. This will require successful implementation of a range of projects, as will be described in the following section.

4 Carbon Management Projects

A range of different projects to reduce carbon emissions: from capital investment to no and low cost measures are outlined, and their effect in reducing the College's carbon footprint illustrated. The first key project being estate change which is covered separately.

Other potential measures which could be introduced to the College estate to allow it to meet its reduction target are then discussed.

4.1 Estate change

The following assumptions were made about the lifetime of the sites and are as follows:

- Postgraduate Centre is expected to be retained for about another 12 months;
- Phase 1 is anticipated to be completed by January 2013, being ready for occupation (with full energy consumption) from summer 2013;
- Cambrian Hall is expected to be retained until the end of academic year 2012/13; and
- Summer Row, Richmond House and the Maltings will be retained throughout the duration of the plan.

Details of the assumptions relating to changing utility consumption as the sites come/go from use are outlined fully in opportunity 15, found in the appendix. The changes in consumption are included on a year by year basis in the estimation of carbon emissions during this plan period.

4.2 Projects to reduce carbon emissions

The 2008/9 baseline consumption data has been used to calculate the savings from implementing a range of projects. These are summarised in the table on the following page with full details provided in the appendix:

Key:

	= Fully funded and approved
	= Business case confirmed but measures not yet fully funded and approved
	= Requires further feasibility studies to confirm the business case.
	= Ongoing refurbishment project

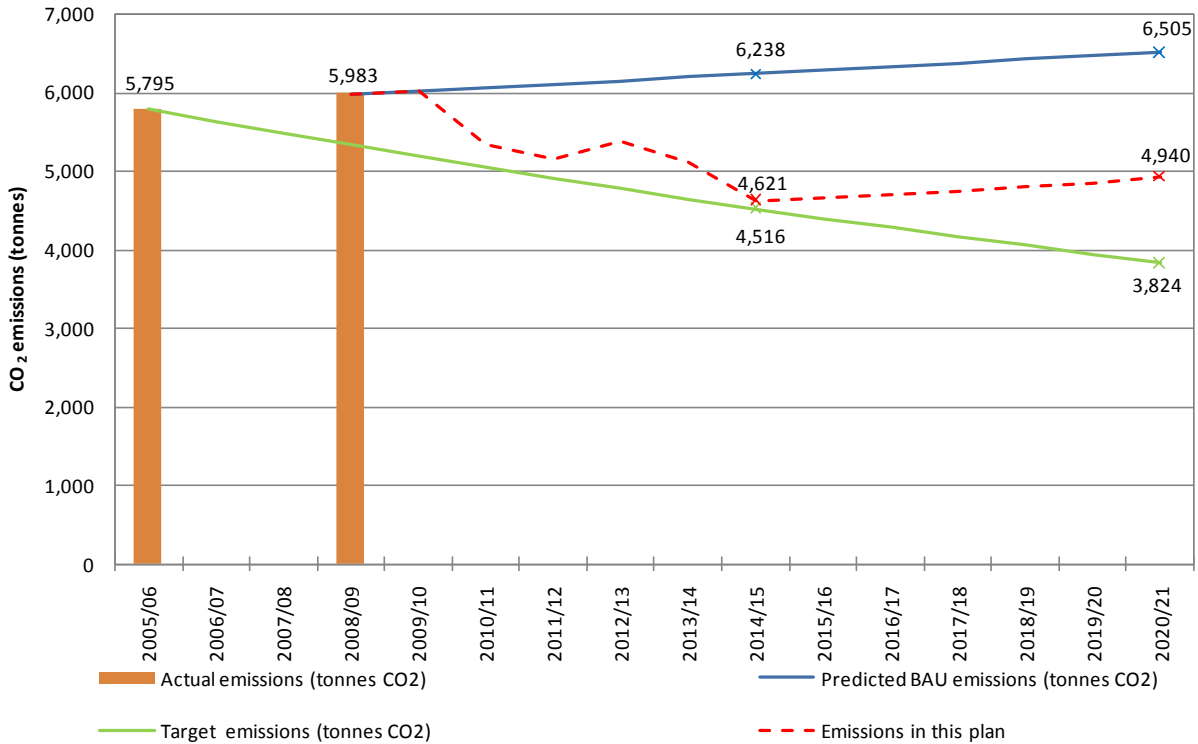
Reference	Project	Cost (£)		Annual savings		Payback period (years)	Implementation year
		Capital	Revenue	Financial (£)	CO _{2e} (tonnes)		
1	Lighting refurbishments	345,700*	-	34,800*	172.4*	9.9	2014/15*
2	Heating – TRVs	15,000*	-	2,000*	41.2*	7.3	2014/15*
3	Window refurbishments	52,000*	-	6,200*	125.1*	8.4	2014/15*
4	Water saving - refurbishments	-	-	3,200	1.7*	-	2014/15*
5	Insulation improvements (risers, valves and flanges and cavity walls)	13,000*	-	4,100*	83.4*	3.2	2014/15*
6	Summer Row new boilers	44,000	-	3,600	72.8	12.2	2014/15
7	BMS upgrade and linking	30,000	-	5,900	33.6	5.1	2014/15
8	IT efficiency measures	1,170	-	131,700	651.8	>1	2010/11**
9	Projects for waste minimisation and increasing recycling	4,000	-	1,300	49.2	3.1	2010/11
10	Travel related	-	-	-	2.5	-	2010/11
11	Policies and procedures	-	-	-	-	-	2010/11
12	Awareness campaign, stakeholder engagement and training	-	5,000	33,800	167.2	>1	2010/11
13	Automatic Meter Reading	2,100	1,500	-	-	-	2010/11
14	Low emissions fleet	-	-	400	0.8	-	2014/15
15	Estate change – Phase 1	tbc	tbc	14,546**	215**	tbc	2013/14**
Total		506,970	6,500	241,546	1,616.7	-	-

*For refurbishment items and estate change, these are the annual savings from 2013/14 onwards. See appendix for full details of savings prior to this date.

**Excluding virtualisation which is a rolling project. See appendix for full details.

4.3 Projected achievement towards emissions reduction target

The following graph illustrates the estimated effect of implementing the projects outlined above on the College's carbon footprint. It shows that if the projects as outlined previously are implemented, then the College will be able to reduce its emissions such that by 2014/15 the emissions are reduced to 4,621 tonnes CO_{2e}, which is 105 tonnes above the target emissions of 4,516 tonnes CO_{2e}. This means that a 20% reduction has been identified.



After 2014/15 the upwards trend in emissions is due to the BAU increase trend in emissions. So, if no further actions are taken, and taking into account 0.7% pa BAU growth, a further 1,116 tonnes of savings will be required to be identified and implemented so that the UCB achieves its emissions target in 2020/21.

4.4 Other potential carbon reduction measures.

An additional 105 tonnes of savings will be required to be identified and implemented so that the College achieves its emissions target in 2014/15. It is expected that, as some of the opportunities which were outlined are not yet fully quantified further savings will be identified. In addition, as part of planned maintenance and replacement of plant, there may be savings identified which will deliver carbon reduction benefits.

In addition, there are other areas which were discussed in developing this plan but are not yet outlined in detail which could provide additional savings. These include:

- Solar hot water system installation to provide hot water at the Maltings Sports Hall
- Photovoltaics installation to provide electricity for the Maltings
- Adjustment of canopy wash controls.

The 2014/15 target should therefore be achievable assuming that all members of UCB are engaged and play their part in delivering carbon emissions reduction.

5 Implementation Plan financing

This plan will require capital investment of about £506,970 to implement over five years, and will, by the 5th year provide annual savings of about £241,500. The payback period for the capital cost of the measures is about 2 year. It is anticipated that the funding will be provided by from a range of budgets across UCB.

5.1 Assumptions

This plan assumes the following utility costs for the savings from the projects:

- Electricity – 11.0 p/kWh
- Gas – 2.7 p/kWh
- Water – 177.5 p/m³
- Waste - £7.60/tonne
- Diesel - 121.6 p/litre
- Petrol - 120.5 p/litre

These costs will change over the five year plan and with energy costs likely to increase. 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.

It will be necessary to conduct further feasibility studies into the following projects before they can proceed:

- Investigation into feasibility of insulation of cavity walls in Richmond House.
- Undertaking a feasibility study into the possible use of CHP and replacement of the existing boilers in Summer Row with new, higher efficiency boilers.
- Undertaking a feasibility study into the options for upgrading the BMS at Summer Row and developing a strategy whereby the BMS at all sites in the estate (Summer Row, Richmond House, the Maltings and planned new sites) can be linked into one central control centre.
- Design-in waste management space on new phase 1 site.
- Travel data recording and policy changes.
- The feasibility of an electric van for use between sites will be evaluated.
- Phase 1 development of the new site using an efficient, low carbon design.

If the Phase 1 development project does not end up selecting a low carbon design then this will have a significant impact through both risk to external funding for the project and also by making ongoing emissions reduction more difficult.

5.2 Benefits / savings – quantified and un-quantified

The following table summarises the annual cost and emissions savings provided from the measures outlined in section 3:

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Annual cost saving (£)	0	136,514	180,858	144,119	181,346	241,546
Annual CO_{2e} saving (tonnes)	0	725	956	767	1,086	1,617

As well as quantified benefits there are additional benefits which cannot be measured in terms of reduced emissions or cost savings. These are:

- enhanced reputation for UCB;
- improved building comfort for staff and students; and
- stabilisation and reduction in energy costs.

5.3 Additional resources

Many of the measures outlined in section 3 involve staff time. In some cases this would be time that they would already be spending in implementing the measures (such as refurbishments) but others will require additional time to be spent looking into new measures. This may add additional costs in some cases, but this has not been included at this stage. Any significant additional staff costs will be assessed as the measures are approved.

5.4 Financial costs and sources of funding

The following table outlines the annual capital costs to implement the projects. The total capital requirements are £506,972 over the period of this CMP. The projects are planned to be fully funded from the College budget.

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Total annual capital cost	57,615	78,887	75,617	147,617	73,617	73,617
Total funded	57,615	78,887	75,617	147,617	73,617	73,617

In addition, there will be an estimated annual revenue cost of £6,500 for AMR and awareness projects which is anticipated to be fully funded from the College budget.

6 Actions to Embed Carbon Management in your Organisation

Appendix A contains the carbon management embedding matrix and the highlighted entries summarise the current status of UCB for each area in relation to carbon management. This plan aims to improve the rating in each area as follows:

Area	Current status	Anticipated status by end of plan	Sections detailing how this is achieved
Policy	2	5	6.3
Organisation	3	5	6.1, 6.6
Information and data	3	5	6.2
Communication and training	1/2	5	6.6
Finance	3	4	5
Monitoring and evaluation	3	5	6.4

6.1 Corporate Strategy

We will demonstrate the commitment of the senior management at UCB to carbon reduction by making this plan publicly available on our website and linking it to our awareness raising activities outlined in section 5.6, including a plan launch.

We will also ensure that our carbon reduction target is included in our Operating Statements which forms the College's Corporate Plan when it is next reviewed. Similarly, when service department or teaching department strategic plans are reviewed we will ensure that carbon reduction is included with relevant areas for action outlined in each case. This will ensure that local commitment to action is achieved by finding specific relevant carbon reduction priorities and ensuring that it is appropriately resourced.

6.2 Data Management

There are actions which we will take to improve data management:

- Electricity, gas and water data capture can be improved by the provision of Automatic Meter Reading which makes accessible meter readings every half-hour. This is covered in more detail in project 13 in the appendix.
- Waste and recycling data could be improved by conducting an audit of the composition of the waste.
- The actions required to improve travel data capture are outlined in project 10 in the appendix.

A complete data set will be collected annually for use by the Carbon Management Strategy Working Group, with Estates staff responsible for leading the data collection process (although it is likely that travel data collection will be jointly the responsibility of other parts of UCB – see appendix 10). The data will be used to monitor carbon reduction projects and ensure that they remain on target to deliver the savings expected. It will be members of Management Strategy Working Group who will lead this process.

The data will be provided as required for use in awareness raising activities as outlined in section 6.6 on stakeholder management.

6.3 Policy Alignment

It is important that key policies for the College include carbon management so that it can be fully integrated as best practise in the College's day to day operations. Key policies requiring review, together with responsibility and timescale for the review are summarised in project 11, in the appendix. There will be an ongoing review of these policies by the Carbon Management Strategy Working Group to ensure that they remain fit for purpose.

6.4 The Carbon Management Strategy Working Group

The Carbon Management Strategy Working Group is the group within UCB who has produced this carbon management plan. It has been tasked with reducing UCB's carbon emissions in line with Government policy by the Professor Ray Linforth, Principal UCB and therefore has been mandated the authority to address the issue across all aspects of UCB's activities. This will be the group who will take responsibility for implementing the plan going forward. The Group brings together in one place all the carbon reduction projects and the key individuals involved in their implementation. This will ensure that carbon reduction activities are coherent and coordinated across UCB. It will also encourage those responsible through sharing of achievements and problems, together with Senior Management support to assist with removal of potential blockages to progress.

The carbon management strategy working group comprises:

Vice Principal (Corporate Services)
Vice Principal (Academic Affairs)
Assistant Principal (Information Services)
College Accountant
Accommodation Manager
Guild President
Deputy Director of Estates
Marketing Manager (Recruitment)
Dean of School of Sports Therapy and Salon Management
Chef Lecturer

The team is chaired by Mike Harkin, Vice Principal (Corporate Services). He will also undertake reporting to the Senior Management Team and to the Executive as required for monitoring the plan's progress and for approval of any measures required to implement carbon reduction projects.

The Carbon Management Strategy Working Group will meet termly and undertake an annual review each summer term of progress against the plan's objectives.

The review will cover the cost and all benefits from the Programme:

- financial savings;
- CO₂ savings against the target reductions; and
- less quantifiable benefits, such as raising awareness and improving UCB's profile.

The review will assess the current level of progress for each carbon reduction project against its planned level of achievement. A register of progress will be maintained for the projects ensuring that problems can be addressed in a timely manner.

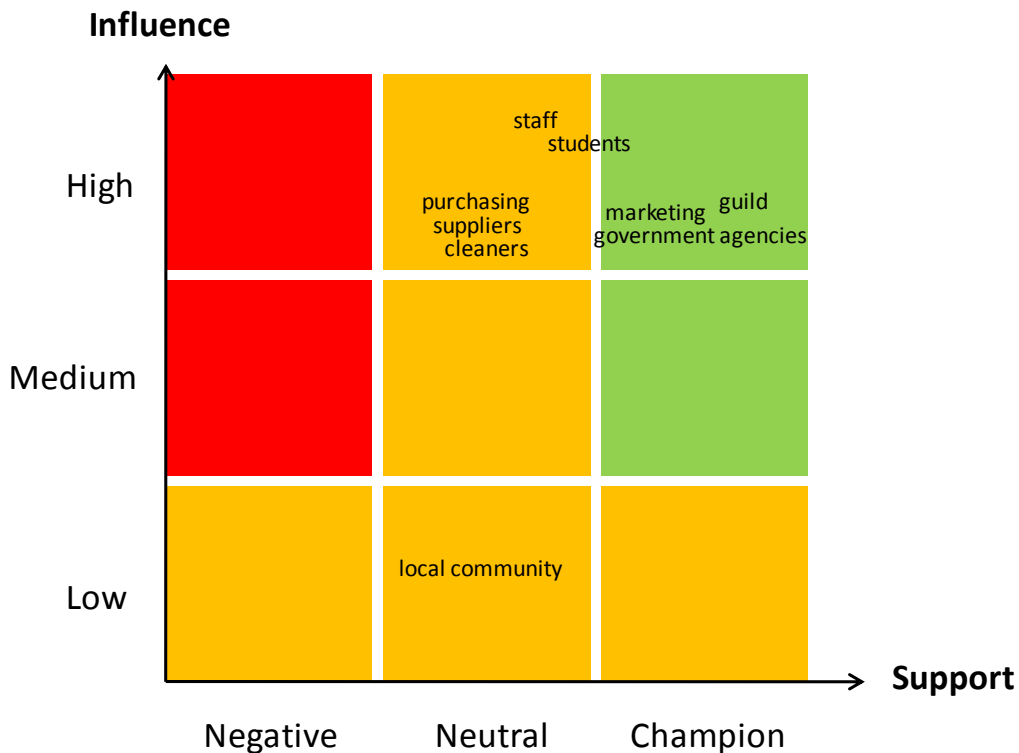
In addition, any further measures to deal with unforeseen events or to mitigate any significant risks to the plan will also be addressed in the review to ensure that the plan remains upon track to achieve its target emissions reduction. The results of the review will be reported by Mike Harkin, Vice Principal (Corporate Services) to the Senior Management Team.

6.5 Succession planning for key roles

In the event of a Carbon Management Strategy Working Group member being unable to continue in their role, or leaving UCB another member of staff will be recruited to help cover their area of action. It will be the responsibility of Vice Principal (Corporate Services) to undertake this.

6.6 Ongoing stakeholder management

An initial stakeholder analysis was conducted to determine the key stakeholders for UCB and estimate their current level of engagement in carbon management issues. This is summarised in the figure below. It shows that in general there is a high level of existing support, including champions within UCB.



An engagement plan to ensure that all stakeholders support in carbon reduction is achieved was compiled and is shown in the following table:

Stakeholder	Method of engagement	Frequency of communications	Person responsible for communications	Training required
Staff – teaching and support	<p>Launch of carbon management plan</p> <p>Rolling awareness campaign</p> <p>Direct engagement via local carbon champions</p> <p>Including carbon reduction into the staff induction process</p> <p>Inclusion of carbon reduction as part of job descriptions or performance management objectives where appropriate.</p> <p>Dedicated point of contact for suggests and reporting inefficiencies.</p>	<p>Inclusion of updates on progress on a termly basis</p> <p>At least monthly reminder of actions that staff can take (posters, e-mail, web and meetings)</p>	<p>Mike Harkin Vice Principal (Corporate Services)</p> <p>Amin Pradhan Assistant Principal (Information Services)</p>	<p>General awareness training</p> <p>Carbon champions will require more detailed training in engagement in carbon reduction</p>
Teaching staff	<p>Development of resources to be used in student induction process relating to simple actions that they can take to reduce carbon emissions.</p> <p>Inclusion of sustainability and carbon reduction into validation documentation for HE so that it is integrated across course modules starting in academic year 2010/11.</p> <p>Provision by student services of resources to be used in FE tutorial system relating to sustainability and carbon reduction for academic year 2010/11.</p> <p>Emphasis on resource efficiency and link to profit margin where appropriate in teaching process (e.g. kitchen, hair and beauty best working practise to minimise utility consumption)</p>	<p>Aiming for these aspects to become fully integrated throughout the whole of the course.</p>	<p>Gary Wood, Vice Principal (Academic Affairs)</p> <p>Elaine Manderville, Dean of School of Sports Therapy and Salon Management</p> <p>Leighton Anderson, Chef Lecturer</p> <p>Rebecca Hesom Accommodation Manager</p>	<p>Staff developing materials will require training in sustainability and carbon reduction as they may have to advise staff delivering in these areas.</p> <p>Annual refreshing will be required to ensure that materials stay up to date.</p>
Students	<p>Launch of carbon management plan</p> <p>Rolling awareness campaign</p> <p>Including carbon reduction into the student induction process</p> <p>Dedicated point of contact for suggests and reporting inefficiencies.</p> <p>Plus, direct engagement through a detailed programme agreed between Guild and Student Services (see appendix)</p>	<p>Inclusion of updates on progress on a termly basis</p> <p>At least monthly reminder of actions that staff can take (posters, e-mail, web and meetings)</p>	<p>Amin Pradhan Assistant Principal (Information Services)</p> <p>Rebecca Hesom Accommodation Manager</p> <p>Gregg Johnson Guild President</p>	<p>General awareness training</p>

Guild	Direct engagement through a detailed programme agreed between Guild and Student Services (see appendix)	Ongoing	Rebecca Hesom Accommodation Manager Gregg Johnson Guild President	Key members of Guild and its Green Society may require training as carbon champions.
Local community	Ensure that UCB's achievements are communicated via publication of this CMP, the website and marketing materials used.	Ongoing	Mike Harkin Vice Principal (Corporate Services) Amin Pradhan Assistant Principal (Information Services)	Not applicable
Government Agencies	Ensure that UCB's achievements are communicated via CMP, website and statutory data returns.	As required.	Estates- statutory data returns.	Not applicable
Marketing	Ensure that UCB's achievements are communicated via website and marketing materials used.	Ongoing	Eileen Prior Marketing Manager (Recruitment)	Not applicable
Purchasing	Direct engagement via local carbon champions with regular updates of progress	Termly	Tim Barker Assistant Principal (Finance)	Sustainable procurement training, especially in relation to tender process.
Suppliers	For significant suppliers briefing that carbon reduction is a priority and discussion of measures that could be taken	Ongoing engagement process	Estates Tim Barker Assistant Principal (Finance)	Not applicable
Cleaners	Reminders of items to be reported to Estates via cleaning supervisors and opportunity for suggestions. Use of half-hourly data to illustrate effect of cleaners switching lights on. Review of contract to embed carbon reduction.	Weekly Occasional At contract renewal	Estates – have responsibility for contract implementation. Tim Barker Assistant Principal (Finance) for contract improvements when it is renewed.	Not applicable
Security	Reminder system for items to be checked and plant control changes. Updates on utilities consumption and potential use of half-hourly data.	Weekly review Monthly	Estates	Detailed awareness training so that they understand the significance of their role in controlling plant and ensuring items are off.

The success of this plan will be measured by the Carbon Management Strategy Working Group in their annual review and changes will be made to ensure continued engagement of all stakeholders as required for the achievement of UCB's carbon reduction target.

Conclusion

This carbon management plan for UCB to reduce its carbon emissions over the period to 2014/15. Implementing this plan will ensure that we remain on track to achieve our target of a 34% reduction by 2020/21 compared to 2005/6 levels. In addition, this plan outlines the internal structures to ensure that the carbon reduction projects and the awareness raising and stakeholder engagement measures which will deliver this reduction are achieved and good carbon management embedded across the UCB.

Appendix A: Carbon Management Matrix – Embedding. Current status highlighted.

	POLICY	ORGANISATION	INFORMATION AND DATA	COMMUNICATION AND TRAINING	FINANCE	MONITORING & EVALUATION
5	Specific sustainability / climate change policy with targets signed off and implemented. Action plan with clear goals and regular reviews to confirm actions undertaken and targets achieved/being progressed.	Accountabilities for sustainability /climate change defined at senior level, e.g. senior Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates	CO ₂ emissions compiled for all main HEI sources for a baseline year and regular collation of annual emissions data. Data externally verified.	Formalised communication and training plan for all staff on carbon and energy related matters, including integration in induction and other normal training processes. Communication on carbon and energy related matters with the academic and student body and other key business partners	Use of innovative external funding mechanisms for carbon related projects. Development of internal financing mechanisms, e.g. self sustaining fund, specifically for carbon related projects	Management Review of carbon management process by senior management. Regular reviews by core team on progress with carbon management.
4	Specific sustainability / climate change policy with targets developed and signed off, but not implemented	Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g Teaching, Finance, Estates	CO ₂ emissions compiled for all main HEI sources for a baseline year (i.e. buildings, transport and commuting, etc). Data internally reviewed.	Formalised communication and training plan for all staff on carbon and energy related matters, including integration in induction and other training, and awareness raising	Strategic plan for developing internal financing mechanisms and obtaining funds from external sources	Regular reviews on progress with carbon management (e.g. review of actions, check against emissions profile and targets, addition of new opportunities etc.)
3	Sustainability / Climate change included in wider policy documents	Sustainability / climate change/ carbon management is part-time responsibility of moderate ranking personnel, e.g. Energy Manager, Sustainability/Environment Officer	CO ₂ emissions data compiled for some sources for a baseline year (e.g. buildings) and source data available for other sources (e.g. transport)	Ad hoc communication and training delivered to all staff/students on carbon and energy related matters	Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects Review conducted on applicable external funding sources	Ad hoc assessment of all aspects of carbon/energy policies/strategies, targets and action plans
2	Sustainability / Climate change as an aspiration in non-policy documents	Sustainability / climate change/carbon management is part-time responsibility of low ranking personnel	No CO ₂ emissions data compiled for any sources but energy data compiled on a regular basis	Communication and training to specific groups in the HEI (e.g. environment team) on carbon/energy related matters	Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects	Ad hoc reviews of specific aspects of carbon/energy policies/strategies, targets and action plans
1	No sustainability / climate change policy or strategy and no mention of climate change in policy/strategy documents	No individual with responsibility for sustainability / climate change issues	No CO ₂ emissions data compiled for any sources and energy data not compiled on a regular basis	No communication or training to staff/students on carbon or energy related matters	No internal financing or funding for carbon and/or energy efficiency related projects	No monitoring of carbon/energy policies/strategies, targets and action plans

Appendix B: Definition of Projects

Definition of Projects

Project:	Lighting refurbishments
Reference:	1
Owner	Director of Estates
Department	Estates
Description	Completion of a rolling programme of replacement of lighting fittings with more energy efficient fittings and integrated light level and motion sensor controls. Sites for installation are Summer Row and corridors/stairways in Richmond House. This will be done as part of the ongoing refurbishments programme.
Benefits	<ul style="list-style-type: none"> • Financial savings estimate: £34,800 • Saving estimate 316,700 kWh electricity • Payback period: 9.9 years • CO₂ Emissions reduction: 172.4 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of the project is estimated to be: £345,700 (based upon £120 per replacement fitting) • Source of funding: annual maintenance funding will be used
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: continued funding required.
Measuring Success	<ul style="list-style-type: none"> • The percentage of lighting refurbished is the appropriate measurement of project implementation. • The project will be successful when all lighting has been refurbished.
Timing	<ul style="list-style-type: none"> • This is an ongoing project, expected to take five years to complete.
Notes	<p>Assuming that:</p> <ul style="list-style-type: none"> • 7.8kW saved per floor by replacing the fittings • 57% Summer Row requires refurbishment • 10% Richmond House requires refurbishment • The lighting controls will turn off the lights an additional 5.5 hours per day, 6 days per week, 50 weeks per year.

Project:	Heating – TRVs
Reference:	2
Owner	Director of Estates
Department	Estates
Description	<p>Completion of a rolling programme of installation of thermostatic radiator valves (TRVs). These will be installed in Summer Row. This will be done as part of the ongoing refurbishments programme.</p> <p>Also, locking of TRVs where appropriate across the whole estate e.g. in public areas such as stairways and corridors so that a maximum heating level cannot be exceeded.</p>
Benefits	<ul style="list-style-type: none"> • Financial savings estimate: £ 2,000 • Saving an estimated 75,600 kWh pa of gas consumption • Payback period: 7.3 years • Estimated saving 41.2 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of the project is estimated to be £15,000 • Source of funding: annual maintenance funding will be used
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: continued funding required.
Measuring Success	<ul style="list-style-type: none"> • The percentage of TRVs installed is the appropriate measurement of project implementation. • The project will be successful when all TRVs have been installed and locked (where appropriate).
Timing	<ul style="list-style-type: none"> • This is an ongoing project, expected to take five years to complete.
Notes	<p>Assuming that 57% of radiators in Summer Row require TRV installation and that installing TRVs saves 10% of heating gas consumption for those areas. The savings in gas consumption from locking TRVs are included in measure 12 under awareness savings from good housekeeping to avoid double counting.</p>

Project:	Window refurbishments
Reference:	3
Owner	Director of Estates
Department	Estates
Description	Completion of a rolling programme of installation of secondary glazing and draft proofing. This will be installed in Summer Row and Richmond House. This will be done as part of the ongoing refurbishments programme.
Benefits	<ul style="list-style-type: none"> • Financial savings estimate is: £6,200 • Estimated savings are 229,800 kWh pa • Payback period: 8.4 years • Emissions saving 125.1 tonnes of CO_{2e}
Funding	<ul style="list-style-type: none"> • The cost of the project is estimated to be: £52,000 • Source of funding: annual maintenance funding will be used
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: continued funding required.
Measuring Success	<ul style="list-style-type: none"> • The percentage of windows refurbished is the appropriate measurement of project implementation. • The project will be successful when all windows have been refurbished.
Timing	<ul style="list-style-type: none"> • This is an ongoing project, expected to take five years to complete.
Notes	<ul style="list-style-type: none"> • Assuming that 67% of windows in Summer Row an Richmond House require refurbishment • Assuming that this saves 15% of heating gas consumption for those areas. • Assuming that it costs £60 per window for draught proofing and £200 per window for secondary glazing • Assuming that 400 windows require refurbishment – 50% draught proofed and 50% secondary glazed.

Project:	Water saving - refurbishments
Reference:	4
Owner	Director of Estates
Department	Estates
Description	Completion of a rolling programme of installation of water efficient devices during refurbishment (aerating, controlled taps, low flush toilets and urinal controls). This will be installed in Summer Row and Richmond House. This will be done as part of the ongoing refurbishments programme.
Benefits	<ul style="list-style-type: none"> • Financial savings: £3,200 • Saving about 1,800m³ pa • Emissions reduction is estimated to be about 1.7 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of installation of best practise water efficient devices is about 10% above standard refurbishment costs. • Source of funding: annual maintenance funding will be used
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: continued funding required.
Measuring Success	<ul style="list-style-type: none"> • The percentage of areas refurbished with water saving devices is the appropriate measurement of project implementation. • The project will be successful when all areas have been refurbished.
Timing	<ul style="list-style-type: none"> • This is an ongoing project, expected to take five years to complete.
Notes	Assuming that 30 toilets and hand basins are refurbished saving 40% water use for these devices.

Project:	Insulation improvements (risers, valves and flanges and cavity walls)
Reference:	5
Owner	Director of Estates
Department	Estates
Description	<ul style="list-style-type: none"> • Installation of insulation covers for valves and flanges in plant rooms in Summer Row and Richmond House. • Completion of a rolling programme of renewal of insulation in risers in Summer Row. • Investigation into feasibility of insulation of cavity walls in Richmond House.
Benefits	<ul style="list-style-type: none"> • Financial savings: £4,100 • Saving 153,300kWh gas pa • Payback period: 3.2 years • CO₂ Emissions reduction: 83.4 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of the project is estimated to be: £13,000 • Source of funding: annual maintenance funding will be used
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: continued funding required. • Insulation of cavity walls in Richmond House may not be feasible
Measuring Success	<ul style="list-style-type: none"> • The percentage of areas insulated is the appropriate measurement of project implementation. • The project will be successful when all areas have been insulated.
Timing	<ul style="list-style-type: none"> • Installation of covers for valves and flanges in plant rooms in Summer Row and Richmond House should be completed by end of 2010. • Insulation of the risers in Summer Row is an ongoing project, expected to take over five years to complete. • Investigation into feasibility of cavity walls in Richmond House (and insulation if possible) should be completed by end of 2011.
Notes	<p>Assuming that installation of insulation covers for valves and flanges in plant rooms in Summer Row and Richmond House saves 150W per valve/flange and that there are 276 insulated.</p> <p>Assuming that insulation renewal of each riser saves 160kWh/m/year, with 21.6m pipe and that there are 5 risers which are completed over 5 years, one per year.</p>

Project:	Summer Row new boilers
Reference:	6
Owner	Director of Estates
Department	Estates
Description	<ul style="list-style-type: none"> • Undertaking a feasibility study into the possible use of CHP and replacement of the existing boilers in Summer Row with new, higher efficiency boilers. • Replacement of the existing boilers in Summer Row following the recommendations.
Benefits	<ul style="list-style-type: none"> • Financial savings: £3,600 • Estimated savings of 133,900 kWh • Payback period: estimated 12.2 years • Emissions reduction estimated 72.8 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of the project is estimated to be £44,000 • Source of funding: to be confirmed
Resources	<ul style="list-style-type: none"> • This project will be delivered within current resources.
Ensuring Success	<ul style="list-style-type: none"> • Principal risks: securing the funding required.
Measuring Success	<ul style="list-style-type: none"> • The project will be successful when the boilers have been replaced.
Timing	<ul style="list-style-type: none"> • The feasibility study will make recommendations by end of 2010. • The boiler replacement timescale will then be agreed.
Notes	Assumed savings of 20% heating gas consumption, accounting for other consumption reduction measures.

Project:	BMS upgrade and linking
Reference:	7
Owner	Director of Estates
Department	Estates
Description	<ul style="list-style-type: none"> • Undertaking a feasibility study into the options for upgrading the BMS at Summer Row and developing a strategy whereby the BMS at all sites in the estate (Summer Row, Richmond House, the Maltings and planned new sites) can be linked into one central control centre. • Installation of BMS upgrade for Summer Row and measures enabling the central control centre.
Benefits	<ul style="list-style-type: none"> • Financial savings estimated to be about £5,900 pa • Saving about 57,900kWh gas and 40,000kWh electricity pa • Payback period estimated to be 5.1 years • Emissions reduction estimated to be 33.6 tonnes of CO_{2e}
Funding	<ul style="list-style-type: none"> • The initial estimate of the cost of the project is about £30,000 • Source of funding: TBC • Operational costs: staff time required for monitoring and acting upon BMS data. • Internal funding will be used for the feasibility study. • The decision on funding for the project will be taken following the feasibility study.
Resources	<ul style="list-style-type: none"> • Additional resource (staff time) is required for monitoring and acting upon BMS data.
Ensuring Success	<ul style="list-style-type: none"> • Summer Row BMS is currently remotely managed by Birmingham City Council and as it is an old system there is the risk that at some point the Council will no longer continue this service. • Securing the additional funding required is a key criteria if all systems are to be integrated into one central control centre.
Measuring Success	<ul style="list-style-type: none"> • This project will be successful when the BMS has been upgraded at Summer Row and a central control centre has been introduced.
Timing	<ul style="list-style-type: none"> • The feasibility study will make recommendations by end of 2010. <ul style="list-style-type: none"> ○ The BMS at Summer Row will be replaced during 2011/12 ○ The central control centre will be introduced as part of the development of phase 1 of the new site.
Notes	This is mainly an enabling measure. However, it is assumed that it can save 2% heating consumption through improved weather compensation control for heating in Summer Row (as currently it is switched on/off by requesting changes manually from the Council) and by improved monitoring at other sites and 2% electricity consumption.

Project:	IT efficiency measures
Reference:	8
Owner	Assistant Principal (Information Services)
Department	Information Services
Description	<ul style="list-style-type: none"> • Increase use of PC switch off software to ensure that all printers and monitors are switched off at night/weekend as well as during prolonged periods of inactivity • Install seven day timers on printer/copiers to ensure that they are switched off out of hours • Complete server virtualisation • Set printing to mono duplex for staff and increase measures to reduce quantity printed • Increase use of paperless document management systems in UCB such as electronic submission using the assessment tracking system, e-mail archiving to avoid printing, and the online vacancy application system. • Consider energy saving features when purchasing new equipment
Benefits	<ul style="list-style-type: none"> • Financial savings are £131,700 • Saving an estimated 1,197,700 kWh pa • Payback period is estimated to be under 1 year • Emissions reduction is estimated to be 651.8 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The cost of the projects outlined is estimated to be £1,170 • Information Services budget is expected to be the main source of funding. • Funding for each item will be decided on a separate case by case basis.
Resources	<ul style="list-style-type: none"> • This project is expected to be provided within current staff resources.
Ensuring Success	<ul style="list-style-type: none"> • The key success factor is the buy-in of staff and students into the new systems and ways of working. This measure needs to work closely with the measures to raise awareness to ensure maximum benefit is derived.
Measuring Success	<ul style="list-style-type: none"> • The effect of these measures can be monitored by: <ul style="list-style-type: none"> ○ the number of PCs/printer/copiers with controlled switch off, with the aim of all being controlled. ○ the number of servers virtualised with the aim of all being virtualised. ○ the number of pages printed by staff/students with the aim of this being minimised.
Timing	<ul style="list-style-type: none"> • Milestones: <ul style="list-style-type: none"> ○ PC switch off software should be rolled out to cover staff computers by end 2010 ○ Timers should be installed by end 2010 ○ Server virtualisation – ongoing programme ○ Printing – mono duplex default should be rolled out to cover staff by end 2010
Notes	<ul style="list-style-type: none"> • Assuming that the savings from the existing PC switch off software trial can be scaled up to cover an additional 545 PCs/monitors and that the cost is not covered here. • Assuming that 234 printer/copier/scanners can each be switched off using 7 day timers, saving an average 10W on standby for 12 hours per day. Timers cost £5 each. • Assuming that 40% of servers remain to be virtualised, saving 80% of their energy consumption (assumed to be 300W). The cost is assumed to be included in standard upgrade costs. • Assuming that 1,873,602 sheets of paper can be saved by duplex printing saving 2Wh per sheet.

Project Reference:	Projects for waste minimisation and increasing recycling 9
Owner	Director of Estates
Department	Estates
Description	<p>There are three main areas:</p> <p>Waste minimisation - which involves raising awareness to reduce the amount of waste produced, key areas being:</p> <ul style="list-style-type: none"> • reduction in paper use; • review of timings of catering classes to reduce amount of food produced when there will not be opportunity to sell the excess; and • working with suppliers to minimise packaging on purchases. <p>Increasing recycling:</p> <ul style="list-style-type: none"> • collection of cans/tins/plastic bottles from Summer Row/Maltings/Richmond House; and • food waste collection service. <p>Design-in waste management space on new phase 1 site, allowing space for:</p> <ul style="list-style-type: none"> • sufficient space for waste compactors, skips, cardboard bailers etc allowing the new site to potentially also act as a hub for Summer Row and Richmond House as they do not have space for such facilities but are in close proximity; • sufficient well designed space will allow sufficient recycled material volumes to be collected to allow cost free collection or to turn waste into a resource.
Benefits	<ul style="list-style-type: none"> • Financial savings: £1,300 • Assuming diversion from disposal of 80.5 tonnes by waste minimisation and 80.5 tonnes by increasing recycling. • Payback period: 3.1 years • Emissions reduction about 49.2 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • Containers are required for the flats in halls and in the kitchen/cafe areas to encourage segregation of materials for recycling at source. This is estimated to cost about £4,000. • The cans/tins/plastic bottles will be collected together with the existing glass collection by the City Council for no extra charge from all sites. • Costs of recycling should be offset by the reduction in costs for disposal to landfill (which is currently increasing annually via tax escalator). • Funding for this will come from the Estates budget.
Resources	<ul style="list-style-type: none"> • Additional resource in terms of staff time will be required as changes in operational procedures will require additional staff time to ensure that recycled materials are appropriately segregated.
Ensuring Success	The key success factor is to raise awareness and ensure user participation in source segregation of materials to minimise risk of waste contractors refusing collection if the materials become contaminated.
Measuring Success	<ul style="list-style-type: none"> • The weight of waste sent to landfill and for recycling are the key aspects which should be monitored. • Success will be evaluated on an annual basis as waste is reported as part of the EMS statistics to HEFCE and reduction in amount of waste sent to landfill.
Timing	<ul style="list-style-type: none"> • The new recycling scheme is likely to be available in for the start of academic year 2010/11.
Notes Page 38	<p>Assuming that:</p> <ul style="list-style-type: none"> • 5% waste volume can be saved by waste minimisation. • 5% waste volume can be saved by recycling of cans/plastic bottles.

Project:	Travel related
Reference:	10
Owner	Carbon Management Strategy Working Group
Department	This project covers most parts of UCB.
Description	<p>UCB has three main types of travel activities:</p> <ul style="list-style-type: none"> • business travel (mainly marketing, visiting placement students and other business trips); • travel to student placements; and • commuting by staff and students to UCB. <p>The key areas to be addressed are:</p> <ul style="list-style-type: none"> • data recording – working to develop data capture procedures for all three areas so that the number of journeys and mode of transport used can be recorded, allowing CO_{2e} emissions estimates to be improved and cost data obtained; • policy – to review policy and operating procedures to ensure that they are designed to incentivise use of the most appropriate low carbon mode of transport, avoid journeys where possible and encourage car sharing and route planning. This is currently happening for business travel.
Benefits	<ul style="list-style-type: none"> • Once more accurate data is obtained and policy reviewed savings can be re-calculated. • Assuming that 10% savings can be made through shift of transport mode from land based business travel, saving 2.5 tonnes CO_{2e}.
Funding	<ul style="list-style-type: none"> • Once more accurate data is obtained and policy reviewed any costs can be estimated.
Resources	<ul style="list-style-type: none"> • Staff time will be required to improve the data capture procedures and review policy.
Ensuring Success	<ul style="list-style-type: none"> • All staff and students will need to be engaged via improved awareness if they are to be persuaded to choose lower carbon transport modes of travel.
Measuring Success	<ul style="list-style-type: none"> • Success will be measured by reducing the number of journeys or by switching to lower carbon mode of travel where appropriate.
Timing	This should be completed in time for the annual review of the carbon management plan in Summer 2011.
Notes	

Project:	Policies and procedures
Reference:	11
Owner	Carbon Management Strategy Working Group
Department	Covers all aspects of UCB
Description	<p>Undertake a review of all UCBs policies and procedures and ensure that next time changes are made, appropriate measures to ensure carbon reduction are included in them.</p> <p>Additionally, a low carbon/energy policy should be developed for UCB to provide the basis for the aims and objectives for carbon reduction. This could be expanded over time to form part of a wider sustainability policy.</p> <p>Consideration should be given to policies for capital projects, and the inclusion of energy/carbon whole life costing to ensure that the best options are selected.</p> <p>It would be advisable to also develop a procurement policy to ensure that specific opportunities are not missed relating to measuring, monitoring and reducing emissions from scope 3 emissions. Specific measures could include procurement of recycled content paper for printing and prospectus printing.</p> <p>Undertaking these measures will contribute to achievement of the Carbon Trust Standard as verification of UCBs achievements.</p>
Benefits	<ul style="list-style-type: none"> • Embedding of carbon reduction principles into ways of working across UCB. • Achievement of the Carbon Trust Standard and credit under the early action metric for CRC.
Funding	These measures are not likely to require additional funding.
Resources	Staff time will be required to review the policies and procedures.
Ensuring Success	Engagement of all staff across UCB will be required if the appropriate changes are to result in improved carbon management.
Measuring Success	Achievement of the Carbon Trust Standard would provide external verification of success.
Timing	This should be completed in time for the annual review of the carbon management plan in Summer 2011.
Notes	

Project:	Awareness campaign, stakeholder engagement and training
Reference:	12
Owner	Carbon Management Strategy Working Group
Department	This project covers most parts of UCB.
Description	<p>Student Services and the Guild have worked together to produce a detailed plan for engaging students. This will be presented to the Carbon Management Strategy Working Group.</p> <p>A detailed description of the measures to engage other stakeholders are provided in section 6 of this plan.</p>
Benefits	<ul style="list-style-type: none"> • Financial savings estimated as £33,800 pa • Assuming that 307,200 kWh electricity pa are saved. • Payback period is under one year • Emissions reduction is estimated at 167.2 tonnes of CO₂
Funding	<ul style="list-style-type: none"> • The estimated costs are £5,000 pa for promotional materials. • This will be obtained from various budgets.
Resources	<ul style="list-style-type: none"> • Staff time will be required from across UCB to deliver the savings, in addition time from the Guild will be provided to engage with students.
Ensuring Success	Continued engagement of all staff and students across UCB will be required if the carbon reduction is to be achieved and maintained. This will require a 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 2010/11
Notes	Assuming that 5% electricity consumption can be saved through improved awareness of staff and students.

Project:	Automatic Meter Reading
Reference:	13
Owner	Director of Estates
Department	Estates
Description	<p>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.</p> <p>This could be installed for the gas and water meters for Summer Row, Richmond House, the Maltings and the new site. The electricity supplies to these sites are already read half-hourly.</p>
Benefits	<ul style="list-style-type: none"> • 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. • This measure would provide credit to UCB under CRC early action metrics.
Funding	<ul style="list-style-type: none"> • The initial capital cost is about £2,100 • The ongoing costs for data access is about £1,500 pa • The source of funding would be from Estates budget.
Resources	<ul style="list-style-type: none"> • No additional resources are required to implement the project, but staff time will need to be found to take advantage of the emissions savings opportunities presented by analysis of the data.
Ensuring Success	<ul style="list-style-type: none"> • Staff time to take advantage of the emissions savings opportunities presented by analysis of the data is the key success factor.
Measuring Success	<ul style="list-style-type: none"> • Installation of the metering. • Success will be achieved when staff regularly use the data available.
Timing	<ul style="list-style-type: none"> • The project should be implemented asap to achieve credit under CRC.
Notes	<ul style="list-style-type: none"> • Assuming that 3 gas meters (Richmond House, Maltings and Summer Row) are required costing £500 per half-hourly meter • Assuming that 3 water meters (Richmond House, Maltings and Summer Row) are required costing £200 per half-hourly meter • Assuming that the ongoing costs for unlimited web-based access to the data are £250 per meter per year for gas/water and no additional cost for electricity.

Project:	Low emissions fleet
Reference:	14
Owner	Director of Estates
Department	Estates
Description	<p>UCB currently has its own fleet. These are replaced on a regular basis. At the next replacement the opportunity will be taken to purchase the lowest emissions vehicle of the type practicable. The feasibility of an electric van for use between sites will be evaluated.</p> <p>Further, on an annual basis the continued need for each vehicle of the fleet will be reviewed, taking into account mileage, type of use and other transport options available in-line with UCB's travel plan.</p> <p>Training in fuel efficient driving techniques should also be provided to regular users of the vehicles.</p>
Benefits	<ul style="list-style-type: none"> • Financial savings estimate £400 pa • Amounting to 300 litres diesel pa • Emissions reduction estimate 0.8 tonnes of CO₂
Funding	Replacement of the current fleet with lowest emissions vehicles is assumed to not require significant additional cost.
Resources	Staff time will be required to investigate the low carbon vehicle options available.
Ensuring Success	The main risk is the availability of capital funding for the additional cost of low emissions versions of vehicles, even if this is offset by lower running costs.
Measuring Success	The number of vehicles replaced with low emissions versions will be the measure of success.
Timing	<ul style="list-style-type: none"> • An annual review of the continued need for each fleet vehicle will be undertaken. • The options for low carbon replacement will be considered as vehicle replacement becomes due. Over five years, the majority of the vehicles will be replaced.
Notes	Assuming that 10% of vehicle emissions can be saved through procurement of low emissions vehicles.

Project:	Estate change – Phase 1																																																																																
Reference:	15																																																																																
Owner	Vice Principal (Corporate Services)																																																																																
Department	Corporate Services																																																																																
Description	UCB plans to develop phase 1 of its new site and close the current Postgraduate Centre and Cambrian Hall. The new building will be an efficient, low carbon design.																																																																																
Benefits	<ul style="list-style-type: none"> Financial savings until 2014/15 of £23,982. Net saving of 4,458,613 kWh in gas consumption but an increase in electricity consumption of 876,369 kWh until 2014/15. Capital cost unknown at this stage, therefore payback period cannot be calculated. 433 tonnes CO_{2e} saving over period to 2014/15. 																																																																																
Funding	<ul style="list-style-type: none"> Source of funding is likely to be a combination of internal funding and external funding (from e.g. HEFCE). The exact details are still to be determined. 																																																																																
Resources	<ul style="list-style-type: none"> External resources will be required to provide the expertise to implement this project. The contract for the Architects responsible for this project is currently being tendered. 																																																																																
Ensuring Success	<p>Achievement of planning permission for the chosen design is a key success factor. Choosing a low carbon design should assist in gaining planning approval.</p> <p>The principal risks are:</p> <ul style="list-style-type: none"> uncertainty over achievement of low carbon emissions if new technologies are chosen; and uncertainty over cost of build and affordability of low carbon design. 																																																																																
Measuring Success	<ul style="list-style-type: none"> Completion of an efficient low carbon building will comprise success. This can be measured through reduced utility consumption. 																																																																																
Timing	<p>The tender has been put out for architects for the project. The time line is anticipated to be:</p> <ul style="list-style-type: none"> Postgraduate centre is expected to be retained for about another 12 months. Cambrian Hall is expected to be retained until the end of academic year 2012/13. Phase 1 is anticipated to be by January 2013, being ready for occupation (with full energy consumption) from summer 2013. 																																																																																
Notes	<p>The savings are estimated as follows:</p> <ol style="list-style-type: none"> It was assumed that the Postgraduate Centre currently uses 220,800 kWh gas and 73,600 kWh electricity pa based upon benchmarks in CIBSE TM46 (80kWh/m² electricity and 240kWh/m² for gas pa). It was assumed that the new Phase 1 building will use 237,824 kWh gas and 743,200 kWh electricity pa based upon 32 kWh/m² for gas and 100kWh/m² for electricity pa. The floor area was assumed to be 7,432m². This is based upon other planned HE sector buildings using an efficient low carbon design. <p>The results are summarised in the following table:</p> <table border="1" data-bbox="383 1747 1388 2172"> <thead> <tr> <th colspan="8">CO2 emissions (tonnes)</th> </tr> <tr> <th></th> <th>Current sites</th> <th>Post graduate Centre</th> <th>Cambrian Hall</th> <th>Phase 1</th> <th>Accounting for site changes</th> <th>Net saving</th> <th>Cost saving (£)</th> </tr> </thead> <tbody> <tr> <td>2008/09</td> <td>4,673</td> <td>0</td> <td>0</td> <td>0</td> <td>4,673</td> <td>0</td> <td>0</td> </tr> <tr> <td>2009/10</td> <td>4,673</td> <td>0</td> <td>0</td> <td>0</td> <td>4,673</td> <td>0</td> <td>0</td> </tr> <tr> <td>2010/11</td> <td>4,673</td> <td>21</td> <td>0</td> <td>0</td> <td>4,651</td> <td>21</td> <td>3,514</td> </tr> <tr> <td>2011/12</td> <td>4,673</td> <td>85</td> <td>0</td> <td>0</td> <td>4,587</td> <td>85</td> <td>14,058</td> </tr> <tr> <td>2012/13</td> <td>4,673</td> <td>85</td> <td>0</td> <td>189</td> <td>4,776</td> <td>-104</td> <td>-22,681</td> </tr> <tr> <td>2013/14</td> <td>4,673</td> <td>85</td> <td>583</td> <td>453</td> <td>4,457</td> <td>215</td> <td>14,546</td> </tr> <tr> <td>2014/15</td> <td>4,673</td> <td>85</td> <td>583</td> <td>453</td> <td>4,457</td> <td>215</td> <td>14,546</td> </tr> <tr> <td>Total</td> <td>32,708</td> <td></td> <td></td> <td></td> <td></td> <td>433</td> <td>23,982</td> </tr> </tbody> </table>	CO2 emissions (tonnes)									Current sites	Post graduate Centre	Cambrian Hall	Phase 1	Accounting for site changes	Net saving	Cost saving (£)	2008/09	4,673	0	0	0	4,673	0	0	2009/10	4,673	0	0	0	4,673	0	0	2010/11	4,673	21	0	0	4,651	21	3,514	2011/12	4,673	85	0	0	4,587	85	14,058	2012/13	4,673	85	0	189	4,776	-104	-22,681	2013/14	4,673	85	583	453	4,457	215	14,546	2014/15	4,673	85	583	453	4,457	215	14,546	Total	32,708					433	23,982
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