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Foreword from the Carbon Trust

Cutting CO₂ emissions as part of the fight against climate change should be a key priority for universities – it's all about getting your own house in order and leading by example. The Higher Education Carbon Management programme has been designed to assist universities like City University in saving money on energy and putting it to good use in other areas, whilst making a positive contribution to the environment by lowering their CO₂ emissions.

City University was selected in 2007, amidst strong competition, to take part in this ambitious programme. As one of the most proactive HEI's in the UK in responding to the risks that climate change presents City University has joined the 48 universities across the UK who have to date partnered with the Carbon Trust on this programme in order to realise vast carbon and cost savings.

This Carbon Management Strategy and Implementation Plan commits City University to a target of 30% reduction in CO₂ by 2015 and 43% by 2020 and underpins potential financial savings of more than £3.9 million over the next 5 years. The Carbon Trust is very proud to support the City University in their ongoing implementation of this Plan.



Richard Rugg
Head of Public Sector, The Carbon Trust

Foreword from the Vice-Chancellor

Climate change is widely accepted as one of the greatest challenges facing our planet. The question is no longer whether our climate is changing but by how much and how quickly.

Our carbon footprint does matter. How we live, how we travel, what we eat and how we generate and consume energy all have huge effects on the sustainability of our environment.

City University London is Islington's third largest carbon dioxide emitter. Not only will we continue to work closely with our local borough, our students and our staff to reduce our operational impact but we are well-placed to contribute meaningfully to environmental sustainability through our research and enterprise.

I hope that all who read this Plan will support our attempts to reduce our carbon footprint and be better environmental citizens as we grasp the environmental challenge of operating a 21st-century University in the heart of London.

Professor Paul Curran
Vice-Chancellor, City University London

Management summary

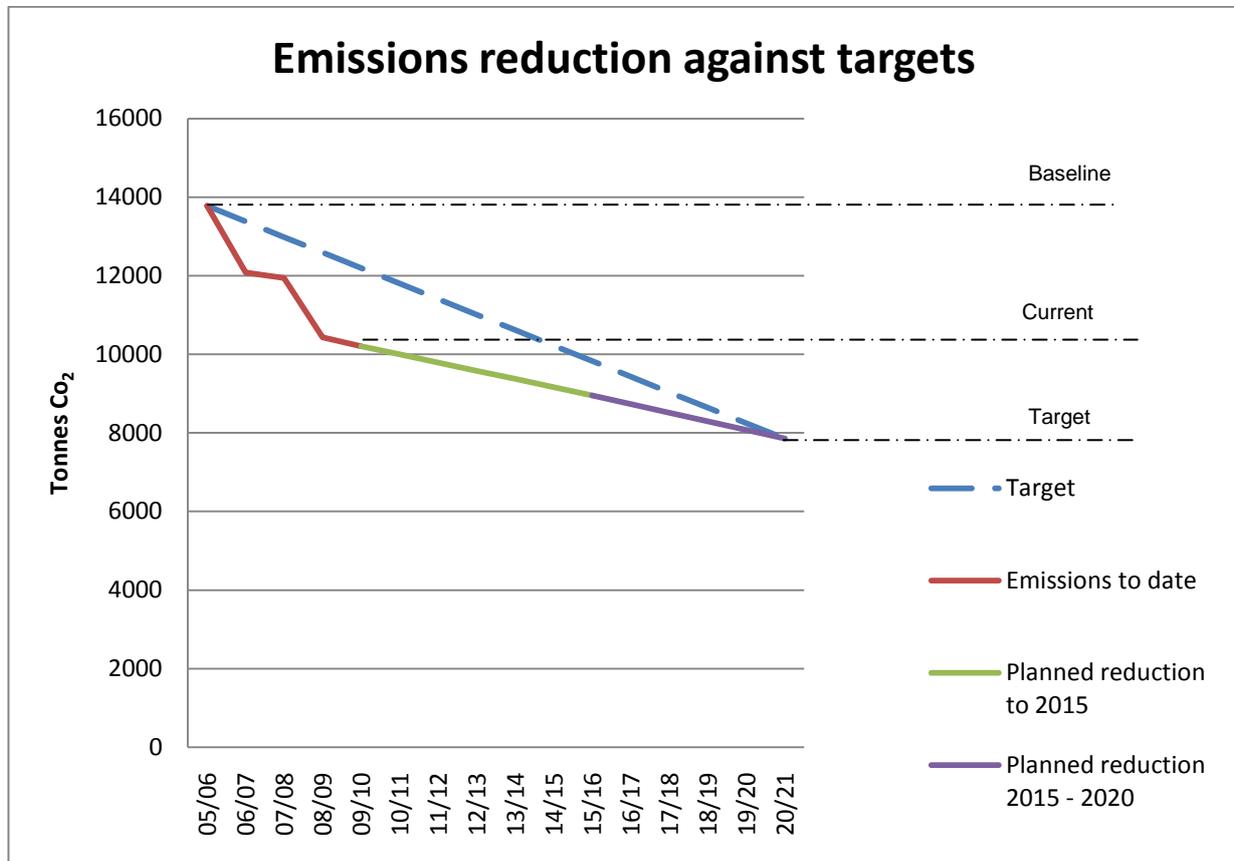
City University was formally inducted into the Carbon Trust's Higher Education Carbon Management Plan in June 2007. Membership of the scheme illustrates City University's recognition of its environmental impact and demonstrates our commitment to improve our environmental performance. The plan, which aims to formulate a strategy to manage and reduce both emissions, and operating costs, was initially published in 2008 with the full support of the University's senior management team. The plan has now been re-evaluated to reflect current UK and Higher Education emissions targets.

Recent developments in UK and European Union legislation have brought about a more challenging operating environment. The Climate Change Act 2008 aims to improve carbon management and help the transition towards a low-carbon economy in the UK. It sets the world's first legally binding targets for greenhouse gas emissions of at least 80 per cent by 2050 and at least 34 per cent by 2020, against a 1990 baseline in the UK. Furthermore, the implementation of the Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES), has introduced a league table and cap and trade carbon mechanism, thus placing a clear financial value on organisational emissions. The higher education sector is vital to the success of these measures and as such, the Higher Education Funding Council for England (HEFCE) has issued guidance which sets a reduction target of 43% by 2020 based on a 2005/6 baseline.

City University is the third largest emitter within the borough of Islington, with total baseline carbon emissions (2005/6) of **13,776 tonnes**. Rather than viewing these legislative developments as an obstacle, City University has embraced this new legislation as an enabler for change in its operating practices. This approach has enabled City University to deliver significant emissions reductions to date, with the most recent measurement (2009/10) showing a marked decrease to **10,208 tonnes per annum (-25.9%)**.

However, to achieve the 43% reduction identified within the HEFCE guidelines, significant action still needs to be taken. Such a reduction would see the university footprint fall to **7,852 tonnes per annum** over the next 10 years. The Carbon Management Plan utilises the tools and methodology provided by the Carbon Trust, as such the carbon management plan identifies measures for implementation over 5 years from commencement of the plan, concluding in 2013/14. Identification of strategies beyond this timeframe are likely to be inaccurate. The university will assess its performance at the end of this 5 year cycle to ascertain its progress towards its HEFCE 2015 and 2020 targets. At which time the CMP will be revised for the next 5 years

The graph overleaf shows progress to date and the required emission reductions to meet the 2020 target.



Programme Focus

The initial HEFCE target is based on Scope 1 & 2 emissions whilst the additional guidance suggests that HEIs should also start to identify measurement mechanisms for Scope 3 emissions. Definitions of each scope as per the Greenhouse Gas GHG protocols are shown below.

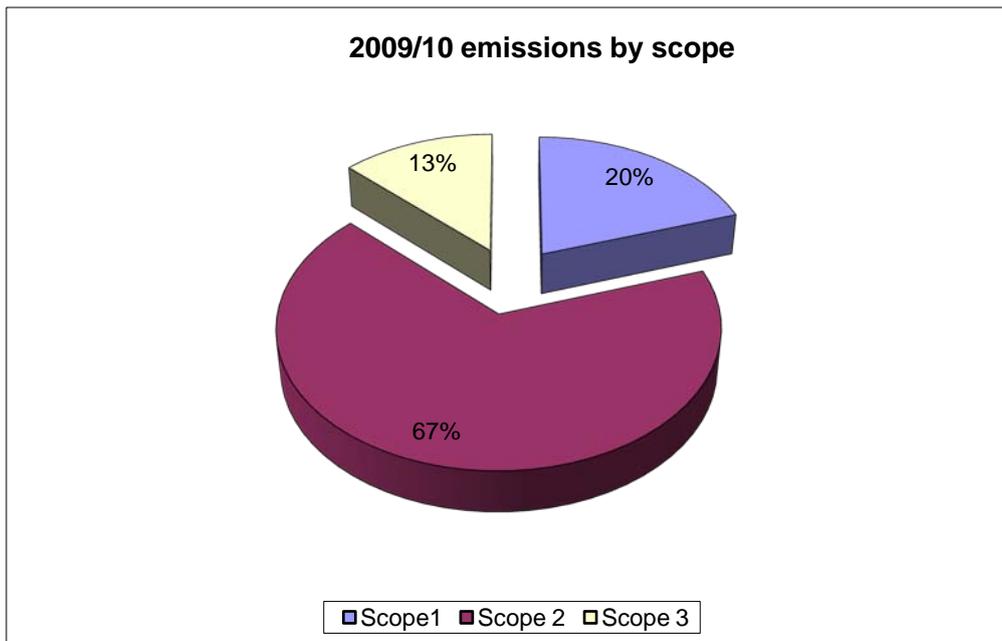
***Scope 1** emissions are those directly occurring “from sources that are owned or controlled by the institution, including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles;

***Scope 2** emissions are “indirect emissions generated in the production of electricity consumed by the institution.”

***Scope 3** emissions are all the other indirect emissions that are “a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution” such as commuting, air travel for university activities, waste disposal; embodied emissions from extraction, production, and transportation of purchased goods; outsourced activities; contractor owned-vehicles; and line loss from electricity transmission and distribution”

The main focuses of this Carbon Management Plan are Scope 1 & 2 emissions, however a number of Scope 3 emissions have been identified and a process of target setting has commenced

As the chart below illustrates, the majority of City University's **current** emissions fall within Scopes 1 & 2. These relate mostly to Gas and Electricity with a small proportion associated with fleet emissions.



Total emissions 10,903 Tonnes Co2

(Scope 1&2 emissions 10,208 Tonnes Co2)

The chart below shows how these emissions relate to the various university activities and their associated costs.

	CO ₂ emissions per annum (tonnes)	Cost (£)
Buildings and street lights	9,506	£1,297,047
Transport	701	£155,573
Further scope	696	-
	10,903	£1,452,620

Note. Further scope items include emissions related to water and waste items such as paper and print cartridges. These are included within the carbon trust methodology but are not recognised within the GHG protocols.

The University will contribute to the achievement of a sustainable environment. This will be through systematically improving the organisation's energy efficiency and use of resources, by integrating principles of sustainability with corporate strategies and operational procedures and by raising the awareness of environmental issues amongst our staff, students and the wider community.

Targets

- Reduce CO₂ emissions from University buildings by 30% by 2015 and ultimately 43% by 2020 against 2005/06 baseline figures.
- Reduce water consumption by 15% by 2020 against 2008/09 baseline figures

Introduction

The Higher Education sector is a significant user of energy and emitter of CO₂, and taken as a whole the sector has an annual primary energy consumption costing around £200M. The sector is reported to occupy around 9% of the UK's total office space, and has an estimated potential for cost-effective energy savings of more than 20%, which could reduce the sector's estimated annual carbon footprint of around 3.3mtCO₂ per annum. The sector is growing, with student numbers increasing by a factor of five over the past thirty years, and with a current policy to increase participation rates.

Carbon management means systematically reducing emissions through energy efficiency, low carbon technologies (such as Combined Heat and Power and renewable energy systems), low energy buildings, more sustainable travel arrangements and improved management systems. These measures should form part of a coherent strategy to reduce emissions, over time, from an established baseline to an agreed target level.

The purpose of this document is to set out how the university will meet the Higher Education Funding Council of England (HEFCE) emissions reduction target. The University was approached by the Carbon Trust in January 2007 to participate in their 10 month Carbon Management Programme. Following an application and presentation of its commitment, the University was accepted on to the programme. This resultant Carbon Management Plan, which was originally published in 2008, has now been re-appraised to take account of the higher education sectors 43% by 2020 emissions reduction target.

The last few years have seen a step change in the University's environmental performance with a number of environmental initiatives being set up. This has included the recruitment of an Environmental Officer, the introduction of a waste recycling scheme, development of a number of environmental policies and the ongoing adherence to the Carbon Trust Carbon Management Programme. Since commencement of the carbon management programme a significant number of identified initiatives have been delivered, which have brought about a 23% reduction in carbon emissions below the baseline year. The desire is now to reappraise the strategy to enable City to further improve its carbon reduction performance

The target savings in the plan are set to be achieved by 2013/14 but the scope and timescale for the potential projects is such that these will extend beyond this date. The plan is to be seen as a working document and will evolve as monitoring methods improve. This will require new targets to be set as progress is made along with adjustments to the scope of the projects to fit in with future development plans.

1 Carbon Management strategy

Context and drivers

During the early development stages of the carbon management plan an organisational risk assessment exercise was carried out the aim of this was to categorize risk, identify the key drivers the areas and nature of their impact. The results were split into generic categories The key drivers are shown below. A full breakdown is included in appendix A.1

Generic category	Driver	Areas of impact	Nature of impact	Importance (high, medium, low)	Consequences/opportunities/issues for carbon management
Political	HEFCE Sustainability Strategy	Property and Facilities	Sustainability for construction and refurbishment projects	High	Funding from HEFCE will be based on whether projects meet the requirements.
Legislative	Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES)	Property and Facilities/ Finance	All organisations with electricity consumption over 6,000MWh to enter into carbon trading. Will have a financial impact	High	The University will face increased costs if measures are not taken to reduce energy consumption and the organisations will be ranked in terms of performance
Economic	Rising utility costs	Across organisation	Increased operating costs will reduce funds for other activities	High	Opportunity to instigate energy efficiency projects to control expenditure
Operational	Estate Masterplan	Property and Facilities	Opportunity to enhance the environmental performance of the estate	High	Will assist in planning applications with local authority if environmental and carbon reducing measures are included
Stakeholders	Islington Climate Change Partnership	Property and Facilities	City University has exceeded the initial target to cut borough emissions by 15% by 2010. A new 2.5% per annum target has now been set by ICCP.	High	The University is the Borough's third largest emitter and therefore can have a large part to play in assisting with this target.

Whilst carbon reduction is the key driver behind this plan, the effects of inflationary pressures within the utilities market cannot be ignored. Utility prices have started to rise, following a period of stagnation in response to the global economic conditions. The future trend is predicted to be year on year increases in the cost of both electricity and gas with the cost of electricity expected to rise more steeply due to a shift away from the use of coal in energy production and the need for increased generating capacity in the UK. In addition to this, the current price of carbon which, though starting to increase, is considered to be particularly low and it is widely assumed that this will need to significantly increase in the short to medium term. It should also be noted that the price of carbon within the Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES), whilst fixed at £12/tonne until 2013, is expected to rise significantly during its second phase and is likely to reach parity with the internationally traded price.

With a view to mitigation of these costs, a series of initiatives are identified within this plan alongside lifecycle financial savings. These have been collated to show an investment cost over the course of this Strategic Implementation Plan.

Vision

The University will contribute to the achievement of a sustainable environment. This will be through systematically improving the organisation's energy efficiency and use of resources, by integrating principles of sustainability with corporate strategies and operational procedures and by raising the awareness of environmental issues amongst our staff, students and the wider community.

University objectives and targets

- **Reduce CO₂ emissions from University buildings by 30% by 2015 and 43% by 2020 against 2005/06 baseline figures.**
- **Reduce water consumption by 15% by 2020 against 2008/09 baseline figures**

Strategy

In order to meet the aims of the Carbon Management Plan, the University will look at all areas of its operations with specific focus on the activities within Property and Facilities, Information Services and the Purchasing department. It will continue to build partnerships with its major stakeholders including The Islington Climate Change Partnership, the University's Student Union and Islington Council. It will also look to develop more stringent policies that have an impact on carbon emissions.

In the key areas the University will explore or implement the following objectives.

Purchasing

- Work closely with Purchasing Department to develop an effective sustainable procurement checklist and guidelines, to be applied in all procurement instances.
- Implement policies or standards to ensure purchase of energy efficient equipment across all departments and buildings
- Implement policies to ensure the purchase of low carbon/recycled products where possible.
- Improve data collection for travel spend and tighten control to reduce number of journeys made, where possible by linking with the green travel plan to promote sustainable alternatives to procured business travel.
- Create awareness of consumption in general and tighten purchasing procedures so that people question whether their purchase is necessary.
- Develop awareness of supplier sustainability, develop methodology to measure and monitor procurement emissions (scope 3).

Information Services/AV

- Implement policies to purchase energy efficient technology
- Implementation of software to switch off computers automatically
- Policies regarding number and location of printers
- Work closely with Information Services to investigate the viability of infrastructure developments such as server virtualisation, thin client and externally hosted services.

Energy and Water Efficiency

- Adopt new energy and water management policies
- Implementation of identified energy saving measures
- Monitoring, targeting and reporting of consumption, cost and carbon emissions
- Implementation of full staff and student awareness campaign and encourage involvement in carbon reduction.
- Installation of automatic controls for building services across the estate

Estate Masterplan

- Exploration of low energy/water design for refurbishment and rebuilding of estate including CHP and district heating/cooling
- Sustainability of materials used, reduction of resources and passive design features
- Life-cycle costing versus central capital costs
- Control and recycling of construction waste

Projects

- Develop standard specifications to include energy efficiency
- Thoroughly scrutinise and challenge design work
- Ensure that projects take a wider view at other areas they may impact
- Implement monitoring and target of specific project carbon emissions
- Develop project carbon emissions benchmark

Timetabling and Events

- Investigate the opportunities to consolidate events and room bookings to reduce out of hours use of all buildings.

Green Travel Plan

- Update green travel plan and associated policies to include reducing travel where practical.
- Provide better monitoring information regarding business travel to allow more accurate reporting of CO₂ emissions.
- Implement Cycle to Work Scheme
- Investigate provision of centralised cycle hire through TfL scheme for local staff travel.
- Improve measurement of staff and business travel and include in measurement of scope 3 emissions.

Waste Disposal and Recycling

- Carry out full waste and recycling audit.
- Roll out improved local recycling across the university estate.
- Introduce agreed targets for waste minimisation and recycling.
- Improve measurement of waste and recycling to enable inclusion in Scope 3 measurement.
- Look at the possible standardisation of furniture to reduce wastage from office moves and refurbishment
- Look into the reuse/recycling of unwanted items rather than disposal through charities etc.
- Roll out composting of food waste across university estate.
- Look into developing market places on similar lines to Freecycle for University use i.e. trading equipment, stationery etc. and a separate one for staff to exchange unwanted items they may have.

Catering

- Food waste, composting, recharging for energy and water use, Fair Trade products, packaging, local sourcing all to be looked into

Cleaning

- Use of biodegradable/environmentally friendly cleaning products including hand wash
- Use of recycled paper products (toilet rolls, kitchen towels)
- Mainstream localised recycling procedure to reduce contamination of waste streams.

Working with Local Partners

- Islington Council, Islington Climate Change Partnership, City of London, LDA, GLA and other relevant public bodies.

Awareness

- Undertake full staff and student campaigns, assist Student Union to set up student lobbying group, ensure website remains up to date with information.
- Participate in schemes designed to recognise achievement in improving performance such as Energy Accreditation, Green Gowns etc.
- Implement staff and supplier sustainability induction.

2 Emissions baseline and projections

As previously stated, the 2005/6 emissions have been used as the HEFCE baseline year. In the years prior to this, consumption and subsequent emissions had grown steadily. This rate of growth in emissions, along with a series of assumptions as to the increase in fuel cost and organisational growth, enable a forecast to be made as to resultant emissions, should the university continue operate in this manner. This business as usual model (BAU), when compared to emissions following our target reduction strategy, allow us to calculate both the financial and emissions value at stake (VAS).

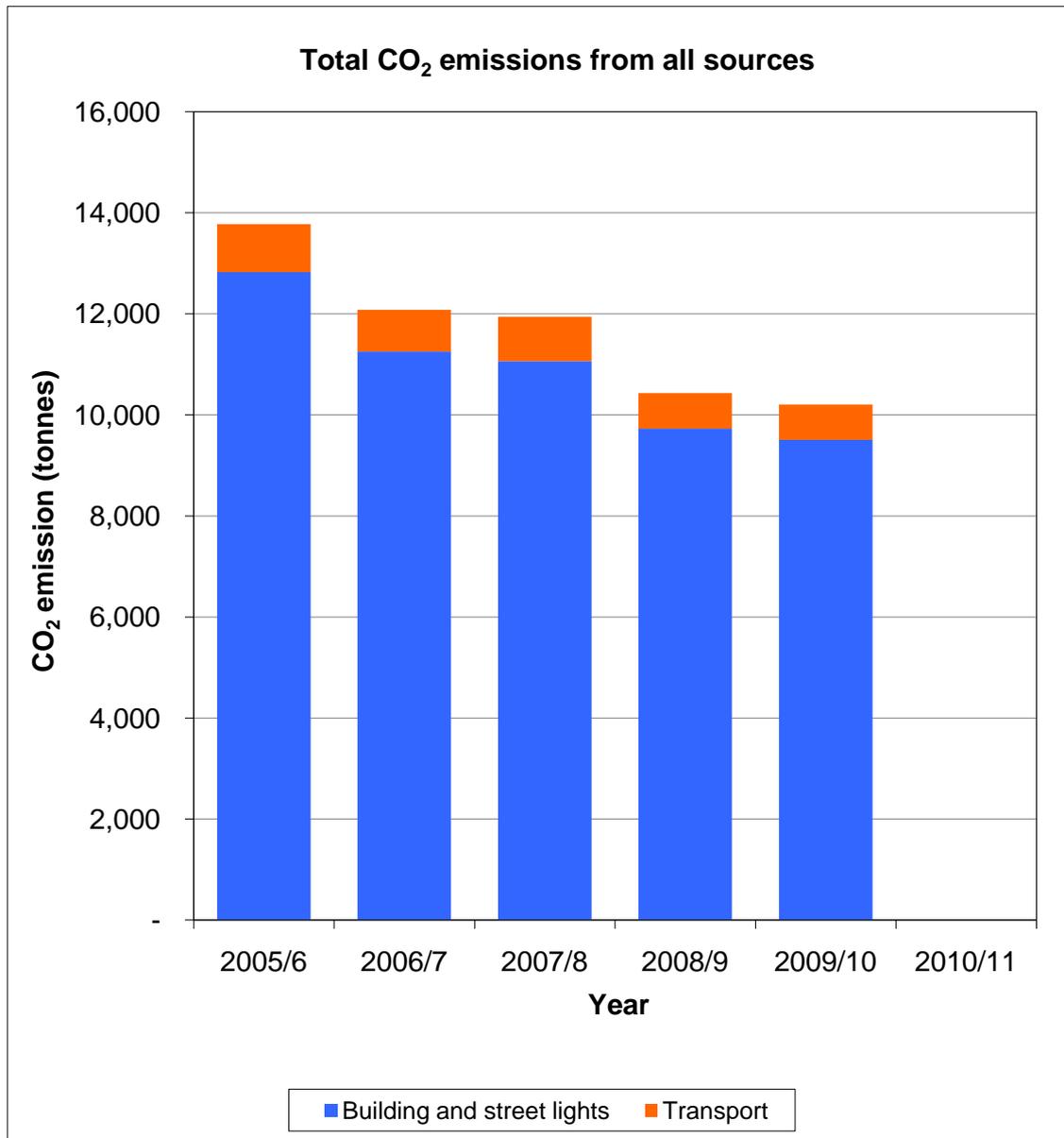
Scope

The initial scope for emissions looked at those from our buildings in the form of energy, water use and waste, those from staff and academic travel, site transport and our procurement of goods and services. Whilst a great deal of improvement has been made in the recording of the business travel and procurement elements, further work is necessary to develop a robust mechanism for recording these scope 3 emissions. This is highlighted in the strategy objectives and will be targeted year on year to ensure that monitoring in these areas is comparable to that carried out on other emissions sources.

Baseline

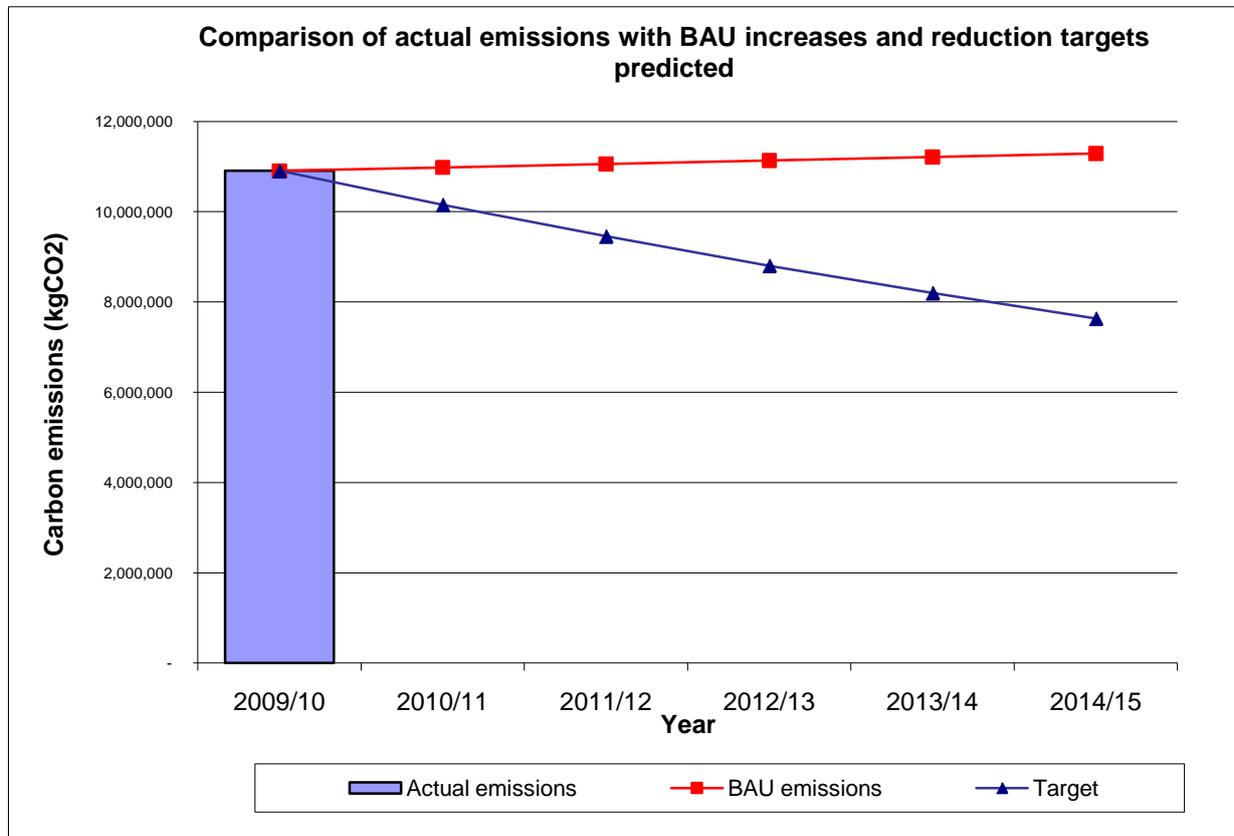
Total emissions in 2005/6 have been calculated at **13,776 tonnes CO₂**. The table below breaks this down by scope.

Scope emissions			
		Emission	Units
Scope 1	CHP	-	kgCO ₂
	Solid fuels	-	kgCO ₂
	Liquid fuels	-	kgCO ₂
	Gaseous fuels	4,176,879	kgCO ₂
	Vehicle fleet	1,208	kgCO ₂
	Refrigerant Gases	-	kgCO ₂
	Total	4,178,088	kgCO ₂
Scope 2	Grid electricity	8,647,199	kgCO ₂
	Heat purchased	-	kgCO ₂
	Total	8,647,199	kgCO ₂
Scope 3	Employee commuting	-	kgCO ₂
	Business Travel	951,147	kgCO ₂
			kgCO ₂
	Total	951,147	kgCO ₂
Total emissions		13,776,434	kgCO₂



Value at stake of carbon emissions

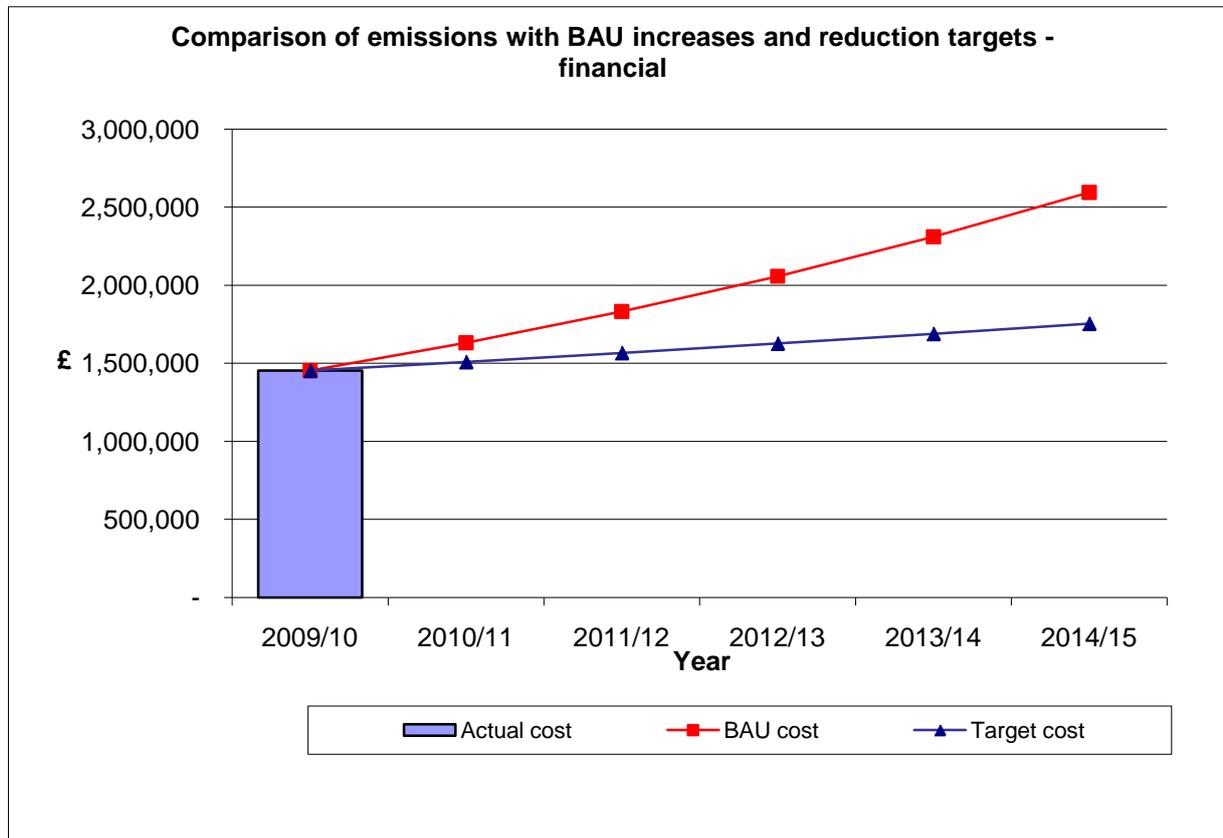
Having established an emissions baseline, it is possible to estimate the University's business as usual (BAU) increase in emissions, were we to continue to consume energy at growth levels within the sector norm, which is indicated within the Carbon Trust Carbon Assessment tool as 0.7% per annum. It is also possible to calculate the Value At Stake (VAS). The VAS is the difference in emissions or costs between the Business As Usual (BAU) scenario and the Reduced Emissions Scenario (RES) based on the Carbon Management Plan target set.



	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Total value at stake	-	996,368	1,917,460	2,769,541	3,558,355	4,289,175
Cumulative value at stake	-	996,368	2,913,828	5,683,368	9,241,723	13,530,898

The BAU comparison graph assumes a 0.7% increase, were the University to consume at the sector norm rather than its current downward trend, a situation which is highly likely as energy saving are harder to identify in later years. As indicated in the table above, there is a significant increase in emissions over the next 5 years under this scenario, resulting in cumulative emissions at stake of 13,530 Tonnes over the 5 year period.

The following graphs illustrate the financial cost of the BAU model and VAS over the next 5 years



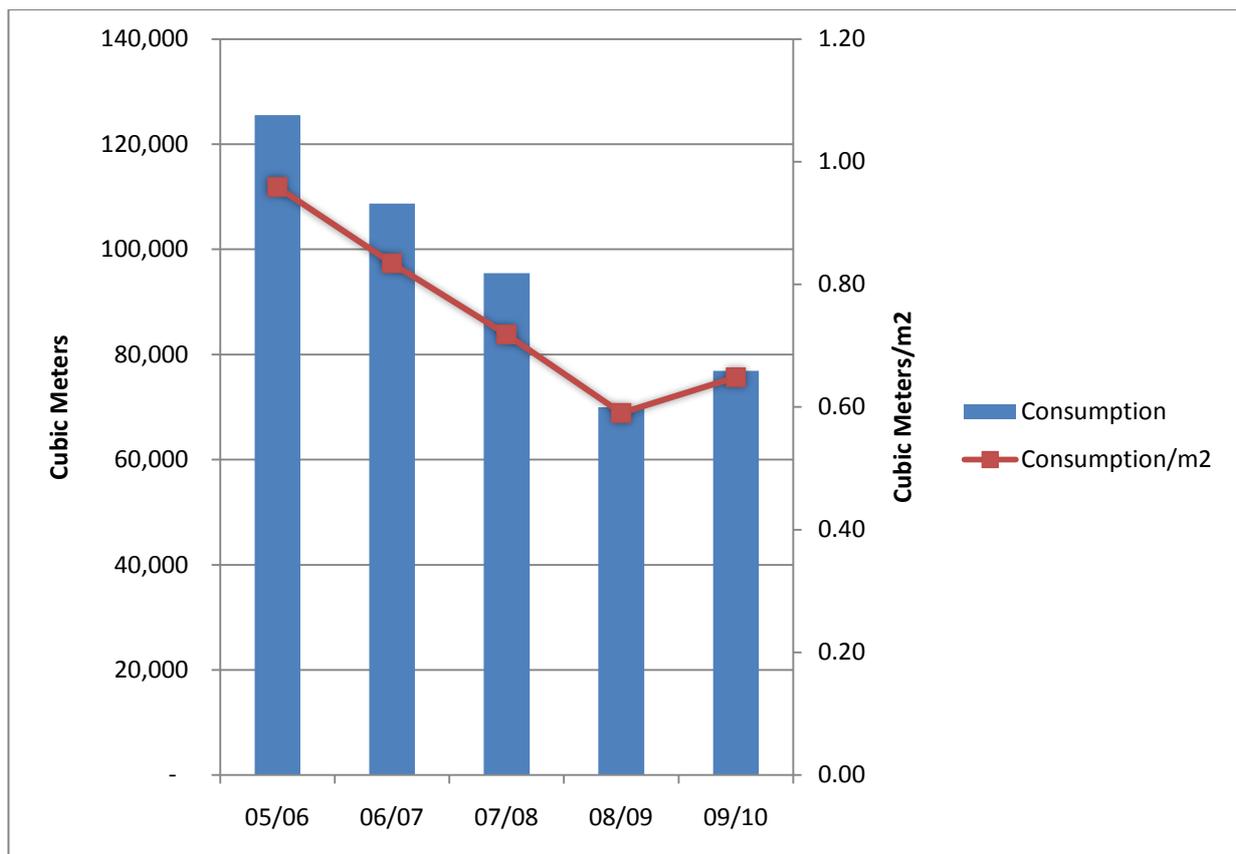
Note: The default input data used from the Carbon Assessment tool which has default figures of 11.6% per annum for grid electricity and 10.7% for transport emissions have been applied year on year for deriving the projections for business as usual and the value at stake. The financial indicative value at stake should be viewed with some caution.

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Total value at stake	-	£ 122,943	£ 265,692	£ 430,865	£ 621,406	£ 840,628
Cumulative value at stake	-	£ 122,943	£ 388,635	£ 819,500	£ 1,440,905	£ 2,281,534

As illustrated above, whilst it is unlikely that the university will see any decrease in utilities expenditure, the impact of utilities cost increases will be significantly mitigated by the continuing adherence to the Carbon Management Plan over the next 5 years

Water consumption

Whilst water consumption is not explicitly identified within the HEFCE reduction target, City University will continue to target water usage over the same timeframe. As such a target of a 30% reduction in water usage by 2020 against the 2005/6 baseline has been set. The graph shown overleaf shows the reduction in water usage to date as a result of initiatives carried out under the carbon reduction plan.



Significant savings in water consumption have been achieved since the baseline year. This has largely been as a result of the implementation out of the urinal controls and greater use of push taps. The sale of the two halls has also reduced demand significantly. 2009/10 saw an increase in water usage over the previous year due to a leak at the Cass business school. This has now been rectified and we expect to see a continuation of the downward trend within the next report.

3 Carbon Management Implementation Plan

In order to meet the targets within this plan, a number of schemes and projects have been identified. A long list of projects was drawn up following consultation with various stakeholders and from the suggestions sent in using the ideas generator on the University website. From this long list, a number of projects were identified that would be taken forward as they met criteria in terms of carbon and cost saving, business direction, longer term objectives and good practice. These are listed in the table below.

Each area may be made up of a number of smaller projects that will be linked together, some of which have already been scoped and costed and others which will require further feasibility work to assess their viability and appropriateness. The projects have been split into five categories which have been given further details and project owners in appendix A.2.

The plan will be managed by the University's Energy and Environmental Manager. The items on the long list and further subsequent ideas and suggestions will be collated for consideration at a later date once the implementation of some of the larger projects is completed. The ideas generator will also be a permanent feature of the University's environmental web pages and this will be reviewed on a regular basis.

It should be noted that the list below is a high level view of some of the projects to be taken forward. There is also a rolling programme of energy audits for all University buildings with an expected lifespan of three or more years and the outputs from these audits will influence the technical measures that are taken forward. Therefore the list below is a result of the actions that can be taken with confidence in advance of these audits taking place.

Short listed actions and emission reduction opportunities

Technical Actions

	Measure	Detail
1.	Combined Cooling Heat and Power	This project will see the installation of CCHP for the main Northampton Square campus. The project will provide tri-generation with absorption cooling and will be future-proofed with a view to provision of district heating to adjacent buildings where appropriate.
2.	Chilled Water Ring Main	This project will centralise some of the cooling systems at the main site providing low energy cooling sources reducing the need for cooling and passive cooling options where appropriate.
3.	Insulation and Draught-proofing	To review and install insulation to walls, roofs and pipework as well as draught proofing measures across all buildings
4.	Building Management System improvements and expansion	To continue with the programme of improving the existing BMS network by linking buildings to the central supervisor, changing strategies and auditing the controls and to pick up items of uncontrolled plant that are not currently on the BMS
5.	Install Power Perfector voltage reduction units in main buildings	To install these units where feasible to reduce supply voltage from 240 to 230V to reduce running and maintenance costs.
6.	Main campus boiler and	To continue with the programme of improving the operation and

	heating improvements	control of the existing heating and hot water services and boiler plant at the main campus.
7.	IS PC Auto Switch Off Control	To work with the IS department to look at installing software to automatically switch off computers when not required.
8.	Lighting	Install more lighting controls to suitable areas and adapt existing to improve operation. Replace old and inefficient lighting and look to incorporate new low energy types during refurbishment
9.	Hand Dryers	To install new low energy hand dryers across the estate as part of a programme of toilet refurbishment.
10.	Water Saving	To continue with the installation of various measures to reduce water consumption such as flow controls and automatic taps.
11.	Sub Metering	To develop a sub metering strategy and install new meters for strategic areas such as catering to allow better accountability, monitoring and targeting and possible future recharging.

Behavioural Measures

	Measure	Detail
1.	Environmental Champions Network	To maintain a network of energy/environmental volunteers to champion awareness in their own areas and encourage others to make a contribution.
2.	Awareness Campaign	To continue to develop and promote a full energy and environmental awareness campaign across the University.
3.	Catering	To look at aspects of the catering operation and to work with the service provider around the areas of packaging, seasonal foods, local sourcing, energy and water use and waste to reduce the environmental impact.
4.	Publicity and Education	To look at improving publicity and education of environmental matters to the staff, students and wider community.
5.	Energy Charging	To investigate the possibility of recharging departments for energy consumption to encourage efficiency.

Travel Matters

	Measure	Detail
1.	Green Travel Plan	To refine and further develop the University's green travel plan with assistance from the local authority, Transport for London and the LDA
2.	Recording Travel	To develop measures to record modes of travel, destinations and other relevant factors to enable a more accurate measure of related carbon emissions to be worked out.
3.	Air Travel Policy	To look into developing a policy regarding when air travel is appropriate and how to manage this.
4.	Alternatives	To look into the alternatives to travelling to events and conferences including the appropriateness and use of technology
5.	Commuting	To look into staff, students and visitors commuting habits so that the emissions from this can be added into the footprint.
6.	Academic links	To look into how items relating to carbon management, sustainability and environmental issues are taught in terms of the wider curriculum and how the various teaching areas can be brought together to share knowledge and create a centre of excellence

Resources

	Measure	Detail
1.	Purchasing	To revisit the existing low carbon/sustainable purchasing policy and mainstream to ensure recycled and low energy products are purchased.
2.	Procurement Data	To develop measures to record more accurately what is being purchased, where and by whom.
3.	Water Coolers	To look at removing the existing bottled water coolers around the buildings and replacing with mains water fountains and mains water coolers where possible
4.	Printing	To seek to develop a University wide set of guidelines/policy to cover items such as cover pages, double sided printing, allocation of printers, supply and recycling of consumables, etc.
5.	IS equipment	To develop a standard specification for all IT and AV equipment to ensure that their environmental impact has been fully taken into account.
6.	Furniture	To develop a standard specification for office furniture across the University to reduce the purchase of new furniture following refurbishments and office moves.
7.	Cleaning	To work with our cleaning contractor to look at using recycled and environmentally friendly products where possible.
8.	Market place	To look into setting up a 'Freecycle' style website to allow unwanted equipment and furniture to be reused by other areas of the University. A staff version could also be set up to enable staff to exchange and/or sell unwanted/wanted items.

Community

	Measure	Detail
1.	Green Roofs	To look at using green roofs on new and existing buildings to improve the thermal performance, appearance of the buildings, reduce surface water run-off during heavy rain and provide new habitats for wildlife
3.	Voluntary work	To encourage the use of volunteers in various community work related to the environment
4.	Islington Climate Change Partnership	To continue to influence and assist with the development of the partnership via the steering group

Implementation plan summary

The table below gives an indicative timetable for the implementation proposed schemes over a five year period. These will result in a significant number of changes to the University estate and as these plans develop, the implementation plan will change to reflect these.

There are no specific dependencies with the items listed other than financial approval and tying in with programmed project work where they are part of a wider scheme. Some of the projects are to undertake feasibility studies and until these are carried out and a full evaluation made, these projects cannot be programmed into future plans

Project	Implementation
Launch of Carbon Trust Strategy	2007/8
Set up Environmental Champions network	2007/8
Drysdale Building HVAC project	2007/8
Main site burner economiser installation	2008/9
Daylight sensing at main campus	2008/9
move to high efficiency hand dryers	2008/9
Implementation of 1st phase of travel plan	2009/10
Trend control expansion at main site	2009/10
trend link to outlying buildings	2009/10
Improved plantroom insulation phase 1	2009/10
Improved plantroom insulation Cass	2009/10
Improved plantroom insulation phase 2	2009/10
Improved draught proofing college windows	2009/10
Introduction of environmental induction package	2010/11
IS initiatives including server optimisation	2010/11
installation of automatic meter reading	2010/11
Sub metering improvements	2010/11
Main campus lighting upgrade	2010/11
Installation of burner management units at Cass Business School	2010/11
Installation of burner management units at Grays Inn Place	2010/11
IS pc shutdown strategy	2011/12
improved building insulation (cavity walls)	2011/12
LED Lighting installation at Cass Business School	2011/12
Daylight sensing in atrium at Cass business school	2011/12
University heating upgrade	2011/12
Myddleton building boiler upgrade	2011/12
Main site CCHP and Chilled water ring main	2011/12
Cass Business school Voltage optimisation	2011/12
Main Site voltage optimisation	2011/12
Main campus window replacement	2012/13
Improved building insulation (cladding)	2012/13

4 Implementation Plan financing

Financial Risks and Benefits

There is a significant risk of rapidly increasing costs to the University if this plan is not implemented. As noted previously energy costs are rising at a rate much higher than inflation and are set to continue to do so for the foreseeable future. In addition, increasing amounts of legislation and publicity will also have an impact on operations and reputation. By taking forward the measures listed, we will not only be reducing our emissions of CO₂ but we will also be helping to mitigate against these future price rises. The HE Sector is becoming a highly competitive marketplace and keeping overheads down to a minimum will enable more funding to be applied to student facing activities to help keep the University competitive.

Existing Funding Arrangements

A budget of £78,000 per annum for energy conservation projects is now in place. This is mainly to allow low cost/fast payback projects to proceed but is not sufficient to progress larger projects or schemes or for the sheer number of smaller projects that could be implemented.

Energy efficiency is factored in at the design stage of larger capital building or refurbishment projects and full life cycle costing are applied where appropriate to justify inclusion. For larger energy saving projects a full business case is completed and funding is awarded depending on the circumstances surrounding that particular project. Whilst an emphasis will continue to be placed on student facing improvements, many energy saving initiatives will not only reduce emissions and costs but will enhance the internal environment and improve working conditions for all who use the buildings. As such the Energy and Environmental Manager and the Projects team will continue to make this case strongly to the decision makers when bidding for funds to make infrastructure improvements.

The university, with the support of HEFCE and match funding from SALIX, have generated a £500K, ring fenced, energy efficiency fund. To date the fund has enabled the commissioning of over £300K of energy efficiency initiatives which will realise emissions savings in the region of 2,200 tonnes of CO₂ per annum.

Additional funds have been received through the Low Carbon Buildings Programme LCBP, which have enabled the installation of photovoltaic panels which currently reduce the universities emissions by a further 12 tonnes of CO₂ per annum and have served as an excellent engagement tool since installation.

Currently the majority of non-energy projects have been implemented through their being self financing as in the case of the recycling project or through grant funding as in the provision of the cycle racks. There are other areas where we have little influence on how money is spent such as our external contractors for catering, cleaning and maintenance. However, there may be opportunities to insist on changes during contract renewals through negotiation.

New Opportunities

The best time to implement carbon management measures, especially energy and water related projects is at the time of major refurbishment and new build. As such the Energy & Environmental Manager will continue to work with the Projects team to develop standard specifications that build energy and water conservation in at the design stage but are sufficiently flexible to enable innovation. All future capital projects will be fully scrutinised by the University's Energy and Environmental Manager to ensure that the proposals fit in with our future objectives and that the most efficient systems are

specified. We will also seek to utilise the Carbon Trust's Design Advice Service for new build or major refurbishment works over 500m² or other support initiative where appropriate.

The Energy & Environment Team will continue to pursue various grants and funding from organisations such as Transport for London and the Carbon Trust where appropriate whilst also investigating the possibility of sponsorship depending on the nature of the project. Other options relating to non-financial support in the form of advice and support across all areas of carbon reduction will also be explored.

Additional Benefits

There are a number of other financial benefits that will stem from the ongoing development of the Carbon Management Plan which are less easy to quantify and may not directly benefit the University. These include the benefit in marketing the University in a positive light relating to environmental matters which may assist in attracting students and conferences to bring in additional revenue. There are wider social benefits to the local community through the demand the University has on the local economy for goods and services which creates local employment.

The University will also look to educate students in environmental matters through initiatives such as its interactive sustainability module, with a view to engendering students leaving the university with a responsible attitude towards environmental issues. Some students will have attended courses that deal directly with environmental issues and again this will qualify them to be able to make a difference and could help to market the University to future students.

Predicted Costs and Savings

The table below shows the predicted implementation cost of the schemes listed in the implementation plan in section 3. It also gives an indication of the likely savings both financially and in terms of tonnes of carbon. If these predicted savings materialise from implementing the measures, then the initial capital investment would pay for itself within the five year time frame.

It has not been possible to predict costs and savings for all measures so there will be additional costs and savings on top of those listed.

Summary of predicted costs and savings

Total Estimated Capital Expenditure		£ 7,824,000			
Total Annual Cost Savings					
	2008/09 savings	2009/10 savings	2010/11 savings	2011/12 savings	2012/13 savings
Annual savings (£)	£147,157	£242,480	£272,146	£959,727	£959,727
Total Annual Carbon Reductions					
	2008/09 savings	2009/10 savings	2010/11 savings	2011/12 savings	2012/13 savings
Carbon Reduction (tonnes Co₂)	574	1,204	1,361	3,695	3,695

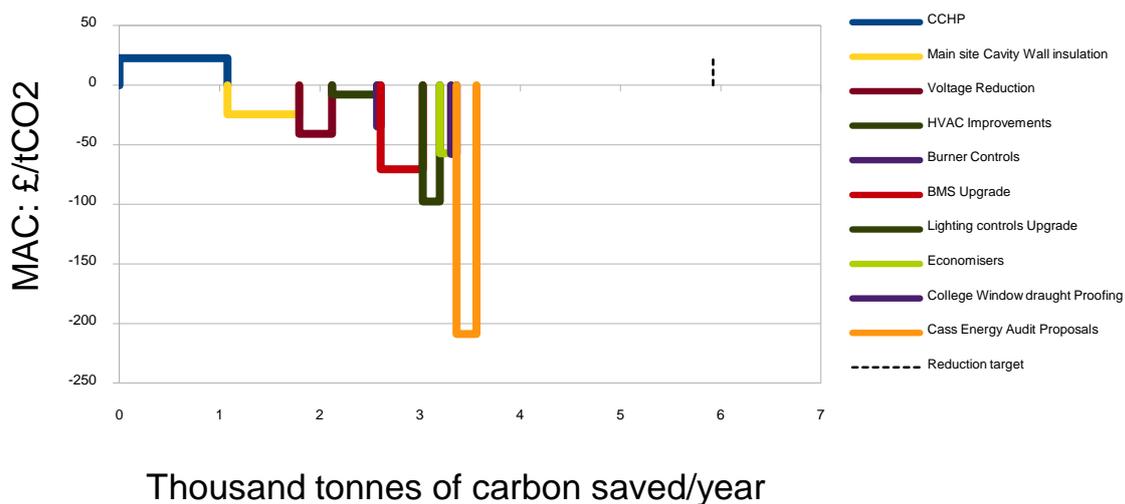
The table and graphs below shows the marginal abatement costs (MAC) for the top 10 emissions reduction projects. The costs for each project have been plotted against the CO₂ saving, the marginal abatement cost of each project or cost/ tonne of Co₂ is shown by the position of each project above or

below the zero cost line. This gives a clear view of which projects should be implemented at different abatement costs.

Further details of individual projects are supplied in the appendices.

Marginal abatement project costs

Discount Rate	10%			
Project Name	Capital Cost	Annual Benefit/Cost	Annual average CO ₂ Savings for project	Project Life
	£	£	tonnes/year	years
Cass Energy audit improvements	£ 20,000	£ 85,000	200	15
Lighting controls	£ 25,856	£ 31,204	170	10
BMS	£ 100,000	£ 66,682	419	12
Voltage Reduction	£ 60,000	£ 59,102	374	25
College window draught proofing	£ 46,866	£ 11,166	55	15
Economisers	£ 47,593	£ 22,858	232	25
Burner Controls	£ 20,000	£ 5,833	38	25
HVAC	£ 1,016,813	£ 121,706	447	25
Main site Cavity Wall insulation	£ 400,000	£ 98,082	713	30
CCHP at main site	£ 4,970,000	£ 480,000	1080	25



5 Stakeholder management and communications

Stakeholder management

The University has recruited a number of key stakeholders to both the Carbon Management Plan and the Sustainability Group. These members have been selected for their knowledge on sustainability and environmental issues, their ability to influence policy and procedures, their ability to engage with other members of staff and students and their ability to communicate both internally and externally. They are mainly senior figures from both the academic and administrative departments and have considerable knowledge of the operation of the organisation.

The main purpose of the stakeholder group is to provide support and assistance to the Energy & Environmental Manager, to assist in developing ideas and assessing which are suitable to progress to fit in with the University's overall strategy. They are also expected to help keep momentum for the scheme and to assist in spotting new opportunities for carbon management. This group is by no means fixed and it is envisaged that it will change to adapt to the various challenges and changing priorities as the implementation plan is progressed.

During the implementation of the plan, regular communications regarding activities and progress will be made and it is envisaged that further workshops and meetings will be convened as required to discuss potential projects and actions.

Communications Plan

Effective communication of the carbon management plan and its progress is essential to its success. Staff, students, visitors, suppliers etc. all need to be aware of the University's efforts and commitment as well as their own personal responsibilities in helping to reduce their impact on the environment.

The main channels of communication will consist of:

- The Communications Officer within Property and Facilities for general articles on progress, help required and awareness issues to be placed on the environmental pages of the University website, City News and other internal communications.
- The University's Marketing and Recruitment team for articles in the internal news letter, events and website design. The team can run surveys amongst our staff and students as well as operating a suggestions website. This team will also be able to include information for new and potential students as well as for general University publications.
- A full staff and student environmental campaign across all the University estate which will be a joint effort between Property and Facilities and Marketing and Recruitment.
- The use of various presentations to students and staff such as induction days, departmental meetings, student lectures, Heads of Departments, UET, ExCo, etc.
- The use of the proposed information screens in main reception areas to highlight progress and various messages to all building users.
- Various events to be held during key dates such as energy efficiency week, world environment date, freshers fair etc to promote the work being done and to encourage participation.

- Communication and championing from the Deputy Vice Chancellor at high level meetings such as UET and ExCo.
- Using publicity for the events team to provide for external meetings both in their marketing packs and for during events to hand out to delegates.
- Using the Environmental Champions Network to disseminate information tailored to their local teams and the way that they work.
- Information either provided or presented to new staff as part of their induction to the University or as part of their starter pack.

The main challenge with the communications will be to keep up the momentum and visibility of the programme. In order to ensure that this is possible, effective branding and marketing of the programme is essential. It is also imperative that the programme is not confused or blurred by other related awareness or saving initiatives. These should all be brought under the umbrella of carbon management.

5 Governance, ownership and management

Ownership of the Carbon Management Plan will be retained at Senior Management level, ensuring that the objectives are fully integrated with strategic University planning. This will help to ensure that the programme can remain in focus and on track should any changes to the existing structure be made.

Main roles and responsibilities

- Senior executive / Member Representative.

The Deputy Vice Chancellor, has had Senior Executive responsibility during the planning phase and this will continue. He will have responsibility for strategic direction and for assisting the funding and implementation of projects that may cover several business areas where this is required. He will also champion the cause of carbon management at the Executive Committee meetings and with the Vice Chancellor to ensure that it is built into University plans.

- Carbon Manager:

The University's Energy & Environmental Manager, Jason Clarke will be responsible for co-ordinating the implementation of the plan as well as reporting and developing the plan in the future. It is envisaged that he will be able to call upon assistance throughout the University to achieve this.

- Sustainability Group.

The University Sustainability Group will oversee the implementation of the programme and will, through the DVC report to the University Executive Committee. A wider group of stakeholders comprising Environment champions and key stakeholders will act as an advisory group and implementation champions for the programme manager.

Tasks of the Sustainability Group

- Review and update of the Implementation Plan on an annual basis
- Monitoring and reporting progress against plan
- Monitoring and reporting emissions performance
- Maintenance of the opportunity database
- Internal and external communication; and
- Engagement with sustainability/ environment champions on awareness raising initiatives

Carbon Management Implementation Plan: Responsibility Table.

Activity	Responsible person			
	Deputy Vice Chancellor	Energy and environmental Manager	University Sustainability Group	Others
Carbon Management Implementation Plan				
- Set objectives	✓		✓	
- Manage implementation plan		✓		
- Monitor and review progress	✓	✓	✓	
- Manage risks and issues		✓		
- Manage stakeholders and communication	✓	✓	✓	
- Report		✓		✓ Marketing Department
Financing of Carbon Management activities	✓	✓		✓ Director of resources
Carbon Management in Buildings – refurbishment, construction and operation	✓	✓		✓ Director of PAF
Green Travel Plan & data collection		✓	✓	✓ Travel plan coordinator/finance manager
Recycling and waste			✓	✓ Deputy Director Facilities
Water management		✓		
Purchasing	✓	✓	✓	✓ Director of Procurement

Reporting and evaluation

Reporting of the progress of the plan will be done on a regular basis. It is proposed that a brief monthly report is produced initially to cover the status of projects with a more thorough quarterly update which would include financial and consumption data. This will be reviewed after six months and one year to see if this is sufficient and will be amended as deemed necessary.

An annual report will also be produced covering the Carbon Management Plan on a similar cycle to the annual utility report and this will look at revising targets, tracking emissions and identifying further measures. It will also look at how other areas of carbon management are brought into the SIP and how this can be accounted for.

Reports will initially be to the Deputy Vice-Chancellor, the Director of Property and Facilities and the chair of the Sustainability Group. These reports can then be discussed at UET or ExCo if required. All reports will be placed on the City and the Environment webpage and where appropriate, further communication will be produced to highlight any significant progress.

It is proposed that reference to the scheme and its progress should be included in the University's annual report which will allow the wider community to view and track the University's progress in reducing carbon emissions.

Appendices

Appendix A1. Context and Drivers

Generic Category	Driver	Areas of Impact	Nature of Impact	Importance (high, medium, low)	Consequences/ Opportunities/ issues for carbon management
Political	Estate Management Statistics	Property and Facilities/ Finance	All Universities Estates operations assessed and ranked	High	Opportunity to improve ranking through more efficient operation
	Green League	Property and Facilities/ academic intake	Universities ranked on environmental data and published in national newspaper	Medium	Opportunity to improve ranking and kudos amongst future student intake.
	HEFCE Sustainability Strategy	Property and Facilities	Sustainability for construction and refurbishment projects	High	Funding from HEFCE will be based on whether projects meet the requirements.
Legislative	Energy performance of Buildings Directive	Property and Facilities	All University buildings over 1000m ² need to produce Display Energy Certificates (DEC). The threshold for this certification will reduce in coming years.	High	Increased visibility of carbon performance to all building users and visitors
	Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES)	Property and Facilities/ Finance	All organisations with electricity consumption over 6,000MWh to enter into carbon trading. Will have a financial impact	High	The University will face increased costs if measures are not taken to reduce energy consumption and the organisations will be ranked in terms of performance
	Building regulations	Property and Facilities/ Finance	Requirement to look at existing buildings during refurbishment and for installation of new building services	Medium	Opportunities to improve the energy performance of the existing estate to reduce running costs and improve conditions.
Economic	Business Efficiency Review	Across organisation	Aims to reduce the running costs of the organisation by £2M per year	High	Opportunity to enable the university to be more accountable for its spending. Opportunity to bid for funds for carbon management projects
	Rising utility costs	Across organisation	Increased operating costs will reduce funds for other activities	High	Opportunity to instigate energy efficiency projects to control expenditure
Competition	Brand, reputation and student recruitment	Across organisation	Increasingly students are looking for leadership on environmental issues as part of their selection criteria	Medium	Opportunity to publicise environmental achievements and attract environmentally conscious students.
Stakeholders	Staff and Students	Across organisation	Staff and Students can be encouraged to help reduce their carbon impact.	Low	Lack of involvement will breed a culture of apathy towards the environment and will be difficult to engage in assisting in reduction campaigns
	Students	Academic areas	Students applying for energy/environmental courses are not recruited	Low	Students being taught these subjects may not come to the university due to poor environmental standing
	Islington Climate Change Partnership	Property and Facilities	City University has exceeded the initial target to cut borough emissions by 15% by 2010. A new 2.5% per annum target has now been set by ICCP.	High	The University is the Borough's third largest emitter and therefore can have a large part to play in assisting with this target.
Aspirational	Develop student environmental involvement	Students Union/ services for students	The University lacks any student environmental society and therefore is not lobbied for change	Low	Student lobbying will ensure that we tackle the areas of interest to future students.
	Environmental leadership	Across organisation	Improve the image and reputation of the university	Medium	To place the University as being at the forefront of environmental and carbon reduction initiatives

Operational	Estate Masterplan	Property and Facilities	Opportunity to enhance the environmental performance of the estate	High	Will assist in planning applications with local authority if environmental and carbon reducing measures are included
Existing Objectives	Energy management	Property and facilities	Reduction in energy and water consumption and cost	High	Several measures already in place but possibility to accelerate change.
	EXCO	Across organisation	EXCO defines and steers the University in specific directions	High	Opportunity to put environmental issues to the top of the agenda

Appendix A2 Risks and issues management

Below is a list of some of the key risks that could arise as the programme progresses and a list of actions that could be taken to prevent the risks from damaging the programme. If any of these risks arise during the course of the programme, they will be reviewed by the appropriate stakeholders for resolution.

Description	Risk To Programme	Impact	Probability	Mitigating actions
Lack of support from the new Vice Chancellor	Could stop programme from progressing or divert resources	H	L	Ensure the new VC is fully briefed and aware of the benefits
Lack of support from the executive council (ExCo)	Could stop programme from progressing or divert resources	H	L	Regular reporting of progress to ExCo
Inadequate management time for project	Project could slip and therefore reduce effectiveness	H	L	Key staff require dedicated time and support particularly the project leader
Competing Priorities	Could slow progress	M	M	Dedicated time and support to be managed
Failure to convince finance and purchasing staff of the benefits of the scheme	Could prevent investment and restrict progress in key areas	M	M	Regular briefings and involvement of staff. Clear financial justification for actions
University's financial position	Lack of capital to meet programme objectives	H	M	Ensure robust business cases with life cycle costing and reinforce the value at stake. Consider Salix funding if appropriate.
Loss of key staff particularly J Clarke	Would probably stall programme	M	M	Need to have back up staff where necessary and clear project documentation.
New University Strategy being developed	New strategies could contradict programme objectives	M	L	Ensure no incompatibilities between new strategy and Carbon Trust programme
New legislation such as EPBD and Carbon Reduction Commitment	Implementation cost could reduce funding for programme objectives	L	H	Programme objectives will reduce impact of CRC when implemented and improve energy rating for buildings
Business Efficiency Review	Diversion of resources away from programme	H	L	Ensure regular updates and highlight the efficiency opportunities
Limited data for transport and procurement impacts	Unable to provide accurate data to measure impact	H	H	Need to establish available data and arrange for its collation
Estate Masterplan	Uncertainty over future plans for estate could delay decisions	H	H	Ensure input into process to enable ideas to be included in future plans
Ongoing support and commitment for programme	Programme loses steam and fades away	M	H	Publicise senior management commitment and ensure resources are applied to programme

Appendix B: Individual actions

The items listed below are intended to provide a guide to the responsibility for each project and to enable the progress of each area to be able to be reviewed.

Technical project Actions	
Description	To undertake the technical actions listed in the project plan in with the exception of IS PC Switch Off Control plus other technical measures listed in the implementation plan summary.
Quantified costs and benefits	<p>Total Cost: £7,400,00 Annual Savings: £1,300,000 Payback: 5.5 years. Additional: Monitoring of server rooms and PC labs will be implemented as this project should lead to a reduction in load in these areas. As such these areas may now need less cooling resulting in further savings.</p>
Resources	Funding will generally be via the LTM energy conservation budget for smaller projects. Larger projects (£20k+) will either be made using a business case or by incorporating it into a capital project. Life cycle costing will be carried out for all larger projects.
Ownership and accountability	<p>Delivery: Energy & Environment Manager – Jason Clarke Approval to Proceed: Deputy Director (Property) – Roger Ward Financial Approval: Deputy Director (Property) - Roger Ward/ Consult: Key stakeholders/building users/project managers</p>
Ensuring success	<p>Known key success factors: Dialogue with manufacturers, use of specialist consultants where required, link in with Islington Proposals for heat zones. Principal risks: Lack of support and changes in key personnel, late decision making, changes to brief, legal issues. Main means of risk mitigation: Develop a clear timetable and working group to examine all possibilities.</p>
Performance / success measure	Projects proceed/ feasibility outputs. Significant reduction in kWh and CO ₂ emissions depending on project. Improved reliability of electrical supplies and heating/cooling provision
Timing	This project is currently in progress following the universities IS infrastructure upgrade
Sources of information and guidance	CIBSE, BSRIA, Carbon Trust, CHPA, other Universities and peer group members.

IS PC Auto Switch Off feasibility Project Actions	
Description	To look at installing appropriate software to enable computers to be switched off out of hours. This mainly applies to computer labs throughout the estate but could be extended to all PCs that are not registered as been required to be on. The project should also look at the new teaching consoles as these tend to be left on.
Quantified costs and benefits	Cost: unknown at present as may need specialist software or could require some programming. Guide Estimate is £10,000 Annual Savings: Estimated at £30,000 by 2011/12 Payback: Less than 2 years Additional: By switching off PCs and equipment out of hours, we will be significantly reducing the fire risk from faulty equipment and it should help to extend the life of the products.
Resources	Funding for this project will be made via a Carbon Management Plan business case. Some initial funding may be required to look at the feasibility.
Ownership and accountability	Delivery: Carl Stokes Approval to Proceed: Director of Information Services and Libraries – Brendan Casey Financial Approval: Deputy Director (Property) – Roger Ward Consult: Key stakeholders/departmental IS teams
Ensuring success	Known key success factors: Good communication of benefits and operation. Principal risks: Switching off computers that should remain on. Main means of risk mitigation: Gradual roll-out of scheme.
Performance / success measure	Project proceeds. Significant reduction in kWh and CO ₂ emissions. No operational issues with IS equipment
Timing	To be decided by consultation but within 08/09 academic year
Sources of information and guidance	Other Universities, local authorities, IT publications and peer group members.

Behavioural Measures Project Actions	
Description	To undertake the behavioural actions listed in the project plan
Quantified costs and benefits	<p>Cost: not yet determined</p> <p>Annual Savings: Will be difficult to calculate as most of these measures are subjective.</p> <p>Payback: May not be quantifiable</p> <p>Additional: These projects will provide additional benefits to the University other than carbon reduction.</p>
Resources	
Ownership and accountability	<p>Delivery: Deputy Director Facilities - Caroline Jenkins with additional support from Catering and Cleaning Contractors, Marcomms, Purchasing and Energy Manager for specific projects</p> <p>Approval to Proceed: Will depend on nature of project but is likely at the very least to be the Carbon Management team</p> <p>Financial Approval: Deputy Director of Property – Roger Ward</p> <p>Consult: Key stakeholders, contractors</p>
Ensuring success	<p>Known key success factors: Well planned and branded awareness schemes with enough material/ideas to keep the project running.</p> <p>Principal risks: Lack of support and changes in key personnel, problems with buy-in from external contractors, not being able to recruit volunteers.</p> <p>Main means of risk mitigation: Develop a clear timetable. Maximise publicity</p>
Performance / success measure	Projects proceed/ feasibility outputs. Significant reduction in kWh and CO ₂ emissions depending on project. Improved reliability of electrical supplies and heating cooling provision
Timing	Ongoing programme to encompass all awareness and behavioural change actions. These include the expansion and co-ordination of the Environment Champions Network and events such as Green City Week.
Sources of information and guidance	CIBSE, BSRIA, Carbon Trust, CHPA, other Universities and peer group members.

Travel Project Actions	
Description	To undertake the measures relating to travel as listed in the project plan.
Quantified costs and benefits	<p>Cost: not yet determined although most of the initial work will involve staff time only. Grants are available to implement some of the measures.</p> <p>Annual Savings: Will be difficult to calculate as initial transport emissions are estimated to a degree and implementation is likely to be a gradual process. However, there will be cost savings if the plan leads to less business travel being taken by staff.</p> <p>Payback: May not be directly quantifiable</p> <p>Additional: These projects will provide additional benefits to the University other than carbon reduction such as improved cycling and walking facilities.</p>
Resources	Assistance with the development of the travel plan is available from Islington Council, the Greater London Authority and Transport for London. Any internal funding will be made via a bid to the strategic development fund.
Ownership and accountability	<p>Delivery: Travel Plan Co-ordinator - Dawn White with additional support from relevant people as required.</p> <p>Approval to Proceed: Will depend on nature of project but is likely at the very least to be the Carbon Management team</p> <p>Financial Approval: Will depend on where funding for this will be made available and any grants received.</p> <p>Consult: Key stakeholders including a travel survey of staff and students</p>
Ensuring success	<p>Known key success factors: Close partnership with Islington Council will help.</p> <p>Principal risks: Lack of staff time to pursue and lack of priority/ funding</p> <p>Main means of risk mitigation: Establish a small travel team to share responsibility and use of students to undertake the time consuming data gathering</p>
Performance / success measure	More accurate reporting of transport emissions, improved facilities and take-up of cycling and walking. Reduction in overall travel. Reduced volumes of freight and service vehicles visiting our sites.
Timing	Initial travel plan to be completed by the end of the academic year. Other measures to be planned as required.
Sources of information and guidance	Local authorities, other Universities and peer group members.

Resources and Procurement Project Actions	
Description	To undertake the resources and procurement measures listed in the project plan.
Quantified costs and benefits	<p>Cost: not yet determined.</p> <p>Annual Savings: these will depend on the measures taken. The initial cost may increase for some measures with savings coming later.</p> <p>Payback: This will require further analysis as the projects are assessed.</p> <p>Additional: The chance to look at life cycle costs for procurement to improve operation and</p>
Resources	There may be some opportunity to link with the Business Efficiency review (BER).
Ownership and accountability	<p>Delivery: Purchasing Manager - Henry Vivian-Neal with additional support from relevant people as required.</p> <p>Approval to Proceed: Will depend on specific actions but is likely to include Chief Operating Officer – Henrietta Royle</p> <p>Financial Approval: Will depend on where funding for this will be made available and what the financial implications are.</p> <p>Consult: Key stakeholders</p>
Ensuring success	<p>Known key success factors: Use existing sustainable procurement policy and BER influence to push forward.</p> <p>Principal risks: Lack of staff time to pursue and lack of priority/ funding. May be difficult to sell increased initial expenditure to save further down the line.</p> <p>Main means of risk mitigation: Full life cycle costing of purchases should help to convince that it is a good idea.</p>
Performance / success measure	The implementation of the various projects identified previously.
Timing	Some areas are already under investigation but it is envisaged that all areas will have been considered and actions implemented within 3 years.
Sources of information and guidance	Local authorities, other Universities, Purchasing consortia and peer group members.

Community Project Actions	
Description	To undertake the Community related measures listed in the project plan.
Quantified costs and benefits	<p>Cost: not yet determined.</p> <p>Annual Savings: These projects will generally not produce direct financial savings although there will be carbon savings that will result for the wider community</p> <p>Payback: N/A</p> <p>Additional: These projects will help the University forge closer links with the local community.</p>
Resources	The Islington Climate Change Partnership has a wide range of members with varying degrees of knowledge and experience which will be valuable.
Ownership and accountability	<p>Delivery: Jason Clarke for Green Roofs and the ICCP and Caroline Jenkins for voluntary work</p> <p>Approval to Proceed: Will be made on a case by case basis and at the very least will include the Carbon Management Group.</p> <p>Financial Approval: Will depend on where funding for this will be made available and what the financial implications are. Most of these schemes have no direct cost.</p> <p>Consult: Key stakeholders</p>
Ensuring success	<p>Known key success factors: n/a</p> <p>Principal risks: n/a</p> <p>Main means of risk mitigation: n/a</p>
Performance / success measure	These projects are desirable but in the wider carbon management programme they are of low importance. The success measure will be any implementation.
Timing	These projects are not critical to Carbon Management and therefore their timing is less easy to define.
Sources of information and guidance	Websites, local authority etc.

Appendix C: Detailed Analysis of Top 10 Projects

Table C.1: Estimated Costs and Savings for Specific Projects

	Description of project	Cost	Annual Savings			Payback		Cost/tonne CO ₂	Status/actions/notes
			kWh	£	Tonne CO ₂	Simple	Life cycle cost		
1.	Installation of a 740 kWe CHP unit at main campus with chilled water ring main.	£4,970,000	2,200,000	£480,000	1,080	10.4 yrs	Not known (NK)	£869	Feasibility and initial detailed design complete awaiting approval to proceed to the next gateway.
2.	Drysdale HVAC project	£1,016,813	1,243,216	£121,706	447	8.4 yrs	6.1 yrs	£2,275	Complete.
3.	College window draught proofing	£37,295	268,929	£10,004	19.93	3.7 yrs	NK	£1,871	Complete
4.	Trend BMS Expansion at main site	£100,000	801,147	£66,682	419	1.5 yrs	NK	£239	Based on initial feasibility
5.	Installation of boiler economisers at main site	£38,200	1,258,884	£30,666	232	1.2 yrs	NK	£165	Complete
6.	Retrofit variable speed drive burners to main boilers	£20,000*	135,444	£5,833	37.7	3.4 yrs	NK	£530	
7.	Installation of lighting controls to various lecture rooms and AC units	£25,856	326,509	£31,204	170	0.8 yrs	NK	£152	Quotes received
8.	Installation of 12 Dyson Hand dryers	£8,538	22,750	£2,093	11.9	4 yrs	NK	£717	Units already purchased
9.	Trend Link to Grays Inn place to allow improved control of plant (3% savings)	£2,500	18,903	£1,194	6.5	2 yrs	NK	£385	Quotes received
10	Main site heating improvements	£200,000	210,620	£27,067	110	7.3 yrs			

Project	Cost	Implementation	savings per annum (£)	savings per annum (TCo2)	(£) Savings over CMP	(Co2) savings over CMP Tonnes	Baseline Tonnes Co2/ annum	Baseline Savings to date (Tco2)	Baseline Savings Through CMP (Tco2)
HEFCE Baseline emissions	n/a	2005/6	n/a	n/a	n/a	n/a	13776		
Launch of Carbon Trust Strategy	n/a	2007/8	n/a	n/a	n/a	n/a	11940	1836	-
Set up Environmental Champions network	n/a	2007/8	n/a	n/a	n/a	n/a	-	-	-
Drysdale Building HVAC project	£1,016,813	2007/8	£121,706	447	£608,530	£2,235	-	-	-
Main site burner economiser installation	£47,593	2008/9	£22,858	112	£91,432	448	-	-	-
Daylight sensing at main campus	£3,500	2008/9	£500	3	£1,500	9	-	-	-
move to high efficiency hand dryers	£8,538	2008/9	£2,093	12	£8,372	48	-	-	-
Implementation of 1st phase of travel plan	n/a	2009/10	n/a	n/a	n/a	n/a	-	-	-
Trend control expansion at main site	£100,000	2009/10	£66,682	419	£266,728	1,676	-	-	-
trend link to outlying buildings	£2,500	2009/10	£1,194	7	£4,776	26	-	-	-

Project	Cost	Implementation	savings per annum (£)	savings per annum (TCo2)	(£) Savings over CMP	(Co2) savings over CMP Tonnes	Baseline Tonnes Co2/ annum	Baseline Savings to date (Tco2)	Baseline Savings Through CMP (Tco2)
Improved plantroom insulation phase 1	£15,402	2009/10	£12,817	118	£51,268	472	-	-	-
Improved plantroom insulation Cass	£964	2009/10	£924	9	£3,696	34	-	-	-
Improved plantroom insulation phase 2	£7,549	2009/10	£2,539	23	£10,156	94	-	-	-
Improved draught proofing college windows	£46,866	2009/10	£11,167	55	£44,668	220	-	-	-
Current Baseline	n/a	2009/10	n/a	n/a	n/a	n/a	10206	3570	1734
Introduction of environmental induction package	£10,000	2010/11	n/a	n/a	n/a	n/a	-		
IS initiatives including server optimisation	tbc	2010/11	tbc	tbc	tbc	tbc	-		
installation of automatic meter reading	n/a	2010/11	n/a	n/a	n/a	n/a	-		
Sub metering improvements	tbc	2010/11	n/a	n/a	n/a	n/a	-		
Main campus lighting upgrade	£86,274	2010/11	£25,762	116	£77,286	348	-		
Installation of burner management units at Cass Business School	£5,400	2010/11	£2,860	30	£8,580	90	-		

Project	Cost	Implementation	savings per annum (£)	savings per annum (TCo2)	(£) Savings over CMP	(Co2) savings over CMP Tonnes	Baseline Tonnes co2/ annum	Baseline Savings to date (Tco2)	Baseline Savings Through CMP (Tco2)
Installation of burner management units at Grays Inn Place	£3,600	2010/11	£1,044	11	£3,132	33	-	-	-
IS pc shutdown strategy	tbc	2011/12	£14,181	104	£28,362	208	-	-	-
improved building insulation (cavity walls)	£150,000	2011/12	£98,082	713	£196,164	1426	-	-	-
LED Lighting installation at Cass Business School	£16,214	2011/12	£5,327	30	£10,654	60	-	-	-
Daylight sensing in atrium at Cass business school	£2,500	2011/12	£300	2	£600	3	-	-	-
University heating upgrade	tbc	2011/12	tbc	tbc	tbc	tbc	-	-	-
Myddleton building boiler upgrade	£12,000	2011/12	tbc	tbc	tbc	tbc	-	-	-
Main site CCHP and Chilled water ring main	£5,128,000	2011/12	£469,000	1,044	£938,000	2088	-	-	-
Cass Business school Voltage optimisation	£79,276	2011/12	£18,806	86	£37,612	172	-	-	-
Main Site voltage optimisation	£330,771	2011/12	£81,885	355	£163,770	710	-	-	-
Main campus window replacement	£350,000	2012/13	tbc	tbc	tbc	tbc	-	-	-

Project	Cost	Implementation	savings per annum (£)	savings per annum (TCo2)	(£) Savings over CMP	(Co2) savings over CMP Tonnes	Baseline Tonnes co2/ annum	Baseline Savings to date (Tco2)	Baseline Savings Through CMP (Tco2)
Improved building insulation (cladding)	£400,000	2012/13	tbc	tbc	tbc	tbc	-	-	-
Anticipated baseline end of CMP Phase 1	-	2012/13	-	-	-	-	8245	5531	3695
Target Baseline emissions 2020	-	2019/20	-	-	-	-	7852	5924	4088
Totals	£7,823,760		£959,727	3694.70	£2,555,286	10399.00			

Items highlighted in green are budget estimates

Emission and cost savings are calculated as full year savings.