Hadlow College

Carbon Management Plan

Date: 25/01/2012

Version number: 1.1

Owner: Sue Brimlow

Approval route: Sign off by Project Sponsor and Project Board

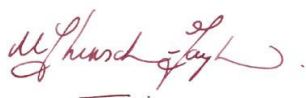*Approval status: Final*

Signed off by the Carbon Trust

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Foreword from our Project Sponsor

In our 2008 Sustainable Development Strategy we stated that having identified global climate change as one of the most pressing environmental issues facing the farming community, we wished to increase our commitment to sustainability and reduce our carbon footprint. We are committed to maintaining, and improving, the quality of our environment, both for the people who live and work in the College, and for the wider community.

This commitment is reflected in our green policies which seek to make the most effective and efficient use of all resources, encouraging all members of the College community to develop an ecologically sound approach to their work and lifestyle. This strategy allows Hadlow College to consolidate its position as a centre of sustainability excellence for education purposes and reduce its energy and maintenance costs.

Involvement in the Carbon Trust's Carbon Management Programme was a natural progression for us, providing us with the support and framework to quantify our considerable work to date and identify further opportunities to continue to reduce our carbon footprint. It has provided a vehicle to raise the profile and awareness of the benefits of reducing our dependence on fossil fuels and a robust action plan to deliver continued improvements over the next 5 years. Sustainability is at the heart of everything we do and this is core to our values and our aspirations as a leading land based college.

Mark Lumsdon-Taylor
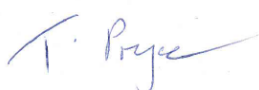Director of Finance and Resources
Hadlow College

Foreword from the Carbon Trust

Cutting carbon emissions as part of the fight against climate change should be a key priority for Universities, Colleges and Schools - it's all about getting your own house in order and leading by example. The UK government has identified the Education sector as key to delivering carbon reduction across the UK in line with the Climate Change Act targets, and the FE Carbon Management programme is designed in response to this. It assists Further Education institutions in saving money on energy and putting it to better use elsewhere, whilst making a positive contribution to the environment by lowering carbon emissions.

Hadlow College partnered with the Carbon Trust on this ambitious programme in 2011 in order to realise substantial carbon and cost savings. This Carbon Management Plan commits the College to a target of reducing CO_2 by 25% by 2015 and underpins potential financial savings to the institution of £58,553 per year by that date.

There are those that can and those that do. Further Education institutions can contribute significantly to reducing CO_2 emissions. The Carbon Trust is very proud to support Hadlow College in their ongoing implementation of carbon management.

Tim Pryce
Head of Carbon Management

Executive Summary

This Carbon Management Plan sets out our strategy and action plan for reducing carbon emissions over the next five years. It identifies the tangible and intangible benefits of Carbon Management and describes the governance arrangements to keep the programme on track. The College has already implemented many successful carbon management initiatives in the past to reduce our carbon emissions and we will continue to build on this success.

There is a range of reasons for the College to take action on carbon. These include delivering against our strategic plan, minimising the impact of rising energy costs and demonstrating both internally and externally that we behave in a sustainable way.

Reducing our energy consumption not only reduces harmful greenhouse gas emissions, but also delivers tangible cost savings. Therefore, this Programme contributes directly to our goals of ensuring a sustainable economic future and reducing our carbon emissions by 3% annually.

In 2009/10 the College spent £405,643 on energy and emitted 1,683 tonnes of CO_2. These emissions are generated when we use gas (42% of kWh usage) and electricity (58% of kWh usage) for heating and lighting and to power our computer systems. This baseline figure also includes the costs of fuel for running our transport fleet and other business travel mileage and our water consumption. Our fuel costs are comparatively high at 10% due the need for staff to travel between our 3 campuses and because we deliver work-based learning across Kent and south London. The breakdown of our emissions is shown in the adjacent pie chart. In this context, stationary means buildings and further sources is water.
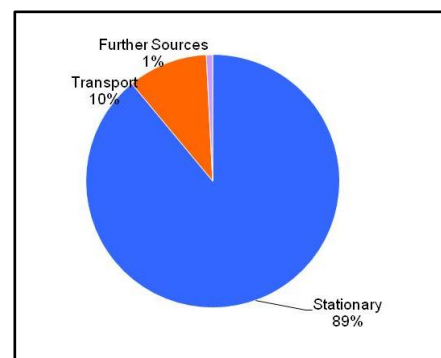
From 2006 to 2010 our emissions increased by 57% due to increased student numbers and additional buildings coming on stream, but they have decreased by 10% over the last year due to the implementation of our energy saving initiatives such as replacement boilers and a voltage optimiser. Our energy cost increased by an equivalent amount over the same period.

Our vision for the College is to: Consume LESS. Hadlow is committed to reducing its carbon footprint by consuming LESS energy, water and fuel and producing LESS waste.

We have also set an ambitious carbon reduction target, supported by concrete technical projects and embedding actions set out in this Plan.

Hadlow College will reduce the carbon emissions from its energy and fuel consumption by 25%, from a 2009/2010 academic year baseline of 1,683 tonnes CO_2, by July 2015

If we take no action, our emissions and energy costs are expected to increase, as our activities become more energy-intensive, even if the size of the College does not change. The adjacent graph shows the 'Value at Stake', or the difference between the 'do nothing' scenario and meeting our reduction target.

The value at stake of not hitting our target could cost Hadlow a cumulative £380,380 by 2015.

This value is based on a conservative assumption that energy prices will increase by 5.8% annually
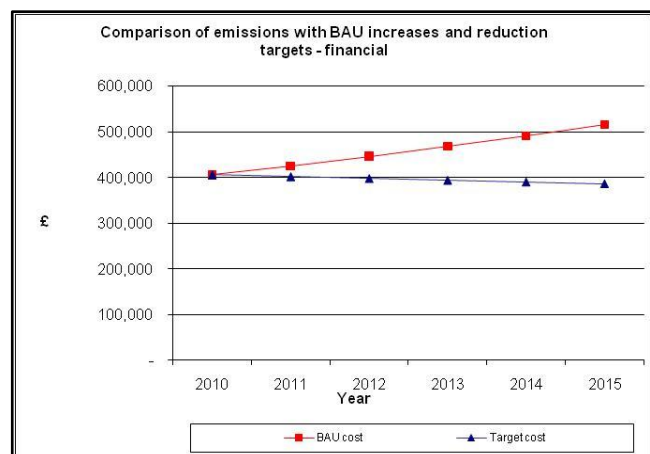
on average. However, it is likely that this rate of increase will be higher and the impact of price volatility on the College is difficult to estimate. Reducing carbon and energy consumption also helps us to reduce our exposure to this risk.

We have identified carbon reduction projects and activities in the following areas:

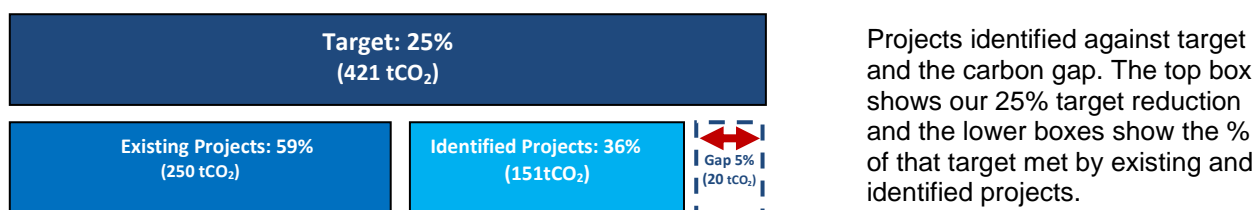- Behavioural change and good housekeeping – campaigns to change student and staff behaviour and an energy policy that ensure efficient equipment settings and monitoring
- Invest-to-save projects, such as lighting replacement, improved valve and pipe-work insulation and energy efficient equipment replacement.

Our existing energy saving projects have already made significant differences and these together with further projects identified in this plan have the potential to reduce our emissions by 401 tonnes CO_2 and achieve 95 % of our targeted reduction measured against the 2014/15 baseline.

Target: 25% (421 tCO$_2$)		
Existing Projects: 59% (250 tCO$_2$)	Identified Projects: 36% (151tCO$_2$)	Gap 5% (20 tCO$_2$)

Projects identified against target and the carbon gap. The top box shows our 25% target reduction and the lower boxes show the % of that target met by existing and identified projects.

This means that we will need to identify projects to make up the further 5% and to compensate for the business-as-usual growth. We have already identified several projects that we believe will be cost effective and deliver the required savings.

The following mechanisms are either already in existence or will be put in place to ensure sustained project pipeline: suggestions to the Sustainable Development Team, regular cross campus "opportunities" walk rounds, green champion network, membership of EAUC and other sustainable communities and regular networking with other Colleges to identify best practice.

The total capital investment to deliver the projects is £320,145 of which £201,004 has already been spent on delivering the existing and current projects. The capital expenditure required to implement the remaining identified projects is estimated at £119,141. We will be looking to fund the lighting replacement projects from SALIX or similar funding providing they meet the compliance criteria. The valve insulation project that delivers 5.8% of our target savings will be met from the maintenance budget.

The identified projects will deliver an annual saving of approximately 401 tonnes CO_2 and £58,553 with an average payback period of 5.46 years, leaving a shortfall of 20 tonnes CO_2 to meet our target 25% reduction. We identified 3 projects with a payback period shorter than 2 years.

To deliver this plan, we are drawing upon our existing Sustainable Development Team structure. This team has been meeting regularly since November 2009 and superseded the earlier Green Strategy group. We have invited additional department representatives on to the team, to widen its remit and created a governance structure that will ensure successful implementation. Mark Lumsdon-Taylor, the Project Sponsor, has the overall accountability for the delivery of this plan and the achievement of our targets.

Progress against this plan will be reviewed annually in March and a report will be provided to the Executive and Senior Management Team and the Board of Governors and published on the sustainability section on our website.

1   Introduction

Hadlow College is a specialist land-based college split over 4 main sites with residential FE and HE students. It has a working dairy, sheep farm, garden centre, fisheries and a garden centre that provides income and a genuinely commercial environment that enhances its learner's educational experience.

The College is one of 45 Further Education Colleges in England taking part in the first Carbon Trust Carbon Management programme focused directly on this sector. The programme has supported the College through a structured and supported five step process to:

Mobilise: identify the individuals and groups in the organisation who can provide the information, ideas, drive and direction to set the scope and target for the college and to create a relevant challenging and justified plan

Baseline and Forecast: seek out and analyse data on the activities leading to the emissions of greenhouse gases

Identify and Quantify: identify and quantify technical projects and initiatives to embed carbon management within the culture and working practices of the College

Approve Plan: have the plan accepted, endorsed and promoted by senior management in the College

Implement the Plan: begin to implement initiatives as early as is feasible to start to reap benefits and to build up a track record of delivery that will give momentum.

This programme was a logical step in the college's continuing journey to be more sustainable. Its Sustainable Development Strategy was signed off in 2008 and was developed to build on past achievements and to provide a framework and process for continued measurable improvements across the college. Actions deriving from this strategy include securing grants and loans from SALIX to replace boilers, installing a voltage optimiser, and improving insulation. There have been several competitions and campaigns to increase sustainability and reduce consumption but with a transient student population these messages need to be continually reinforced. Despite the above measures, the college consumption originally increased due to greater student numbers and new buildings and sites coming on stream but the savings are now beginning to be reflected in reduced energy usage.

Energy consumption is recorded and water usage is monitored but this is done on an ad-hoc basis and only significant variations are highlighted and investigated; there is no set process to collect or analyse the data to determine if greater savings could be made.

Participation in this programme provides the tools, support and over-arching governance structure to effectively measure and monitor our consumption. It has already enabled us to produce our carbon baseline and the meetings with the SMT and other key staff have energised and raised the profile of sustainability across the campus.

Plans were already in progress to implement campus campaigns that alter behaviour and further energy saving infrastructure projects had been scoped. They can be incorporated into this programme and with the support from SMT and the Project Sponsor enable a much stronger and therefore more

effective message to be given. Currently most projects are driven by Estates, IT or the Business Unit. The programme structure encourages ownership and support from all areas of the campus that also will help embed enduring processes and behavioural changes across the college.

2   Carbon Management Strategy

This section describes why Hadlow College is engaging in carbon management and the targets and objectives we have set.

2.1   Our drivers and priorities for reducing carbon emissions

Climate change is globally recognised as the greatest environmental and economic threat faced by national governments and individuals, and Hadlow College is determined to play a full part in delivering on our collective responsibility to reduce carbon emissions. Our Strategic Plan, covering the period from 2010 to 2015, includes the strategic objective 'To ensure a sustainable economic future for the organisation that maximises best use of resources and partnerships' and an existing operational objective was to reduce college CO_2 omissions annually in line with the government's CO_2 policy, by 3% per annum.   Our involvement in this Carbon Trust initiative will help deliver these objectives by reducing carbon emissions and associated costs and help safeguard our future. The rising cost of energy also creates a shorter term opportunity to create financial savings through energy efficiency actions. Below we set out, in priority order, the main drivers for taking action to reduce our carbon emissions / energy consumption.

- **Energy cost saving.**

  Energy and fuel costs have increased dramatically in recent years, with energy prices growing by over 50% since 2004. Prices we pay for our energy will continue to increase at a significant rate and energy efficiency makes good business sense.

- **Corporate Social Responsibility**

  As a land-based college, sustainability is a key driver for us, especially the need for adaptation to climate change, increase food production and security. Sustainability is at the heart of everything we do and this is core to our values and our aspirations as a leading land based college. It is essential that we are seen to deliver what we teach.

- **High Profile Issue**

  Climate change and sustainability have become high profile issues and we want to build on our existing reputation for sustainable development and encouraging local low carbon communities by showing leadership in this area.

- **Culture change**

  We want the processes to capture and monitor our carbon footprint to be embedded in our operational and estate functions and to get buy-in across the campus from both curriculum staff and students. We want it to be seen as an integral part of the college rather than an additional function.

- **Expected future targets**

  There is an expectation of future external targets set for the College, e.g. regulatory or in partnership with other organisations, similar to the ones that have already been set for universities.

2.2   Our low carbon vision and target

Hadlow is committed to reducing its carbon footprint by consuming LESS energy, water and fuel and producing LESS waste. This will be achieved by improved monitoring of consumption, practical projects that reduce consumption and decrease waste and by campaigns that encourage ownership and behavioural change across all aspects of our campus. Therefore;

The key theme for our vision is LESS. Hadlow is committed to reducing its carbon footprint by consuming LESS energy, water and fuel and producing LESS waste This means less energy, water, waste and fuel as shown in this sample pop-up.
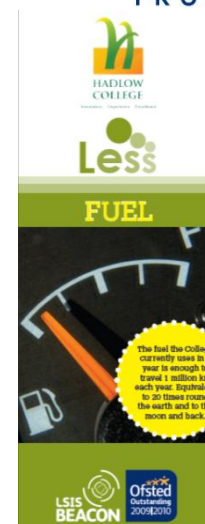
Hadlow College will reduce the carbon emissions from its energy and fuel consumption by 25%, from a 2009/2010 academic year baseline of 1,683 tonnes CO_2, by July 2015

3   Emissions Baseline and Projections

The carbon baseline is a record of our approximate carbon emissions in a chosen year. Targets and performance in reducing emissions are measured against this figure as a % of the baseline value. This section outlines what parts of our College's emissions are included in the baseline, what year we have chosen as our baseline and how we have calculated that baseline.

This emissions baseline will be used to monitor and measure changes in emissions resulting from the carbon-saving initiatives identified in this plan.

3.1   Scope and data sources

The scope of the college's baseline emission calculations covers;
- all the buildings on our campuses at Hadlow, Mottingham and Canterbury,
- the HE student accommodation at Grove Farm,
- our Farm Shop and
- fleet transport emissions.

The college runs a few courses in the glasshouses and rooms at Cozenton Nursery, renting these from the owners, Medway Council. These premises were not included in the scope, because we do not have any input or control over the consumption there. It is planned that they will come under our direct control within 2 years and at that time the consumption will be included in our emissions and we will investigate whether there are any suitable projects to make them more energy efficient.

We were unable to include any figures for refrigerant gases as the historic maintenance records did not detail the volume of gas replaced.

The emission sources we've included in our baseline are listed overleaf, divided into Scopes 1, 2 and 3, in accordance with the World Resources Institute standards, to enable comparison with other organisations. The emissions volumes identified are approximate, and limited by the accuracy and completeness of available data.

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Emissions sources included in baseline scope	Data sources and quality
Scope 1 - includes all direct emissions from sources directly controlled by the College - fuels consumed on site and from owned vehicles	
• Fuel use in buildings and estates – natural gas, calor gas and oil	The majority of our buildings use natural gas for heating and hot water, although some of the more rural locations do not have a gas supply. Consumption figures were derived from invoices and bills some of which contained estimated figures. Given the high proportion of estimated readings for the smaller sites an estimate of +/- 5% accuracy is considered suitable. Oil is used for heating the glasshouses and calor gas provides additional space heating at Grove Farm. These figures can be considered to be accurate as they are based on actual consumption.
• Fleet transport emissions that are all diesel	These figures were obtained from the invoices from our suppliers and relate to actual consumption.
• Refrigerant gas loss (from air conditioning and refrigeration systems)	Not included as details were unavailable
Scope 2 – emissions from purchased energy produced off site.	
• Electricity consumption in buildings and estates	Consumption figures were derived from bills and some relate to estimated readings. The 2 largest bills are half hourly metered so these figures are accurate. Therefore an estimate of +/- 5% accuracy is considered suitable. We will need to introduce some form of smart metering to ensure that our figures are more accurate.
Scope 3 - all other emissions	
• Business travel (public transport and staff vehicle use)	We have been able to work out the emissions for staff vehicle use from the staff expenses database. Only the cost figure is retained but we have been able to divide that by the mileage rate to derive the number of miles it relates too. Assuming that staff claim all their business mileage then this figure can be considered accurate. The reporting system does not allow us to separate out the public transport costs, so these have been omitted.
• Water consumption	Consumption figures have been derived from bills. The largest accounts have water meters and the figures therefore accurately record consumption. Smaller sites have some estimated readings so an estimate of +/- 5% accuracy is considered suitable.

The sources below have not been considered at this point as appropriate data is not available. However, related carbon reduction opportunities will be considered under 'other projects' and emission data may be considered in future baselines as mechanisms are developed to collect and analyse:

- Commuting for staff. We are working on a voluntary travel plan and have carried out a staff travel survey so we may be able to incorporate this at a later stage and demonstrate reductions in carbon emissions
- Commuting for students
- Waste
- Procurement

3.2 Baseline

We have chosen the 2009/10 academic year as our baseline year as we had a full set of consumption figures due to having a Carbon Trust audit in February 2011. This was our second survey and many of the recommendations from the first survey in 2007 had already been implemented. These included loft insulation, double glazing, upgrading boilers and some lighting upgrades. These projects had already been implemented before the baseline year, so their savings cannot be included in this programme. The 2011 Carbon Trust audit identified further opportunities that we were able to secure SALIX loans for and these projects are included in the existing projects table as they were implemented after the baseline year. They are boiler upgrades, flat roof insulations and T8 to T5 retrofits. A percentage of the voltage optimiser savings can also be included due to the date of its installation.

The following table identifies emissions sources relevant to our Plan's scope as described above.

Table 1 Breakdown of baseline CO_2 emissions for 2009/10

	Buildings	Transport	Waste and Water	Total
Baseline CO2 emissions (tonnes)	1,498	171	14	1,683
Baseline Cost (£)	£258,644	£94,825	£52,175	£405,643

Figure 1 Summary of emissions for baseline year 2009/10
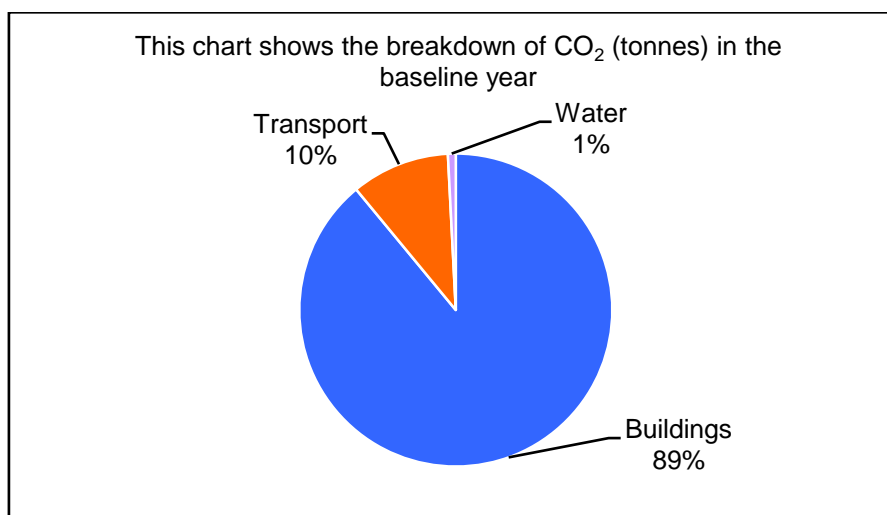
From the above graph it can be seen that the majority of our emissions come from our buildings. The following 2 figures show the emissions and cost breakdown for the buildings across our sites. As expected the 2 largest sites by consumption are the main campus and the Animal Management Unit (AMU); the main campus includes student residences, classrooms, offices, library, restaurant and specialised areas such as machinery, the fish hatchery and the Landscape Training Centre. The AMU has the largest footprint of any occupied building on campus and includes heated laboratories for our exotic animals and a heated aviary.

The comparatively high figure for gas for Grove Farm, as shown in the graph below, is because it does not have a natural gas supply so the heating requirements for the HE residential accommodation are met by calor gas. Other locations such as Princess Christian Farm (PCF), the Dairy and Garden Centre do not have a gas supply so the fuel costs reflect the higher unit cost of electricity.

Pinetrees, a 3 bed roomed house used as offices, also recorded a high consumption for its size, but investigation showed that the meter readings were incorrect and subsequently we have had corrected meter readings.

Our transport costs and emissions are also comparatively high because staff often travel between campuses to deliver lectures and we also provide work based learning where students are trained and assessed in their workplace.

Figure 2 Breakdown of energy consumption by area and fuel type
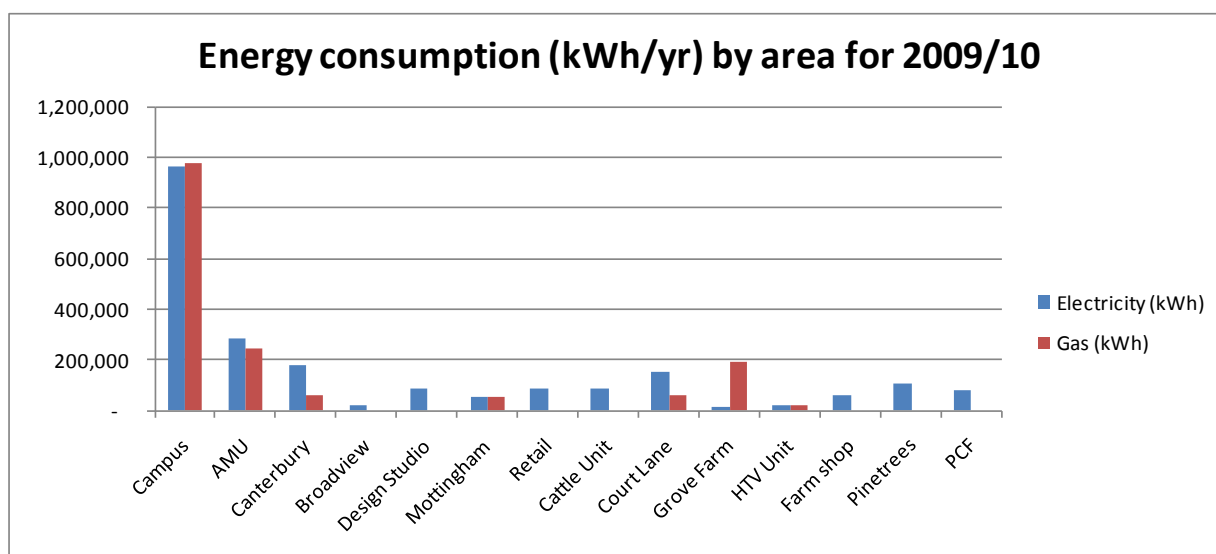
Figure 3 Chart showing the energy costs for each area
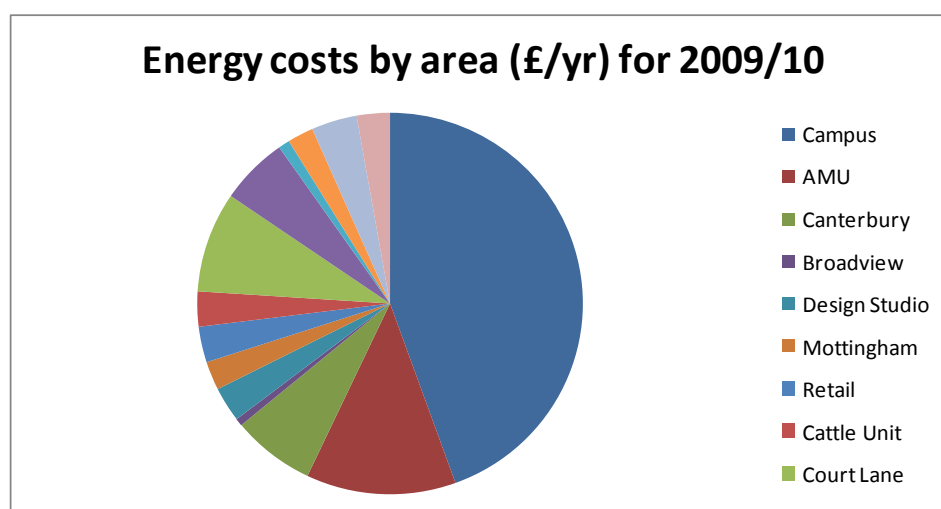
This graph showing the energy costs per area is included as it clearly indicates the areas of greater consumption where it could be assumed that projects to reduce carbon would be most effective. However, sites such as the Cattle Unit and Court Lane, which are quite large 'slices of the pie' are predominantly livestock (dairy and milking parlour) and horticulture sites (glasshouses), where energy

improvements to consumption are limited and costly. These areas have been excluded from our calculations on the savings generated by behavioural change projects too as they will have little impact there.

3.3   Projections and Value at Stake

The potential cost to Hadlow College of taking no action on carbon reduction, compared to achieving the target in this plan, is a cumulative sum of £380,380 by 31st July 2015.

This section analyses what will happen to our carbon emissions and related costs over the 5 year period from our baseline academic year of 2009/2010. The key point to note is that although the proposed reductions do not generate large cost savings over the next 5 years, there is a considerable cost increase to doing nothing.

The business-as-usual (BAU) scenario in Figure 4 shows the calculated growth in carbon emissions and related costs that the college would experience if we do nothing to reduce consumption. The BAU scenario includes assumptions on how our consumption might increase and also what increases in energy tariffs we are likely to experience. For the purposes of these calculations we have assumed that student numbers will remain static and there will be no significant changes to the building infrastructure and have therefore based the increases on government projections for energy cost rises and historical growth figures for buildings and fleet usage. Even if we do nothing, our emissions are still likely to increase over time, as our activities become more energy intensive. This increase in the BAU scenario is based on the following assumptions:

- BAU Increase in Demand for all building sources, 0.7%, source DTI/DBERR EP68

- BAU increase in demand for Fleet, 0.7%, source DTI/DBERR EP68

In addition, the price of energy is also likely to continue to increase. The rate of increase assumed is 5.8 % annually over the next five years based on DECC's energy costs projections.

We know that there are potential changes to our infrastructure on the horizon, for example the Free School and increasing demand for the Football Academy. It is inappropriate to include these in the figures due to the uncertainty of demand associated with them, but they can be added to the forecast model once we have clarity on their impact.

Our Carbon Management Plan has a target 25% reduction in our carbon emissions from our baseline 2009/2010 academic year until the 2014/2015 academic year. The reduced-emissions-scenario (RES) shows what the yearly carbon emissions and our energy, fleet and water costs would be if we hit our target reduction. The capital costs of projects required to meet the target are not included in this analysis. The following graph (Figure 4) from the Carbon Trust baseline tool shows the BAU scenario compared to the RES scenario.

Figure 4 Graph showing the financial comparison between BAU and RES costs

Comparison of emissions with BAU increases and reduction targets - financial
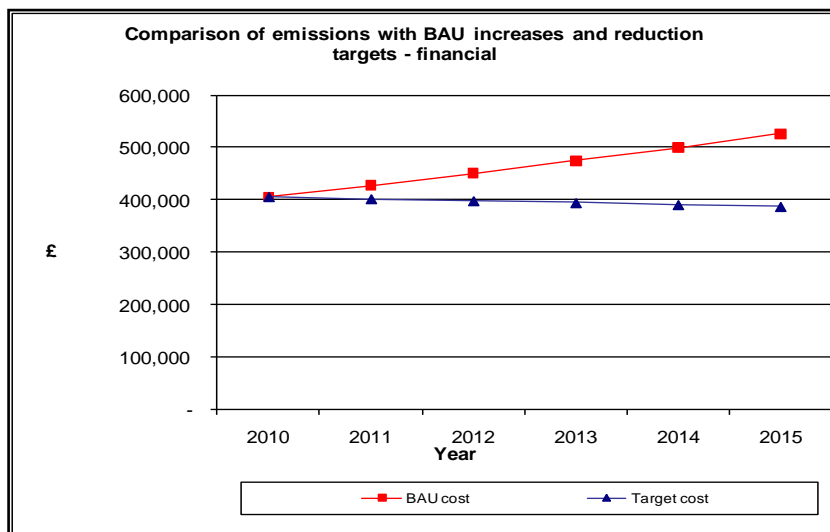
The second graph (figure 5) compares the BAU and RES figures for our carbon emissions. Unlike the previous graph the emissions do not increase in the BAU scenario but the potential reductions are shown for the RES scenario.

Figure 5 Graph showing the carbon emission variations between the BAU and RES scenarios

Comparison of actual emissions with BAU increases and reduction targets predicted
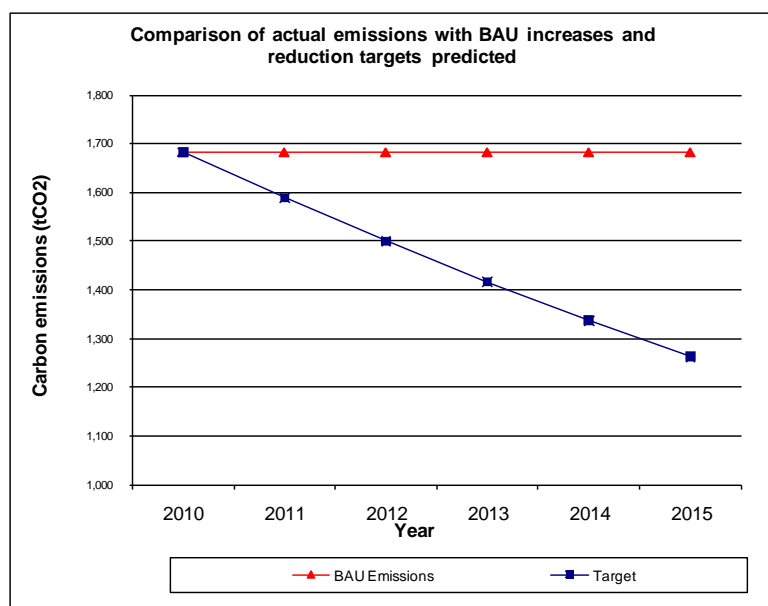
The Value at Stake (VAS) is the year-on-year difference between the BAU and RES scenarios. The Value at Stake shows us the potential savings, or avoided cost, from implementing our plan and hitting our target against the alternative of doing nothing (BAU). The capital costs of projects required to meet the target are not included. The Value at Stake is a useful high level analysis, as it can be produced early on in the process of developing our carbon management plan and helps make the case for action. However the detail we have developed on savings and costs from specific projects supersede this analysis and can be seen in further detail in section 4.

The following diagram adapts Figure 4 to show the cumulative VAS, which is the area shaded green.

Figure 6 Graph showing the cumulative Value at Stake

Comparison of emissions with BAU increases and reduction
targets - financial
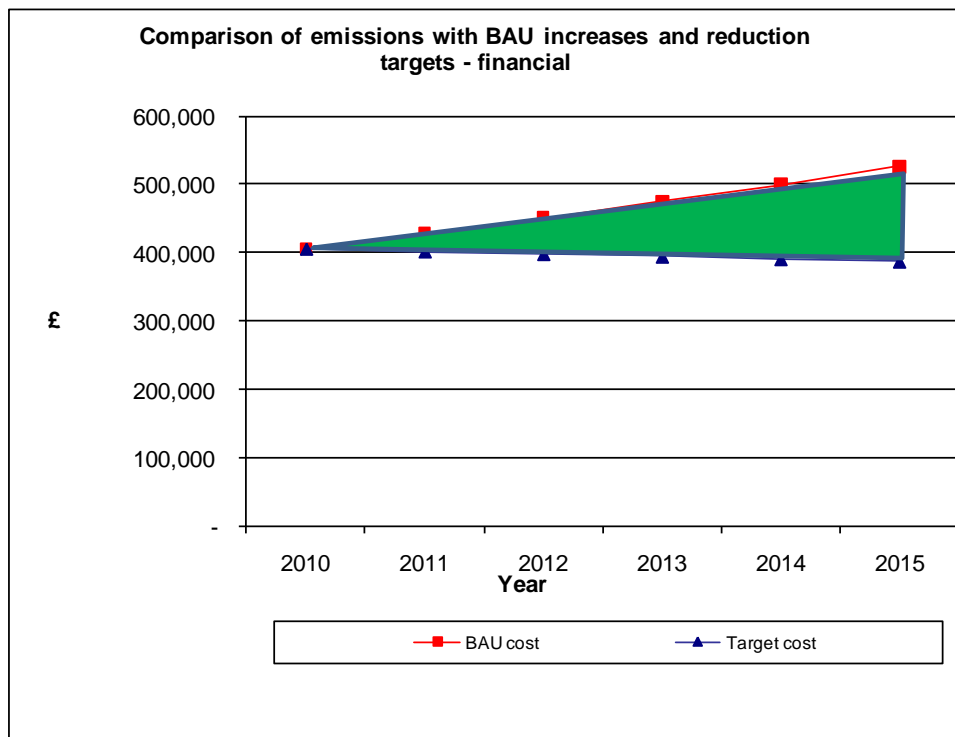
Under the BAU scenario our energy cost could rise from its current £405,643 pa to £525,750 by 2015. This equates to a cumulative value at stake of £380,380 over five years.

3.4   Display Energy Certificates

We have display energy certificates (DECs) for 2 of our buildings on the main campus, which are eligible based on their size and number of 'public' visitors per annum. Whilst every effort has been made to ensure the accuracy of the DECs, the 2 buildings, Northbourne and Maplesden Noakes do not have separate meter supplies so their energy consumption has been derived from their floor area and footfall compared to the total area covered by the meter. The buildings are both rated at C with scores of 68 and 65 respectively. For the purposes of these plans we do not consider that the DECs will help us prioritise our projects and carbon emission reductions as the majority of the recommendations in the Advisory Reports had low potential impacts. However, they will be reviewed to ensure that all aspects have been considered.

4   Carbon Management Projects

Projects have been identified that could achieve 95 % of our 25% target

This section of the plan lists and prioritises the opportunities identified for carbon emissions savings and sustainable practices that are critical to ensuring the college achieves the five-year reduction target.

The projects were identified through a variety of processes. We already had a portfolio of projects under our existing Sustainable Development Strategy. These included boiler upgrades, improved insulation, the installation of a voltage optimiser and pilot lighting upgrades. These projects had been funded partly through the rolling Estates maintenance budget and through grants and interest free loans from the SALIX FE carbon reduction fund.

We also had a programme of IT projects that were planned to reduce costs and equipment and improve resilience and a by-product of these projects was a reduction in carbon emissions, so we have been able to include them in our Carbon Management Plan.

Since February 2011, we had been investigating installing Solar PV panels on some of our large buildings. This has proved to be a moving target, with changes in installation cut off dates, reduced FITs and potential aggregation rule changes, all directed at deterring commercial gains from the scheme and focusing on the domestic market. We have decided to go for the roof-rental model on 2 buildings and have just had confirmation that planning permission has been granted.

Finally, over the last 3 years we had held several campaigns and competitions to increase awareness of sustainability. One of the major benefits of our involvement in this programme has been the greater awareness and buy-in from our Senior Management Team that has resulted in funding for a campaign across all campuses that we hope will bring longer term behavioural changes and corresponding reductions in emissions.

We quantified the projects to understand the cost and benefits of each of them. Some of these projects had already been quantified to determine whether they met the SALIX funding criteria, so these figures were readily available. Our programme technical advisor, Tim Crozier-Cole was able to help with the quantification of the IT and other projects. We then prioritised them based on cost, return on investment and ease of implementation. Cost is the major criteria given the funding constraints that we are under. However, we have been able to identify some projects, such as the removal of over-specified lighting in our new build that has cost nothing to implement, improved the working environment and will potentially save nearly 4,000 kWh a year.

There has been insufficient time and resources for us to analyse all the potential projects that we have identified and further projects will be quantified and included in the plan over the 5 year period. These include adding lighting controls, printer rationalisation, review of night time usage, smart metering and installation of e-cubes in the catering fridges and 'vending misers' for vending machines. Depending on their payback period for domestic fridges, we could also consider installing e-cubes in the residential and office kitchen fridges.

Space utilisation has also been reviewed, but progress had already been made on providing accurate timetables on room doors, minimising the use of rooms, especially mobiles, for short periods in a day and ensuring that staff who travel to our out-centres are based there all day where possible to reduce fleet mileage. Work will continue on this to identify rooms that are energy inefficient so that their use can be minimised, but the savings in carbon emissions will be difficult to identify and too small to have a meaningful impact on our target reduction.

A Carbon Management Projects Register will be maintained by the Sustainability Co-ordinator, who is also the Project Lead to record, quantify and evaluate projects on an ongoing basis.

The projects are split into the following sections:

- Existing projects: those that are being implemented or have been implemented since the baseline year and will therefore deliver savings with respect to the baseline
- Planned / funded projects: those that have already been approved and have funding allocated
- Planned projects requiring funding: planned project that have been quantified, but funding has not yet been allocated.
- Potential future projects: further opportunities have been identified where emissions reductions and savings are anticipated, but further work is needed to confirm the numbers.

The headings in the project tables below refer to:

- Ref – a unique reference for reporting purposes that corresponds to the Project Definition Template in Appendix A
- Project - short title for the project
- Lead– this is the individual lead / owner of the project.
- Costs – financial figures for:
  - Capital - the investment or implementation cost
  - Operational – revenue/running costs
- Payback period – the overall cost divided by the annual saving
- Net Present Cost (£) – future costs discounted to represent their value in today's money
- % of target – the percentage of your CO_2 saving target that this project will annually contribute

Note that the cost figures represent the marginal cost of the carbon / energy saving, rather than the full cost of the project i.e. the additional cost of choosing an energy efficient option beyond what would have had to have been implemented anyway. For example, where a boiler replacement project is necessary (e.g. as part of routine refurbishments) only the difference in costs between an energy efficient option and the basic alternative that would have been chosen is included. The savings likewise are the difference in energy savings between the energy efficient and basic version. Planned projects are described in more detail in Appendix B.

The following table summarises the total financial and carbon impacts of the projects that we have identified. The projects are described in more detail in subsequent sections.

Projects	Cost		Annual Savings (yr 1)		Average Payback (yrs)	Net Present Cost (£)	% of Target
	Capital	**Operational**	**Financial (Gross)**	**tCO₂**			
Existing	£199,504	£1,000	£35,402	248.2	4.48	-£154,041	58.9%
Planned/funded	£1,500	£320	£10,287	66.1	0.05	-£114,930	15.8%
Planned/funding required	£119,141	£0	£12,864	86.6	9.12	-£62,148	20.5%
Total	**£320,145**	**£1,320**	**£58,553**	**400.9**	**5.46**	**-£331,119**	**95.2%**

4.1   Existing projects

This section includes projects that are already underway or have been completed since the baseline year. 2010 is given as the implementation year for the first 3 projects but they were carried out in the

working with

summer recess, i.e. in the 2010/11 academic year so their savings can be counted towards the target reduction.

| Ref | Project | Lead | Cost | | Annual Savings (yr 1) | | Pay back (yrs) | Net Present Cost(£) | % of Target | Implementation Year |
			Capital	Operational	Financial (Gross)	tCO$_2$				
1	Voltage Optimiser	SB	£28,450	£0	£2,908	18.7	9.8	£5,993	4.4%	2010
2	Replacement boilers 1	DRH	£13,637	£0	£1,645	12.7	8.3	-£9,551	3.0%	2010
3	Virtualisation of servers yr 1	SL	£0	£0	£1,615	10.4	0.0	-£12,471	2.5%	2010
4	LESS campaign	SB	£5,000	£1,000	£7,579	48.6	0.8	-£23,482	11.6%	2011
5	PC log off scripts	SL	£0	£0	£4,058	26.0	0.0	-£31,331	6.2%	2011
6	Flat Roof insulation	DRH	£60,000	£0	£5,425	41.9	11.1	-£16,445	10.0%	2011
7	Virtualisation of servers yr 2	SL	£0	£0	£1,615	10.4	0.0	-£12,471	2.5%	2011
8	Replacement boilers 2	DRH	£85,917	£0	£9,000	69.5	9.5	-£40,929	16.5%	2011
9	Lighting optimisation	DC	£0	£0	£327	2.1	0.0	-£2,527	0.5%	2011
10	Replacement lighting yr 1	DC	£6,500	£0	£1,230	7.9	5.3	-£10,829	1.9%	2011
	Totals		£199,504	£1,000	£35,402	248.2	5.6	-£154,041	59.1%	

4.2 Planned / funded projects

This section shows projects that are definitely planned to take place and have funding allocated. The IT projects were planned replacements from the maintenance budget so no funding has been allocated to this project. Similarly the Solar PV installation will be installed using the roof rental model so only minimal costs are included.

| Ref | Project | Lead | Cost | | Annual Savings (yr 1) | | Pay back (yrs) | Net Present Cost(£) | % of Target | Implementation Year |
			Capital	Operational	Financial (Gross)	tCO$_2$				
11	Solar PV	SB	£1,500	£320	£6,527	41.9	0.2	-£85,982	10%	2012
14	Virtualisation of servers yr 3	SL	£0	£0	£1,615	10.4	0.0	-£12,471	2.5%	2012
17	Virtualisation of servers yr 4	SL	£0	£0	£1,615	10.4	0.0	-£12,471	2.5%	2013
15	PC replacement	SL	£0	£0	£530	3.4	0.0	-£4,096	0.8%	2013
	Totals		£1,500	£320	£10,287	66.1	0.1	-£114,930	15.8%	

4.3   Planned projects requiring funding

This section lists projects that we plan to do but are not yet funded. Project 12, boiler valve insulation will be strongly recommended as the cost is low and there will be considerable benefit from the carbon reduction emissions. It is hoped that this project that only costs £5,290 + VAT can be absorbed within the 2012 maintenance budget.

Projects 13, 16 and 18 are based on a 2010 previous survey of the T8 lighting in the main teaching and office blocks and are for their replacement with LED lighting. These figures need to be reviewed to determine current costs both of energy and replacement lights. T8 to T5 retrofits are now available and we have a pilot project (10) running to see if the lighting levels are sufficient. This is a much cheaper project to implement so if there are no issues with the retrofits we will consider replacing the LED upgrade with the T5 retrofits. It is hoped that we will be able to fund either project through SALIX loans if the payback period are within their criteria, especially if we go for the cheaper option. The funding options are explored in more detail in section 5.1.

| Ref | Project | Lead | Cost | | Annual Savings (yr 1) | | Pay back (yrs) | Net Present Cost(£) | % of Target | Implementation Year |
			Capital	Operational	Financial (Gross)	tCO$_2$				
12	Boiler valve insulation	MLT	£6,348		£3,171	24.5	1.7	-£38,349	5.8%	2012
13	Replacement lighting yr 2	MLT	£37,598		£3,231	20.7	11.6	-£7,933	4.9%	2012
16	Replacement lighting yr 3	MLT	£37,598		£3,231	20.7	11.6	-£7,933	4.9%	2013
18	Replacement lighting yr 4	MLT	£37,598		£3,231	20.7	11.6	-£7,933	4.9%	2014
		Totals	£119,141		£12,864	86.6	9.26	-£62,148	20.5%	

4.4   Potential future projects

This section lists further projects under consideration that are not yet funded. As previously stated there has been insufficient time to analyse the benefits of these projects and further work is needed to evaluate the projects in more detail.

- Smart metering
- Review of night time usage
- Lighting controls
- Catering efficiency, e.g. e-cubes and vending-miser
- Review of current heating controls
- Printer rationalisation

4.5   Projected achievement towards target

The figure below shows how far the existing and identified (planned and potential) projects take us towards the target. If all these projects are implemented, we expect to achieve 95% of our targeted savings. We will need to identify further a 20 tonnes of emissions savings to fill the gap and make up for the BAU upward drift. We have already identified several projects that could be investigated that we believe will be cost effective and help deliver the required savings.

The following mechanisms are either already in existence or will be put in place to ensure sustained project pipeline; suggestions to the Sustainable Development committee, regular cross campus "opportunities" walk rounds, green champion network, membership of EAUC and other sustainable communities and regular networking with other Colleges to identify best practice.

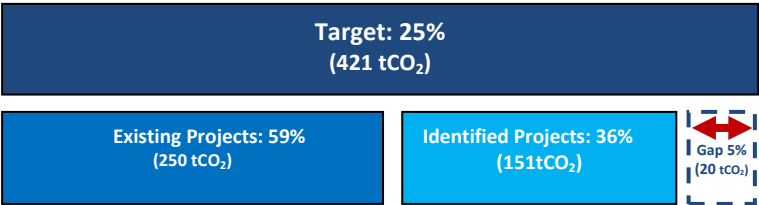| Target: 25% (421 tCO$_2$)		
Existing Projects: 59% (250 tCO$_2$)	Identified Projects: 36% (151tCO$_2$)	Gap 5% (20 tCO$_2$)

Fig 4: Projects identified against target and the carbon gap. The top box shows our 25% target reduction and the lower boxes show the % of that target met by existing and identified projects.

Figure 5 below shows predicted business-as-usual (BAU) emissions and the target emissions. The 'emissions in chosen plan' plot shows the emissions reductions from the projects scheduled in the duration of this plan. This plot includes the effect of BAU forces, so for example if in year three no additional projects were implemented the emissions would then trend back along the BAU line. Also the impact of project life is included, so if a short life project is finished (e.g. awareness raising) before the end of the programme (and not maintained or repeated) the trend would show a stepwise increase in emissions. Finally a degradation factor is included. This assumes that over the life of a project its carbon saving impact will decrease due to factors such as business focus being diverted to other initiatives, projects not being maintained and also % savings becoming smaller as a building becomes more efficient.

By including these effects we are trying to model some of the real life factors that may impact on our ability to meet our target. Because of these additional factors the plot does not directly agree with a simply summed list of the carbon saving impact of the projects.
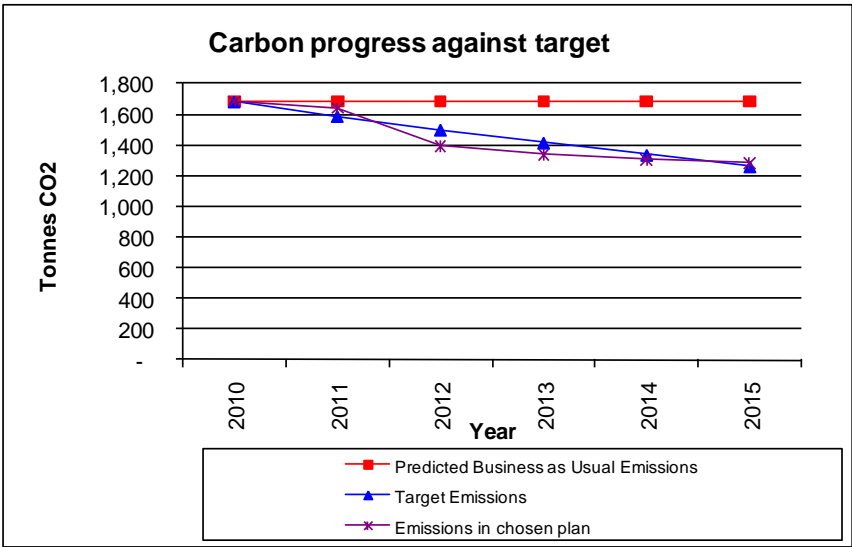

Fig 5: Projection of impact of projects on meeting carbon target

5   Implementation

This section covers the main elements required to move from planning to implementation.   This includes our financing strategy, governance structure, monitoring and reporting mechanisms. We also describe the activities that will help us embed carbon management within the College and drive the changes in behaviour that will lead to long-term, sustained savings and low carbon practice.

5.1   Carbon Management Plan Financing

In Section 4 we have described the projects we will implement to achieve our target; we have also identified capital and revenue costs for these projects. This section summarises the funding required year by year, describes where it will come from and identifies any gaps where funding may not yet be secured.

To implement the projects defined in this plan it will cost £320,145 of which £201,004 has already been allocated, leaving £119,141 yet to be found.

When all these projects are implemented it will result in estimated annual financial savings / cost avoidance of £58,551. The average payback period of the projects in this plan is 5.46 years.

5.1.1   Financial costs and sources of funding

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Annual costs:						
Total annual capital cost	£42,087	£157,417	£45,446	£37,598	£37,598	£0
Total annual revenue cost	£0	£0	£1,320	£1,320	£1,320	£1,320
Total costs	£42,087	£157,417	£46,776	£38,918	£38,918	£1,320
Committed funding:						
Committed annual capital	£42,087	£157,417	£1,500	£0	£0	£0
Committed annual revenue	£0	£0	£1,320	£1,320	£1,320	£1,320
Total funded	£42,087	£157,417	£2,820	£1,320	£1,320	£1,320
Unallocated funding						
Unallocated annual capital	£0	£0	£43,946	£37,598	£37,598	£0
Unallocated annual revenue	£0	£0	£0	£0	£0	£0
Total unfunded	£0	£0	£43,946	£37,598	£37,598	£0

The total cost of implementing the projects in this plan has been estimated at £320,145 over five years, of which £201,004 has already been allocated from the following sources:

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Salix loans	£42,087	£157,417				
Internal capital budget			£1,500			
Total Committed funding:	£42,087	£157,417	£1,500			

The college has had a successful track record of securing SALIX funding over the last 3 rounds, as can be seen from the table above, and we are confident that we will be able to secure further funding for the lighting upgrade projects that account for £113,874 of the currently unsecured funds. At the time of writing SALIX have just announced a further scheme and it is possible that we will be able to bring forward the 2102 lighting project to this academic year. Furthermore, we will be reviewing the results of the current replacement lighting pilot using the T8 to T5 retrofits and if this continues to be successful we may vary the projects to continue with this rather than replacement by LED. The decision will be based on replacement costs and energy/carbon savings, but the retrofit option is considerably cheaper. The remaining unsecured funds are for the boiler valve insulation project, which we hope to incorporate within the maintenance budget.

5.1.2   Assumptions

Key assumptions underlying our financial projections are:
- Electricity cost of 9.1p in the baseline year and an annual increase of 5.8% in the following years
- Gas cost of 2.8p in the baseline year and an annual increase of 5.8% in the following years
- There will be no increase in student numbers and no major campus developments. If significant developments are identified subsequently their impact will be added to the BAU emissions.

5.1.3   Benefits / savings – quantified and un-quantified

	2010	2011	2012	2013	2014	2015
Annual cost saving	£0	£6,168	£41,928	£49,945	£55,321	£58,551
Annual CO$_2$ saving	0	42	290	345	380	401
% of target achieved	0%	10%	69%	82%	90%	95%

Unquantified benefits:

- Our involvement in this programme provides an important message both internally and externally, that we have a robust and comprehensive grasp of our carbon footprint and have a clear roadmap to reduce it.

- The need for data capture of energy and water consumption has been recognised and formalised and is not seen as 'a nice to have'.

- It has provided weight to the argument that not only should we be capturing our energy and water consumption, we should also be actively monitoring and reviewing it.

- Publishing clear reduction targets and our progress towards them will encourage reciprocal sustainable behaviour from staff and students.

- We've signed up to the Green Impact scheme as one of the projects in this programme. An unquantifiable benefit of this scheme is the establishment of a sustainable champion network that helps embed behavioural change across the campus.

5.2   Embedding Carbon Management across the College

Beyond the set of initiatives identified above, it is important that organisational changes are put in place to maintain a focus on carbon management over time. The Carbon Management Maturity Matrix at Appendix A shows the different areas of embedding, our current level and what we plan to achieve during the next 5 years.

This section describes the main activities and changes that will help us achieve this.

- Our 2008 Sustainable Development Strategy created actions that would deliver energy, water and waste reductions, many of which had already been implemented. Work had therefore begun on an updated 3 year Sustainable Development plan and the projects in this plan will be included in the larger action plan. The targeting and reporting aspects of the CMP are a natural progression to this strategy and will be included in its existing reporting cycle.

- The Project Sponsor provides a lead at Executive level. He is chair of the existing Sustainable Team that has regular meetings every 12 weeks and sustainability is reported to the Board. Progress against our target reductions will be included in this report.

- Our involvement in the Green Impact scheme will see the creation of sustainable champions across all areas of our 3 campuses. The programme runs over several months, which will help embed behavioural change. Teams complete on-line workbooks to gain bronze or silver awards and there are awards for the most successful team. The launch event and lunch time drop-in sessions for support will help establish a champion network. It is hoped that this scheme will help the longevity and effectiveness of our 'LESS' campaign.

- FE residential students are a difficult target area to influence. They have had no previous experience of paying bills and they don't pay for their energy consumption separately, so they have no incentive to act in a sustainable way. We have engaged with the cleaners and intend to award good behaviour and point out poor behaviour, e.g. leaving on lights, computers, radios and other electrical equipment when they've left their rooms. Having installed sub-meters in each student house, we also intend to hold inter-house energy saving competitions. We have also engaged with 2 current representatives from the Student Association, who have already started contributing ideas to help influence students.

- The profile of sustainability within the college has been steadily increasing over the past 4 years. In addition to regular emails, competitions and posters, there is now a sustainable article in our bi-monthly staff newsletter – Planet Hadlow, a dedicated micro site on the main college website and sessions were included in a recent staff development day. There is also a section on sustainability in the student handbook. We have agreed that we will include a Sustainable section on Moodle, which will contain resources, information and be an area for reporting progress that is readily available across staff and students.

- We are formalising the role of the Duty warden to make it a defined part of his job to ensure lights and equipment are switched off when it is safe to do so and heating and ventilation is left at acceptable levels. He does this informally already, but it is felt that this change will raise the importance and profile of sustainability.

- The quantification aspects of this programme have been quite demanding, especially where it hasn't been possible to provide a clear detailed breakdown of savings. It has however provided a framework for monitoring and measuring progress and enabled us to understand the energy and cost benefits of some of our existing and proposed projects. We intend to regularly report progress against targets as part of our LESS campaign, to demonstrate that continued vigilance and actions do produce results.

- Our assessment of our current position on the Carbon Management Maturity Matrix identified several areas that we wanted to improve upon over the next 5 years. Responsibility was one of these areas and we intend to work with HR to see if it is appropriate to include carbon saving responsibilities and targets in relevant job descriptions.

- Data management was also seen as a challenging area and in response to this we have created an Energy Policy, which is included as Appendix C. This includes steps to address this issue.

- The standard interview pack for job-candidates already includes a question on sustainability. It is intended to introduce sustainability into the induction programme for new appointees.

- We will trial the Ascentis sustainability training module and will include it as a CPD option if it is considered to be suitable.

- The CMP will be the vehicle for reporting our progress over the next 5 years and will absorb the existing actions from the sustainable team.   The Sustainability Co-ordinator will maintain the plan and responsibilities will be agreed and allocated by the Sustainable Development team meetings that are chaired by the Project Sponsor.

Ref	Change Action	Owner	When complete
1	Roll out the Green Impact scheme across college and provide support to champions	SB	July 2012
2	Engagement with Student Support Services, cleaners and Sustainability Warden to change residential student behaviour	SB/SL/WW	May 2012
3	Create Sustainable Section on Moodle	SB	Jan 2012
4	Include sustainability at Hadlow into the induction programme	SB/EC	Mar 2012
5	Trial training module as potential CPD module	SB	Mar 2012

5.3   Programme Management of our carbon management programme

In this section our governance structure for carbon management is shown. The following sections provide further detail of who is responsible for which areas of work and how progress is reported.

5.3.1   The Programme Board – strategic ownership and oversight

The table below describes the roles and responsibilities of the Programme Board.

Role	Name and position in the College
Project Sponsor & Chair	Mark Lumsdon-Taylor, Director of Finance and Resources
Finance Champion	Mark Lumsdon-Taylor
Co-Sponsor	Lynda Brown, Vice Principal
Co-Sponsor	Harvey Guntrip, Governor

The terms of reference for the board are derived from the FECM Project Plan that was one of the first deliverables from this programme. They are:

1. To provide senior leadership direction and endorsement for the Carbon Management Plan
2. To review and agree strategic approach and challenging targets
3. To prioritise and support the financial provision for Carbon Management projects
4. To externally promote the college's achievements and effect cultural change within the organisation
5. To monitor and review progress on a termly basis at the Finance and General Purposes Committee to ensure all targets are met.

The Programme Board does not have separate meetings; instead the progress against plan is incorporated into the SMT meetings and reported on a monthly basis to the SMT and Governors. This progress is currently shown using the report produced following the monthly conference call, which shows the overall status, using traffic light indicators and the latest position on the maturity index. Sustainability and related projects are included in the College's Risk Register which is regularly reviewed. Management reports will be issued to the Executive Group on a termly basis.

When the current programme is completed, progress reporting will be against the project implementation plan that is an output of the programme. In addition, performance against target using actual consumption figures will be reported to the board and to the rest of the college.

5.3.2   The Carbon Management Team – implementing the projects

The Carbon Management Team has been incorporated into the existing Sustainable Development Team that met every 12 weeks. During this programme the frequency has increased to every 6 weeks.

Role	Name and position in the College
Project Sponsor & Chair	Mark Lumsdon-Taylor, Director of Finance and Resources
Project Leader	Sue Brimlow, Sustainability Co-ordinator
Carbon Management Team members	Mandy White, Facilities
	Dave Charrington, Estates
	Dave Hammond, Capital Projects
	Stephen Liffen, ICT
	Judith Bellingham, Student Support Services
	Derek Payne, Head of Faculty
	Neil Lakeland, Marketing
	Howard Lee, Sustainability Champion
	Kate Moore, Finance
	Graeme Collie, ABM Catering
	Pat Crawford, Press
	Dave Arthur, SA
Sustainable Development Team members	Lesley Mason, Associate Principal Curriculum
	Bev Cleves, Associate Principal Student Support Services

This team has been reviewing and monitoring sustainable actions for the past 3 years and is the forum for discussing and agreeing new projects. It is the logical place to continue to review progress against the Carbon Management Plan. Agendas are sent out prior to meetings and minutes and action plans produced following each meeting.   The terms of reference for this team have been updated to reflect the work on the CMP and are:

1. To provide support and input to the delivery of the Carbon Management Plan
2. To actively encourage sustainable behaviour within their teams and across campus that will provide cultural shift
3. To provide a framework that ensures projects are prioritised and co-ordinated, and all deadlines met
4. To meet to monitor progress against targets every 2 months
5. To promote the wider aspects of sustainability that are relevant to a land-based college
6. To engage and educate all stakeholders including staff, students and business on sustainable issues
7. To work collaboratively to propose and help deliver future projects
8. To help promote the college's efforts to a wider audience.

5.3.3   Succession planning

Responsibility for this programme comes under the remit of the Director of Finance and Resources and the present incumbent is Project Sponsor. Sustainability, energy consumption and cost control are key aspects of this role and would continue if there were any personnel changes.

The Project Lead is the Sustainability Co-ordinator. This role is currently in the Business and Commercial Development Unit (BCDU), and is a direct report to the Director of Finance and Resources. The role has support at Executive and Senior Management Team level.. This role was not under threat in the 2011 comprehensive spending review although there were other redundancies in this unit. The energy and cost saving benefits of this role, together with the successful funding applications to date, ensure the longevity of this role.

A benefit of this programme has been the more active and collaborative roles taken by other members of the Carbon Management Team. Estates will start taking meter readings and monitoring usage and Finance will be entering the consumption figures from invoices into the Energy Management database. In addition, the implementation of the Green Impact workbook scheme, under the LESS campaign, means there will be a network of up to 15 Sustainable Champions across the college, and the resulting network will ensure that the links and contacts that are currently concentrated on the Sustainability Co-ordinator role can be disseminated to a wider community, ensuring adequate succession planning is in place.

In addition, all relevant information (documents and directories) are stored in the Carbon Management Plan folder on the BCDU drive. Currently, the energy and water consumption data is stored on the Energy Management sub-directory in the Sustainability folder also on the BCDU drive. This drive is backed up daily.

The Carbon Management Team is an expansion to the existing Sustainable Development Strategy team that met 4 times a year to report on progress against the Sustainable Development action plan. As stated previously, the CMP will be included in this action plan and progress will continue to be reported to the team and SMT.

5.4 Monitoring and Reporting

This section describes actions we will take to improve the quality of carbon emissions data and the data gathering process, and how will we report on our progress. Robust data will provide us the basis to monitor and report on the results of our actions and it will help to drive behaviour change.

Data and monitoring

The following actions have been agreed with regards to data and monitoring:

Ref	Change Action	Owner	When complete
1	Revise the historical data collection to be tracked against academic rather than calendar year	SB	Complete
2	Create a separate Finance file for utilities invoices to improve access to them	KM	1/11/11
3	Finance to take over the data entry of consumption figures	KM	TBC
4	Review the design of the expense forms to see if individual travel modes can be identified	SB/GS	TBC
5	Take monthly electricity, gas and water readings	DC	TBC
6	Create energy monitoring and targeting database and monitor consumption	SB/DC/MW	TBC
7	Include specific responsibilities for consumption monitoring within a job role	SB/HR/DC	TBC

Data collection and consumption monitoring of water, electricity and gas had been carried out on ad-hoc basis, prior to this programme. Data had been collected from invoices, many of which contained estimated readings as there was no regular in-house meter reading.   The manual process for intercepting the invoices was not always followed, which became obvious when we needed accurate data for DEC renewals or Carbon Trust audits. Trying to track down invoices in Finance was time consuming as they were filed by posting date and it was normally quicker to ask either KCC Laser or other suppliers to provide us with scans or reprints of the missing data. We went back to the suppliers of diesel to obtain the required figures for our baseline for fleet information. In addition, data had been collated per calendar year, whilst for this programme we have decided that academic year is a more suitable period to report against.

Finance scan in invoices and file paper copies, but were only concerned with the financial figures. Facilities, part of Estates department, control the budget for utilities and query bills that seem unusually high but there is no ongoing analysis or comparison against expected consumption. They do work with external consultants to ensure that we obtain the best tariffs. Furthermore, in April 2009 the college signed up to AquaFund, a programme that delivers water savings through the implementation of water savings devices.   It also monitors unusual consumption and has changed some of the accounts to better tariffs.

 Mileage is captured on staff expense forms but other travel is captured on one expense code, so it is not possible to distinguish between train, tube or air travel. We will investigate whether this expense code can be broken down into these categories, although air travel is minimal.

A by-product of this programme is an Energy Policy (Appendix C) that clearly articulates our aims and objectives to reduce our carbon emissions. An action deriving from this policy is for Estates operatives to take monthly gas, electric and water meter readings for those meters that are not read automatically and provide them to the suppliers. We will produce an energy monitoring and targeting database for Estates to record energy consumption by area so that Facilities can monitor consumption and validate emission reduction targets.

The tasks deriving from the embedding actions and changes in data monitoring will be included in the overall action plan that includes the specific carbon-emission projects, providing a comprehensive plan of all the work that needs to be done to deliver the longer term objectives of the programme and embed behavioural change.

Regular progress reporting
Sue Brimlow, the Project Leader, will report on progress of the carbon management programme monthly to the Project Sponsor, who will then escalate any issues or concerns to the Project Board. The progress will also be reported at the Sustainable Development team meetings. The regular progress report will be based on the existing monthly progress report and will cover:

1) the progress and status of current projects in tabular form, with owners, target dates and progress updates and Red, Amber, Green (RAG) reporting, to highlight attention on
2) the top 3 risks / issues to the programme – this will help the Board remove barriers and obstacles
3) progress on our Key Performance Indicators (KPIs), such as % of target achieved, or carbon and financial savings with respect to the baseline, although this will be historical information until the consumption recording and monitoring database is fully operational

Annual reporting

Sue Brimlow, the Project Leader, will compile an annual report each March to report on progress of the carbon management programme. The report will be signed-off by the Project Sponsor and submitted to the Programme Board, Governors, made available to all staff and students via the intranet and externally on the College's website. The annual report will cover: our targets, progress against them and case studies that demonstrate successful strategies.

Communication of progress to stakeholders

We will communicate our performance to staff, students and other stakeholders and use this as an opportunity to raise awareness of the carbon implications of their behaviour.   A separate communications plan will be produced to encapsulate this and will include the actions that have been identified elsewhere in this plan; e.g. monthly progress reports to the Project Sponsor, bi-monthly staff updates in Planet Hadlow, regular updates on Moodle and the website that will be every term as a minimum.   Reporting our progress against targets will be a valuable tool to raise the profile of our sustainable efforts.

Follow up by the Carbon Trust

The Carbon Trust will follow up annually with the Project Leader to measure the level of progress against the projects defined in this plan.

working with

Appendix A: Carbon Management Matrix – Embedding

Now	5	3	2	3	3	2	3
In 5 years	5	5	4	5	4	4	5
Challenge			X		X		
	POLICY	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION & TRAINING	FINANCE & INVESTMENT	PROCUREMENT	MONITORING & EVALUATION
Best **5**	• SMART Targets signed off • Action plan contains clear goals & regular progress reviews • Strategy launched internally & externally	• CM integrated in responsibilities of senior managers • Principal and Vice Principal support • Part of all job descriptions	• Quarterly collation of CO2 emissions for all sources • Data externally verified • Monitoring and Targeting in place for: - Buildings - Transport - Waste	• All staff & students given formalised CM: - Induction - Regular training (incl. accreditation courses) - Communications - Performance updates • CM matters regularly communicated to: - External community - Key partners	• Granular & effective financing mechanisms for CM projects • Finance Director actively involved • Robust task management mechanism • Ring-fenced fund for carbon reduction initiatives	• At least Level 2 on the flexible framework achieved (Whole-life costing, supplier engagement, key sustainability risks used for prioritisation) • Regional procurement for key categories	• Senior management review CM process • Core team regularly reviews CM progress • Performance published externally on website • Visible senior engagement
4	• SMART Targets developed but not implemented	• There is an individual with clear responsibility for CM (full- or part-time)(• CM integrated in to responsibilities of key staff	• Annual collation of CO2 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	• Familiarity with the sustainable procurement flexible framework [1] • Regional and local procurement initiatives consider carbon	• Core team regularly reviews CM progress: - Actions - Profile & Targets - New opportunities quantification
3	• Draft policy • Climate Change reference	• CM is part-time responsibility of a 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	• General sustainability criteria occasionally included in key contracts • Products considered in isolation	• Ad hoc reviews of CM actions progress
1 **Worst**	• No policy • No Climate Change reference	• No CM responsibility designation	• No energy data or CO2 emissions compiled • Estimated billing	• No communication or training	• No internal financing or funding for CM related projects	• No sustainability criteria • No life cycle costing	• No CM monitoring

Appendix B: Definition of Projects

Project: Reference:	Voltage Optimiser Ref: CMP1
Owner (person)	Sue Brimlow
Department	BCDU
Description	This project was originally identified in 2008 and power consumption was analysed to determine its viability. It met the compliance criteria for a SALIX loan and was installed on the power supply to the main campus in September 2009. Due to fluctuating voltage supply it had to be upgraded to a PowerPerfector Plus device in April 2010. It reduces energy consumption, increases the working life of equipment and reduces maintenance costs.
Benefits	- Financial savings: £ 2,908 in the 2010/11 academic year - Payback period: 9.8 years (This is longer than the original estimate due to the optimiser being out of action for 6 months) CO_2 Emissions reduction: 18.7 tonnes of CO_2 - This is 4.4% of our target reduction These figures are based on the actual savings posted on the PowerPerfector Green Gauge extranet.
Funding	- Project cost was £28,450 - There are no operational costs - The project was funded by a SALIX interest free loan. - The project has already been implemented
Ensuring Success	- We had to liaise with the DNO as they had to be involved in the installation - The main power supply had to be switched off for several hours during the installation so we had to select a date during breaks when the students were not on site and also - Check that the garden centre and team room would still function - There were no other commercial bookings that day - Arrange for servers to be switched off and on in a controlled manner - Disable alarms and enable them again. - Ensure that no other college facilities were impacted e.g. hatchery
Measuring Success	Savings can be measured using the Green Gauge facility as above and monitored when required
Timing	- The first optimiser was installed in September 2009 and the improved model was installed in April 2010 - Accurate timings were essential to avoid disruption to the colleges functionality
Notes	The suppliers have a proven track record in this field. Several data logging surveys were held and half hourly electricity consumption figures were analysed to ensure that the savings were justifiable

| Project:
Reference: | **LESS Campaign**
Ref: CMP 4 |
|---|---|
| **Owner (person)** | Sue Brimlow |
| **Department** | BCDU |
| **Description** | A behavioural change and awareness campaign to encourage more sustainable behaviour across campus. Visual components include a phone app, pop-ups, stickers on lights and equipment, water bottles, mugs and t-shirts and screen messages. It will be sustained by signing up to the Green Impact scheme that awards points for sustainable actions by individual teams. |
| **Benefits** | • Financial savings: £ 7,579pa
• Payback period: 0.8 years
• CO_2 Emissions annual reduction: 48.6 tonnes of CO_2
• This is 11.6% of our target reduction
These savings were derived from taking the annual energy costs for those areas that are used by staff and students, e.g. excluding areas such as the retail centre and dairy and calculating a 5% reduction. |
| **Funding** | • £5,000 was spent on pop-ups, water bottles, a phone app and associated material.
• It is estimated that there will be an ongoing annual cost of £1,000 to replenish material.
• This has been funded from the internal central and marketing budget.
• The campaign was launched on the 12th October. |
| **Resources** | • The project was delivered by Marketing and BCDU
• The phone app was provided by an external company for £4,000 |
| **Ensuring Success** | • This campaign needs to be continually refreshed and reinforced for it to deliver continuous reductions. This will be achieved by;
  o Reinforcement messages to staff and students delivered by the duty wardens and cleaners.
  o Participation in the Green Impact scheme
  o Displays at out-centres
  o Inclusion in Staff Development Days
  o Inter-house student competitions
  o Opportunity walk rounds
• The principal risk is that behavioural change is not maintained. The campaign also needs to be re-launched each year to capture and engage the new cohort of students. |
| **Measuring Success** | • Achievement against target will be measured by the publication of our current carbon footprint and comparison against the target reduction.
• This will be done on a termly basis, to allow for collation of the figures. |
| **Timing** | • The campaign was launched on 12th October 2011
  o The Green Impact 11/12 campaign will be rolled out on 6th February
  o The campaign will last for 5 years with a refresh each academic year |
| **Notes** | • The savings were calculated during the on-site day and are recorded in the project savings spreadsheet. |

Project: Reference:	**Virtualisation of servers Yr1, Yr 2, Yr3 and Yr4** Ref: CMP 3, 7, 14 & 17
Owner (person)	Stephen Liffen
Department	IT
Description	Using the multiple processors available in modern servers, one physical server can be converted into multiple virtual machines. Each virtual server acts like a unique physical device. The reduction in the number of physical servers needed means reduced energy, space and air-conditioning requirements.
Benefits	• Financial savings: £ 1,615 pa for each project • Payback period: 0 years as servers were replaced as part of planned and budgeted upgrades • CO_2 Emissions reduction: 10.4 tonnes of CO_2 pa per project • These 4 projects combined deliver 10% of our target reduction These savings were calculated by multiplying the power usage per physical server by the usage time of 24/7.
Funding	• There was no cost associated with this project, it was delivered as BAU. • The first 2 projects were implemented annually and were successfully delivered in August 10 and 11 by the IT team. The further 2 will be delivered in August 12 and 13 by the same team
Ensuring Success	• This is a recommended model for reducing power consumption of servers and air conditioning units • Use of industry standard software, either Microsoft's Hyper V or Virtual Server 2005 platform • This project is repeated each summer for 4 years so the implementation can be fine-tuned based on past experience.
Measuring Success	• The success is immediate as 2 servers are de-commissioned each summer leading to an instant saving in power consumption that leads to annual power saving of 19kWh
Timing	• The servers are upgraded during the summer break when network traffic is very low and disruption is minimal. • IT staff holidays are managed to ensure that staff are available to do the upgrades
Notes	The savings were calculated during the on-site day and are recorded in the project savings spreadsheet.

Project: Reference:	**Flat Roof insulation** Ref: CMP 6
Owner (person)	Dave Hammond
Department	Capital Builds
Description	The Carbon Trust audit carried out in February 2011 identified that the flat roofs of the Northbourne building, which houses offices, the restaurant and the library were un-insulated and would benefit from exterior foam roof insulation.
Benefits	• Financial savings: £ 5,425 pa • Payback period: 11.1 years • CO_2 Emissions reduction: 41.9 tonnes of CO_2 pa • This is 10% of our target reduction
Funding	• The overall project cost was £80,000 • The insulation was guaranteed for 25 years • £60,000 was to be met by a SALIX interest free loan and the remainder from the maintenance budget. • This project has already been implemented.
Resources	• The insulation would be carried out by a specialist firm.
Ensuring Success	• The installers requirements for access and electrical supplies had to be met
Measuring Success	• The success of this project will be measured by comparing the monthly gas and electrical consumption for the site before and after the implementation. • There is no separate meter for this building, so it will be difficult to separate the savings for this project from the total savings delivered across the site
Timing	• Scaffolding was required for the installation so timings were important to ensure staff and student safety and minimise disruption
Notes	The figures for savings were based on the calculations from the Carbon Trust audit.

Project: **Reference:**	**Replacement boilers 2** Ref: CMP 8
Owner (person)	Dave Hammond
Department	Capital Builds
Description	The Carbon Trust audit carried out in February 2011 identified that the Northbourne boilers that provided heating and hot water for the main office, library and catering block were inefficient and would generate considerable savings especially if seasonal efficiency could be incorporated
Benefits	• Financial savings: £9,000pa • Payback period: 9.55 years • CO_2 Emissions reduction: 69.46 tonnes of CO_2 pa • This is 16.5% of our target reduction, based on the estimated calculations of the proportion of the gas consumption used by Northbourne.
Funding	• The project cost was £85,917 • There are no additional operational costs as we already had an annual maintenance contract • The project was funded by a SALIX interest free loan. • The project has already been implemented
Ensuring Success	• The contractors who maintain the college's boilers were used as they fully understood the old system meaning there were no unexpected problems
Measuring Success	• The success of this project will be measured by comparing the monthly gas and electrical consumption for the site before and after the implementation. • There is no separate meter for this building, so it will be difficult to separate the savings for this project from the total savings delivered across the site by other projects.
Timing	• The project was implemented during the summer vacation when the boilers could be decommissioned without causing any disruption to staff and students.
Notes	These figures were based on the calculations from the Carbon Trust audit.

Project: Reference:	**Solar PV on suitable buildings** Ref: CMP11
Owner (person)	Sue Brimlow
Department	BCDU
Description	We plan to install solar PV on 2 suitable buildings and benefit from free electricity. The financial model has changed since the project was first proposed due to changes in FITs and installation deadlines and our current proposal is to go for a roof rental scheme on the Equine Ménage and AMU site.
Benefits	• Financial savings: £ 6,527pa • Payback period: 0.24 years • CO_2 Emissions reduction: 41.9 tonnes of CO_2 pa • This will contribute 10% of our target These figures are based on suppliers' quotations.
Funding	• There is a low cost of £1,500 associated with the roof rental attributed to planning applications and electrical upgrades, which will be met from our reserves
Resources	• The installations will be carried out by the suppliers
Ensuring Success	• Planning permission is essential and any further changes to the FIT will render this proposal uneconomic
Measuring Success	• Savings will be measured via monthly meter recordings
Timing	The timings will be specified by the installers who are responsible for the installation. Key milestones are • Planning application decision – confirmed 12/12/11 • Installation certification deadline – 31/03/12
Notes	The suppliers have undertaken site surveys to determine suitability, orientation, lack of shading and have produced comprehensive assessments of the potential output from the panels

Appendix C: DRAFT ENERGY POLICY

HADLOW COLLEGE ENERGY POLICY

Hadlow College is determined to play a full part in delivering on the collective responsibility to reduce carbon emissions. Our Strategic Plan, covering the period 2010 to 2015, includes the strategic objective "To ensure a sustainable economic future for the organisation that maximises the best use of resources and partnerships". This energy policy provides a framework for delivering this objective in relation to our energy consumption.

Hadlow College;

1. Recognises the need to take action on the causes and effects of climate change.

2. Is committed to reducing its carbon emissions by 25% from the 2009/10 baseline by July 2015.

3. Will prepare and maintain a carbon management plan.

4. Will promote a culture of energy awareness and individual responsibility throughout the organisation.

5. Will ensure that all staff receive an appropriate level of training and information in order to support its energy policy aims.

6. Maintain a reporting system that ensures that all staff receive or can access relevant information about the energy use in their area.

7. Maintain an energy monitoring & targeting system in order to identify energy wastage, verify energy reduction projects, verify utility bills and provide consumption forecasts for budgeting.

8. Will regularly review tariffs and suppliers to ensure that energy is supplied at lowest cost.

9. Will take a strategic approach to energy by integrating its energy efficiency objectives within the estate strategy.

10. Will include energy efficiency considerations and adopt best practice when procuring buildings, equipment or services which have a direct or indirect impact on energy use.

11. Will adopt best practice design, construction and commissioning standards in all new build and refurbishment construction projects to maximise energy, health and comfort benefits.

12. Will adopt a life-cycle costing approach to the assessment of capital purchase and building design options, so that the benefits of those options with lower energy running costs can be fully realised in the analysis

13. Will consistently maintain a comfortable environment for users of all premises. This shall be done without use of supplementary portable heaters or air conditioning, unless authorised by the Estates Department. Requests shall be evaluated using a standardised, formal and transparent process.

ACTIONS DERIVING FROM THIS POLICY

1. We will participate in the Green Impact workbook and run other campaigns to reinforce staff awareness.

2. We will include sustainability and energy awareness in staff induction and staff development training.

3. We will produce an energy monitoring and targeting database to record energy consumption by area to monitor consumption and validate emission reduction targets.

4. We will provide a reporting system on the intranet to show the above consumption figures.

5. We will take monthly gas, electric and water meter readings for those meters that are not read automatically and provide them to the suppliers on-line and enter them into the recording system.

6. We will monitor consumption to determine anomalies and identify areas for improvement and to verify utility bills.

7. We will allocate responsibility for energy management and monitoring to a specific role to ensure there is ownership.

8. We will ensure that energy considerations and life-cycle costing are included in capital projects and procurement criteria

9. We will audit current energy settings including; thermostat settings and location, timers for heating, hot water and lighting, air-conditioning settings and lighting intensity and ensure they are set to the optimum levels for comfort and efficiency. Once this has been completed, staff and students will be told that no changes can be made without authorisation from Estates Department.

A further consideration would be to audit our existing buildings to create and maintain a database of information such as age, construction, size, floor area and usage so we could benchmark their energy performance. This would be a considerable project although some of the material may be available from old e-mandate data. This would enable us to supply the new e-mandate information and this type of data is often required for projects and funding bids.