

University College London

Carbon Management Plan

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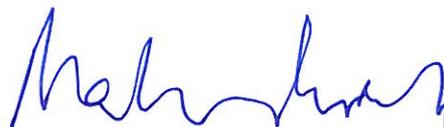
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Foreword to 2011 UCL Carbon Management Plan

As a world leading university, UCL is very conscious both of its role in environmental research and teaching and of its environmental impact as a large organisation. At UCL we have established an Environment Institute to bring together research on climate change, sustainable cities and water management and an Energy Institute. Both play an active part in contributing to the UCL Grand Challenges. We carry out world-leading research on the cryosphere, on new energy technologies and on the societal responses to changing climate. Teaching in geography, space and climate physics, biomedicine, architecture and engineering all incorporate the challenges of climate change. We have a clear plan presented in this document to reduce our carbon emission by 34% per cent by the year 2020, a target that is vital we meet as more and more evidence is gained about the warming impact of increased carbon in the atmosphere. We have identified a number of different projects on which we will concentrate in the first instance, engaging both students and staff in the important challenge of reducing carbon. I am particularly pleased that the preparation of this plan has engaged staff and students in a collective effort. Its implementation must involve all members of the UCL community. Our carbon footprint is too big and we plan to make it smaller.

Professor Malcolm Grant
President and Provost
UCL



Highlight Message

UCL will reduce its scope 1 and 2 emissions against its 2005/06 baseline by 34% by 2020. This is a reduction of 19,274 tonnes of CO₂ against that baseline.

The milestone target to be achieved by 2015/16 is a 15% reduction against the same baseline. We will also seek to further assess and reduce our scope 3 emissions

Institutional growth since 2005/6 means that the measures outlined in Section 4 now need to reduce carbon emissions by 30,883 tonnes by 2020 at a cost of £18.7 million, in addition to those costs incorporated into major refurbishment and new build project budgets. If institutional growth continues at 3% until 2020/21 the measures outlined in this plan will do no more than hold emission at the current rate necessitating the implementation of even more radical abatement measures.

1 Introduction to 2011 revision

Situated in Bloomsbury, UCL is the largest of the institutions that make up the University of London. Founded in 1826 it was the first university in England to admit students regardless of race, religion or gender. It continues to thrive on the creativity and diversity of its community which today comprises more than 13,000 undergraduates and over 10,000 postgraduates along with approximately 7,500 staff from nearly 140 countries around the globe.

UCL is one of the world's premier research universities, as reflected in the scale and quality of its research activities, among its staff and former students are 21 Nobel Prize winners. It has immense research strength across all areas of science (especially environmental and medical science) and the humanities, and is developing a whole range of interdisciplinary initiatives.

The physical estate of UCL comprises 194 buildings having a total gross internal area of 467,417 m².

The utility budget including electricity, gas, oil, steam, heat and water, for the entire UCL estate, exceeded £14,000,000 for 2009/10.

This Carbon Management Plan is a revision of the 2008 Strategy and Implementation Plan (2008 Strategy) which was designed and planned in association with the Carbon Trust, as part of its Higher Education Carbon Management Programme. Factors informing this revision include:

- The experience gained in implementing the 2008 Strategy
- An expansion of the scope of the plan to encompass the entirety of UCL's estate, including the academic Postgraduate Institutes (PGIs) and student accommodation managed by UCL Student Residences
- The requirements of the Higher Education Funding Council for England (HEFCE), in particular:
 - UCL has set a target of 34% reduction Scope 1 and Scope 2 utility-related emissions by 2020 against a 2005/2006 baseline
 - UCL is undergoing a baselining exercise for Scope 3 indirect emissions (including those from water, waste, travel and procurement) in preparation for setting appropriate reduction targets
- HEFCE publication 2010/02 Carbon Management Strategies and Plans: a guide to good practice.

A key development at UCL since the 2008 Strategy has been the adoption of the UCL Environmental Sustainability Policy and this Carbon Management Plan implements key objectives within that Policy. It is recognised that communications and training are essential for the effective implementation of the Policy and this Carbon Management Plan. The UCL Environmental Sustainability Communications, Learning and Development Strategy underpins the Policy, this Carbon Management Plan and other implementation plans.

Progress on the implementation of the plan and results from the projects listed within the plan will be reported on at least twice a year to Environmental Sustainability Steering Group and to Estates Management Committee. Progress will also be reported through the Green UCL web site and through other means identified in the communications plan.

2 Carbon Management Strategy

2.1 Context and drivers

A wide range of UK strategies, programmes, legislation, regulation and guidance now exist that encourage all sectors of society to reduce carbon emissions. The public now expect 'responsible' businesses and organisations to take action on climate change and stakeholders are increasingly demanding action. Also, as energy costs are expected to rise by 60% over the next decade it makes good business sense to reduce energy consumption. Policies, strategies and environmental management systems are being adopted accordingly.

It must be stressed that carbon management is not only an environmental activity, but one that, under this plan, will yield substantial financial savings. Carbon management is best effected by reducing our consumption of electricity and fossil fuels. This has a welcome side effect for UCL. As North Sea oil and gas resources become depleted we have become increasingly dependent on the world oil and gas markets, in which demand from emerging economies is increasing. Thus, reduction in our demand for fossil fuels, using what we need more efficiently and increasing our consumption from non-fossil sources are all good ways to insulate ourselves as a university and as part of the UK from higher fuel prices.

We believe that measures aimed at mitigating the potential for dangerous Climate Change are desirable in their own right, and UCL can act as a leader for stakeholders, especially students, staff, alumni and colleague institutions, in delivering carbon emission reductions. We also understand that financial benefits will accrue from judicious action and that the organization will enjoy reputational benefits from being seen to act well and act early. The converse need hardly be stated: late, ineffectual action will be costly for UCL and may damage its hard-won reputation.

Thus many drivers exist for the implementation of a carbon management programme, some of these being listed below:

- In the HEFCE publication "Carbon Reduction Target and Strategy for Higher Education in England", a target is set for the sector to reduce Scope 1 and 2 emissions by 34% by 2020 against a 1990 baseline, All higher education institutions are required to produce a Carbon Management Plan showing how it will contribute to achieving this target, failure to do so resulting in reduced funding from HEFCE
- The plan will reduce UCL's financial liability to purchase emissions allowances under the Carbon Reduction Commitment (CRC) which is a UK mandatory cap and trade scheme whereby CRC allowances will be issued to participants via an auction process and provide a potential income stream via the sale of unused allowances under the European Emissions Trading Scheme

- The EU Building Energy Performance Directive will require all campus buildings with a floor area over 1000 m² to display an Energy Performance Certificate giving visibility of carbon and energy performance to all building users. Data gathered as a result of this carbon management plan will be very helpful in producing these certificates and may reduce costs of their provision.
- Long term rises in utility costs would increase UCL's operating costs and reduce funding for core university activities. Thus it is important to analyse opportunities for increased efficiency in the use of energy and water and also to ensure best methods of procurement are adopted.
- Compliance with building regulations Part L2 and F should give rise to improved efficiency in new buildings and existing buildings where major refurbishment takes place. However the requirement for increased ventilation rates for offices could potentially be a high energy overhead.
- UCL should discharge its global social responsibility, in part by contributing to national targets to reduce carbon dioxide emissions.
- There are reputational and other competitive advantages to be gained from a pro-active approach to energy management and conversely a risk in lagging behind peers and competitors.
- The HEFCE sustainability strategy promotes sustainability in construction projects and refurbishments. Failure to comply may be reflected in reduced funding from HEFCE.
- UCL offers courses that relate to climate change, environmental science and carbon management. Students may choose to select a university that can demonstrate an active institutional environmental management programme to support the teaching.

2.2 Low Carbon Vision

Vision Statement

UCL will strive to enhance its environmental reputation by reducing its environmental impacts and make savings in its operational cost base through reducing the carbon footprint of the institution by integrating the principles of carbon management into its corporate strategies and operational procedures.

The vision will be achieved through implementation of the measures outlined in the Carbon Management Plan. We envisage a low-carbon environment in which:

- There is efficient energy generation and use
- There are innovative and energy efficient buildings, creating an environment in which it is easier for occupants to save energy and resources
- The environment is inspirational and an example to students and staff, and complements the educational and research environment
- Every employee is aware of their environmental responsibility and their role to reduce carbon emissions and is aware of the climate imperative and importance of actions to reduce UCL's environmental impact
- Obvious improvements are made and more innovative, flagship projects are examined further to improve environmental sustainability
- UCL's reputation for environmental management matches its excellent reputation for academic performance
- UCL is proud of its property portfolio and genuine achievements in institutional environmental management
- Creating the infrastructure and network of support for achieving the vision.

2.3 Objectives and strategy

This Carbon Management Plan is an updated and extrapolated version of the Carbon Management Strategy and Implementation Plan adopted by UCL in February 2008 which described a path for the reduction of emissions caused by energy use in core academic buildings by 10% between 2008/09 and 2012/13. The new Carbon Management Plan has been produced to ensure:

- That there is a sonority of approach with the rest of UCL's policy framework, particularly the Environmental Sustainability Policy and the Estates Master Plan Strategy which is currently in preparation
- That energy, water and waste management overheads are kept at the lowest level consistent with UCL's leading global research, teaching and learning activities and the pursuit of competitive advantage
- That we have a response to the requirements of HEFCE's Capital Investment Framework

- To promote carbon management issues to all members of the UCL community and for carbon management to become standard university practice.
- To facilitate new carbon reduction initiatives concentrating on energy consumption and to continue to review and improve wherever possible initiatives related to water conservation and waste minimisation.
- That we are seen to fulfil our moral obligation to act on Climate Change
- That UCL plays its part in achieving HEFCE's national sector targets.
- Working with the student body to integrate principles of carbon management into the UCL Student Union portfolio of responsibilities.
- That UCL has a strategic tool to reduce its exposure to volatile energy markets and carbon trading schemes such as the European Union Emissions Trading Scheme and Carbon Reduction Commitment
- To develop further the application of life-cycle costing principles as they relate to capital estates and equipment projects
- That carbon is considered at the earliest planning stages of new buildings, refurbishment and procurement, when mitigation can be implemented most cost effectively
- That UCL has a framework for considering carbon emissions outside of our direct control i.e. Scope 3 emissions

3 Scope 1 & 2 Emissions Baseline and Projections

3.1 Scope

UCL's initial Carbon Management Strategy and Implementation Plan focussed on energy use in non-residential buildings, to a large extent because there was some good quality current and historic data readily available for this area of the estate. However this new plan extends the scope to include all areas of the estate including student accommodation and PGI's, such as the Institutes of Child Health, Ophthalmology and Neurology, the Medical School at the Royal Free Hospital, the Archway Campus and all other elements of the non-core estate.

3.2 Baseline

UCL's carbon emissions in 1990/91 are reported to be 32,957 tonnes in the report to HEFCE by SQW "Carbon baselines for individual Higher Education Institutions in England" and we have calculated that our Scope 1 and 2 emissions in 2005/6 were 56,687 tonnes. The basis for the preparation of the 1990/91 figure has been lost, so we have a much higher level of confidence in the 2005/06 figure.

The growth is ascribable to an increase in student numbers and an increase in the quantity and energy-intensity of the research now undertaken.

The increase we have seen is similar to that of some of our Russell Group peers: for example, Cambridge, Oxford, Imperial, LSE, Bristol and Leeds have all seen a near doubling of their emissions over this period. However, there are differences across the sector as a whole, with some institutions showing modest reductions. These differences are an indication of the wide spread of activities undertaken across the sector, and the differences between the buildings that support them.

The baseline for 2005/06 has therefore been established as 56,687 tonnes.

3.3 Emissions since 2005/06

The table below indicates the Scope 1 and 2 emissions being produced across the entire estate. The estate itself has been split into seven distinct sections.

Year	2005/06	2006/07	2007/08	2008/09	2009/10
Core Academic	36,277	38,545	37,113	46,334	45,176
Student Accommodation	5,136	5,187	5,343	6,016	6,678
Institute of Child Health	4,164	4,289	4,417	4,763	4,910
Institute of Ophthalmology	2,270	2,338	2,408	2,690	2,773
Institute of Neurology	2,179	2,244	2,312	2,588	2,669
Archway Campus	880	906	934	1,166	1,202
Royal Free Medical School	5,831	5,860	5,833	5,868	5,876
Total	56,687	59,369	58,360	69,425	69,284

0506 historical data are partially based upon estimates and so do not correspond with the arithmetic total which we believe best reflects the 0506 baseline

The figures show an increase of 12,597 tonnes (22%) over the last five years, to a large extent this is due to growth of the physical estate, growth in student numbers and an increase of energy intensive activity. However the large increase between 2007/08 and 2008/09 was due to an increase in the conversion rates used to calculate emissions:

- Electricity: from 0.422 kg per kWh to 0.54055 kg per kWh (28.57%)
- Gas: from 0.194 kg per kWh to 0.20374 kg per kWh (5.15%)

To a large extent these changes have come about to the reduced level of nuclear generation into the grid and increased reliance on imported gas.

It should also be noted that the part of the estate regarded as core academic is also the part of the estate covered by the original Carbon Management Strategy and Implementation Plan adopted in February 2008 and also by the 10:10 projects which are described in some detail later in this document so the reduction in emissions from this area in 2009/10 reflects this activity.

3.4 Targets and Projections

Aspirational target

UCL will reduce its scope 1 and 2 emissions against its 2005/06 baseline by 34% by 2020. This is a reduction of 19,274 tonnes of CO₂.

The milestone target to be achieved by 2015/16 is a 15% reduction against the same baseline. We will also seek to further assess and reduce our scope 3 emissions

In calculating progress towards this target on an annual basis, benchmarking will need to consider the following statistics for each year:

- Total building floor space in operation
- Number of full time equivalent staff
- Number of full time equivalent students
- Opening hours of buildings
- Number of external out of hours bookings

Changes in these statistics will need to be taken into account in the calculation of % change in CO₂ emissions. It is considered that growth in these areas is likely to result in an increase in energy consumption and carbon emissions of between 3 and 5% per annum

We estimate that the measures outlined in Section 4 will reduce carbon emissions by (34%) 30,883 tonnes by 2020 at a cost of £18.7 million in addition to those costs incorporated into major refurbishment and new build project budgets.

In order to meet the target reduction the current average annual growth figure of between 3 and 5% must be restricted to a maximum of 0% as from 2010/11. If growth were to continue at the lower rate of 3% until 2020/21 our emissions would increase to 90,069 tonnes and the effect of adopting this plan would be merely to hold emissions at the current rate.

3.5 Past actions and achievements

UCL has been very active in the field of utility conservation for a long time; all future work should build on and complement what has already been done.

The Estates and Facilities Division has undertaken a range of work to improve energy and water efficiency and have looked at ways of increasing recycling rates and improving waste management. Energy and water efficiency work is undertaken in the interests of good financial best practice. The following list is not exhaustive but some of the past and ongoing work includes:

Investment in large scale Combined Heat and Power scheme

Building Energy Management System installation and operation

Integration of energy efficiency features in new buildings

Maintenance of boilers and other plant to a high standard

End of life HVAC equipment replaced with more energy efficient options

Automatic (presence detection) lighting controls at appropriate locations.

Undertaken energy surveys on many buildings

Investment in an energy Monitoring and Targeting system

Preliminary installation of automatic meter reading equipment

Automatic (presence detection) flush urinal controls

Press action or automatic taps fitted in washrooms etc

Sava Watt units fitted to fridges

Of the above the gas-fuelled CHP scheme, which came on line in the summer of 2003, is the most significant technical development with the majority of academic buildings on the main campus being connected to the CHP network. The installation brought about a reduction in CO₂ emissions of 7405 tonnes per year.

3.6 Scope 3 Emissions

UCL has identified the following activities as giving rise to Scope 3 (indirect emissions) which will also contribute to the institutional carbon footprint:

- Mains water use
- Waste disposal
- Travel
- Leased buildings and facilities
- Procurement

3.6a Mains Water Use

What we have done

Calculated the baseline water consumption and associated carbon footprint for the entire estate for 2009/10 to be 500,786 cu m and 200.3 tonnes equivalent.

Put in place a maintenance regime to ensure that urinal water controls operate correctly.

Worked with the Green Champion for the Department of Chemistry in the Christopher Ingold Building to monitor process water usage. From this work we have been able to:

- Identify and remedy maintenance defects which have contributed to excessive water consumption.

- Identify potential opportunities to install process water flow meters and control valves that would allow users to control their personal process water usage.
- Identify potential opportunities to replace diffusion-type vacuum pumps with turbo pumps which would lead to electrical savings and significant water savings.

What we are planning to do

Analyse water consumption data per building to enable buildings to be ranked in water consumption performance.

Based upon the ranking above, devise and implement a programme of water audits to identify opportunities to implement water savings.

Work with the Chemistry Department to look at the payback time for both the introduction of process water controls and the replacement of diffusion pumps:

- Construct a business case to support the appropriate course of action.
- Identify sources of funding for the relevant business case.

3.6b Waste Disposal

What we have done

Calculated the 2008/9 waste disposal baseline for the core estate and have recorded the monthly disposal figures to date.

	Total Waste Tonnage	Total Recycled Tonnage
2005/06	2066	323
2006/07	2046	713
2007/08	2294	989
2008/09	2779	1381
2009/10	2861	1705

(We attribute the increase in waste arisings in 0809 to the incorporation of the Archway Campus into the collection round and to improvements in data reporting.)

Introduced co-mingled recycling for the core estate from 1 Aug 2008 and have improved recycling take-up with consequent reduction in landfill.

Diverted food wastes from our main kitchen from landfill to anaerobic digestion.

Worked with our furniture supplier to encourage:

- Take-back and supply of reusable furniture.
- Supply of furniture with high recyclate content.
- Supply of furniture whose lifetime can be extended by repair.

Worked with our clinical waste disposal contractor and laboratory managers to improve the performance of the clinical waste disposal operation by:

- Diverting non-hazardous recyclable wastes from the clinical waste stream into the recycling stream.
- Optimising the clinical waste stream to divert appropriate wastes from high temperature incineration to incineration with energy recovery.
- Optimising the routing of the clinical waste collection vehicles.

Devised a pilot system to apply the waste minimization methodology associated with large (>£300k) construction projects to projects of lower value (£50k and above)

What we are planning to do

Calculate the carbon footprint associated with the waste disposal tonnage records.

Work with Green Champions to improve recycling take-up – current target is 75% of wastes by 2013.

Divert residual waste arisings for the core estate from landfill to refuse derived fuel. Aside from construction and specialist wastes this allows the UCL core state to become **zero landfill** from 7th March 2011.

Work with UCL Student Residences and the Postgraduate Institutes to calculate monthly waste.

Look for synergies in waste disposal operations with UCL Student Residences and the Postgraduate Institutes to introduce consistent and compatible best practice waste disposal systems and record keeping across the entire UCL estate.

3.6c Travel

What we have done

Identified that university travel can be broken down into:

- Business travel.
- Staff/student daily commute.
- Student beginning/end of term travel.

Estimated that approximately 50% of business travel is processed by UCL's travel management company. From management reports supplied for 0910 we currently (roughly) estimate the carbon footprint associated with business travel to be:

- Car: about 500 tonnes.
- Rail: about 150 tonnes
- Air: about 4000 tonnes
- Total: approx 4650 tonnes

Have a travel plan in place for the core estate which has reduced car parking and has introduced charges for the remaining parking spaces.

Have used data provided by UCL Registry to look at the numbers of overseas students and their countries of origin. Using the following simplifying assumptions:

- Students fly from the capital city of their country to London Heathrow.
- Full time undergraduates from near-Europe travel home three times per year.
- Part time and postgraduate students travel home once a year.
- Students from China travel home once a year.

We have estimated the following carbon footprints associated with student beginning/end of term:

- Near Europe: 2600 tonnes
- China: 2000 tonnes

This is an indicative model which requires further development.

What we are planning to do

Introduce a carbon offset scheme for air travel. It is envisaged that the carbon for air travel will be surcharged at rate prevailing in the Carbon Reduction Commitment (currently £12/tonne) and that a methodology will be devised to calculate the surcharge as a percentage (currently estimated as 1.72%) of the flight ticket price. The surcharge would automatically be deducted from the appropriate account code and hypothecated into a “green fund”, the use of which would be overseen by the Environmental Sustainability Steering Group.

In relation to staff/student commute:

- Carry out travel surveys to obtain baseline data into staff/student commute habits and to calculate the associated carbon footprint.
- Extend out the scheme for charging for car parking to all London-estate UCL premises and to hypothecate these charges into the “green fund” noted above.
- Incorporate the requirement for secure cycle parking and other support facilities for cyclists into the Bloomsbury Masterplan exercise.

Continue (possibly with student help) the analysis of student beginning/end of term travel to allow a carbon baseline to be calculated for future review.

3.6d Leased buildings and facilities

What we have done

Identified the requirement to calculate the carbon footprint from leased buildings (ie buildings for which the utilities are purchased by a landlord, rather than by UCL as occupier).

What we are planning to do

Develop a methodology for estimating and reporting the carbon footprint for leased buildings.

3.6e Procurement

What we have done

Published a Sustainable Procurement Policy.

Worked with our furniture supplier to encourage:

- Take-back and supply of reusable furniture.
- Supply of furniture with high recyclate content.
- Supply of furniture whose lifetime can be extended by repair.

What we are planning to do

- Include the highest energy rating standard in all future procurements.
- Investigate appropriate methodologies for the measurement of the supply chain emissions.

3.7 Carbon Management Matrix

A carbon management matrix has been developed by the Carbon Trust In order to establish the status of carbon management at any organization. The three matrices below have been used to show firstly the level at which UCL was positioned in 2007/08 the target levels under the original plan and the position as of 2010/11. These show an improvement considerably greater than that originally targeted.

MATRIX 2007/08 (STATUS OF CARBON MANAGEMENT)

	POLICY	ORGANISATION	INFORMATION AND DATA	COMMUNICATION AND TRAINING	FINANCE	MONITORING & EVALUATION
5	<p>Specific sustainability / climate change policy with targets signed off and implemented.</p> <p>Action plan with clear goals and regular reviews to confirm actions undertaken and targets achieved/being progressed.</p>	<p>Accountabilities for sustainability /climate change defined at senior level.</p> <p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year and regular collation of annual emissions data.</p> <p>Data externally verified</p>	<p>Formalised communication and training plan for all staff on carbon and energy matters, including integration in induction and other normal training processes.</p> <p>Communication on carbon and energy related matters with the academic and student body and other key business partners</p>	<p>Use of innovative external funding for carbon related projects.</p> <p>Development of internal financing mechanisms, e.g. self sustaining fund, specifically for carbon related projects</p>	<p>Management Review of carbon management process by senior management.</p> <p>Regular reviews by core team on progress with carbon management</p>
4	<p>Specific sustainability / climate change policy with targets developed and signed off, but not implemented</p>	<p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year (i.e. buildings, transport and commuting, etc. Data internally reviewed</p>	<p>Formalised communication and training plan for all staff on carbon and energy related matters, including integration in induction and other training, and awareness raising</p>	<p>Strategic plan for developing internal financing mechanisms and obtaining funds from external sources</p>	<p>Regular reviews on progress with carbon management (e.g. review of actions, check against emissions profile and targets, addition of new opportunities etc.)</p>
3	<p>Sustainability / Climate change included in wider policy documents</p>	<p>Sustainability / climate change/ carbon management is part-time responsibility of moderate ranking personnel, e.g. Energy Manager, Environment Officer</p>	<p>CO₂ emissions data compiled for some sources for a baseline year (e.g. buildings) and source data available for other sources (e.g. transport)</p>	<p>Ad hoc communication and training delivered to all staff/students on carbon and energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p> <p>Review conducted on applicable external funding sources</p>	<p>Ad hoc assessment of all aspects of carbon/energy policies/strategies, targets and action plans</p>
2	<p>Sustainability / Climate change as an aspiration in non-policy documents.</p>	<p>Sustainability / climate change/carbon management is part-time responsibility of low ranking personnel</p>	<p>No CO₂ emissions data compiled for any sources but energy data compiled on a regular basis</p>	<p>Communication and training to specific groups in the HEI on carbon/energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p>	<p>Ad hoc reviews of specific aspects of carbon/energy policies/strategies, targets and action plans</p>
1	<p>No sustainability / climate change policy or strategy and no mention of climate change in policy/strategy documents</p>	<p>No individual with responsibility for sustainability / climate change issues</p>	<p>No CO₂ emissions data compiled for any sources and energy data not compiled on a regular basis</p>	<p>No communication or training to staff/students on carbon or energy related matters</p>	<p>No internal financing or funding for carbon and/or energy efficiency related projects</p>	<p>No monitoring of carbon/energy policies/strategies, targets and action plans</p>

MATRIX 2009/10 (TARGET UNDER ORIGINAL PLAN)

	POLICY	ORGANISATION	INFORMATION AND DATA	COMMUNICATION AND TRAINING	FINANCE	MONITORING & EVALUATION
5	<p>Specific sustainability / climate change policy with targets signed off and implemented.</p> <p>Action plan with clear goals and regular reviews to confirm actions undertaken and targets achieved/being progressed.</p>	<p>Accountabilities for sustainability /climate change defined at senior level.</p> <p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year and regular collation of annual emissions data.</p> <p>Data externally verified</p>	<p>Formalised communication and training plan for all staff on carbon and energy matters, including integration in induction and other normal training processes.</p> <p>Communication on carbon and energy related matters with the academic and student body and other key business partners</p>	<p>Use of innovative external funding for carbon related projects.</p> <p>Development of internal financing mechanisms, e.g. self sustaining fund, specifically for carbon related projects</p>	<p>Management Review of carbon management process by senior management.</p> <p>Regular reviews by core team on progress with carbon management</p>
4	<p>Specific sustainability / climate change policy with targets developed and signed off, but not implemented</p>	<p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year (i.e. buildings, transport and commuting, etc.</p> <p>Data internally reviewed</p>	<p>Formalised communication and training plan for all staff on carbon and energy related matters, including integration in induction and other training, and awareness raising</p>	<p>Strategic plan for developing internal financing mechanisms and obtaining funds from external sources</p>	<p>Regular reviews on progress with carbon management (e.g. review of actions, check against emissions profile and targets, addition of new opportunities etc.)</p>
3	<p>Sustainability / Climate change included in wider policy documents</p>	<p>Sustainability / climate change/ carbon management is part-time responsibility of moderate ranking personnel, e.g. Energy Manager, Environment Officer</p>	<p>CO₂ emissions data compiled for some sources for a baseline year (e.g. buildings) and source data available for other sources (e.g. transport)</p>	<p>Ad hoc communication and training delivered to all staff/students on carbon and energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p> <p>Review conducted on applicable external funding sources</p>	<p>Ad hoc assessment of all aspects of carbon/energy policies/strategies, targets and action plans</p>
2	<p>Sustainability/ Climate change as an aspiration in non-policy documents</p>	<p>Sustainability / climate change/carbon management is part-time responsibility of low ranking personnel</p>	<p>No CO₂ emissions data compiled for any sources but energy data compiled on a regular basis</p>	<p>Communication and training to specific groups in the HEI on carbon/energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p>	<p>Ad hoc reviews of specific aspects of carbon/energy policies/strategies, targets and action plans</p>
1	<p>No sustainability / climate change policy or strategy and no mention of climate change in policy/strategy documents</p>	<p>No individual with responsibility for sustainability / climate change issues</p>	<p>No CO₂ emissions data compiled for any sources and energy data not compiled on a regular basis</p>	<p>No communication or training to staff/students on carbon or energy related matters</p>	<p>No internal financing or funding for carbon and/or energy efficiency related projects</p>	<p>No monitoring of carbon/energy policies/strategies, targets and action plans</p>

MATRIX 2010/11 (STATUS OF ENERGY MANAGEMENT)

	POLICY	ORGANISATION	INFORMATION AND DATA	COMMUNICATION AND TRAINING	FINANCE	MONITORING & EVALUATION
5	<p>Specific sustainability / climate change policy with targets signed off and implemented.</p> <p>Action plan with clear goals and regular reviews to confirm actions undertaken and targets achieved/being progressed.</p>	<p>Accountabilities for sustainability /climate change defined at senior level.</p> <p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year and regular collation of annual emissions data.</p> <p>Data externally verified</p>	<p>Formalised communication and training plan for all staff on carbon and energy matters, including integration in induction and other normal training processes.</p> <p>Communication on carbon and energy related matters with the academic and student body and other key business partners</p>	<p>Use of innovative external funding for carbon related projects.</p> <p>Development of internal financing mechanisms, e.g. self sustaining fund, specifically for carbon related projects</p>	<p>Management Review of carbon management process by senior management.</p> <p>Regular reviews by core team on progress with carbon management</p>
4	<p>Specific sustainability / climate change policy with targets developed and signed off, but not implemented</p>	<p>Sustainability / climate change responsibilities integrated into responsibilities of relevant people in different departments, e.g. Teaching, Finance, Estates</p>	<p>CO₂ emissions compiled for all main HEI sources for a baseline year (i.e. buildings, transport and commuting, etc. Data internally reviewed</p>	<p>Formalised communication and training plan for all staff on carbon and energy related matters, including integration in induction and other training, and awareness raising</p>	<p>Strategic plan for developing internal financing mechanisms and obtaining funds from external sources</p>	<p>Regular reviews on progress with carbon management (e.g. review of actions, check against emissions profile and targets, addition of new opportunities etc.)</p>
3	<p>Sustainability / Climate change included in wider policy documents</p>	<p>Sustainability / climate change/ carbon management is part-time responsibility of moderate ranking personnel, e.g. Energy Manager, Environment Officer</p>	<p>CO₂ emissions data compiled for some sources for a baseline year (e.g. buildings) and source data available for other sources (e.g. transport)</p>	<p>Ad hoc communication and training delivered to all staff/students on carbon and energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p> <p>Review conducted on applicable external funding sources</p>	<p>Ad hoc assessment of all aspects of carbon/energy policies/strategies, targets and action plans</p>
2	<p>Sustainability/ Climate change as an aspiration in non-policy documents</p>	<p>Sustainability / climate change/carbon management is part-time responsibility of low ranking personnel</p>	<p>No CO₂ emissions data compiled for any sources but energy data compiled on a regular basis</p>	<p>Communication and training to specific groups in the HEI on carbon/energy related matters</p>	<p>Some internal financing on an ad hoc basis for carbon and/or energy efficiency related projects</p>	<p>Ad hoc reviews of specific aspects of carbon/energy policies/strategies, targets and action plans</p>
1	<p>No sustainability / climate change policy or strategy and no mention of climate change in policy/strategy documents</p>	<p>No individual with responsibility for sustainability / climate change issues</p>	<p>No CO₂ emissions data compiled for any sources and energy data not compiled on a regular basis</p>	<p>No communication or training to staff/students on carbon or energy related matters</p>	<p>No internal financing or funding for carbon and/or energy efficiency related projects</p>	<p>No monitoring of carbon/energy policies/strategies, targets and action plans</p>

4 Implementation

4.1 Emission Reduction Opportunities

The purpose of this section of the plan is to list and prioritise all of the opportunities identified for carbon emissions savings and sustainable practices which have been collected from suggestions made at three brainstorming sessions: one involving members of the student body, another for the academic group and another for staff from the Estates and Facilities Division.

Each session was tailored to producing project opportunities that would either directly or indirectly reduce the carbon emissions from UCL. Some opportunities may reduce carbon emissions outside of the emissions accounted for within the baseline but these are given equal priority as it is expected that the baseline will expand in the future to include emission sources previously unaccounted for. There are also opportunities for influencing emissions of activities outside of UCL itself, these are also considered as they fall within UCL's environmental obligations and obligations to the wider community.

The identified opportunities have been categorised into three types:

Abatement projects – projects (of whatever scale of investment) that lead to measureable reductions in emissions.

Feasibility projects – projects with the objective of determining the scale and cost of potential future projects.

Embedding projects – projects or actions which do not themselves reduce carbon emissions, but which have the effect of facilitating or causing the reduction of emissions through further actions (e.g. policies and procedures)

Term – short, medium and long term refer to the period over which the action is undertaken, not the period over which emissions reductions are realised.

Each project has been given an overall ranking based on the following scoring table:

Cost		Saving		Payback		Ease of Implementation		Potential Carbon Saving	
£	20 points	£££££	20 points	>2 years	20 points	1	20 points	1	30 points
££	15 points	££££	15 points	>4 years	15 points	2	15 points	2	25 points
£££	10 points	£££	10 points	>6 years	10 points	3	10 points	3	20 points
££££	5 points	££	5 points	>8 years	5 points	4	5 points	4	15 points
£££££	0 points	£	0 points	<8 years	0 points	5	0 points	5	10 points

Short Term Abatement Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
1. Carry out a full review of the Building Management Systems (BMS) in respect of temperature set points, time schedules, optimiser settings and compensation slopes etc	££	££££	>1 year	1	2	95
2. Improve pipe work insulation and fit valve covers / jackets etc as necessary	££	££££	1-2 years	1	2	95
3. Replace fan units in older air handling units with modern high efficiency models reducing electricity consumption	£££	££££	3-4 years	1	1	90
4. Improved zoning of heating systems in some buildings such as Wilkins building which is currently just one zone.	£££	££££	2-3 years	1	1	90
5. Draught stripping in buildings with poorly fitting windows such as Bentham House.	££	£££	3-4 years	1	2	85
6. Fit timers to water coolers/water boilers/vending machines/office equipment etc	£	£££	1-2 years	4	2	80
7. Install PIR presence detectors in lecture theatres and pooled teaching rooms to control air conditioning plant and lighting	£££	£££	3-4 years	1	2	80
8. General installation of lighting controls working via presence detection and/or ambient light levels.	££	£££	3-4 years	1	3	80

Medium Term Abatement Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
9. Install water saving / spray type taps and shower heads in all sinks and showers	££	££££	1-2 years	1	4	85
10. Improve roof insulation in buildings with pitched roofs e.g. Pearson Building and Medical Sciences and Anatomy Building	£££	£££	3-4 years	2	2	75
11. Consider upgrading to waterless urinals where appropriate	££	£££	> 1 year	4	4	75
12. Fit Sava Watt units to fridges etc	££	£££	4-5 years	2	3	70
13. Install Sunpipes in areas lacking natural light	££	££	5-6 years	3	3	65
14. External lighting to be controlled via Building Management System	££	££	3-4 years	2	3	60
15. Install blinds in areas where solar gain is causing the use of fans or air conditioning	£££	££	3-4 years	3	3	60
16. Automatic Smart Meter Reading System for all utilities. A start has been made with some electricity meters of this type already being installed	£££	£	5-6 years	2	4	50
17. Consideration to be given to limited local control of centrally controlled services e.g. temperature control of plus or minus 3 degrees around set point	£££	£	8+ years	2	5	35

Long Term Abatement Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
18. Replacement of older style fume cupboards with low face velocity type thereby considerably reducing the loss of heated air from the buildings.	£££££	££££	1-2 years	3	2	70
19. Replace all kettles with appropriately located fixed hot water units	££	££	4-5 years	3	2	55
20. Reducing the use of the 25 litre drinking water bottles for provision of chilled water by providing plumbed in chilled water units	£££	££	4-5 years	3	3	55
21. Use solar panels to provide hot water in winter and cooling in summer via absorption chillers if roof space allows	££££	£££	6-7 years	4	2	50
22. Install power factor correction / harmonics correction equipment.	££££	££	6-7 years	2	3	50
23. Fit secondary glazing to buildings with very poorly fitting windows. Replacement windows to be double glazed and 'K glass' or equivalent	£££££	£££	8+ years	4	3	40
24. Fit over cladding systems to older buildings facades.	£££££	£££	8+ years	5	3	35

Short Term Feasibility Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
25. A technical audit into the operation of the CHP plant is to be undertaken in the near future. In the longer term the addition of absorption chillers will be considered to better utilise summer heat production.	££	££	4-5 years	1	2	85
26. Departmental re-charging for energy use, initially in a small scale trial project involving a few suitable buildings.	££	££££	3-4 years	3	2	80
27. Make use of water from existing borehole.	£££	££££	2-3 years	2	3	75
28. Investigate the possibilities for voltage reduction ideally by tap changing at the transformer although products such as the Power Perfector which carry out this function are available on the market should the preferred method prove impractical	££	£££	4-5 years	2	2	75
29. Use LED lighting for lifts and other current halogen lighting applications. Also investigate the possibility of turning lift lights off during periods of inactivity.	££	££	4-5 years	2	2	70
30. Provision of metered charging areas for personal electric vehicles	££	££	3-4 years	2	3	70

Medium Term Feasibility Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
31. Merchant wind turbine agreement	£	££££	> 1 year	4	1	90
32. Use student resources to consider most effective ways of increasing student recycling rates	££	££	4-6 years	2	3	75
33. Carry out thermo graphic survey of all buildings	£££	£££	4-5 years	3	3	60
34. Consider energy efficiency of washing durable plates and cutlery versus use of disposable but compostable alternatives	£££	£££	4-6 years	4	2	60
35. Make use of ground source heat pumps. It is planned to install one in the development of 134 – 136 Gower Street which would provide a good test case.	££££	£££	6-7 years	2	3	55
36. Tree planting on remote sites such as Shenley.	££	£	N/A	3	2	50
37. Installation of wind turbine at Shenley.	£££££	££££	7-8 years	4	2	50
38. Investigate the use of absorption chillers linked to the CHP plant	£££££	£££	5-8 years	3	2	50
39. Consider options for composting of kitchen waste	££	££	4-6 years	4	4	50

Long Term Feasibility Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
40. Investigate the use of micro bio-digestion plant for kitchen waste.	££££	£££	2-4 years	4	1	65
41. Trial installation of fuel cell and/or bio fuel heat and power generation	££££	££££	5-6 years	4	2	60
42. New fleet vehicles to be hybrid or electric. Consideration also of combining with others to make a calor gas fuelling point viable	£££	££	5-6 years	3	4	50
43. Consider suitability of buildings for green/brown roofs	££££	£££	6-8 years	4	3	45
44. Soft start system for areas with high lighting loads	£££	££	5-6 years	4	4	45
45. Make use of photovoltaic cells located such that they can also provide solar shading.	£££££	£££	8+ years	4	2	40
46. Consider incorporation of sustainable urban drainage systems in surfaced courtyard areas	£££	£	N/A	3	4	35
47. Make windows in 1 – 19 Torrington Place openable to reduce cooling requirements	£££	£	8+ years	4	5	25
48. Explore utility meter validation systems or equipment	£££	£	8+ years	4	5	25

Short Term Embedding Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
49. Implement energy and water conservation awareness campaign.	££	££££	1-2 years	1	2	95
50. Institution wide PC shutdown arrangements overnight and weekends etc.	££	££££	1-2 years	2	2	90
51. To revisit the existing energy and water policy, and adopt a new policy embracing carbon, energy and environmental management.	£	£££	2-4 years	1	2	90
52. Make turning all non essential lights off at the end of buildings opening hour's part of security staff's duties	£	££	> 1 year	1	4	80
53. Routinely check on library opening hours as these frequently change and heating etc may be being provided when it is not needed	£	££	2-3 years	1	3	80
54. To incorporate waste management data into the Carbon Management Strategy and Implementation Plan	£	£££	2-3 years	2	3	80
55. Consider bespoke BREEAM ratings for new buildings	£££	£££	4-5 years	3	2	65
56. Improve facilities for cyclists, secure parking, showers etc. Introduction of cycle scheme in accordance with the Government's Green Travel Plan.	££	£	N/A	2	4	45

Medium Term Embedding Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
57. Ban the use of supplementary heaters except in cases where normal services have failed.	£	£££	>1 year	3	2	85
58. Liaise with departments in respect of locating their equipment e.g. fridges to minimise services provision requirements such as air conditioning	£	£££	1-2 years	3	2	85
59. Inclusion of Carbon Management Strategy and Implementation Plan or extracts from it in the student prospectus	£	£££	2-3 years	2	3	80
60. Check room booking system to ensure services are not provided to centrally booked rooms when not in use	£	££	2-3 years	1	3	80
61. Incorporate waste management data into the Carbon Management Strategy and Implementation Plan	£	£££	2-3 years	2	3	80
62. Set limit/target for energy consumption in each building. Energy used up to target level paid for by Estates. Energy used above target paid for by building users. If energy use is below target money from estates given to building users	££	££££	3-4 years	3	2	80
63. Shift paper procurement towards recycled goods	£	£	N/A	2	3	55

Long Term Embedding Projects

Opportunity	Cost	Saving	Payback	Ease of Implementation	Potential Carbon Saving	Overall Ranking Points
64. Continually updating the carbon management Strategy and Implementation Plan beyond the initial period in light of changing circumstances.	£	£££	2-4 years	1	3	85
65. Appoint a full time Building Management System operative to ensure that correct settings are maintained for all plant controls.	££££	££££	1-2 years	3	2	75
66. Increase provision of recycling facilities especially near catering outlets	££	££	5-6 years	2	3	75
67. Revise procurement policy for computer purchases to allow upgrading rather than replacement of equipment	£	££	> 1 year	3	3	75
68. Consolidating orders for the supply of building and maintenance materials etc in order to reduce the number of deliveries.	£	£	N/A	4	3	45
69. Find markets /users of redundant materials rather than throwing away potentially useful items	££	£	N/A	3	3	45
70. Explore methods and costs of carbon offsetting.	££££	£	N/A	5	1	35
71. Use natural products or recycled materials for flooring etc.	£££	£	N/A	3	4	35
72. Provide opportunities to work from home when appropriate	£	£	N/A	4	5	15

4.2 Activity since February 2008

The Carbon Management Strategy and Implementation Plan adopted by UCL in February 2008 suggested that funding for some of the identified projects be sought through the SALIX / HEFCE revolving green fund. A successful application was made in July 2009 resulting in a total fund value of £625k.

HEFCE/Salix Funding is drawn down in four tranches over a two year period,

HEFCE/Salix Finance Tranche Payment	Client Additional Contribution	Grant Claim Date	Milestones
£30,000 (n/a)	£7,500 (n/a)	August 2009	Signature of Agreement by HEFCE and Salix Finance. Appropriate personnel in place to manage fund. Demonstration of additional contribution in place.
£150,000 (£24,000)	£37,500 (£6,000)	February 2010	End of Year Finance Statement Approved by Salix Finance Demonstration of additional contribution in place.
£160,000 (£144,000)	£40,000 (£36,000)	August 2010	End of Year Finance Statement Approved by Salix Finance Demonstration of additional contribution in place.
£160,000 (£272,000)	£40,000 (£68,000)	February 2011	End of Year Finance Statement Approved by Salix Finance Demonstration of additional contribution in place.
n/a (£400,000)	n/a (£100,000)	August 2011	End of Year Finance Statement Approved by Salix Finance
£500,000	£125,000		TOTALS

The additional funding through Salix / HEFCE will enable an accelerated implementation of carbon reduction projects during 2010 and 2011 enabling participation in the ambitious 10:10 project details are shown below.

1010 PROJECTS

These projects have been funded through the SALIX / HEFCE revolving green fund. Total value of fund £625k. Last tranche (£200k) was received in February 2011 and must be spent by end of July 2011.

Description	Site	Cost	Fuel Type	p/kWh	kWh/pa Saving	Financial Savings	tCO2/pa Savings
Fitting insulation jackets to Valves and flanges etc	Archaeology Building	£6,935	Gas	3.00	66,683	£2,000	12.34
Fitting insulation jackets to Valves and flanges etc	Christopher Ingold Building	£10,346	Gas	3.00	106,113	£3,183	19.63
Fitting insulation jackets to Valves and flanges etc	Gordon House	£5,543	Gas	3.00	67,188	£2,016	12.43
Fitting insulation jackets to Valves and flanges etc	Physiology Plant Room	£15,576	Gas	3.00	165,262	£4,958	30.57
Fitting insulation jackets to Valves and flanges etc	1-19 Torrington Place	£12,849	Gas	3.00	152,150	£4,565	28.15
Fitting insulation jackets to Valves and flanges etc	Wates House	£4,161	Gas	3.00	41,300	£1,239	7.64
Draught proofing windows and doors etc	Rockefeller / Medical School Administration	£10,892	Gas	3.00	91,200	£2,736	16.87
Insulation of uninsulated internal pipework	Rockefeller / Medical School Administration	£13,115	Gas	3.00	114,110	£3,423	21.11
Fit zone control valves to Heating system	MSSL	£11,500	Fuel Oil	4.50	74,375	£3,347	19.93
Cooling – plant upgrade to free cooling	1-19 Torrington Place	£42,300	Electricity	8.05	291,212	£23,445	156.38
Draught proofing windows and doors etc	Archaeology Building	£19,003	Gas	3.00	136,590	£4,098	25.27

Roof top photovoltaic installation	CCB	£23,100	Electricity	*44.15	7,784	£3,437	4.67
Fit voltage optimisation equipment	1-19 Torrington Place	£71,875	Electricity	8.05	220,600	£17,758	118.46
Fit voltage optimisation equipment	Rockefeller / Medical School Administration	£35,176	Electricity	8.05	107,990	£7,150	59.07
Install high efficiency hand driers	Various	£6,555	Electricity	8.05	31,091	£2,798	16.70
Roof top photovoltaic installation	Archaeology Building	£22,950	Electricity	*44.15	5,623	£2,482	3.20
Fit voltage optimisation equipment	Archaeology Building	£25,187	Electricity	8.05	63,420	£5,105	23.84
Fit voltage optimisation equipment	CCB	£23,500	Electricity	8.05	48,075	£3,870	40.49
Fit voltage optimisation equipment	Christopher Ingold Building	£58,515	Electricity	8.05	247,543	£19,927	180.61
Fit voltage optimisation equipment	Cruciform Building	£133,500	Electricity	8.05	371,677	£29,920	246.61
Fitting insulation jackets to Valves and flanges etc	Rockefeller / Medical School Administration	£22,784	Gas	3.00	229,663	£6,890	43.64
Fit car park ventilation fans with VSD's / CO monitors	1-19 Torrington Place	£15,333	Electricity	8.05	46,189	£3,718	24.80
T8 to T5 lighting adaptors	Wates House	£25,000	Electricity	8.05	156,500	£13,303	84.51
		£569,645			2,828,931	£165,449	1189.05

- Overall cost of saving 1 tonne of carbon is £515.22. Overall simple payback is 3.44 years.
- Projects completed in 10 buildings. The carbon footprint of these 10 building is 10,888 tonnes thus a saving of 10.92% has been achieved in these 10 buildings, (1010 / 10 buildings / 10%+). Across UCL core non- residential buildings the saving is around 3%.

In addition to the projects listed above a number of other measures have taken place as a result of the original plan. These include:

- Full review of Building Management System control settings, it is noted that this work will have to be repeated at regular intervals, in particular before the commencement of each heating season
- The supply of well over 100 plug in timers to control use of office and laboratory equipment
- Expansion in the installation of advanced lighting controls including absence detection and ambient light level measurement
- The use of LED lighting in lifts as replacement for halogen lamps. Future use of LED's for task lighting.
- Provision of metered charging bays for personal electric vehicles
- Improved parking facilities for cyclists

4.3 Next Steps

The table of projects in the previous section indicates two types of project that are, due to the very large building stock covered by this plan, repeatable at the same level over the next ten years these are the installation of voltage optimisation equipment and fitting of insulation jackets to valves and flanges in all plant areas:

Voltage Optimisation

The voltages measured at the University's electrical outlets are higher than those for which modern equipment is designed to run at. The University has embarked on a programme of voltage optimisation at our major sites which will reduce the power drawn by many pieces of equipment, without affecting performance.

Based on the installations already completed and underway the programme will cost £350k per annum and save around £84k a year, resulting in carbon savings of around 670tCO₂ a year.

Total cost over ten years: £3.5m – to be funded from LTM budget

Annual carbon reduction: 670tCO₂, over ten years 6,700tCO₂

Simple payback time: 4.16 years

Insulation Jackets

Wrap-around valve insulation jackets can be used to insulate heating and hot water service valves and flanges etc as necessary. In general plant areas the pipe work itself is well insulated as are some of the valves and flanges.

However many of these have no insulation jackets or boxes. Considerable energy savings would result from the reduction in heat loss achieved from the use of easily applied wrap-around insulation jackets.

Based on the installations already completed and underway the programme will cost £78k per annum and save around £25k a year, resulting in carbon savings of around 154tCO₂ a year.

Total cost over ten years: £780k – to be funded from LTM budget

Annual carbon reduction: 154tCO₂, over ten years 1,540tCO₂

Simple payback time: 3.12 years

Other projects that will provide accumulating savings are:

Energy Efficiency and Conservation Measures

We will invest in an energy investment programme to address specific energy issues as they arise. This will have a value of £200k/year and be largely funded using the savings being returned to the revolving green fund in repayment of loans that have been used for projects already completed. We have conservatively estimated that these projects will have a mean payback time of 5 years, saving 440 tCO₂ a year, which will accumulate.

Projects could include; improvements to heating systems such as better zoning; better control of air-conditioning plant; the incorporation of variable speed drives into ventilation systems; further renewable energy schemes etc.

The Energy Manager and BMS Engineer will operate and continue to innovate a housekeeping programme to ensure heating, ventilation and air conditioning systems are working optimally.

Total cost over ten years: £2m

Annual carbon reduction: 440tCO₂, over ten years 4,400 tCO₂

Simple payback time: 5 years

Behavioural Changes

Experience has shown that awareness schemes tied to rewards and/or celebration of success for participants work best. The high churn rate of

students and, to a lesser extent, staff, means that awareness work will need to be supported throughout the period to 2020.

We envisage three strands of awareness activity the first being the activities of the departmental and student green champions whom are tasked with improving awareness throughout their areas of activity, the Student Switch-Off campaign at the student accommodation buildings, and amongst staff implementation of the Green Impact Awards. The effect of these will be a one-off reduction in halls' electricity consumption by 5% and academic and administrative electricity consumption by 2%, costing £200k over 10 years, and delivering savings of 900tCO₂ per year. These programmes will go further and address use of domestic hot water (a major expense) in halls, and raise awareness of energy-efficient behaviours amongst users of kitchens and fume cupboard – both areas with high costs and carbon associated with them.

Total cost over ten years: £200k – ten equal annual spends

Annual carbon reduction: 630tCO₂, over ten years 6,320tCO₂

Simple payback time: 4 years

Other projects providing savings at specific moments in time are:

Green ICT

One of the main drivers for growth in the University's electricity consumption over the last five years has been the implementation of the University's High Performance Computers, and over the previous ten, we've gradually reached saturation with desktop IT and peripherals, such as printers.

Desktop IT has a double effect: it uses electricity and dumps heat into rooms which then often need to be cooled electrically. We are therefore supporting efforts to virtualise desktops, removing quite large loads from offices into server rooms where they can be better managed, and leaving only low-power thin-client devices in offices. This solution will take a number of years to roll out, and may not be suitable everywhere. We are therefore also supporting technologies which switch off conventional desktop computers remotely when they are not in use.

The main HPC is very well managed, and has consumed less electricity than had been expected as new technologies became available between its design and construction. Good housekeeping will maintain the good energy performance of the facility. However, the academic requirement for more installations of this magnitude over the next ten years is unknown, and this is a key variable in our predictions. We envisage a spend of £500k on Green

ICT enabling works in the initial 4 years of the programme, to manage desktop IT currently being bought.

Total cost over ten years: £500k – spent over four years, bid for from capital funds.

Annual carbon reduction: 600tCO₂

Simple payback time: 4 years

Combined Heat and Power

The existing CHP plant situated in the Malet Place energy centre reduced CO₂ emissions by 7,405 tonnes per year. It is anticipated that over the next ten years CHP capacity could be considerably increased and probably doubled with potential installations at the Rockefeller boiler house and at the new building to be constructed on the Windeyer site.

There is likely to be scope for optimising the use of the existing CHP. Likewise, we may see some medium scale implementation of combined heating and cooling, but we have yet to identify the potential for these projects.

Total cost over ten years: £10.0m – likely to involve a bid from capital funds and new build project costs.

Annual carbon reduction: 7,405tCO₂

Simple payback time: 10 years

Renewable Energy

Many of our colleague organisations have identified renewable energy sources as a way of reducing carbon emissions. We will continue to try to identify projects which may be cost effective, but understand that there is an opportunity cost in investing in renewables. Feed-In Tariffs (FIT's) make projects financially attractive that otherwise would have been untenable, but do not improve the carbon performance of the project per capital pound spent.

The University has no good wind sites, and has limited space available for the storage of biomass, so is likely to be limited to solar electricity (PV), air-source heat pumps, solar thermal, and use of biofuel in new CHP installations.

Currently two planning applications have been made in respect of two small scale solar electricity installations on the roofs of the Archaeology Building and the Central Collegiate Building which will generate 13,400 kWh of electricity per year.

Cost £46k

FIT payments: £4.8k per annum guaranteed for 25 years

Annual carbon reduction: 7.87tCO₂

Simple payback time 7.78 years

Reboiling

Reboiling has many drivers; with the impending total failure of the equipment the usual trigger for replacement, early reboiling will reduce energy and maintenance spend and reduce the risk of early failure. Reboiling has quite a long payback time if fuel is considered to be the only saving, usually around ten years. However, this reduces to less than ten years if the avoided costs of maintenance and denial of service are factored in.

Currently reboiling projects are taking place at Christopher Ingold Laboratories, Bentham House and Hillel House.

Total cost: £1.05m

Annual carbon reduction: 740tCO₂

Simple payback time (energy only): 10 years

Simple payback time (including avoided maintenance costs): 6 years

Refurbishment

In the next ten years, UCL will be refurbishing a number of buildings. Sustainability will work to ensure that any envelope improvements and actions which will increase the efficiency of space heating, lighting and domestic hot water systems, with a pay back time of ten years or less, are considered from the outset of any refurbishment plans. There is a great potential for cost and carbon savings via refurbishment, although some areas may be able to be more densely populated as a result. We predict that savings on buildings brought up to Part L of the building regulations and BREEAM “Very Good” as part of capital refurbishment programmes will save 1,600tCO₂ a year.

Total cost over ten years: embedded within refurbishment costs

Annual carbon reduction: 1,600tCO₂

Metering

A number of the main academic buildings are served by large electrical incomers, and individual buildings need more metering for us to understand their contribution to our consumption properly. UCL will therefore continue its roll-out of half-hourly metering in order to better understand the time profile of their buildings. This helps us to ascertain, for example, when equipment has been left on unnecessarily out of hours, and is also useful for providing information for Display Energy Certificates and gauging the effectiveness of energy saving measures. We will work with energy providers to provide half-hourly data at fiscal metering points.

We will ensure that student accommodation buildings are adequately metered, so that we can identify and eradicate spurious loads. Eventually we will be able to use these as awareness tools amongst the residents, too.

There will be no savings per se from these measures, but they will support other efficiency actions.

Total costs over ten years: £600k spent over three years

New Buildings

We cannot know for certain what new buildings will be in our stock by 2020, but we do know that the Windeyer Building will be demolished and replaced with a new building on the same site. We anticipate that this building will be built to BREEAM excellent or very good standard and incorporate efficient energy generation.

Total costs – embedded in new build budget

Annual carbon reduction: 940tCO₂

Space Utilisation

One of the key outcomes of the Estates Master Plan, currently under preparation, will be to make more efficient use of the space within the core campus area. Other projects include the restacking of office accommodation in two buildings and identifying buildings away from the main campus with limited value to UCL, but which could yield funds to improve assets in our main areas of operations.

There will be income from this action.

Annual carbon reduction: 630tCO₂

5. Carbon Management Plan Financing

It is anticipated that a £200k annual budget, to be created within the existing Estates and Facilities Division's budget envelope, will be dedicated to financing small scale energy conservation measures as and when these are identified.

However the larger projects, identified in section 4 above, require greater investment and it is anticipated that some of these will be funded through the long term maintenance budget, some through budgets allocated to major refurbishment and new build projects. Others will need to be considered on a case by case basis with thorough feasibility proposals and business cases being submitted to senior management for consideration under a bid for capital funds.

It should be recognised that whilst a degree of flexibility is necessary in scheduling the projects in this Strategy and Implementation Plan, those identified have been included because they are likely to be cost effective to implement, efficient and with wider positive benefits to the campus environment. These benefits include operational considerations, aesthetic value, awareness building and enabling other projects to develop. However, all reasonable payback options are given consideration on a case by case basis, wherein the factors to be considered include the wider benefits the project may create, and the ease of implementation by the project team.

Currently no further funding is available through the Salix / HEFCE revolving green fund. However the fund will continue to provide financial support as the financial savings gained from the energy efficiency measures already undertaken are returned to the fund until the original project investment is repaid. The recycled money can then be used for further investment.

Renewable energy projects can provide an income stream because of the feed in tariff scheme and the renewable heat incentive, this income could be used to provide funding for other conservation projects.

Other opportunities for external funding will be considered as and when they become available in the coming months and years.

Ultimately, it is expected that the Carbon Management Programme will have substantial financial benefits for UCL and that the listed projects are a sensible investment that will provide an element of mitigation against unexpected eventualities arising in the energy market.

6. Stakeholder Management and Communications

6.1 Stakeholder Management

UCL has defined Key Stakeholders as those individuals in the organisation who can influence and motivate staff and students within their respective area of responsibility to ensure the programme objectives are successfully delivered.

Those key stakeholders are generally senior members of staff responsible for significant teams and budgets, but may also be individuals with specialist knowledge. The support and commitment of the key stakeholders is critical to the success of the programme.

The members of the implementation team (Environmental Sustainability Action Group) are key stakeholders, with specific responsibility for delivery of the programme, including:

- Provision of data and expertise relating to sources of emissions for monitoring progress in future years.
- Identification of emissions reduction opportunities including project life cycle assessments and conformity with UCL's financial procedures.
- Contributing to the development of a UCL Energy Policy.
- Delivering the Communication, Learning and Development Strategy to support the UCL Environmental Sustainability Policy, including this Carbon Management Plan, and the evaluation of consequent behavioural change.
- The degree to which the UCL Environmental Sustainability Policy, including this Carbon Management Plan, is integrated within UCL's core activities of teaching and research

6.2 Progress Since 2008

We have delivered on a number of programmes since the publication of the 2008 Carbon Management Strategy.

Green UCL is the corporate brand for UCL's environmental sustainability programmes, including carbon management, and replaces the "You Have the Power" brand developed as part of the 2008 Strategy.

At the heart of this new brand lies the Green UCL website (www.ucl.ac.uk/environment) which is intended to act as the "landing point" for stakeholders, internal and external, staff and student, seeking information about environmental sustainability at UCL. The website has links to academic activities, activities undertaken by Corporate Support Services (including Estates and Facilities Division), student activities and activities undertaken by

UCL's Green Community (including Green Champions). It is maintained by Estates and Facilities Division and has editorial support from Head of Corporate Communications and a Lead Green Champion. Green UCL carries sufficient gravitas that it is now linked to from the main UCL homepage (www.ucl.ac.uk).

The Green UCL brand plays a vital role in promoting the notion that stakeholders bear a personal responsibility in contributing to the success of UCL's environmental sustainability programmes. For this reason the brand is supported by the strapline "**your** campus, **your** environment". The brand along with the strapline has been used to produce a series of leaflets and a poster supporting UCL's environmental sustainability initiatives, all with a consistent look and feel. The leaflets produced to date include:

- Environmental Sustainability
- Energy
- Recycling and Waste
- Sustainable Transport

The brand supports UCL's Green Community, those stakeholders who wish to become actively involved in UCL's environmental sustainability programmes. Key members of the Green Community are departmental Green Champions, and departments are encouraged to appoint at least one staff Green Champion and, where appropriate, one student Green Champion. In order to provide leadership to the network of Green Champions a steering group of three Lead Green Champions has been formed. The Lead Green Champions are all members of the Environmental Sustainability Steering Group (ESSG) and act as a consultation conduit between ESSG and the Green Champions. The Green Champions have their own web area (www.ucl.ac.uk/environment/greencommunity/green-champions) within the Green UCL website and organize their own programme of activities.

These various communication routes allow for feedback and interaction. A generic Green UCL email address has been set up (green-ucl@ucl.ac.uk) and this is supported by various members of the Environmental Sustainability Action Group. The Green Champions have set up a mailing list which has proved to be so successful as to warrant transfer to a more formal moderated chat forum/blog.

Face-to-face communication has been promoted through a number of events. Estates and Facilities Division has supported the People and Planet Go Green Weeks for 2009 and 2010. Members of the Environmental Sustainability Action Group have supported events such as Love Food, Hate Waste in the spring of 2010 and the Staff Benefits Market Place (following the Provost's introduction and welcome) in November 2010. Most recently staff, students and Green Champions took part in a week of events supporting Go Green Week 2011 with:

- Meat-free Monday
- Travel-light Tuesday
- Waste-not Wednesday
- Switch-off Thursday

- Debate about climate change on Friday

Carbon management was actively promoted with the UCL Energy Manager appearing as “Doctor Carbon” to answer questions about energy conservation both in the workplace and at home.

6.3 Communicating this Carbon Management Plan

For this Carbon Management Plan to be effective it is essential that all stakeholders understand its strategic objectives, which are:

- To reduce the consumption of utilities, primarily electricity, gas and water
- To reduce the environmental impact of emissions associated with the operation of the university
- To reduce the costs associated with the procurement of utilities and disposal of waste
- To understand and quantify the potential to reduce consumption and waste
- To develop a prioritised list of investment opportunities to deliver the savings
- To promote UCL internally and externally as an organisation that cares about these issues
- To demonstrate to staff, students and the wider community that UCL has in place a progressive and comprehensive programme to manage its impact upon the environment
- To integrate the objectives of carbon management into the procurement and development of new buildings and refurbishment projects
- To embed the principles of carbon management into the culture of UCL

To assist in achieving these, a separate Communications, Learning and Development Strategy has been devised. This latter strategy underpins the UCL Environmental Sustainability Policy as well as this Carbon Management Plan. The aim of the Communication, Learning and Development Strategy is to embed environmental sustainability, including carbon reduction, as a core value within all UCL’s activities, including:

- Teaching
- Research
- Provision of student accommodation
- Services required to support the above.

A separate and detailed Communications, Learning and Development Implementation Plan is being devised which will include a development routemap and resourcing plan which will ensure that the strategy fully

supports all aspects of the UCL Environmental Sustainability Policy, including this Carbon Management Plan.

In relation to carbon management, the objectives of the Communications, Learning and Development Strategy are to:

- Give a clear signal to staff and students from the senior management team that UCL is committed to this issue for the long term
- Establish a clear shared understanding of the Carbon Management Plan's vision and goals
- Generate enthusiasm for carbon management and therefore help the programme secure the necessary resources
- Keep the programme in touch with changing academic, estates, student and other needs
- Enable early recognition of risks and issues so that the programme plans can be adapted where appropriate
- Ensure accurate information and guidance are provided at the right time
- Ensure that decisions are based on accurate information
- Improve readiness for change amongst staff that may be impacted by the carbon management programme, through changes to working practices
- Ensure that staff and students understand their personal responsibility.

7. Governance, Ownership and Management

7.1 Governance Structure to Deliver UCL's Carbon Management Plan

Carbon management and its governance have been incorporated into the UCL Environmental Sustainability Policy which is managed under the following three-level governance structure:

The Environmental Sustainability Action Group is based within Estates and Facilities Division but has stakeholder representation from other support services, Green Champions and students. In particular, the Environmental Sustainability Action Group promotes carbon reduction opportunities in:

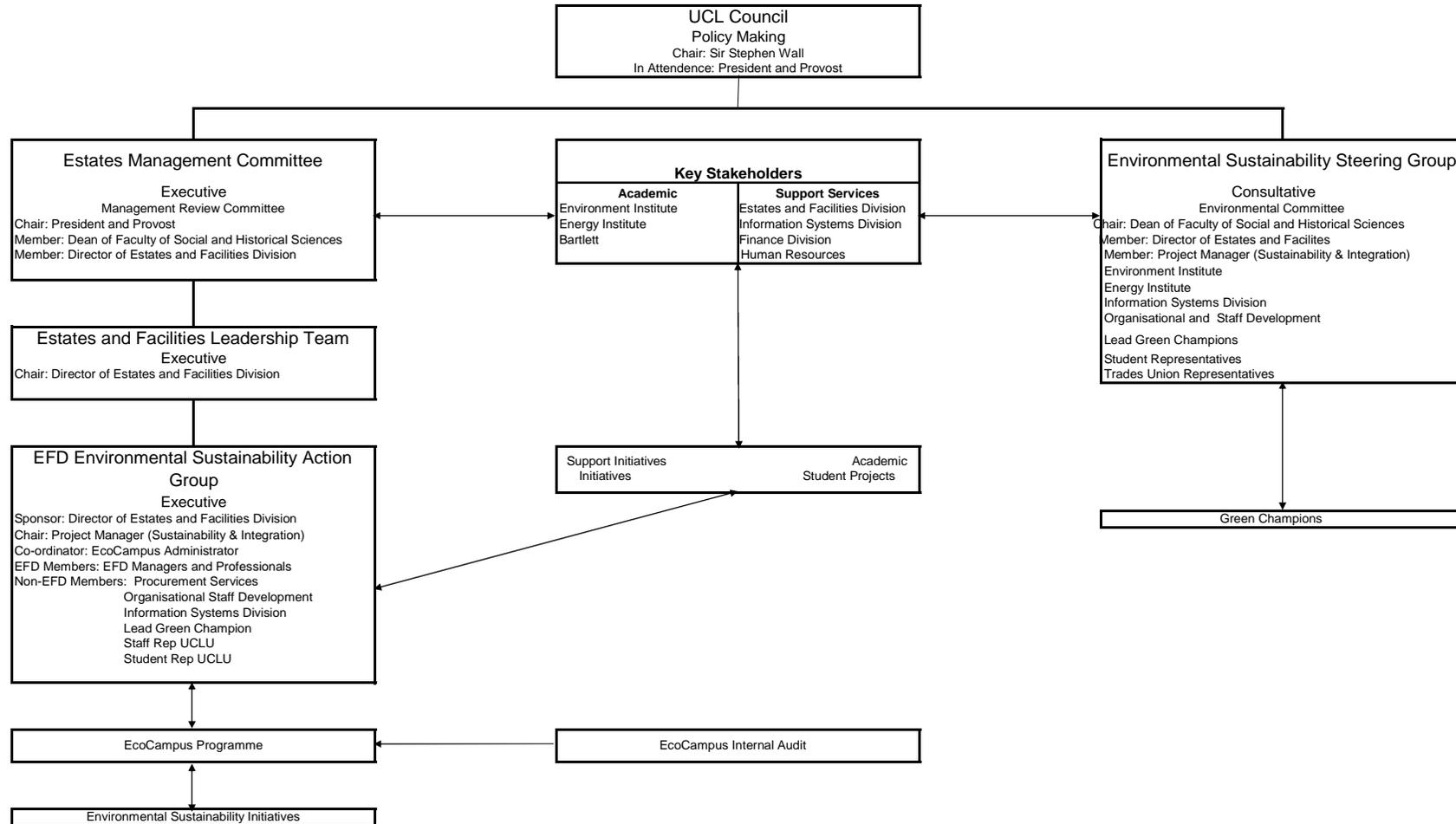
- New-build and building refurbishment projects
- Planned and reactive maintenance
- Utility management
- Facilities management and waste disposal
- Student accommodation
- Postgraduate Institutes
- Procurement
- Information Systems
- Laboratories and other Green Champion initiatives
- Behavioural and organisational change
- Student engagement and UCL Union

Its role is to implement UCL's environmental sustainability initiatives. It reports through the Estates and Facilities Leadership Team to Estates Management Committee.

Matters requiring wider consultation and approval are reported by the Environmental Sustainability Action Group to the Environmental Sustainability Steering Group, a formal consultative committee with academic, non-academic, staff and student representation. Matters which have been approved by the Environmental Sustainability Steering Group are tabled for adoption by Estates Management Committee. Whose role includes

- To provide oversight and strategic support to the development and ongoing review of UCL Environmental Sustainability and Carbon Reduction Strategy and sign off any amendments or new strategies prior to submission to Council for approval.
- To monitor progress of Carbon Reduction against agreed targets.

Organisation to Manage Environmental Sustainability at UCL v4.3



- Roles and Responsibilities**
- CEO: President and Provost
 - Senior Management Sponsor: Dean of Faculty of Social and Historical Sciences
 - Senior Management Sponsor: Director of Estates and Facilities Division
 - EMS Manager: Project Manager (Sustainability & Integration)

Carbon Management Plan Responsibility Table

Activity	Responsible person			
	Director	Lead Manager	Core Team Members	Others(s)
Carbon Management Implementation Plan <ul style="list-style-type: none"> • Set objectives • Manage Implementation Plan • Maintain Opportunities Database • Monitor and review progress against plan • Monitor and Report on Emissions 	Director of Estates and Facilities Division (Andrew Grainger) Academic Sponsor (Professor Stephen Smith)	Head of Environmental Sustainability	Energy Manager (David Anderson)	
Financing of Carbon Management Activities	Director of Estates and Facilities Division (Andrew Grainger) Director of Finance (Alison Woodhams)	Head of Environmental Sustainability Head of Procurement Services (John Feraday)	Energy Manager (David Anderson)	Finance Section EFD
Carbon Management in Buildings	Director of Estates and Facilities Division (Andrew Grainger)	Head of Maintenance and Engineering	Energy Manager (David Anderson)	Assistant Energy Officer, EFD Maintenance and Project Engineers, EFD

Activity	Responsible person			
	Director	Lead Officer	Core Team Members	Others(s)
Waste Management	Director of Estates and Facilities Division (Andrew Grainger)	Head of Facilities (David M Smith)	Facilities Services Operations Manager (Ian Wright) Disposal of Hazardous Waste Technician (Paul Monk)	Student Residences Managers PGI Managers
Communications and Stakeholder Engagement	Director of Estates and Facilities Division (Andrew Grainger)	Head of Environmental Sustainability	Head of Communications (Clare Bowerman) Organisational and Staff Development (Richard Laughlin)	Green Champions TU Reps Student Reps UCLU
Purchasing	Director of Finance (Alison Woodhams)	Head of Procurement Services (John Feraday)		EFD Procurement Office

7.2 Risks and issues management

A summary of the key issues which may impact upon the programme are listed below together with a broad risk assessment. These issues will be reviewed regularly to ensure the programme is not de-railed or progress delayed. The table below identifies the risks:

Issue	Risk to Project	Probability	Impact	Corrective Action
Institutional Growth	Institutional growth above 0% will reduce the ability to meet the 34% target with growth >3% leading to zero progress	High	High	Institutional plans should restrict growth
Changing face of HE market, international and home based competition	This issue poses no risk to the project merely enhances the need for it to be successful and actively reported on.	Low	Medium	Effective Carbon Management will improve efficiency and make UCL more attractive to all potential customer groups If challenged on environmental probity, able to positively respond
University's financial strength	Lack of capital to invest in the identified carbon abatement opportunities	Medium	High	Re-enforce value at stake calculation Bring forward quick wins Promote Salix funding Re-invest savings Trade surplus EUETS permits and invest in programme work
Impact of utility and waste management price increases	Major issue for UCL, increasing costs may mean less money to invest in projects	High	High	Opportunity to demonstrate the value of carbon management, by offsetting increases against relatively modest reduction in emissions.
EU & UK legislation	UCL will be effected by the introduction of the Carbon Reduction Commitment. Current emission levels will be costly to cover with allowances	High	High	EPBD will introduce energy labeling for some of our buildings. CRC provides a clear signal that inefficiency carries both operational cost and risk to reputation.

Issue	Risk to Project	Probability	Impact	Corrective Action
Carbon management not recognised by faculties and departments as their responsibility	No incentive to engage with the programme	Medium	Medium	The principle of personal and business centre responsibility must be clearly communicated from the Provost Communicate personal responsibility with CL&D Strategy
'Beat them with a big carrot'	Without a quid pro quo unlikely to motivate the behavioral change necessary	High	High	Implement and publicise the carbon management strategy. Communicate information on simple methods of introducing good practice in the workplace and devise ways of giving back some of the benefit to the school or department
UCL vision for Carbon Management post HECM programme	Programme regarded as short term, lack of commitment from key stakeholders	Medium	High	Reinforce senior management commitment through communication plan Ensure ESAG has terms of reference linked to UK & international targets for carbon reduction. Clear reporting line with access to resources.
UCL's previous track record with environmental group(s)	Motivating stake holders to engage with the programme	Medium	Medium	Ongoing meetings of ESSG Demonstrate the value at stake, make the link to the Provost's presentation on the future of the University This initiative is long term, with increasingly more stringent international legislation

7.3 Initiatives and Opportunities

The effective implementation of this Carbon Management Plan is supported by a number of initiatives and opportunities which relate to the governance and management of the plan.

7.3a Bloomsbury Masterplan

The Bloomsbury Masterplan exercise is looking at the estate of the UCL Bloomsbury Campus and it seeks to provide opportunities to:

- Use the estate effectively, enhancing the academic environment and student experience.
- Use the estate efficiently and intelligently shrink the physical, and associated carbon footprint, of the estate.
- Incorporate carbon management into the future plans for the estate an example being to increase the capacity to generate electricity through additional combined heat and power plant.
- Incorporate environmental sustainability, including waste management, traffic and pedestrian movement, support for pedestrians and cyclists and supporting biodiversity, into the future plans for the estate.

7.3b Maintenance Strategy

A review is currently underway into the provision of planned and reactive maintenance to the UCL estate. A number of the projects delivered under the 2008 Carbon Management Strategy might better be described as maintenance rather than energy management projects. This leads to the possibility of looking for opportunities for delivering and funding measureable carbon reductions within existing maintenance programmes, particularly the Long Term Maintenance Programme.

7.3c Estates Approvals Committee

The Estates Approvals Committee within Estates and Facilities Division provides financial oversight to estates projects with a budget of over £100k. Part of the oversight process is that each project must be supported by an environmental sustainability justification. There is an opportunity to strengthen this by requiring projects to be underpinned by carbon accounting in addition to financial accounting.

7.3c Restructure of Estates and Facilities Division

The restructure of Estates and Facilities Division will clarify the leadership across the entire UCL estate for environmental sustainability, including carbon management. Additional opportunities exist to centralize energy management

for the entire estate into the role of the UCL Energy Manager and to devolve the management of utility invoicing to a utility procurement bureau.

7.3d UCL EcoCampus

UCL has joined the EcoCampus scheme, a phased programme to assist higher education institutions to develop their own environmental management system based upon ISO14001. Our approach has been to further break down the task by initially limiting the scope of the programme to buildings for which we manage the utility supply and waste disposal within the UCL Bloomsbury Campus, including student accommodation within this boundary, and the Institute of Child Health. The scope will then widen to the entire estate, and then further expand to leasehold and other buildings for which we do not manage the utility supply and waste disposal.

Within the initial scope we have completed the planning phase and have achieved the Bronze award. We are currently undertaking the implementation phase which will enable us to set objectives and measurable targets for improvement of our environmental performance – including carbon management.

7.3e Green Impact Programme

The Green Champion network in UCL has now developed to the extent that we can look to join the Green Impact programme run by NUS Services Limited. “Green Impact is an environmental accreditation scheme that encourages pro-environmental behaviours by staff. It empowers Green Champions within their workplace, helping them to gain recognition for their environmental efforts, whilst playing on the competitive spirit of staff working in teams. It provides people and their departments with a tangible framework for improving their environmental performance, breaking down complex environmental issues into bite-size chunks.”

If UCL were to join the programme it would provide Green Champions with a structured activity set which would encourage them to work within their departments to measure current environmental performance and to effect real improvement. It would also be engaging and fun!

7.4 Benefits Management

There will be several indicators to measure both the quantitative and qualitative benefits of the Carbon Management Programme.

Firstly, progress of project implementation will be reported to the Environmental Sustainability Steering Group and to Estates Management Committee.

Following completion the performance of each project will be closely monitored to establish the exact level of energy and carbon savings achieved. This procedure will ensure that progress on carbon abatement is accurately reported.

Secondly, the benefits of the associated reduced consumption, emissions and cost. Key Performance Indicators derived from and reported annually via the Estate Management Statistics have been identified that will clearly demonstrate the performance of the estate. These will allow internal and external benchmarking and will enable the comparison of year on year performance. Relating to environmental sustainability these include:

- 1) % Energy generated
- 2) % Low carbon fuels used
- 3) League table position (Carbon Reduction Commitment)
- 4) Energy consumption per m² both gross and nett internal
- 5) Energy consumption per m² both gross and nett internal per building
- 6) Energy consumption per student and staff FTE
- 7) Mains water consumption per m² both gross and nett internal
- 8) Mains water consumption per student and staff FTE
- 9) CO₂ emissions (Scope 1&2)
- 10) Customer opinion on UCL's environmental sustainability performance
- 11) People and Planet Green League ranking

7.5 Reporting and Evaluation

During the years following the formal adoption of the Carbon Management Plan in which carbon reduction projects will be put into operation, there will be regular updates on the Programme targets and evaluation of the Programme status. This will:-

- Ensure that carbon management is being implemented effectively
- Enable management to be improved and optimised where appropriate
- Provide data that can be used to update the emissions targets and programme scheduling

The Environmental Sustainability Action Group will have responsibility for delivery of the actions identified in the programme and monitoring progress.

The Environmental Sustainability Steering Group will be kept apprised of developments in the programme at least twice a year.

The Estates Management Committee will receive updates on the status of the programme at least twice a year. Reporting on progress against the plan and target and implementation of actions / opportunities.