Leeds Trinity University College Carbon Management Programme

Carbon Management Plan (CMP) November 2010

Date: January 2011

Version number: 1

Owner: Steve Oddy

Approval route:

Approval status: Final

Contents

Foreword from our Principal and Sponsor

Sustainable development is a major challenge facing the world today which includes the world of higher education. The impact on the environment of our global lifestyle is increasing and we need to ensure that we play our part in reducing this impact. Not to do so means that we are not planning for future generations

At Leeds Trinity University College we believe that we should be preparing for our future generations through systematic planning which includes the need to reduce our carbon emissions.

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 reduction targets for greenhouse gas emissions of at least 34 per cent by 2020 and at least 80 per cent by 2050, against a 1990 baseline. Over coming years further legislation will be introduced to drive emissions down in support of government targets.

We are equipped to make a significant contribution to this through our teaching, learning and research, in how we manage our assets and in how we interact with our local communities. As part of our mission we believe individuals and communities are important to us through our strategies on carbon reduction we can show one way of realizing this.

Freda Bridge
Principal
Leeds Trinity University College
September 2010

Foreword from the Carbon Trust
text

Management Summary

Global climate change is recognised as the key environmental threat facing the world. Concerns over fossil fuel depletion, security of energy supplies and rising energy costs are focussing the attention of individuals, organisations and governments on the need for energy conservation and carbon emission reduction.

At Leeds Trinity University College (LTUC) we are committed to improving our environmental performance and cutting our carbon emissions.

We aim to cut our emissions through investing in appropriate technologies, as well as careful management and monitoring. We have already made much progress in this area by taking action on our 2009/10 carbon management plan, but this carbon management plan is designed to help direct our actions even further.

This plan will cover the whole of the campus and will set time-bound targets outlining reductions for us to achieve. It will sit alongside the policies we already have in place, including the Sustainability Policy as well as the existing strategies covering waste management, travel and transport and procurement.

This document, the University College Carbon Management Plan, sets out our strategy for reducing carbon emissions by 22% over a five year period to 2014, from a baseline of 2008/09.

The HEFCE requirement to identify the 2005/2006 baseline is shown; however the University College undertook significant additional development between 2005 and 2008, adding significantly to the floor area with an increasing carbon footprint. In order to provide realistic five year targets the baseline of 2008/09 has been used for the basis of calculations.

Our carbon baseline for the year 2005/06 and 2008/09 was made up of emissions from residential and non-residential buildings, staff mileage and commuting, student travel, water consumption, and waste.

At the national level, the Climate Change Bill 2008 the UK Government committed to an 80% reduction in CO_2 emissions by 2050.

HEFCE's 2009 grant letter makes it clear that the sector is expected to achieve reductions which are at least in line with UK government targets of CO_2 emission reductions of at least 80% by 2050, at least 34% by 2020, against a 1990 baseline and a reduction of 43% against a 2005/06 baseline

Total baseline emissions (including scope 1, 2 and 3 emissions) for LTUC for the year have been calculated at 3033 Tonnes of CO_2 in 2005/06 and 3014 Tonnes of CO_2 in 2008/09.

The direct costs of the programme and the projected returns on investment and emissions reductions over the 5 years from the baseline year of 2008/09 can be seen in the **Table 1** below:

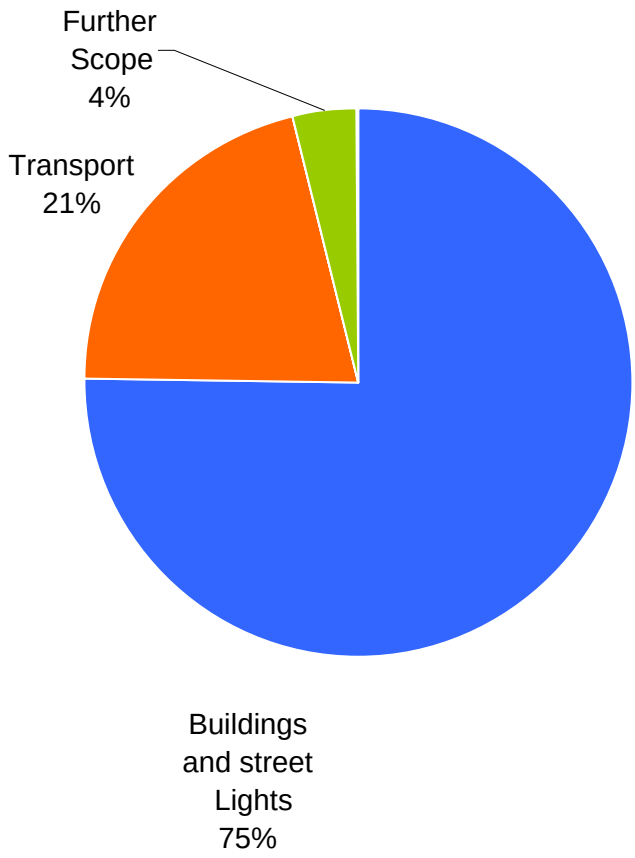
Table 1

Total Estimated Capital Expenditure £1860K							
Total Annual Cost Savings (£k)							
	08/09 savings	***09/10 savings***	***10/11 savings***	***11/12 savings***	***12/13 savings***	***13/14 savings***	***5 year Total***
Annual savings (£K)	0	£67k	£30k	£9k	£8k	£8k	***122***
Total Annual Carbon Reductions (tCO_2e)							
	08/09 savings	***09/10 savings***	***10/11 savings***	***11/12 savings***	***12/13 savings***	***13/14 savings***	***5 year Total***
Carbon Reduction (tCO_2e)	0	142	136	129	123	118	**648**

The pie chart in **Figure 2** below indicates the percentage of carbon emissions which are attributable to the institution. Around 75% of our carbon emissions are from buildings and street lighting primarily through the use of gas and electric. Around 21% of our emissions are from travel and transport, including staff and student commuting with a smaller element of 4% being attributable to the use of water and the generation of waste and how effectively we manage its disposal.

Figure 2

Baseline of 3014 Tonnes of CO_2 in baseline year 2008/09



Baseline year 2008/2009

Table 3 below indicates in graph format the scenario for a "Business as Usual "profile BAU (Red line) for the institution on the basis that we do not implement the carbon management programme and our carbon baseline gradually increases over the coming years .The blue line on the graph indicates the reduction in our carbon emissions and baseline assuming that the carbon management programme is fully implemented and indicates a reduction in carbon emission from the 2008/09 baseline figure of 3014 Tonnes CO_2 reducing to 2366 Tonnes CO_2 by 2015. A reduction of 22% over the 5 years.

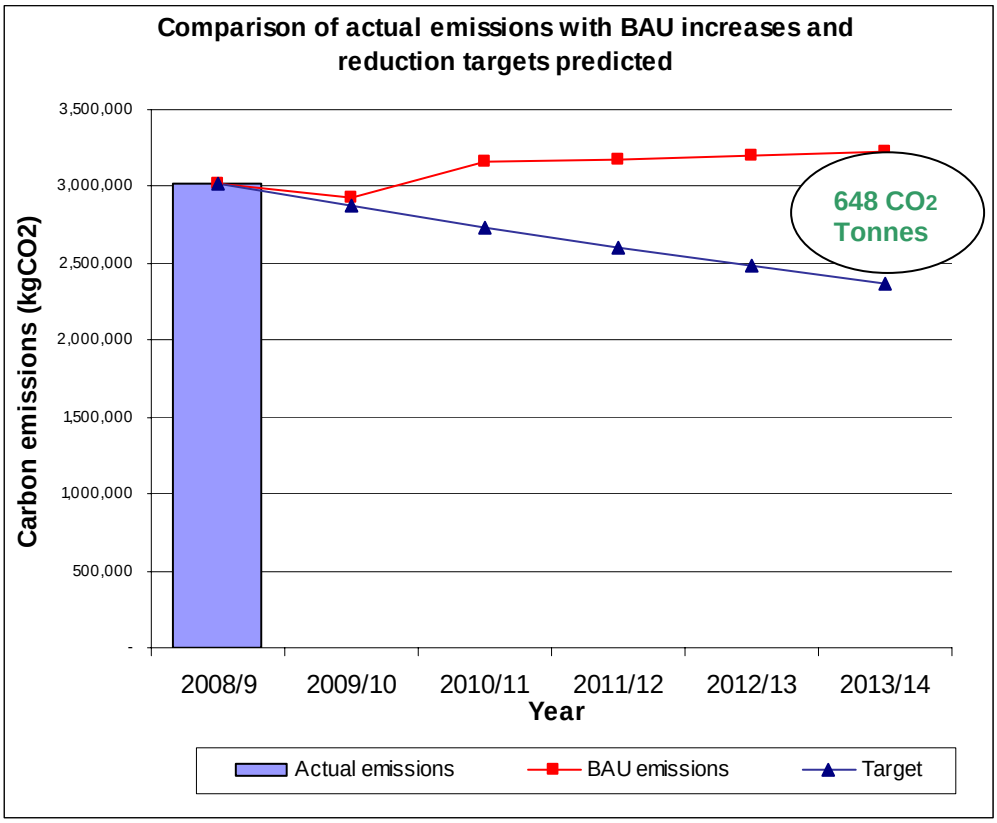
This will make significant inroads into achieving the sector target of a 43% reduction by 2020 based on our 2005/06 baseline figure.

Key objectives in achieving this reduction will be by a combination of factors including-:

- Enabling measures: Improving housekeeping measures including a sustained marketing campaign to staff and students (5% to 10% reduction in carbon emissions have generally been achieved were this has been effectively managed)

- Technical measures: including improving insulation levels, plant replacement/upgrades etc
- Effective Travel and transport strategy managed through our Travel Plan scheme
- Effective water and waste management
- Space management and rationalisation

Table 3



Value at Stake 2008/9-2013/14 648 CO_2 Tonnes

In addition to carbon emission savings there are economic benefits to the institution from reducing its emissions .In 2008/09 the institution expended circa £365k on energy costs.

A business as normal scenario would project these costs rising by a minimum 12 to 15% over the next 5 years, however by reducing our energy use and hence reducing our carbon emissions it is likely to reduce our energy costs by 15% based on the current assumptions.

Over the 5 year programme overall cost savings are currently estimated to be circa £122k from a capital investment of circa £1860k of which circa 1225k has already been expended including the new CHP installation and the external wall cladding to the main teaching block.

1. Introduction

Leeds Trinity occupies a single main campus located on Brownberrie Lane in Horsforth some 6 miles north of Leeds City Centre. The majority of the estate was constructed in the mid 1960s.

The campus provides for the full range of accommodation and infrastructure needs. Buildings are used for teaching and administration purposes and also as student residences (570 units) and student social space. The campus grounds accommodate a range of sports uses and occupy a total of 44 acres. The Gross Internal Area for teaching/ administration facilities is approximately 21,058m^2 and for residential properties some 12,113 m2 .This includes a new residential block completed in summer 2010.

Leeds Trinity University College (LTUC) is committed to reducing the environmental impacts of its activities. The University College recognises that to engage staff and students in the drive to improve its environmental performance, it must put in place measures which demonstrate its commitment.

To achieve this, the University College has formulated a Sustainability Strategy which sets out its approach to integrating the broad range of sustainability issues into its business model. These issues include education, waste/recycling, transport, biodiversity, procurement, IT, energy/carbon emissions.

This Carbon Management Plan is a key element of the Sustainability Policy and sets out in detail our strategy for reducing carbon emissions over the next five years. The plan details a range of measures and actions to reduce emissions across the estate. These fall into two main categories; technical measures which require capital investment to achieve a direct reduction in emissions and enabling measures which help embed carbon management in the operational processes of the institution.

In preparing this Carbon Management Plan the institution has gone through a rigorous process of development, supported by a programme board of senior mangers and a dedicated Carbon Management Team lead by the Director of Estates. The five steps from mobilisation to implementation are identified below. The process commenced in June 2010 with support from the Carbon Trust and its advisors .The table below identifies the key elements of the process.

By introducing carbon management into the organisation now, LTUC will safeguard itself against potential negative impact of future legislation. By engaging with both staff and students now, our ability to adapt to future legislation will be enhanced.

Past achievements by the institution include a history of monitoring energy data and managing a computerised Building management system (BMS) to achieve careful monitoring of energy use. The institution currently has a functioning Carbon Management Plan approved by the Board in spring 2010.

The institution is a member of the HEFCE/Salix Revolving Green fund and since joining in spring 2009 has already achieved savings of 136tCO_2 and expenditure of circa £70k .The installation of a combined Heat and Power plant (CHP) in February 2010 is projected to provide annual carbon reductions of between 6% and 8% of current emissions. To date carbon savings of circa 260 tCO_2 have already been saved from completed projects.

Major improvements to the main teaching block including over cladding and re-roofing will also provide significant energy and carbon reduction post September 10.

The institution is also a previous runner up in the Green Gown awards 2007 for it's "Moving on all fronts programme "which was for making rapid progress in establishing and managing an environmental campaign across the institution including travel/transport, recycling, teaching and learning and biodiversity.

2. Carbon Management Strategy

2.1 Context and drivers for Carbon Management

Global climate change is recognised as the key environmental threat facing the world. Concerns over fossil fuel depletion, security of energy supplies and rising energy costs are focussing the attention of individuals, organisations and governments on the need for energy conservation and carbon emission reduction. At the national level, the Climate Change Bill 2008 the UK Government committed to an 80% reduction in CO_2 emissions by 2050.

Over coming years further legislation will be introduced to drive emissions down in support of government targets. In 2010 the government introduced the Carbon Reduction Commitment (CRC), a national carbon trading scheme which will include emissions from both gas and electricity. The Carbon Reduction Commitment (CRC) is a new mandatory emission trading scheme that aims to improve energy efficiency and reduce the amount of carbon dioxide (CO_2) **emitted** in the UK. This is vital to achieving the governments overall targets of reducing greenhouse gas emissions in 2050 by at least 80% compared to the 1990 baseline.

The new CRC legislation will affect large organisations in both the public and private sector including schools and universities. Organisations that meet the qualification criteria (which are based on how much electricity they consumed in 2008) will be obliged to participate in the CRC. Participant organisations will have to monitor their emissions and purchase allowances, sold by Government, for each tonne of CO_2 they emit. The more CO_2 an organisation emits, the more allowances it has to purchase. So there is a direct incentive for organisations to reduce their emissions. CRC will not be a mandatory requirement for LTUC; it will be at some time in the future, however we still are required to make an "*information disclosure" to* the administrator (Environment Agency) about our electricity usage and CO_2 emissions.

LTUC is also required to evaluate buildings on the campus (in excess of1000m2 in floor area) in terms of their energy performance and produce Display Energy Certificates for the buildings. Results of the updated survey carried out in spring 2010 are detailed in the **Table 2.1** below -:

Table 2.1

Rating	Number of DECs
A	0
B	1
C	1
D	10
E	0
F	0
G	1
Total	**13**
Average DEC score	**75.2**

The majority of the institutions building are in rating D which reflects the age of many of the buildings and their low energy efficiency levels .Rising energy prices and the low energy efficiency of many of our buildings emphasise the need to have an effective carbon management plan in place to prioritise and drive savings wherever reasonable and practical.

HEFCE's 2009 grant letter makes it clear that the sector is expected to achieve reductions which are at least in line with UK government targets of CO_2 emission reductions of at least 80% by 2050 and at least 34% by 2020, against a 1990 baseline. HEFCE have also identified that the provision of a Carbon Management Plan (in place by March 2011) will be a key metric in support of the Capital Investment Framework 2 (CIF2) submitted by HEIs in October 2010.

LTUC developed an institution wide Sustainability Policy and Strategy in 2009 which encompasses a wide range of issues which will contribute to the long term objective of building a "*Sustainable campus village."* This includes implementation plans for energy management, waste management, space management, procurement, education and teaching, IT and transportation amongst others.

2.2 Strategic themes

The Carbon Management Plan sets out a five year strategy to build on the actions and achievements detailed in this plan. To achieve the 5 year target of a 22% reduction in emissions there is a requirement to devote additional resources to meet the technical measures. This will include the continued use of an external energy consultant to develop the technical requirements and additional funding to enable the measures to be implemented i.e. annual energy conservation budget, continued access to HEFCE/Salix green funds and annual capital and revenue budgets etc. By making these resources available (and by attracting external investment) LTUC will achieve emissions reduction by -:

- *Engaging staff and students in the Carbon Management Plan.*
- *Investing in energy conservation measures in buildings which ideally have a payback period of 5 years or less through annual capital and revenue allocation and support from external funders e.g. HEFCE/Salix Revolving Green Fund.*
- *Improving metering and monitoring arrangements so that the impact of such measures can be monitored.*
- *Assessing the feasibility of other measures for reducing carbon emissions from buildings and other sources and attempting to obtain both internal and external funds for any schemes which appear to be viable.*
- *Delivering actions to meet the targets embodied in the University College Travel Plan.*
- *Continuing to look for ways to monitor and manage emissions from other sources e.g. Travel and transport through the institutions Integrated Transport strategy.*
- *Reviewing and updating appropriate policies and plans to ensure that carbon management is fully integrated into business planning.*
- *Developing relationships with regional and national partners to share best practice and deliver improved carbon reduction schemes.*
- *Space rationalisation programme 2010/11 onwards.*

The institution will provide communication updates on the progress of the CMP through regular newsletters and announcements on the website and will report through SMT to the Board on an annual basis.

2.3 Targets and objectives

The proposed target is an absolute emissions reduction of 22 % on the baseline year 2008/09 over the next five financial years (i.e. by 2013/14.) We have also included the baseline figures for 05/06 which is the HEFCE baseline data, however the college undertook substantial new build development between 2005 and 2008, hence using the 05/06 data would show an increase in emissions due to the increase in floor space and energy use. The scope 3 emissions for this period are also unreliable.

Though challenging, the target is considered achievable if the actions detailed in the Carbon Management Plan are fully implemented. The target would set the University College on course for an 80% cut in emissions by 2050, (in line with the Government's emissions reduction target) and achieving the HEFCE target of a 43% cut in emission by 2020 based on the 2005/06 baseline.

Leeds Trinity will reduce the CO_2 emissions from it's activities by 43% from the 2005 baseline, by April 2020. We have set an intermediate milestone to reduce emissions by 22% by April 2013/14 from our current 08/09 baseline .

3. Emissions Baseline and Projections

3.1 Scope

Residential buildings and Non – residential buildings.

All emissions from this sector are included in the baseline. This includes emissions from electricity and gas. Data quality is good and reporting is already carried out - primarily in the Estate Management Statistics (EMS) and the institutions annual energy audits. Latest published EMS data is for the financial year 2007/08. The utilities budget for 2009/10 was circa £365k.

Vehicles/Transport

Emissions relating to staff mileage are not included in the baseline primarily on the basis that the data is difficult to evaluate and monitor plus the emission levels in respect to overall CO_2 levels is relatively minor. Emissions relating to staff/student commuting are included in the baseline based on the staff/student travel survey carried out in 2008.An assumption based on the 08/09 figure has been included in the 05/06 data. Overall the data is reasonably reliable based on a sample of staff/students. The CO_2 emissions from staff/ student commuting is significant, however achieving significant reductions in this element will be extremely challenging and will require a cultural shift in peoples attitudes to travel and types of travel, improved public transport will be limited, (based on an institution which is in a semi rural location on the edge of the main public transport systems): hence reductions in CO_2 emissions are estimated to be nominal in the short term.

It is currently not possible to reliably estimate emissions associated with the majority of academic and business travel at LTUC, as the method of ordering and recording the travel varies widely. As current data quality is poor and the amount of CO_2 emissions considered low, this element has been excluded from the baseline calculation. However, the institutions Finance department are currently looking at options in respect to improving the data management to enable annual calculations to be recorded.

Procurement

LTUC generally uses Government purchasing consortiums for the bulk of its procurement requirements Though purchasing data is available for a range of consumables and equipment (e.g. stationery, P C's, photocopiers etc.), the carbon impacts of their supply chains are less well understood, and they have not been included within the baseline. In future we will endeavour to utilise approved suppliers from approved consortiums who meet relevant sustainability criteria

Waste Disposal

Good quality data is available for waste tonnage disposed of to landfill, and tonnage recycled. Waste data included in the baseline consists of bin waste to landfill plus compacted waste. The percentage of waste recycled and compacted by the institution is reported via the EMS.

Water Consumption

Good quality data is available for the volume of water consumed .Although emissions from this source are small they have been included in the baseline as consumption data is readily available and the appropriate emissions factor is known. Emissions from water consumption relate to those produced during the treatment, transport and disposal of water. Reporting on water consumption is carried out via EMS.

The baseline figures are calculated from the most recent data possible (2008/2009), and cover the entire campus, including student Halls of Residence.

3.2 Baseline

LTUC has established its baseline CO_2 emissions from a range of data on floor area, energy use ,travel and transport, waste and water .The baseline is detailed in **Table 3.2** below for 2008/09 .This will be used as the benchmark in respect to measuring any future reductions in emissions.

The baseline CO_2 emissions for 2005/06 was 3033 tCO_2

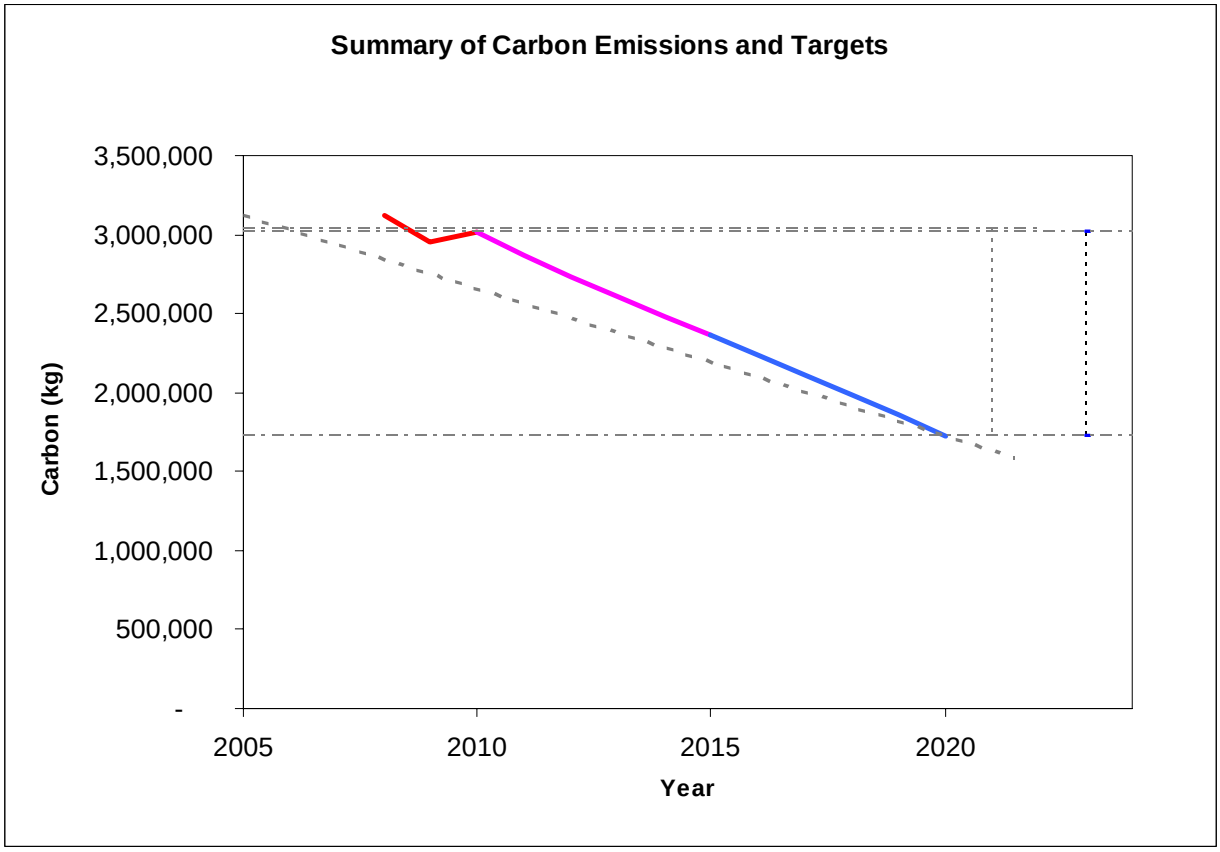
The baseline includes emissions from refrigerant gases and is included in the scope 1 emissions data.

Table 3.2 Summary table of emissions for baseline year 2008**/09**

	Buildings	Transport	Waste and Water	Total
Baseline CO_2 emissions (tonnes)	2303	623	88	3014
Baseline Cost (£)	318,000	0	49,000	367,000

Figure 3.3 below indicates in graphic form the current emissions to date .This is indicated by the red line with the planned reductions over the next 5 years identified by the pink line .Planned reduction from 2015 are indicated by the blue line. From our current baseline of 3014 tCO_2, the graph indicates a reduction down to circa 2366tCO_2 in 2014/15 reducing down to circa 1700tCO_2 in 2020.

Figure 3.3 Summary of Carbon Emissions and Target.



3.3 Projections and Value at Stake

In addition to carbon emission savings there are economic benefits to the institution from reducing its emissions .In 2008/09 the institution expended circa 365k on energy/utility costs.

The “Value at Stake” is the difference between the “Business as Usual” (BAU) scenario and the actual position the institution would be in, on the basis that the carbon management plan is fully implemented.

This is reflected in both a reduced carbon emissions scenario and a financial scenario and is identified graphically in **Figures 3.4** and **3.5** below.

A BAU scenario projects utility costs rising by a minimum 12 to 15% over the next 5 years, however by reducing our carbon emissions and hence reducing our energy use, it is projected to reduce our energy costs by 15% based on the current target projections.

Figure 3.4 below identifies and compares projected carbon emissions with a BAU scenario with increasing levels of emissions against projected savings assuming the carbon management plan is fully implemented

Figure 3.4 Value at Stake graph: Carbon emissions; 2008/9-2013/14 is 648Tonnes

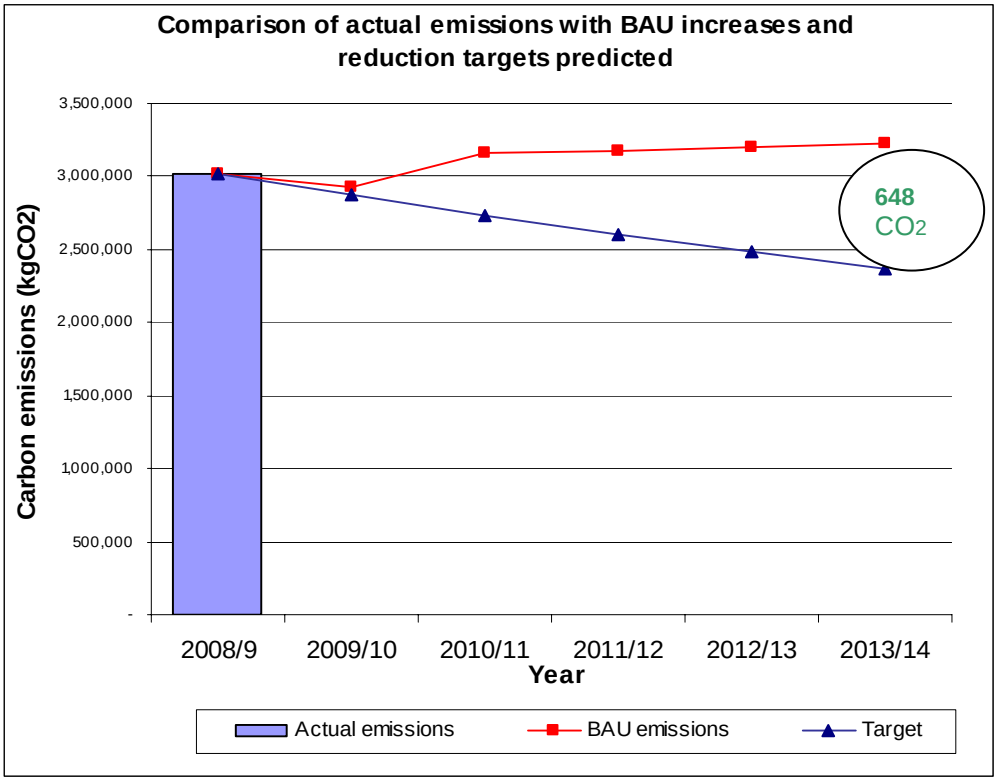
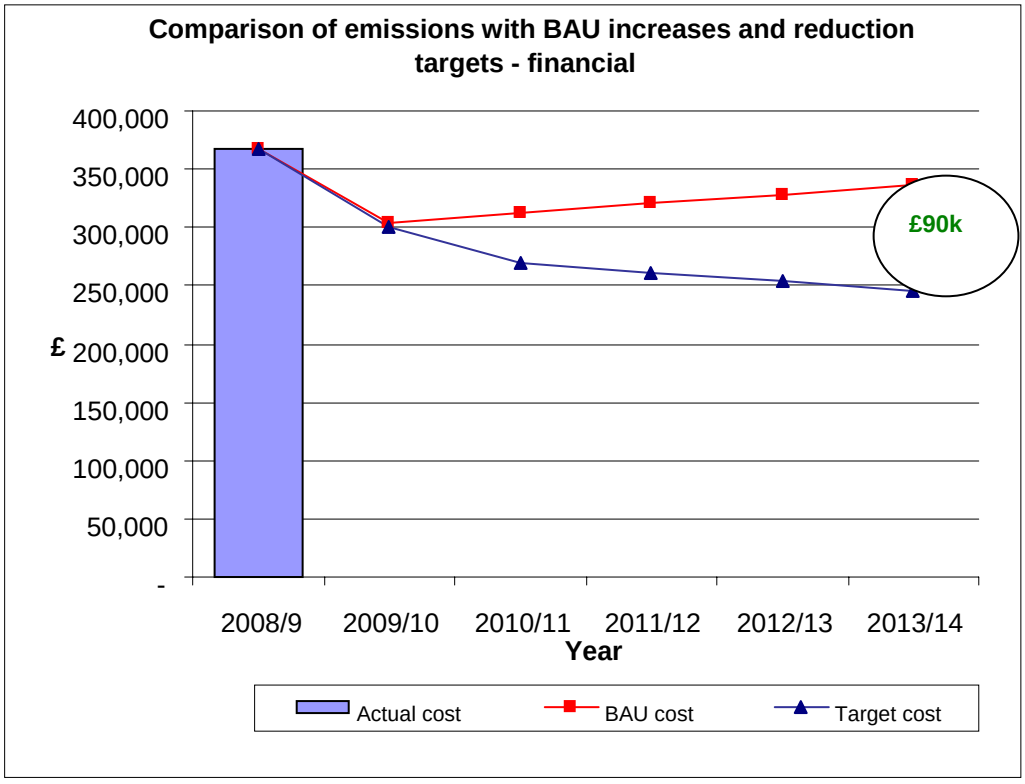


Figure 3.5 below identifies and compares actual financial savings which could be saved by adopting the carbon management proposals rather than a BAU scenario. Over the initial 5 year programme these savings amount to circa £90k.

Figure 3.5 Value at Stake graph: Financial; 2008/9-2013/14 is circa £90k



4. Carbon Management Projects

LTUC has a long history of energy management across the Estate and Facilities .Past actions and achievements include -:

- Energy Management in Buildings:

  Building Management Systems (BMS) - control of Heating, Ventilation and Air Conditioning (HVAC) plant.

  LTUC began its investment in BMS in 1984. The system in use is a Trend system which serves the majority of buildings on the main campus. The system is web-enabled allowing greater access and improved functionality.

- Monitoring and Targeting (M&T) System

  M and T is used to monitor energy consumption across the Estate using data from utility bills and our own (manual) meter readings. This is an essential tool for energy management, however to deliver the targets in the Carbon Management Plan and to comply with upcoming legislation further investment in improved M&T (mainly automatic sub meters) is required.

- Energy Policy

  LTUC has had an Energy Policy in place for many years. As with most policies and procedures, the Energy Policy will be reviewed to ensure it meets the needs of Carbon Management.

- BREEAM

  All new buildings must endeavour to achieve the BREEAM 'very good' standard as a minimum.

- Staff and business travel:

  The University College Travel Plan 2009/10 contains a range of objectives and targets aimed at increasing the number of journeys made by staff and students to and from the campus by sustainable methods of transport. Actions coming out of the travel planning process include free mini bus links, improved cycle facilities and reserved parking for car sharing.

- Sustainable Procurement Policy

  Purchasing is mainly contracted via the nationally agreed purchasing agreements with consortium including the Buying agency, NEUPG etc

- Waste:

  Recycling facilities for materials including food waste, glass, steel/aluminium cans and plastic bottles have been introduced across the University from 2007/08?

  Paper and cardboard recycling has been in place for many years

  We have prioritised those areas where we feel that we can achieve the most significant savings and those that we are easily able to influence.

  Our initial target is to reduce our carbon emissions from the 08/09 baseline by 22% by end of year 2013/2014 at which point we will set new targets for the following period through to 2020.

Our first priority is to achieve reductions in the area of energy use. We are aiming for a 14% reduction in emissions from energy use, which will result in an approximate 9% overall reduction in our total carbon emissions. The majority of this reduction will be a result of the completion of our Combined Heat and Power plant on campus in February 10 and implementation of the PC power management software anticipated to be operational by January11.Initially the remaining reductions will come from a number of smaller projects initiated under the HEFCE/Salix Revolving Green Fund scheme, as well as a campaign amongst staff and students to personally reduce usage.

The remaining savings which have not been drawn from energy reduction will come from:

- Reducing the impact of staff and student term time travel and commuting with the introduction of the University college travel plan
- Increasing the amount of waste that is recycled, rather than sent to landfill. We have already set targets of increasing recycling by 50% in 09/10 and achieving zero waste to landfill by 2015.
- Setting targets to reduce water usage.

4.1 Existing projects

Projects ongoing or completed with the last academic year are detailed in **Table 4.1** below. A number of these projects, external wall insulation/ re-roofing (LTUC-012) were included in a major capital works programme completed in mid 2010.The primary function was to improve the external appearance of the main teaching block and to renew the dilapidated roof .Whilst these projects have no short-term payback because of the high initial capital costs, nevertheless they do contribute to future energy savings and CO_2 reduction by incorporating significant levels of additional wall and roof insulation. Similarly the project for the heating system renewal in Concorde block (LTUC-003) included a full heating system replacement as part of a replacement programme for an old inefficient system.

All the projects identified were completed as of August 2010 except for the PC power management project (LTUC-007). Implementation of this project commenced in January 2011.

Two key projects are the major contributors to the 2010/11 carbon reduction programme these being project (LTUC-011) CHP installation which is now live and operational and the PC power management project identified above .These two projects alone contribute to over 50% of our carbon reduction from existing projects (circa 200 tCO_2) with annual cost savings of circa £35k per annum at today's prices.

Projects completed to date have already achieved 12% of our overall 5 year target to 2013/14.

Table 4.1

Ref	Project	Lead	Cost		Annual Saving		Pay back	Life	NPV	% of Target	Year
			Cap	Rev	Fin	CO_2					
LTUC-001	BMS upgrade	SO		9466	2400	15	6.8	10	-2.177	2.3%	2010
LTUC-002	Heating isolation valves	SO		8510	1800	11	4.7	15	-12.211	1.7%	2010
LTUC-003	Heating system replacement: Concorde	SO		28000	619	4	n/a	20	+19,198	0.6%	2010
LTUC-004	Heating boiler replacement to bungalow	SO		1000	150	1	7	15	-728	0.1%	2010
LTUC-005	Heating pipe-work insulation	SO		10000	1500	9	6.7	25	-14.7	1.4%	2010
LTUC-006	Direct fired DHW: Kitchen	SO		18635	3000	18	6.2	15	-15,917	2.8%	2010
LTUC-007	PC Power management	SO		5500	18000	98	0.3	10	-144,666	15.1%	2011
LTUC-008	PIR lighting control Phase 1	SO		7000	1800	10	3.9	10	-7,970	3.9%	2010
LTUC-009	High efficiency lighting upgrade Phase 1	SO		12000	3200	17	3.8	10	-14,613	2.7%	2010
LTUC-010	Roof insulation to Trinity and Kirkstall	SO		3672	1365	8	2.7	20	-15,721	1.3%	2010
LTUC-011	CHP installation	SO	203,000		16500	101	n/a	20	+110,619	15.6%	2010
LTUC-012	External wall /roof insulation to teaching block	SO	898,000		4920	30	n/al	25	+816911	4.7%	2010
LTUC-033	Travel plan initiatives 09/10	DO		10000	4000	30	n/a	n/a	n/a	4.6%	2010
LTUC-014	Waste management 09/10 programme	YL		n/a	n/a	9	n/a	n/a	n/a	1.4%	2010
Totals			1101000	113,783	59254	361	n/a	n/a	n/a	12%	2010

4.2 Planned / funded projects

Projects planned have been identified and approved in the 10/11 Estates budget/ HEFCE /Salix Revolving Green fund 10/11.These projects are currently in design and development and will be completed before 31st July 2011. Many of the projects are relatively low cost and small scale; nevertheless the contributory factor of all of them is significant towards the overall target and will see our percentage of overall target reach to over 15% by 2011.

A number of projects including the re-roof programme have a large capital costs but do not achieve a reasonable payback. The primary reason for carrying out these projects is backlog maintenance and the poor condition of the roofs which are a constant source of leaks. The contributory effect of the new roofs is to provide increased insulation levels which contribute to energy reduction and carbon savings. We propose to continue with the next phase of the lighting upgrade and PIR installation programme and to move to installing individual electric metering to each of our key buildings to improve monitoring and targeting through our integrated BMS system. We also propose to remove the condenser units in a number of our IT rooms as they contain harmful R22 refrigerants.

The planned/ funded projects for 10/11 are identified in **Table 4.2** below

Table 4.2

Ref	Project	Lead	Cost		Annual Saving		Pay back	Life	NPV	% of Target	Year
			Cap	Reve	Fin	CO_2					
LTUC-015	High efficiency lighting upgrade Phase 2	SO		10000	2400	13	4.2	10	-9,960	2%	2011
LTUC-016	Time switch control of vending	SO		150	175	1	0.9	10	-1305	0.1%	2011
LTUC-017	Heating control 2 port valves to Bede centre	SO		5264	1200	7	4.4	15	-8557	1.1%	2011
LTUC-018	R22 refrigerant replacements	DO		5000	n/a	30	n/a	10	n/a	4.6%	2011
LTUC-019	Water management	SO/DO		n/a	1000	1	n/a	n/a	n/a	0.1%	2011
LTUC-020	Roof insulation upgrade programme Phase 2	SO		5000	1500	9	3.3	20	-16,319	1.4%	2011
LTUC-021	Re-roof ;Backlog programme Phase 1	TC	75000	n/a	1200	7	n/a	20	+57,945	1.1%	2011
LTUC-022	Boiler BMS hold of strategy Kirkstall hall	SO		1000	606	4	1.7	10	-4040	0.6%	2011
LTUC-023	Boiler BMS :Heating boiler return strategy AKLC	SO		500	483	3	1	10	-3517	0.5%	2011
LTUC-024	BMS control; Natural cooling to AKLC	SO		1000	1000	5	1	10	-7317	0.8%	2011
LTUC-025	Replace DHW calorifier in teaching block	SO		1500	453	3	3.3	15	-3717	0.4%	2011
LTUC-026	PIR lighting upgrade Phase 2	SO		6000	1500	8	4	10	-6475	1.3%	2011
LTUC-027	Electric metering	SO		10000	4800	26	2.1	15	-45284	4%	2011
LTUC-028	Main heating pumps Inverter drives	SO		1500	630	3	2.4	10	-3739	0.5%	2011
Totals			75000	46914	16947	120	n/a	n/a	n/a	15.4	2011

4.3 Near term projects

A number of near term projects have been identified which will have significant longer term effects on reducing both energy costs and carbon emissions and help us to exceed our current target and potentially achieve 27% of overall target by 2013.However this is dependent on a number of significant capital projects with associated risks

The server virtualisation programme has commenced with IT consultants appointed to project manage the process. Capital funding for this project has been included in the 10/11 and 11/12 financial years. Similarly capital funding has been allocated for the space rationalisation programme 10/11 and currently an option study is ongoing .The replacement of heating boilers and installation of gas fired water heaters is dependent on any residual Estates revenue funding for 10/11 and the proposed funding profile for 11/12.These will be reviewed in early summer 2011.

The near term projects are identified in **Table 4.3** below.

Table 4.3

Ref	Project	Lead	Cost		Annual Saving		Life	Pay back	NPV	% of Target	Year
			Cap	Rev	Fin	CO_2					
LTUC-013	Server virtualisation programme Reduction in mechanical cooling	MS	250000		7695	42	10	n/a	161369	6.5%	2012
LTUC-029	New heating boilers to Kirkstall hall.	SO		12000	1815	11	10	7	3095	1.8%	2012
LTUC-030	Decentralisation of DHW and 13 No direct gas fired water heaters	SO	175000		21774	134	10	8	6086	4.2%	2013
LTUC-031	Space rationalisation programme.	DO	100000		24690	143	10	4.1	105337	22%	2013
Totals			525000	12000	580974	330	n/a	n/a	n/a	27%	2013

4.4 Medium to long term projects

Currently we have identified two long term projects which both require a significant amount of capital investment if they are to proceed. Current indications are that the high capital costs and long term payback periods are a barrier but the long term carbon emissions savings are substantial .Whilst these project are outside the current 5 year plan and not identified in section 5.1.2 Financial costs they are important not to loose sight of for the future. We will continue to review the capital costs, funding mechanisms and opportunities for grant support /loans etc.

The medium to long term projects are identified in **Table 4.4** below.

Table 4.4

Ref	Project	Lead	Cost		Annual Saving		Life	Pay back	NPV	% of Target	Year
			Cap	Rev	Fin	CO_2					
LTUC-032	20kw wind turbine	SO	800000		61900	391	15	13	+87072	60%	2016
LTUC-034	Solar heating to 5 No halls calorifiers	SO	200000		14520	89	20	14	+2246	14%	2015
Totals			1000000		76420	480	n/a	n/a	n/a	n/a	n/a

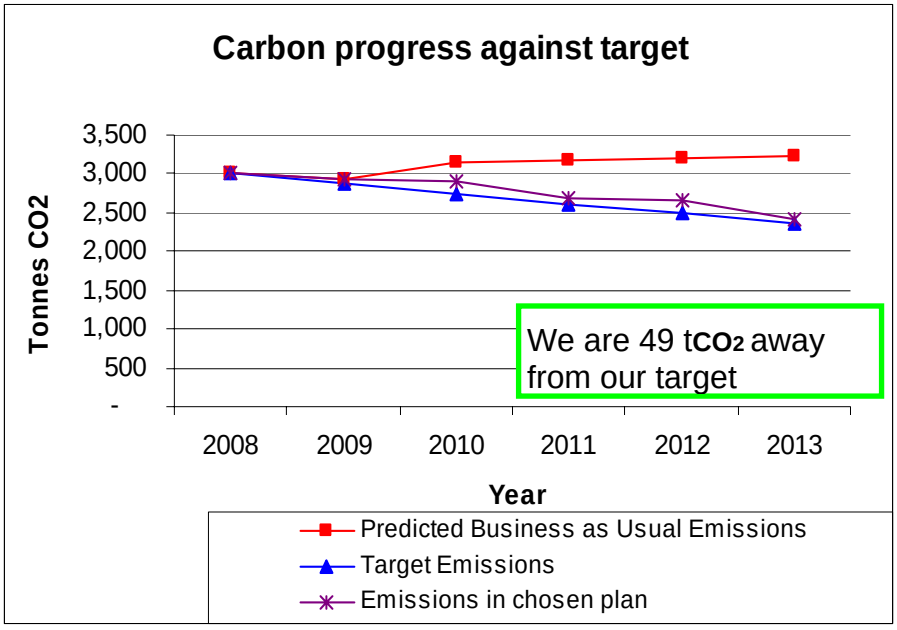
4.5 Projected achievement towards target

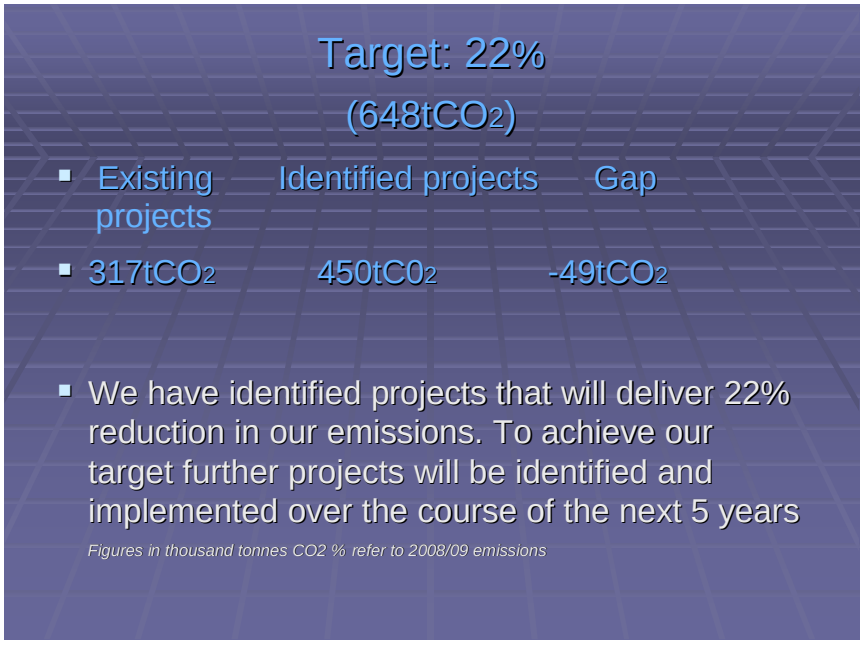
LTUC are well advanced in achieving our target of a 22%reduction in our carbon emission by 2012/13 from our 2008/09 baseline .The existing and planned/funded projects identified together with the near term projects up to 2012/13 already indicate that we are currently only 49 tCO_2 away from achieving out target emissions reduction of 648 tCO_2.However the current likelihood is that the space rationalisation programme for the institution will be accelerated and increased from the current programme which should more than account for the current minor difference in our target

This is indicated graphically in the **Table 4.5** below.

Total identified savings within the current plan are 1637 tCO_2, however 480 tCO_2 are identified from 2 significant long term projects namely the proposal to provide a 20kW wind turbine and solar heating to five halls of residence. These projects are currently at risk in terms of potential capital cost and long pay back periods, however these will be reviewed annually as part of the CMP update and considered for capital investment in the future.

Table 4.5





5. Implementation

The following section identifies how the institution intends to implement the CMP from a financial viewpoint, in embedding the philosophy of carbon management into the institution, recording data and in delivering key projects.

5.1 Financing

To meet the target savings a significant investment programme is required. Investment will include capital investment in technical measures to achieve emissions reductions (lighting controls, insulation etc.), and investment in resources to assist with staff and student engagement.

This plan will be implemented in the following academic year 2009/2010 as detailed in the relevant sections. Implementation will be primarily through the Estates and Domestic Services team with support from the Marketing team and the Student Union representatives

For the majority of the projects, the funding will be secured from revenue via the HEFCE/Salix Green fund, Estates minor capital and planned budgets including energy conservation budget. An element of the funds collected from car parking charging will also be reinvested back into the initiative to support bio-diversity projects .

All UK HEIs are entering a period of financial uncertainty. This will require some tolerance in the scheduling of the implementation plan but not in its absolute priority.

From projects completed in 2009/10 we have already achieved over 50% of our targeted t CO_2 saving in the 5 year plan (2008/09 t0 2013/14) with annual cost savings of circa £60k per annum in year one. In 2010/11 we are on programme to deliver a further 120 tCO_2 saving with further annual cost savings of circa £17k

The key assumptions made in calculating the benefits and savings are-:
- Electricity 8.8p/kWh
- Gas 2.6p/kWh
- Business as usual (BAU): 5.3% cost increase per annum and a demand increase of 0.7% per annum

5.1.1 Benefits / savings – quantified and un-quantified

	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Annual cost saving	**0**	**£67k**	**£30k**	**£9k**	**£8k**	**£8k**
Annual CO_2 saving	**0**	**142**	**136**	**129**	**123**	**118**
% of target achieved	**0**	**22**	**21**	**20**	**19**	**18**

Unquantified benefits:

There are a number of unquantified benefits identified against which it is hard to place a monetary value, these are as follows -:
- Staff and student health and wellbeing
- University reputation
- Staff and student recruitment and retention
- Decreased risk from volatile energy markets
- Effect on climate change from the impact on the behaviour of staff, students and the community

5.1.2 Financial costs and sources of funding

Capital and revenue costs are indicated below and are taken from actual expenditure in 09/10 and committed expenditure in 2010/11 from the Estates capital and revenue budgets.

Capital and revenue costs post 2011/12 onwards are indicative based on the CMP plan proposal but subject to affordability and annual review. This is considered as part of the annual pre budget discussion with the Finance Director for capital and revenue expenditure and for submission within the Financial Plan for Board approval.

The funding will be dependent on availability, including HEFCE capital grants (CIF2 anticipated March 11 over 3 year programme), and HEFCE/Salix revolving green fund, minor capital projects and annual estates revenue budgets (planned maintenance, minor works and energy conservation.)

The capital costs indicated below in 09/10 and 10/11 were primarily funded from the major capital works programme; however future capital works are likely to be limited with more focus on using revenue and recycled funds (achieved from energy savings).

figures in £ 1000's	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Annual costs:						
Total annual capital cost	**0**	**£1101k**	**£75k**	**£275k**	**£200k**	**£50k**
Total annual revenue cost	**0**	**£114k**	**£47k**	**£12k**	**£0k**	**£0k**
Total costs	**0**	**£1215k**	**£122k**	**£287k**	**£200k**	**£50k**
Committed funding:						
Committed annual capital	**0**	**£1101k**	**£375k**	**0**	**0**	**0**
Committed annual revenue	**0**	**£66k**	**£99k**	**0**	**0**	**0**
Total funded	**0**	**£1167k**	**£474k**	**0**	**0**	**0**
Unallocated funding						
Unallocated annual capital	**0**	**0**	**0**	**£50k**	**£50k**	**£50k**
Unallocated annual revenue	**0**	**0**	**0**	**£12k**	**£85k**	**£85k**
Total unfunded	**0**	**0**	**0**	**£62k**	**£135k**	**£135k**

5.2 Governance for Implementation

This Carbon Management Plan has been produced by the Director of Estates who will continue to have responsibility for the implementation, monitoring and review of the plan and all targets and reporting to the Executive Team and Estates and Facilities sub-committee..

The Director of Estates as team leader for the CMP will endeavour to manage and motivate the team through regular meetings and communications to ensure that the implementation of the plan is achieved within programme and costs.

5.2.1 Embedding Carbon Management

This Carbon Management Plan, which sets out Leeds Trinity University College's low carbon vision, its CO_2 saving target and its plan to achieve it, is endorsed by the Principal, and is available publically, demonstrating the institution's commitment to embedding carbon management. The Principal at the annual address to staff launched the Carbon Management Plan process and this is included in the student's induction process at the commencement of the academic year.
We envisage greater student and staff involvement in the process and we will be launching a marketing campaign and working with students to raise awareness.

Appendix A shows the Carbon Management Embedding Matrix which consists of seven subjects headings with embedding actions for each subject that are ranked in five levels from worst to best. The actions highlighted in colour and ticked, show the University's perceived current position for each subject. This will be reviewed and updated annually as part of the CMP review and submission to Board.

5.2.2 Data Management – measuring the difference, measuring the benefit

Data collection will take place annually and will be compiled by the Project Leader in his role as Director of Estates, assisted by an external M and E consultant. This will be communicated annually to staff and students, making reference to targets and previous performance. All data (energy, finance, travel, waste

and water) is currently recorded on a monthly basis and an annual energy report is carried out by an external consultant which will assist in the updating of the CMP on an annual basis

It is important to note that the carbon footprint associated with travel and construction waste is expected to grow as our data collection in these areas improves.

5.3 Resource commitment

All members of the team are extremely committed to the sustainability agenda and cover all the key aspects of the institutions requirements from student support to specific project management.

5.3.1 Implementing the Initiatives

The principal members of the carbon management team are detailed below -:

Role in Carbon Management team	Name and person in the University	Contact details
Project Sponsor	**Mr Mark Shields** Vice Principal	X107 m.shields@leedstrinity.ac.uk
Project leader	**Mr Steve Oddy** Director of Estates	X237 s.oddy@leedstrinity.ac.uk
Academic Sponsor	**Mr Tim Leadbeater** Director	X292 t.leadbeater@leedstrinity .ac.uk
Facilities representative	**Mr Dominique Owen** Director of Facilities	X307 d.owen@leedstrinity.ac.uk
Financial representative	**Mr Martin Tallontire** Finance Manager	X261 m.tallontire@leedstrinity.ac.uk
Marketing representative	**Mrs Tania Clarke** Marketing	X304 t.clarke@leedstrinty.ac.uk
Student representative	**Mr Stephen Knowles** Chair of Student Union	X353 s.knowles@leedstrinty.ac.uk
Student representative	**Mr Mark Whittle** Student	MarkChristopherWhittle@leedstrinity.ac.uk
Domestic services rep:	**Ms Yvonne Leighton** Domestic Services	X297 YvonneLeighton@leesdstrinity.ac.uk
Student Union	**Mr Adam Shepherd** Student Union	X352 AdamShepherd@leedstrinity.ac.uk

Detailed implementation plans will be developed each year. The implementation plan for 2010/11 has been developed and confirmed. Priorities include:

- *Engaging with staff and students through a marketing campaign*
- *Bio-diversity project to develop a "Forest school "and tree planting scheme*
- *Lighting controls to corridors, toilets and common areas.-Ongoing phased development*
- *Replacement of T8 light tubes with T5-.-Ongoing phased development*
- *Installation of instantaneous gas water heaters to replace DHW calorifiers*
- *Installation of individual electric metering*

- *Replacement of ozone depleting refrigerants in condenser units*
- *Improved logging of travel*
- Reduced waste to landfill

5.3.2 Maintaining quality over time

The Carbon Management Team will meet regularly throughout the academic year to monitor and review progress and develop further opportunities for consideration. The overall progress and quality of the delivery of the plan will be monitored and reviewed by the CMP project leader and the Project sponsor on a regular basis throughout the academic year and an annual update report given to the Senior Executive Team and the Estates and Facilities sub –committee.

Embedding of the ethos of sustainability within the institution and being pro-active in communications will be a key requirement in ensuring that quality over time is maintained.

5.3.3 Programme Management of the CM Programme

The Director of Estates will have the key role of ensuring that the CMP programme is managed effectively and that targets are achieved .An Annual report on progress will be submitted to the Estate and Facilities sub committee. Historically the institution has an excellent record on delivery, having established a CMP (approved by Estates and Facilities sub-committee) over a year ago and being active in producing energy audits and energy saving programmes over the last 5 years. The institution has already expended allocated Revolving Green Fund monies in the first six months of joining the programme and is currently ahead of target in the first 12 months of the programme. The Director of Estates is assisted by an external energy consultant in the programme management of the projects within the CM programme.

5.3.4 The Programme Board (or other Governance structure) – strategic ownership and oversight

The institutions strategic plan was approved by the Board of Governors in October 2009. Included in this plan is the commitment to make environmental sustainability a key priority in the management and development of the institution to become a "*sustainable campus village*" with the target of reducing the institutions carbon footprint by 43% by 2020.
The Principal, exercising appropriate delegations within the institutions Senior Executive Team, will be responsible to the Board of Governors for the successful delivery of the CMP, including particularly decisions about capital expenditure. The Senior Executive team will in turn be advised by a Carbon Management Team chaired by the Director of Estates. The Carbon Management Team will communicate directly through the Project Sponsor, (Vice Principal support) on a regular basis and as necessary, alert the institution - through them - to any significant problems and/or failures of implementation. The plan, and resulting strategies and targets, will be monitored by the Estates and Facilities Sub Committee and reviewed on an annual basis.

5.3.5 The Carbon Management Team – delivering the projects

The annual energy audit has been one of the key drivers in understanding the energy performance of our buildings .Key findings of the report are considered and actioned, funds permitting. The strategic lead for this is through the Director of Estates who is responsible for securing funding and project managing the individual projects .Similarly other members of the CM team have strategic roles in ensuring that key objective of the CM Plan are implemented e.g. through the Travel Plan initiatives , waste management plan and general good housekeeping.

On technical aspect the team are advised and assisted by external consultants particularly on energy saving projects, travel and transport planning and waste management.

Historically the institution has an excellent record on delivery of projects to cost and time and will endeavour to maintain this position.

5.3.6 Succession planning for key roles

The Carbon Management plan has primarily been project managed and delivered by the Director of Estates who has taken the key role as project leader. The project leader has been assisted by an external mechanical and electrical consultant (Carbon Trust assessor) who has worked with the

institution for many years and undertaken an annual energy report and assisted in the technical process of developing the Carbon Management plan. The role of the project leader could be taken on board by the institutions resident Building Surveyor with the aid of the external consultant expertise in any future succession role. Similarly the Director of Hospitality takes on a very active role in the overall sustainability agenda and would assist in a future succession.

The Project Leader is a recent appointee and there is no reason to believe that he will not be in position for the duration of the programme.

5.4 Implementation Plan

Detailed implementation plans will be developed each year. The implementation plan for 2010/11 has been developed and confirmed. Initial priorities include those detailed

The following table summarises the emissions reduction opportunities identified. The list is not exhaustive and this part of the document will be continually revised and updated to take account of new opportunities and challenges.

No.	Emission Reduction Opportunity	Action
A1	**Engaging Staff and Students**	Introduce energy/carbon element to staff and student inductions
		Energy/Sustainability training for staff.
		Develop a range of University College specific publicity materials (posters, stickers, strip thermometers, postcards etc.)
		Run a “Switch it off” day and publicise results
		Annually publish an Energy newsletter
A2	**Building Management Systems (BMS) Optimisation**	Upgrade BMS controllers to enable intelligent support and maintenance provision.
		Review/ adjust temperature settings / compensators etc
		Identify and remove heating / cooling conflicts
		Survey building use and requirements and realign automatic time control operations
		Install new controls to facilitate consistent control settings
		Upgrade graphics and interface to explain control philosophy
		Arrange further BMS training for estates staff.
		Enhance control schemes as applicable to gain control of floating / local settings
A3	**M&T System and Sub Metering Upgrade**	Review use of current system and utilise direct data import facility
		Consider installing an automatic Monitoring and Targeting (AM&T) system to link with new electrical sub metering.
		Complete training to required estates staff
		Identify load shape and apply saving opportunities to the buildings using Encompass system
No.	**Emission Reduction Opportunity**	**Action**

A4	**Improve efficiency of computing facilities**	IT to implement centralised shutdown of unused PC's
		Implement standard cooling policy for server rooms and IT labs
		Replace CRT screens with new flat screens
		Shut down unused cluster PC's overnight and at weekends
		Investigate server load shedding through "virtualization"
A5	**Improve Efficiency of Lighting**	Complete building lighting surveys and identify opportunities
		Improve control of lighting –Install PIR detection, daylight dimming
		Install PIR detection in corridors, stairwells, toilets and common areas
		Replace tungsten lamps with CFL's
		Upgrade fluorescent lighting to high frequency with appropriate controls
		Replace T12 tubes with T5 tubes where possible.
A6	**Building Fabric and Heating Improvements**	Re-survey buildings for cavity wall and ceiling insulation
		Upgrade insulation in walls and ceilings as appropriate
		Upgrade existing heating systems, boilers and controls
		Improve zoning of heating systems
		Install Thermostatic Radiator Valves (TRV's)
A7	**Plant Room equipment Insulation Improvements**	Survey campus plant rooms and identify insulation requirements
		Repair or upgrade insulation on pipework
		Install valve and pump insulation jackets
		Replace indirect water cylinders with direct gas fired water heaters
A8	**Conserve Water**	Enhance early warning system for leaks and other wastage
		Assess and fit low water urinals in upgrade projects
		Install water displacement device in toilet cisterns
		Complete push spring return taps as required
A9	**Review Energy Supply Options**	Consider on-site generation from renewable sources
		Consider Green Electricity tariff- check YPO

No.	Emission Reduction Opportunity	Action
A10	**Develop & Implement Communications Strategy**	Provide feedback on energy performance.
		Expand coverage of utility, bio diversity and conservation meetings
		Promote use of recycled paper
		Promote use of recycling facilities
		Produce Annual Carbon management update report for the institution.
		Engage marketing in promotion of carbon management e.g. in

		student prospectus.
A11	**Embed into Strategy & Policy**	Include environmental considerations in Estate Strategy
		Aspire to making 'excellent' the minimum BREEAM rating for new build (currently 'very good').
		Embed carbon management into the institution business plans
A12	**Reduce Emissions From Transport**	Implement measures to meet the targets in the University College Travel Plan
		Review cycle facilities provision (parking, showers etc.)
		Student travel projects – student/staff commuting survey
A13	**Reduce Waste**	Increase recycling rates of a range of materials including glass, paper, cardboard, cans, and food waste

Steve Oddy
Director of Estates
Project Leader
Leeds Trinity University College
February 2011
Rev 2

Appendix A: Carbon Management Matrix – Embedding

	POLICY	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION & TRAINING	FINANCE & INVESTMENT	PROCUREMENT	MONITORING & EVALUATION
5 **BEST**	SMART Targets signed off Action plan contains clear goals & regular progress reviews Strategy launched internally & to community	CM is **full**-time responsibility of a **few** people CM integrated in responsibilities of **senior** managers VC support Part of **all** job descriptions	Quarterly collation of CO2 emissions for all sources Data externally verified M&T in place for: • Buildings • Waste	All staff & students given formalised CM: • Induction • Training Plan • Communications CM matters **regularly** communicated to: • External community • Key partners	**Granular & effective** financing mechanisms for CM projects Finance representation on CM Team Robust task management mechanism Ring-fenced fund for carbon reduction initiatives	Senior purchasers consult & adhere to ICLEI's Procura+ manual & principles Sustainability comprehensively integrated in tendering criteria Whole life costing Area-wide procurement	Senior management review CM progress Core team regularly reviews CM progress Published externally on website Visible board level review
4	SMART Targets developed but not implemented	CM is full-time responsibility of an individual CM integrated in to responsibilities of department managers, not all staff	Annual collation of CO_2 emissions for: • Buildings • Transport • waste Data internally reviewed	All staff & students given CM: • Induction • Communications CM communicated to: • External community • Key partners	Regular financing for CM projects Some external financing Sufficient task management mechanism	Environmental demands incorporated in tendering Familiarity with Procura+ Joint procuring between HEIs or with LAs.	**Core** team **regularly** reviews CM progress: • Actions Profile & Targets • New opportunities quantification
3	Draft policy Climate Change reference	CM is part-time responsibility of **few** people CM responsibility of department champions	Collation of CO2 emissions for limited scope i.e. buildings only	Environmental / **energy** group(s) give ad hoc: • Training • Communications	Ad hoc financing for CM projects Limited task management No allocated resource	Whole life costing occasionally employed Some pooling of environmental expertise	CM team review aspects including: • Policies / **Strategies** • Targets • Action Plans
2	No policy Climate Change aspiration	CM is part-time responsibility of an individual No departmental champions	No CO2 emissions data compiled Energy data compiled on a regular basis	Regular poster/awareness campaigns **Staff** given ad hoc CM: • Communications	Ad hoc financing for CM related projects Limited task coordination resources	Green criteria occasionally considered Products considered in isolation	Ad hoc reviews of CM actions progress
1 **Worst**	No policy **No** Climate Change reference	No CM responsibility designation	Not compiled: CO_2 emissions Estimated billing	No communication or training	No internal financing or funding for CM related projects	No Green consideration No life cycle costing	No CM monitoring