The School of Oriental and African Studies Carbon Management Plan

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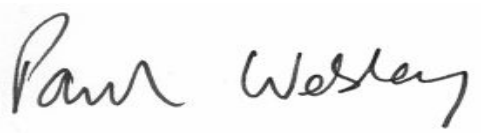
Contents

Foreword from the Director

Reducing our environmental impact is the responsibility of each of us and the School has been actively involved in various carbon reduction measures for a number of years. We host a large combined heat and power plant in the main boiler house which has, since 2000, significantly reduced the carbon emissions of both SOAS and the other Bloomsbury Colleges. More recently we have been implementing energy saving measures and increasing our recycling rates. We are also fortunate in that we have an active Student's Union who have over the years promoted the wider agenda and helped to minimise their environmental impact which has contributed to our overall efforts.

As an international institution, SOAS takes its responsibility for environmental stewardship seriously and has committed to a 48% reduction of our carbon emissions by 2020 against our 2005/06 footprint. This plan sets out a series of recommendations and projects which we intend to implement over the next few years. In order to meet this challenge, each of us, staff, students, visitors and stakeholders will have to play an active role and it is our aim to provide help, information and the necessary tools to achieve this and to become a more sustainable institution for the future.

With a greater focus being placed on the environmental performance of institutions and the changes in the funding mechanisms, it is more important than ever that we look to make efficient use of our resources. The School is pleased to have participated in cohort 6 of the Carbon Trust's Carbon Management Programme and has developed a challenging but achievable plan for reducing the carbon emissions produced by our activities.



Professor Paul Webley
Director of SOAS

working with

Foreword from the Carbon Trust

Cutting carbon emissions as part of the fight against climate change should be a key priority for Universities and Colleges - it's all about getting your own house in order and leading by example. The UK government has identified the Higher Education sector as key to delivering carbon reduction across the UK in line with the Climate Change Act targets, and the HE Carbon Management programme is designed in response to this. It assists Higher 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.

The School of Oriental and African Studies partnered with the Carbon Trust on this ambitious programme in 2010 in order to realise substantial carbon and cost savings. This Carbon Management Plan commits the School to a target of reducing CO_2 by 32.3% by April 2016 and 48% by 2020, and underpins potential financial savings to the institution of around £330,000 per year by 2013.

There are those that can and those that do. Universities can contribute significantly to reducing CO_2 emissions. The Carbon Trust is very proud to support the School of Oriental and African Studies in their ongoing implementation of carbon management.

Richard Rugg
Head of Public Sector, Carbon Trust

Management Summary

The School of Oriental Studies was founded in 1916 and became the School of Oriental and African Studies (SOAS) in 1938. It is a collegiate college of the University of London and is the world's leading centre for the study of a highly diverse range of subjects concerned with Asia, Africa and the Middle East.

SOAS have taken part in the Carbon Trust's Higher Education Carbon Management Programme over the last 10 months in order to develop a fully worked up carbon management plan in line with HEFCE's requirements. This document is the output of this process which will enable us to put into action many of the measures listed and enable SOAS to make significant reductions in its carbon emissions and become a greener institution.

SOAS recognises the environmental impacts arising from energy consumption and waste and is committed to tackling climate change by integrating sustainable practices at the core of its operations. Examples of this commitment include the core values expressed in *2016 A Vision and Strategy for the Centennial*[1] and the sustainable approach as part of the general maintenance regime and capital projects which is promoted by the *Estates & Infrastructure Strategy*[2]. SOAS have worked with the Green Consultancy and have appointed a Head of Energy Management which is a collaborative post shared with other Bloomsbury Colleges[3].

HEFCE expect all institutions to have a compliant Carbon Management Plan in place by March 2011 which is aligned to their sector wide carbon reduction target of 43% on 2005 figures by 2020 and the wider 84% reduction by 2050. The latest Capital Investment Framework (CIF2) requires institutions to demonstrate that public funds are being used wisely and that capital funding is delivering real value. Two new criteria have been added for reducing carbon emissions and improving space usage and failure to address these areas will have an impact on the funding given to institutions.

Fortunately, SOAS has been working proactively on these areas for some time and has developed a Long Term Maintenance Plan which identifies a number of projects to improve energy efficiency. SOAS has also been investing in its building management and sub-metering systems to improve the control of heating and lighting. The Long Term Maintenance plan will develop in alignment with the Carbon Management Strategy and there will be the opportunity to mitigate the effects of rising or increased fuel consumption and consequently cost.

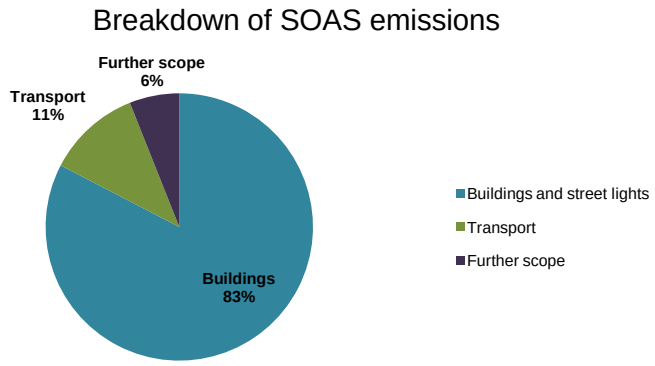
The table and pie chart below highlights the emissions related to our buildings, business transport, waste disposal and water usagefor our baseline year of 2008/09 and the cost of providing these services is illustrated in the table below.

	CO_2 (tonnes)	%	Cost (£)
Buildings	2,938	83%	£ 604,114
Transport	404	11%	£ 196168
Further scope	214	6%	£ 68,907
	3,556		**£869,190**

[1] http://www.soas.ac.uk/directorate/soas2016/file23384.pdf

[2] **http://www.soas.ac.uk/directorate/soas2016/file43679.pdf**

[3] **The Head of Energy management is based at SOAS and works principally with the Bloomsbury Heat and Power Consortium of which we are part and from which we derive much of our electricity and heat. The other members of the Consortium are Birkbeck College, Institute of Education, University College London and the University of London.**



As can be seen, buildings represent the largest area of emissions and are probably the easiest to tackle in the short term. The current cost of our annual energy bill stands just short of £1M and this is likely to increase in the near future with the introduction of the government's Carbon Reduction Commitment Energy Efficiency Scheme (CRC EES). SOAS are obliged to take part in the CRC EES as even though our energy consumption is below the normal threshold, we are captured as we are a collegiate school of the University of London. Many measures are already being put in place and we should see a significant reduction in these emissions and costs over the next 5 years.

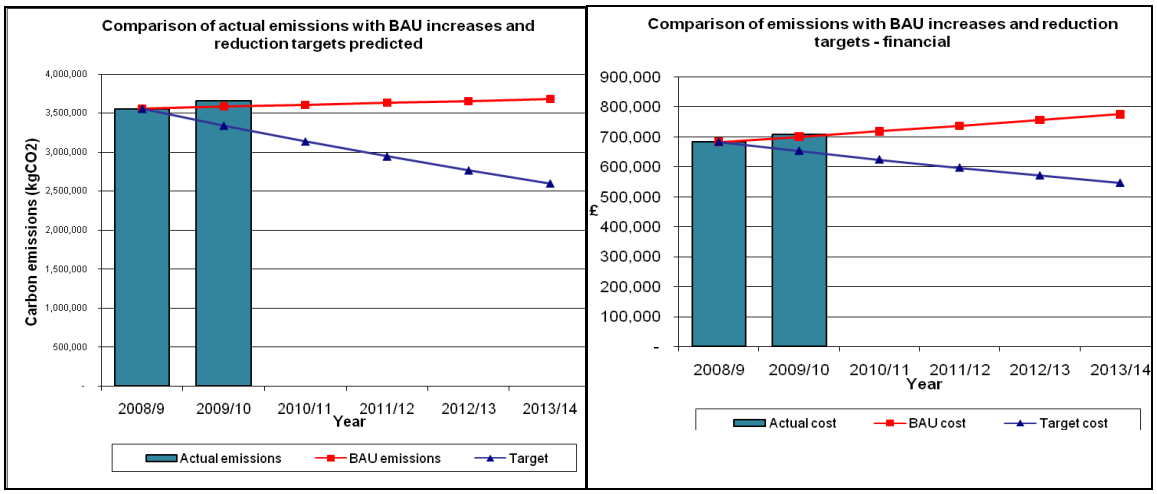
Transport emissions may be a contentious issue for the school to tackle because of the nature of our work but nonetheless, it is an area that needs looking into and policies and measures put into place. It should be noted that these emissions are not absolute as they are based on a staff travel survey.

The further scope includes waste and water consumption. This is an area that will expand as we look into more and more scope 3 emissions such as procurement in the future.

The plan highlights the significant implications of inactivity which include increased utilities costs, increased emissions, as well as the loss of reputation and the inability to demonstrate responsible governance. It is anticipated that one of the greatest challenges will be implementing behavioural change, at both an individual and institutional level.

Our targets for reducing these emissions are 48% by 2020 and 80% by 2050 based on our 2005/06 emissions. We have an interim target of 32.3% by April 2016 and the measures listed later in this plan should take us beyond this and well on our way to meet our 2020 target.

The cost of implementing the measures to help us reach the 2016 target is estimated to be around £1.5M and a proportion of this is already accounted for in the LTM programme. The savings these measures should bring to the school will be around £650,000 over this period. The two graphs below show the value at stake for carbon and financial from not doing anything to reaching our targets.



1. Introduction

SOAS have participated in cohort 6 of the Carbon Trust's Higher Education Carbon Management Programme to develop a comprehensive carbon management strategy for the organisation to implement to enable a significant reduction of carbon emissions in line with HEFCE's aspirations for the higher education sector. The process has followed the five steps shown below.

The majority of the projects identified to enable this reduction rest with Estates and Facilities to implement due to the nature of their remit but there are a number of areas that will involve all members of the school and this plan attempts to highlight all actions required to make SOAS a greener institution.

Historic activity

It would be fair to say that SOAS has a patchy past regarding energy efficiency and environmental awareness. There have been some major achievements such as the Bloomsbury Heat and Power Consortium with its CHP plant and we have a very active student population. However, as a small institution, the staff resources to pull together the many strands of a full energy and environmental strategy have not been available until recently. A Head of Energy Management was recruited in March 2010 which is a shared appointment with 4 other institutions and a shared Environmental Manager has also been recruited more recently.

The Student Union has been very active in ensuring that the refurbishment of their space has been done in an energy efficient and environmentally responsible manner. The phased refurbishment of the library is looking to obtain Very Good under the BREEAM rating system which is difficult given that it is a refurbishment of a building which, while not listed, attracts attention of the 20th Century Society to ensure that its original design intent is not compromised.

Other environmental initiatives such as server virtualisation, recycling and working with some of our partners have been going on for some time but the publicity of these has been subdued.

Programme

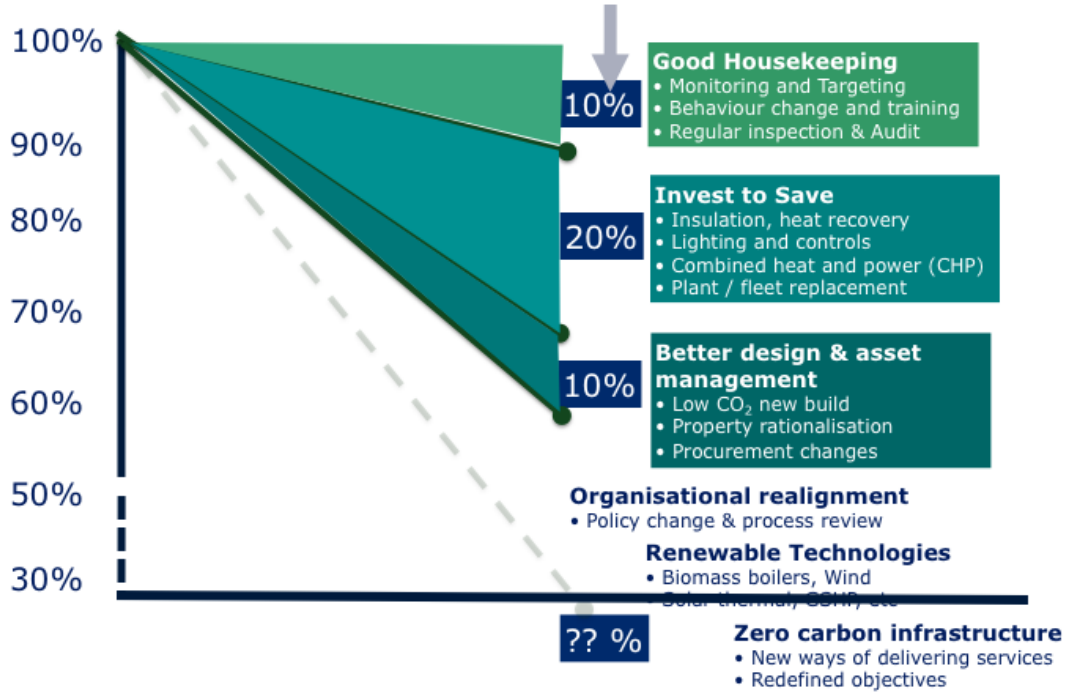
The carbon management programme will provide opportunities to knit together some of these initiatives, develop policies and ensure full engagement of staff, students and all SOAS stakeholders. The programme is intended to be a working document with a plan of action to cover the next 5 years. Progress will be monitored and reported on a regular basis and the document will be updated as required to account for areas not covered in this first version and for changing legislation etc.

SOAS have set a carbon reduction target of 48% by 2020 and there are a number of projects included in this plan to help us to achieve this. We have been fortunate to obtain some last minute funding from Salix, who provide interest free loans to the public sector to implement energy saving projects that meet certain criteria. This has enabled us to bring forward a number of projects which are currently being

implemented. Further Salix funding will be sought in the future if it becomes available and other potential areas for funds will also be explored to help to bring some of the projects forward. Focus will also be given to ensuring the continuing efficiency of measures implemented through monitoring and targeting, improved maintenance regimes and continued adjustment and alterations to keep pace with changes in the organisation.

The other projects will need to find funding and given the current situation, this may be difficult to obtain especially for projects where the savings are less easy to quantify such as awareness campaigns. All projects will have to stand on their own in terms of financial viability and therefore priority will be given to the projects that have the fastest payback or fit in with other business objectives such as the need to bring our facilities up to standard in line with any potential fees that may be charged as part of the change to Higher Education funding.

The programme will be signed off by the Board of Governors in March 2011.



Example of How Carbon Reduction Targets can be met

2 Carbon Management Strategy

2.1 Context and drivers for Carbon Management

The potential impact of global warming due to the continued rise in greenhouse gas emissions is well documented and is recognised as one of the main threats to the environment. Countries around the world united in action in 1997 to tackle climate change through the Kyoto Protocol - the global agreement on climate change.

Since then, a number of legislative requirements have been introduced by the UK government and European Union to promote energy efficiency and carbon reduction including:

- The Energy Performance of Buildings Directive (EPBD) which requires organisations to display energy certificates (DECS) which rate the performance of their buildings.
- EU Emissions Trading Scheme (EU ETS) which is one of the EU's key policies in reaching its greenhouse gas emissions reduction target. Whilst SOAS itself is not part of the EU-ETS scheme, the Bloomsbury Heat and Power CHP system where we obtain the majority of our electricity and heat is with the majority of the emissions coming from the SOAS boiler house.
- The UK Climate Change Act 2008 which introduces the world's first long-term legally binding framework to tackle the dangers of climate change. This sets ambitious, legally binding targets as well as enhancing the UK's ability to adapt to the impact of climate change.
- The Building Regulations Part L Conservation of fuel and power
- The Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES)which requires all participating organisations to purchase carbon allowances on an annual basis to cover their carbon emissions. SOAS is mandated to participate in this scheme as it is a college of the University of London. The scheme started on the 1st April 2010 and has been revised to remove the recycling of the payments meaning that the scheme will increase the cost to SOAS of using energy.

In addition to these legislative requirements there are other political, financial and reputational drivers which require consideration:

- The efficient use of utilities and funds provided for estate operations.
- HEFCE have set targets for carbon reduction which are equal to 43% by 2020 and 84% by 2050 measured against a 2005 baseline.
- The funding mechanism Capital Investment Framework II will link carbon management and carbon reduction with funding.
- The regular returns such as the EMS which measure and report on our carbon emissions
- BREEAM (BRE Environmental Assessment Method)

- The University Green League produced by People and Planet which attempts to measure and rank Higher Education institutions in relation to their environmental performance. SOAS scored a Third class degree in 2010 and slipped down the table 16 places on the previous year.

- Increasing long term costs for Utilities due to dwindling cheap fossil fuel supplies, increased worldwide demand, aging infrastructure and increased environmental costs.

- The need to demonstrate that SOAS is acting in a socially responsible manner.

- The Camden Climate Change Alliance which aims to reduce emissions across the Borough of Camden where the majority of SOAS is based.

2.2 Strategic themes

The 2016 A Vision and Strategy for the Centennial which has good environment practice as a core value The Estates and Infrastructure Strategy identifies good environmental performance and carbon reduction as a key strategic aim.

The development of the Carbon Management Plan has raised the following issues:

- The need to embed carbon management and reduction within all of our strategies, policies and practices and to ensure that it is recognised at an institutional level rather than being perceived as an Estates and Facilities issue.

- The need to quickly commission proposed energy saving projects.

- The need to ensure that sufficient resources for carbon reduction projects are made available within capital projects including the Long Term Maintenance plan and revenue budgets

- The need to seek external funding for further carbon reduction projects from sources such as Salix

- Recognition that individual and organisational behavioural change will be required to meet and perhaps exceed the carbon reduction target of 84% by 2050. This target cannot be met entirely by physical works or improvements.

- The need to ensure regular and ongoing communication of the Carbon Management Strategy and its aims which will ensure continued commitment and momentum.

- The formation of strategic partnerships both within and outside SOAS to assist with achieving the aspirations expressed in this Strategy. Examples are HEFCE, AUDE, Bloomsbury Heating and Power Consortium, Carbon Trust, and Salix.

2.3 Targets and objectives

This carbon management plan establishes that by March 2011 SOAS will be committed to the following measures:

- To reduce its building related (scope 1 &2) CO_2 emissions by 48% from 2005/06 levels by 2020
- To more accurately measure scope 3 emissions and develop measures to reduce them
- To develop projects and policies to assist with reduction measures

- To embed the principle of carbon management with staff, students and all stakeholders
- To report openly on our carbon performance.

SOAS will reduce the CO_2 emissions from its activities by 48% from the 2005/06 baseline, by April 2020. We have set an intermediate milestone to reduce emissions by 30% against the 05/06 baseline by April 2016

3 Emissions Baseline and Projections

3.1 Scope

In order to calculate our carbon footprint we have covered the emissions from our buildings in the form of gas, heat from the district heating system and electricity consumption from the CHP plant and the grid. We have also looked at water consumption, waste from our buildings and travel related emissions. However, data for the latter two have only been available more recently. For scope 1 emissions, transport fuel is excluded as SOAS do not have any fleet vechicles.

It is difficult to calculate a total footprint as areas such as procurement are incredibly complex and difficult to define. This is an area that needs to be looked at in more detail at a later date. It was not possible to obtain data from our maintenance contractor regarding refrigerant leakage from our buildings so this has not been included in the baseline. The table below shows the scope of our measurement.

Scope 1 Direct emissions	Scope 2 Indirect emissions	Scope 3 Other indirect emissions
Gas	Grid electricity	Water
Transport fuel	CHP electricity	Waste
Refrigerant Gases	Heat	Business travel
		Commuting
		Air travel
		Procurement

KEY

Included 05/06 & more recent
Included only for 08/09
Excluded
Data unavailable

3.2 Baseline

Our carbon footprint baseline for 2008/08 is 3,556 tonnes of CO_2
Our 2005/06 baseline for HEFCE targets is 3,442 tonnes of CO_2

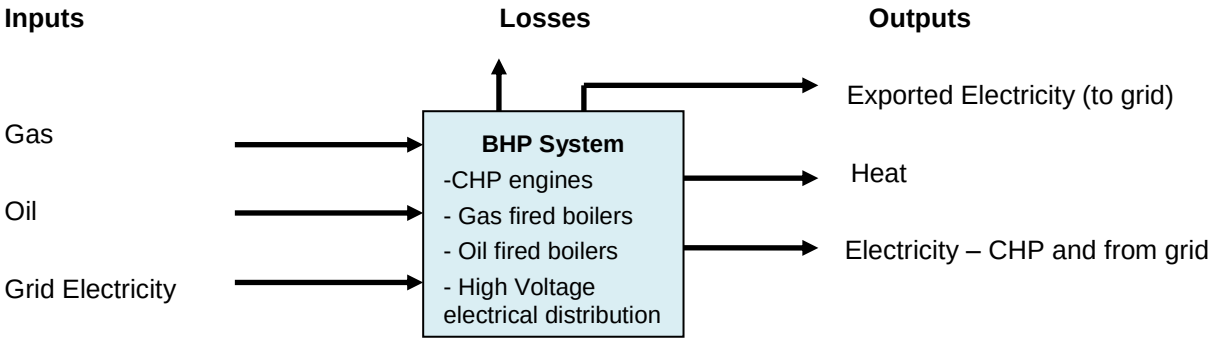
The figures shown below relate to 2008/09 academic year. The buildings figure relates to gas, heat and electricity with the data derived from our utility bills. Transport emissions have been calculated from the travel survey that was conducted in 2009. Water data again is from invoices and the waste data was compiled as part of the re-tendering of the waste contract in 2009.

For the main site heat and electricity is provided via Bloomsbury Heat and Power which supplies several institutions within the University of London precinct. The system consists of two 725kWe gas-fired CHP engines, a 3.5MW gas-fired boiler, a 2.1MW gas-fired boiler, two 3.5MW oil-fired boilers and a contribution from some gas-fired steam generators. Some of the connected institutions take heat and others take heat and electricity.

The carbon content of this heat has been worked out from data for the whole Bloomsbury scheme and some of the measures taken under this contract will benefit the whole scheme and not just SOAS. Electricity for this scheme is a mixture of that generated by the CHP engines and top up electricity from the Grid and again, this system serves a number of other colleges. For the purpose of carbon reporting, only the import electricity is accounted for in terms of the carbon footprinting. This may not necessarily be the best method of calculation as it penalises the institutions that are not able to benefit from the CHP electricity but it is felt the most appropriate in the context of the SOAS carbon footprint due to the fact that SOAS hosts the plant.

One issue with the BHP arrangement is that we are not directly responsible for how the plant operates and its performance and operation can greatly affect the carbon footprint of the school. For example, we know that there has been a significant increase in oil consumption for the current year and in previous years the CHP engines have had significant downtime due to faults and repairs. This makes our carbon footprint very volatile.

The simple diagram below Illustrates how the current scheme operates.



All other SOAS sites use grid electricity and natural gas for heating. 53-55 Gordon Square has been excluded from the footprinting exercise as this building is currently not in use and is awaiting refurbishment. This building currently derives its heat from an unmetered district heating system.

Table 3.1 Summary table of emissions for baseline year 2008/09

	Buildings	Transport	Waste and Water	Total
08/09 Baseline CO_2 emissions (tonnes)	2,938	404	214	**3,556**
08/09 Baseline Cost (£)	£604,114	£196,168	£68,907	**£869,190**

Figure 3.1 Summary of emissions for baseline year 2008/09

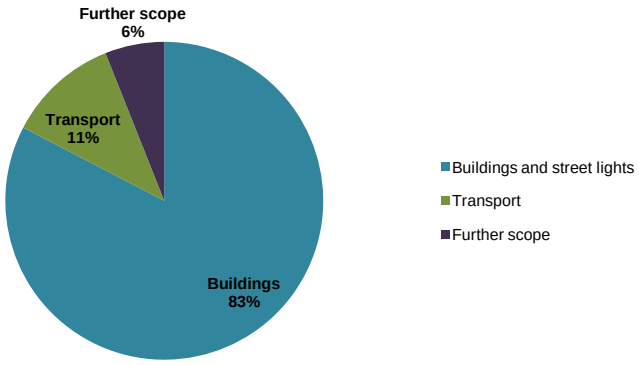
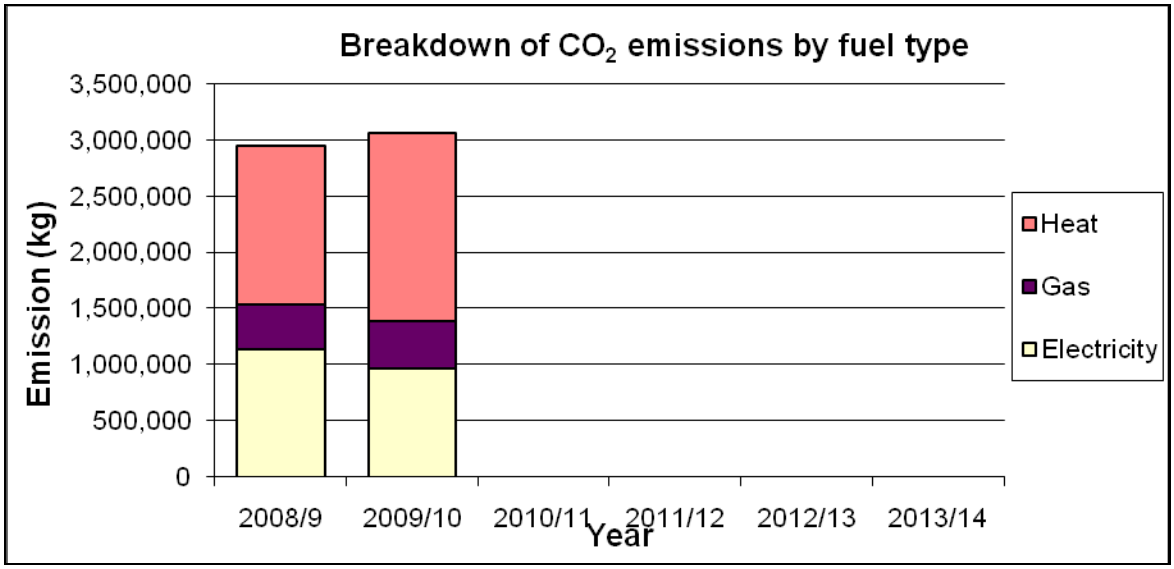


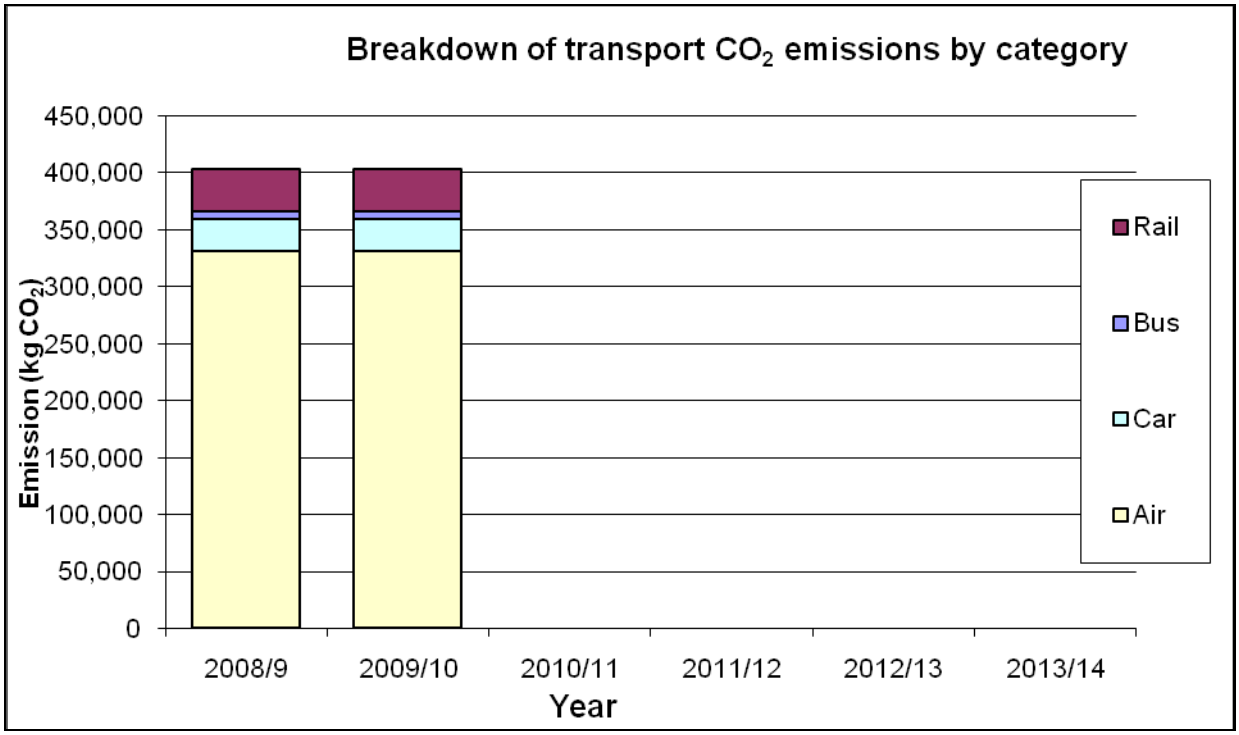
Figure 3.2 Breakdown of building emissions



As can be seen, the main area of carbon emissions relates to the energy used within our buildings. As noted above, the BHP contract accounts for the majority of our energy consumption and at present, we have little influence on how they provide the heat and electricity. We will be looking at amending the existing contract to see if we can incentivise them to be as carbon efficient as possible.

The main source from our buildings relates to the heating of them and several projects are underway which will address the control and operation of all of our heating systems.

Figure 3.3 Breakdown of transport emissions



The chart above illustrates the breakdown of our transport emissions. Unsurprisingly, air emissions are high due to the nature of our institution.

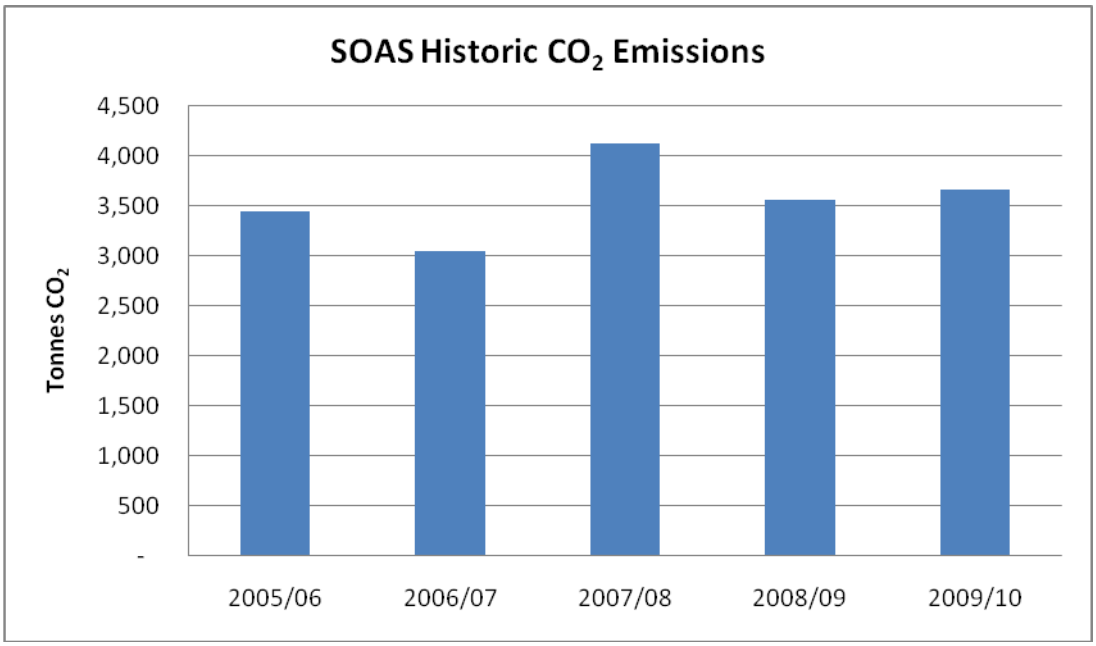
Our carbon reduction target relates to our 2005/06 carbon baseline which is shown below. Due to a lack of some of the data from that period, emissions for travel and waste have been estimated in order to relate to the 2008/09 footprint year. The emissions for travel have been held at the same level as it is like that any change has been limited and small. A general reduction in waste volume from 500 tonnes to 460 tonnes has been assumed for waste based on improved recycling and waste awareness. These assumptions may not be correct but they are the best we can achieve in order to have comparable figures.

Table 3.2Summary table of emissions for HEFCE baseline year 2005/06

	Buildings	Transport	Waste and Water	Total
2005/06 Baseline CO_2 emissions (tonnes)	2,823	389	230	**3,442**

Figure 3.4 below shows the Trend in CO2 emissions from SOAS since 2005/06. As can be seen, there is a wide variation which is due to the emissions from buildings. The main reason for this variation is due to the performance of the BHP system as discussed previously and the weather conditions.

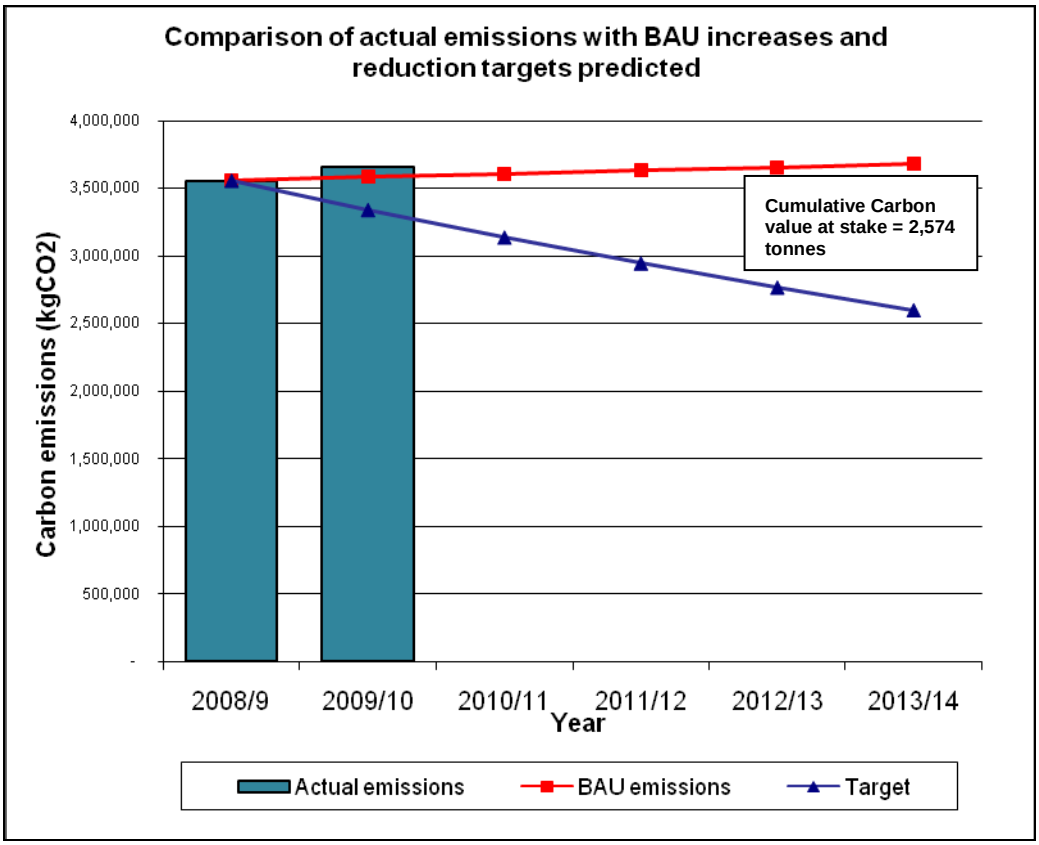
Figure 3.4 Historic CO_2 Emissions



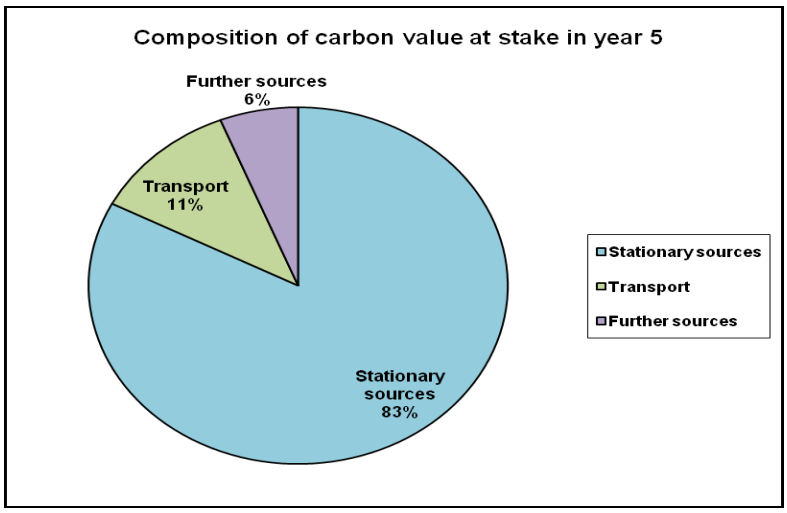
3.3 Projections and Value at Stake

There are many factors which could drive consumption up at the school including aging and inefficient plant, growing demand for IT equipment, longer opening hours and longer terms and changes to the seasons requiring more heating and/or more air conditioning. The exact nature of these is difficult to predict. However, there are many opportunities for SOAS to reduce consumption overall.

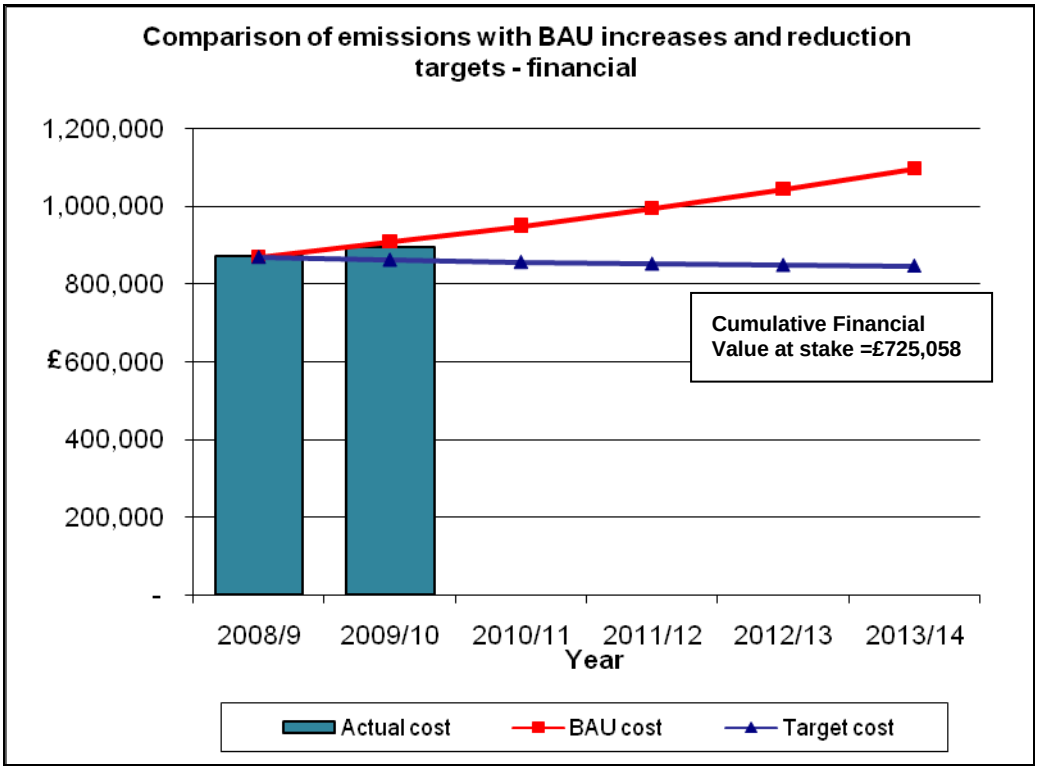
Going forward, it is unlikely that there will be any significant additions to the building areas in use with the exception of the possible refurbishment of 53-55 Gordon Square. Refurbishment of many of the buildings is more likely and that provides the opportunity to implement measures to reduce carbon emissions. However, the trend in consumption and emissions has been upwards



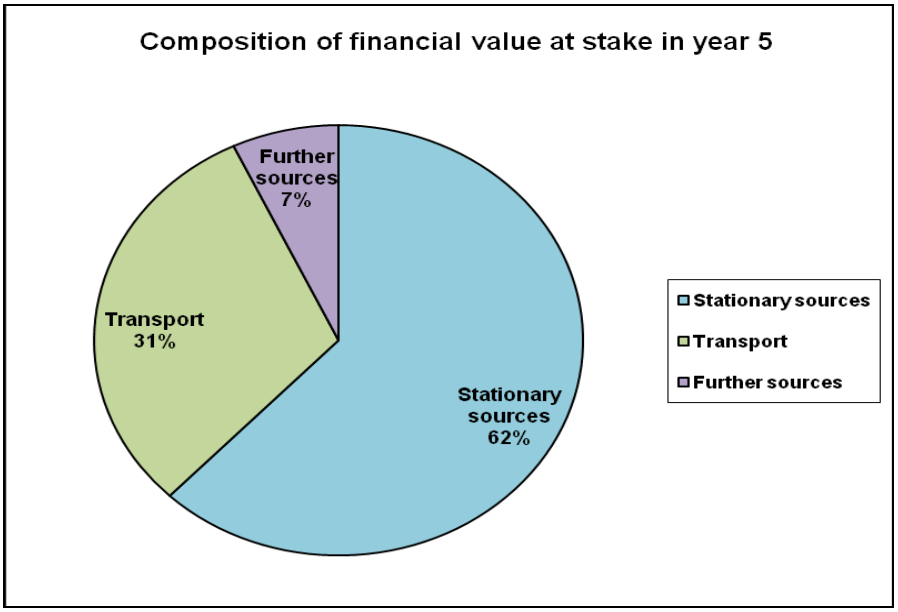
The graph above illustrates what where our current emissions are and our business as usual projection in red and our target that we need to meet in blue if we are to meet our 2020 target reduction of 48% on our 2005/06 baseline. The transport emissions for 2009/10 have been set as for the previous year as we have not yet carried out a travel survey for this period. The graph below shows the makeup of the 2013/14 carbon value at stake which illustrates that the greatest area is with energy consumption within our buildings.



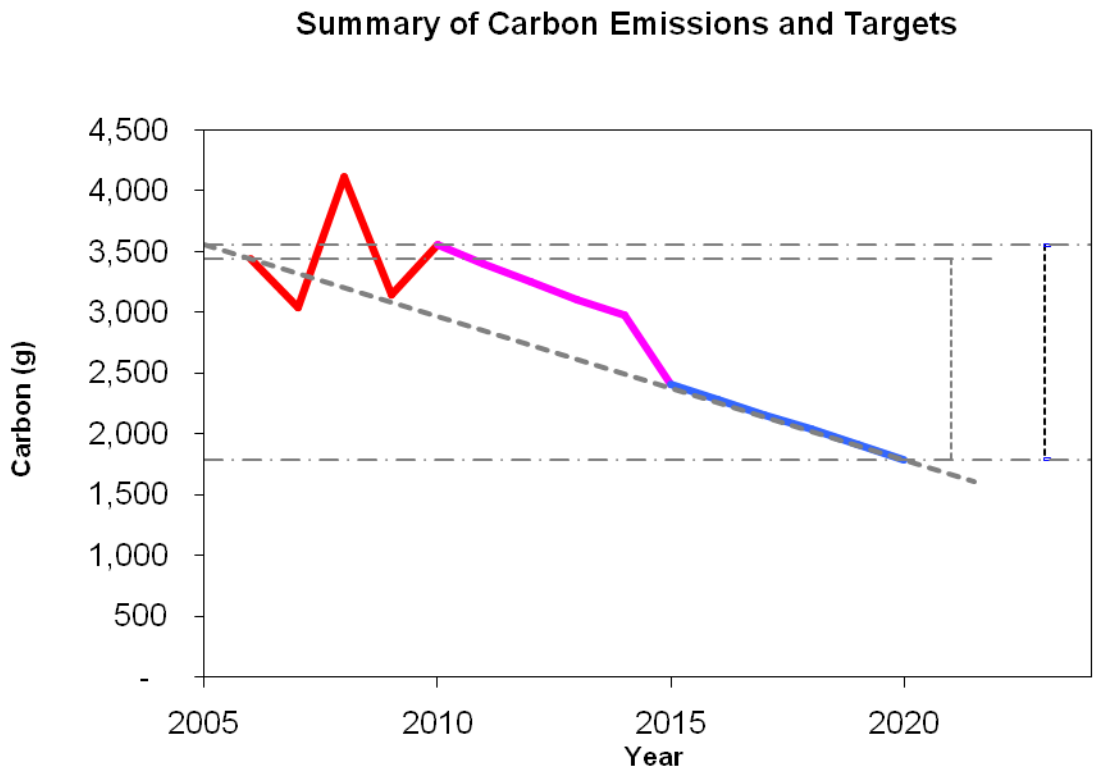
The graph below shows the financial value at stake from not implementing measures to reach our target reduction compared with if we remain on target for 2013/14. The business as usual figure assumes a modest 1.7% annual increase in energy costs as per the recommendations for the Department of Energy and Climate Change but given the volatility of the energy markets in recent years, this could be much higher. The cumulative value at stake by 2013/14 is £725,058.



The pie chart below shows the makeup of the financial value at stake and again it is the energy consumption of our buildings which has the greatest impact followed by transport.



The graph below illustrates our target emission reductions and progress to date. Our short term intermediate reduction target is 30% by 2015 on our 05/06 baseline whilst our 2020 target is a 48% reduction on the same baseline. This means that by 2020 our emissions should reach no more than 1,790 tonnes per year.



	Carbon Emission to Date
	Planned Reduction to 2015 (CMP)
	Planned Reduction from 2015 to 2020
	Construction Lines

The peaks in the emissions to date show the impact of the operation of the BHP scheme which is out of our direct control, and changes to the weather. As we are a small institution, relatively small changes in consumption can appear to have a big impact.

4 Carbon Management Projects

Like many other higher education and indeed other public sector institutions, SOAS went through a period during the 1990's early 2000's of not investing enough funds in its existing estate and as such there is a backlog of long term maintenance items. The Estates and Infrastructure strategy adopted in 2007 recognised this problem and has since secured funds to address these issues. This has provided an opportunity to make significant inroads to reducing carbon emissions by upgrading and replacing many items of plant and their systems which are currently time expired. More recently we have secured funding from Salix who provide interest free loans to the public sector to invest in energy and carbon reduction measures.

Completed projects

A number of projects have been completed ahead of the Carbon Management Programme taking place. As a consequence, it is not possible to quantify the carbon savings that have arisen from these as they were put in process before the carbon management programme began. These are listed below.

Project	Measures implemented	Date completed
21-22 Russell Square refurbishment	Full refurbishment including new condensing boilers, condensing water heater, new lighting and controls.	2007
SURE phase I lecture theatre and research block refurbishment	New air conditioning, new heating, new controls, new energy efficient lighting and controls	2009
Main campus toilet refurbishment	New toilet AHUs, Low energy hand dryers, percussion taps, urinal controls, new lighting and controls	2010
SURE phase II Student Union refurbishment	Full refurbishment including new heating, new air handling unit, new bar equipment, new lighting and controls	2010
Library transformation project Phase I	Full refurbishment of the lower floors of the library including new chilled water system with new chiller, new heating system and controls, new lighting and central controller	Jan 2011
Philips Building heating zone valve project	Installation of 32 zone valves and associated controls to allow for more flexible control of the heating system accounting for local heat gains, occupancy patterns and space usage.	Jan 2011

The chilled water installation for the library transformation project was a direct intervention to replace the proposed VRF cooling with chilled water to realise energy savings and allow for the future use of an absorption or adsorption chiller linked to the CHP system to improve summer utilisation. The use of the chilled water is expected to save 332,000 kWh of electricity relating to around 135 tonnes of CO_2. In addition, the use of a single chiller greatly reduces the amount of refrigerant on site and the associated risk of leakage and further greenhouse gas emissions.

The Philips heating zone valve project was adopted ahead of the Carbon Management Programme taking place and has now been completed. This project expects to save around 700,000 kWh of heat and 70,000 kWh of electricity due to a reduced requirement for electric space heaters. The carbon savings from these savings adds up to around 320 tonnes of CO_2.

Bloomsbury Heat and Power System

The Bloomsbury Heat and Power (BHP) scheme is a large PFI operated CHP district heating scheme that serves a consortium of Colleges in the Bloomsbury Precinct. The majority of the plant is located in the SOAS boiler house and SOAS forms one of the consortium members. The CHP plant came on stream in October 2000 and the contract has a 20 year duration.

As noted previously, SOAS derives most of its heat and electricity via the BHP scheme which includes 2 gas-fired 725 kWe CHP engines, a 3.5 MW gas-fired boiler, two 3.5MW oil-fired boilers, a 2.1 MW gas-fired boiler and a plate heat exchanger linked to steam generation in the London School of Hygiene and Tropical Medicine. The way this plant is operated and which bits of plant run when has a significant impact on the carbon emissions of the consortium as a whole.

The existing contract only stipulates that the consortium members will receive heat and electricity at a given temperature and voltage at a price linked to an indexed formula and not how it is supplied. Whilst there is an incentive for the service provider to ensure maximum usage of the CHP plant due to the cost of importing electricity, there is no obligation on them to ensure that carbon emissions are reduced. The scheme is in the EU-ETS and if we need more permits, these are simply passed on to the consortium. In addition, there are a number of deficiencies with the existing system such as lack of adequate insulation of the primary system, the use of oil as a primary fuel and the age and condition of the existing boiler plant which is around 40 years old.

The Head of Energy Management is working with the service provider to address many of these issues and to ensure the most efficient use and the further development of the scheme. There may be an opportunity to amend the existing agreement to place more emphasis on carbon emissions and overall scheme efficiency and this will be explored over the coming months.

Current projects

There are a number of projects currently in progress at the moment. Some of these are related to refurbishment projects and others are being funded from some last minute Salix funding that we were able to obtain. These current projects are all due to complete shortly and are listed below. Full year savings will not be realised until the next financial year.

Project	Measures implemented	Completion
Brunei Gallery Trend BMS improvement works	Upgrade of existing controls and changes to strategy to enable more efficient use of the existing building services.	December 2010
Installation of Powerperfector unit to Brunei Gallery and College building	Installation of PP unit and new transformers over the Christmas shutdown	December 2010
Installation of Trend controls to 3 boiler houses	Installation of networked Trend control system to 3 poorly controlled boiler houses	End Jan 2011
Philips Building Hot water heat recovery project	Installation of plant and equipment to capture low grade waste heat from the on-site CHP plant for the pre-heat of the domestic hot water service including new hot water plate heat exchangers	End Feb 2011
Improvement work to constant temperature, College infill and East block heating systems	Installation of new pumps, controls and ancillary equipment to these areas as part of above project	End Feb 2011

The above projects are anticipated to save around 500 tonnes of CO_2 between them.

Future projects

These projects are currently earmarked to take place during the remainder of the 2010/11 academic year. These are not specific carbon reduction projects but are being undertaken under long term maintenance and will assist to reduce energy usage.

Project	Measures implemented	Completion
Replacement of Brunei Gallery Chillers	Installation of new Turbocor chiller to replace existing 15 year old units and upgrades to failed items of plant.	End Mar 2011
Upgrade of main AHU control panels and link to BMS	Replacement of original control panel and control system for 2 main air handling units which currently operate 24/7 to support the CHP units.	Easter 2011
College building window replacement	Installation of new double glazed Crittal style windows to listed College Building	Summer 2011
Main Campus electrical infrastructure upgrade	Replacement of main electrical distribution in Philips building including the installation of another Powerperfector unit and additional sub-metering.	Autumn 2011

These projects will have a varying effect on the carbon emissions from SOAS. The chiller replacement may increase energy consumption in the short term as part of the existing installation has failed and cooling demand is not being met. However, the new chiller is the most energy efficient solution so the emission increase will be much less than that of the alternative solutions.

The electrical infrastructure upgrade will not produce direct electricity savings other than those earmarked for the voltage optimisation equipment, but the use of the sub metering that will be installed as part of this project will help to identify wastage and provide opportunities for future projects.

Awareness and Cultural Change

It is recognised that technical projects will not be sufficient on their own to meet the longer term carbon reduction required and it is envisaged that staff, students and all visitors will be required to play their part in helping us reduce our emissions. However, at this stage, SOAS has not publicised some of the positive steps it has taken and therefore any awareness raising must start with highlighting our achievements. The recent appointment of the shared Environmental Manager with 3 other Bloomsbury Colleges will assist with this process and a full awareness and participation plan will be devised.

Other areas such as procurement, business travel and student commuting will have to be examined at a later date. Travel is a contentious issue for the school due to the nature of the work carried out by academic staff and the fact that a high proportion of our students are from overseas.

Information Technology and AV equipment

Our IT services team have undertaken a number of measures in recent years such as low energy specification of equipment, server virtualisation, classroom AV pods and the use of an off-site data centre. The team have also been actively looking into improved printing measures, video conferencing and cloud computing. Through their involvement in the carbon management team further measures will be explored and supported via this group and as such, there are no dedicated IT or AV projects currently in this plan.

4.1 Existing projects

The list below shows projects that have either completed recently or are underway.

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	Heating Zone valves in Philips building	Stephen McKinnell	£125,000		£41,631	300.8 tCO_2	3.0	-£221,231	42.30%	2010
2	Install Trend BMS to Faber building heating system	Stephen McKinnell	£13,500		£2,003	12.2 tCO_2	6.7	-£3,162	1.71%	2010
3	Brunei Gallery Trend BMS improvements	Stephen McKinnell	£13,000		£25,008	109.2 tCO_2	0.5	-£194,981	15.35%	2010
4	Brunei Gallery Turbocor Chiller replacement Project	Stephen McKinnell	£95,000		£49,869	197.2 tCO_2	1.9	-£479,357	27.73%	2011
5	Vernon Square Trend BMS for heating	Stephen McKinnell	£17,500		£5,170	31.6 tCO_2	3.4	-£25,494	4.44%	2010
6	Philips Building - use Chilled water instead of DX/VRF	Stephen McKinnell	£90,000		£10,507	22.1 tCO_2	8.6	-£20,865	3.11%	2010
7	Voltage optimisation Brunei and College Buildings	Stephen McKinnell	£80,118		£16,489	34.7 tCO_2	4.9	-£191,648	4.88%	2010
9	Install Trend BMS to 21-22 Russell Square heating system	Stephen McKinnell	£14,500		£1,338	8.2 tCO_2	does not payback	£3,371	1.15%	2010
10	Main site hot water improvements	Stephen McKinnell	£100,000		£23,628	193.7 tCO_2	4.2	-£289,420	27.24%	2010
11	Main site heating improvements to Research block and College infill	Stephen McKinnell	£60,000		£8,995	73.8 tCO_2	6.7	-£88,255	10.37%	2010
	Totals		£608,618		£183,638	984 tCO_2	3.3			

Project no. 8 to install the Trend BMS to 21-22 Russell Square does not pay back but there are operational reasons for continuing with this installation and it may result in greater than predicted savings which may result in a payback.

Another £11,808 will be saved when the CRC EES is introduced as carbon will be charged at £12 per tonne.

4.2 Planned and future projects

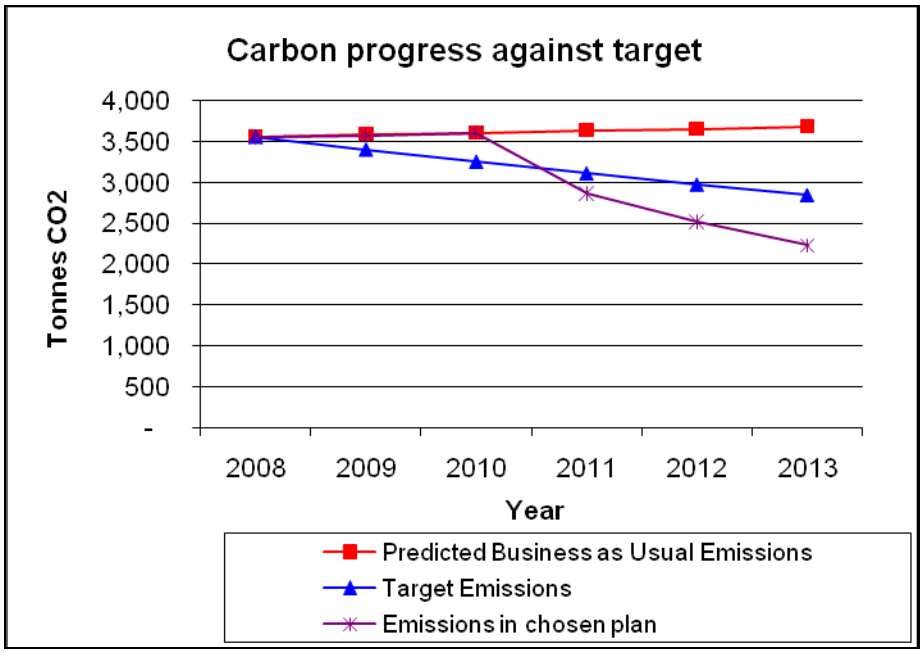
The list below illustrates projects that have been identified but are not yet planned to take place.

Ref	Project	Lead	Cost		Annual Savings (yr 1)		Pay back (yrs)	Net Present Cost(£)	% of Target	Implementation Year
			Capital	Operation	Financial (Gross)	tCO_2				
8	Vernon Square replace electric heating with radiators	Stephen McKinnell	£85,000		£7,000	38.1 tCO_2	12.1	-£14,487	5.36%	2011
12	Vernon Square Boiler replacement	Stephen McKinnell	£100,000		£5,162	31.7 tCO_2	19.4	£14,918	4.45%	2012
13	Faber building communal lighting upgrade	Stephen McKinnell	£12,000		£2,620	14.3 tCO_2	4.6	-£9,787	2.00%	2012
14	Philips Building corridor upgrades - LED lighting	Stephen McKinnell	£120,000		£6,175	13. tCO_2	does not payback	£48,880	1.83%	2011
15	Philips Building AHU upgrades	Stephen McKinnell	£150,000		£28,335	114.1 tCO_2	5.3	-£317,011	16.05 %	2012
16	Philips Building lift upgrades	Stephen McKinnell	£40,000		£4,750	10. tCO_2	8.4	-£14,708	1.41%	2012
17	Philips Building Library lighting upgrade	Stephen McKinnell	£0		£10,649	22.4 tCO_2	0.0	-£88,561	3.15%	2012
18	Philips Building general lighting controls	Stephen McKinnell	£100,000		£10,649	22.4 tCO_2	9.4	£11,439	3.15%	2012
19	College Building Lighting controls	Stephen McKinnell	£60,000		£6,650	14. tCO_2	9.0	£4,695	1.97%	2013
20	College Building Window Replacement	Richard Poulson	£0		£2,875	23.6 tCO_2	0.0	-£47,384	3.31%	2011
21	College building reception lighting upgrade	Stephen McKinnell	£20,000		£5,320	11.2 tCO_2	3.8	-£24,244	1.57%	2011
22	College building kitchen equipment upgrade	Richard Poulson	£0		£5,320	11.2 tCO_2	0.0	-£44,244	1.57%	2011
23	21-22 Russell Square draughtproofing and insulation	Stephen McKinnell	£3,000		£487	2.9 tCO_2	6.2	-£1,049	0.41%	2011
24	Faber building draughtproofing and insulation	Stephen McKinnell	£3,000		£464	2.8 tCO_2	6.5	-£857	0.39%	2011
25	Faber building green roof	Stephen McKinnell	£10,000		£728	4.5 tCO_2	13.7	-£1,992	0.63%	2014
26	Faber building lighting upgrades	Stephen McKinnell	£25,000		£1,747	9.5 tCO_2	does not payback	£10,475	1.34%	2012
27	Brunei lighting improvements	Stephen McKinnell	£40,000		£28,500	60. tCO_2	1.4	-£197,023	8.44%	2012
28	Brunei lift improvements	Stephen McKinnell	£25,000		£1,900	4. tCO_2	13.2	£3,117	0.56%	2010
29	College building heating zoning and control	Stephen McKinnell	£25,000		£1,750	14.4 tCO_2	does not payback	£10,446	2.02%	2012
30	College building air conditioning control	Stephen McKinnell	£5,000		£266	0.6 tCO_2	does not payback	£2,788	0.08%	2012
31	College building lift improvements	Stephen McKinnell	£10,000		£950	2. tCO_2	10.5	-£942	0.28%	2015

Ref	Project	Lead	Cost		Annual Savings (yr 1)		Pay back (yrs)		% of Target	Implementation Year
32	College building draughtproofing	Stephen McKinnell	£4,000		£1,438	11.8 tCO_2	2.8	-£5,881	1.66%	2012
33	College building green roof	Stephen McKinnell	£25,000		£2,000	16.4 tCO_2	12.5	-£7,963	2.31%	2015
34	Research Block conversion of cooling to chilled water	Stephen McKinnell	£50,000		£3,325	7. tCO_2	15.0	-£4,801	0.98%	2015
35	Research Block lighting controls	Stephen McKinnell	£3,000		£760	1.6 tCO_2	3.9	-£3,321	0.22%	2015
36	Faber building conversion of electric HWS to central	Stephen McKinnell	£30,000		£1,800	9.8 tCO_2	16.7	£333	1.38%	2015
37	Vernon Square conversion of electric HWS to central	Stephen McKinnell	£40,000		£2,800	15.2 tCO_2	14.3	-£6,148	2.14%	2014
38	Vernon Square heating zone controls	Stephen McKinnell	£40,000		£1,590	9.7 tCO_2	does not payback	£21,687	1.37%	2013
39	Vernon Square draughtproofing and insulation	Stephen McKinnell	£10,000		£660	4. tCO_2	does not payback	£4,511	0.57%	2012
40	Vernon Square lightng controls	Stephen McKinnell	£30,000		£3,000	16.3 tCO_2	10.0	£5,050	2.30%	2014
41	Philips building Voltage Optimisation	Stephen McKinnell	£83,225		£21,722	45.7 tCO_2	3.8	-£274,792	6.43%	2011
	Totals		£1,148,225		£160,743	564 tCO_2	7.1			

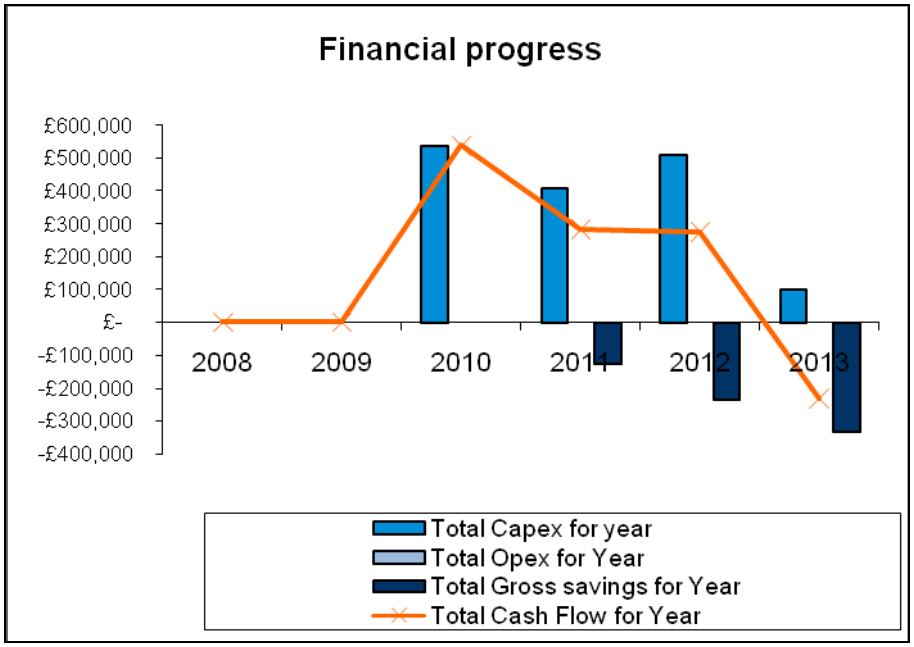
The projects above may or may not be taken forward as highlighted. The reason for the uncertainty relates to the interface with other projects such as the next phase of the library transformation project and other refurbishment opportunities. Also, there hasn't been adequate time to consider these in detail during the process of developing this plan. Additional funding from Salix if available may allow SOAS to bring forward some of the higher priority schemes. Additional savings of £6,768 will be made from the introduction of the CRC EES.

4.3 Projected achievement towards target



The graph above shows the emissions reduction against our target and our business as usual emissions. If we follow the plan we have adopted, we will be 568 tonnes of CO_2 ahead of our target by 2013/14

The graph below shows the financial progress regarding capital expenditure against savings from implementing the measures. Breakeven is predicted to occur in 2013 on the current implementation measures.



5 Implementation

In order to enable this plan to be implemented over the next 5 years, resource is required both financial and in staff time. There is a significant risk that the financial penalties from not becoming more carbon and energy efficient will place a burden on the overall financial position of the school. One issue of being a small institution is the lack of staff resource and both the Head of Energy Management and the Environmental Manager are a shared resource with other Bloomsbury Colleges.

Appendix A consists of a matrix highlighting where SOAS currently are in terms of carbon management against the various areas such as policy, communications and finance. As an institution committed to improving its environmental performance, we should be aiming to raise our score in all of these areas and this plan will help to realise this. However, as we are a small institution with limited resources we may be unable to reach the top of this table in all areas.

5.1 Financing

In order to realise the savings highlighted in this plan, investment is required to implement the measures. A significant proportion of the finance is required regardless of the carbon savings as SOAS has a significant quantity of time expired plant and systems that require replacement.

Funding for carbon management projects are principally within the capital funding allocated for improvements to the estate. The projects identified to date have either been funded from LTM funds, Capital improvement budgets or from Salix funding. Additional funding will be sought from various opportunities as they arise.

5.1.1 Benefits / savings – quantified and un-quantified

	2008	2009	2010	2011	2012	2013
Annual cost saving	**£0**	**£0**	**£0**	**£126,162**	**£235,901**	**£332,426**
Annual CO_2 saving	**0.00**	**0.00**	**0.00**	**768.19**	**1135.99**	**1451.12**
% of target achieved	**0%**	**0%**	**0%**	**108%**	**160%**	**204%**

The above table shows that we will be ahead of our carbon reduction target with the implementation of the various measures to 2023/14. However, it must be stressed that the savings are calculated based on a series of assumptions regarding future use of our estate and in particular the BHP CHP system as well as energy costs. Because of the BHP system, we pay below market rates for electricity and our rate for heat is equivalent to that of current gas rates. However, the introduction of CRC EES at £12 per tonne will increase costs going forward as will pressures on dwindling fossil fuel reserves, ageing UK infrastructure and higher carbon costs for generators.

Unquantified benefits

In addition to the financial and carbon savings, a number of other benefits should arise from the implementation of the various projects such as improved reliability of replaced plant, improved comfort conditions for building users, reduced maintenance costs from the replacement of old kit, improved monitoring of plant and equipment using the BMS and the faster response times to problems that this will enable. In addition to these, the improvement in the performance of SOAS will be reflected in various league tables such as the EMS figures and the Green League as well as improving our reputation within our own community.

5.1.2 Financial costs and sources of funding

The Estates and Infrastructure strategy has identified funding required to upgrade and replace most of the time expired plant and systems through our buildings. This has resulted in funding being secured for the next 11 years for this purpose and provides an opportunity to build in energy efficient measure as part of implementing these replacements.

Discounted Costs	2008	2009	2010	2011	2012	2013
Total annual capital cost	**£0**	**£0**	**£538,618**	**£409,225**	**£511,000**	**£100,000**
Total annual operational cost	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**
Total costs	**£0**	**£0**	**£538,618**	**£409,225**	**£511,000**	**£100,000**

SOAS have also been successful in obtaining over £230,000 from Salix finance in the form of a 5-year interest free loan. The loan has been used to implement a number of energy saving projects and the financial savings from these projects will be used to pay off the loan and provide ongoing savings to the school. Further opportunities to use Salix funding in the future will be considered should the scheme continue. Additional opportunities to lever in other external funding will be explored as and when they arise.

The Head of Energy Management is also working with the BHP service provider to improve efficiency of the district heating and CHP plant. To date, this has resulted in the provider investing in additional insulation of the primary pipework, valves and flanges, installing a new more energy efficient district heating pump and committing to invest in their BMS controls. Consideration is currently being given to replacing the 40 year old boilers and upgrading the gas supply so that oil usage becomes a standby fuel. Further out, we are looking at the connection of additional buildings, potentially adding additional CHP capacity and working with the local authority to expand the district heating network to pick up some of their district heating systems. All of these measures will help to reduce carbon emissions both for SOAS and the wider Bloomsbury area.

5.2 Governance for Implementation

The Carbon Management Plan is sponsored by the Registrar and Secretary who is a member of the senior management team. The Carbon Management Plan will be implemented by the Estates and Facilities Directorate and this will be monitored by the Carbon Management Group (formerly Energy Management Group) which has been convened for this purpose. The Carbon Management Group includes members from all parts of the SOAS community and has terms of reference which will be updated to reflect the change in name[4].

The Carbon Management Group will review projects and progress on an annual basis and provide Estates and Infrastructure Committee with an annual report on developments within this Plan for their review and endorsement. The Estates and Infrastructure Committee reports to Resources and Planning Committee which in turn reports to the Governing Body.

The Carbon Management Group aims to:

- regularly update the Estates and Infrastructure Committee on the progress of the Carbon Management Plan against the established targets

[4] **Appendix E**

- engage with staff and students through a 'Champion' network within the Faculties, the Professional Services Directorates and the Students' Union and by doing so promote a cultural of awareness and support for aims of the Carbon Management Plan

- Help to identify and develop carbon saving opportunities throughout the school

The Carbon Management Group will achieve this by:

- establishing a communications strategy to ensure the regular communication on the progress of the Carbon Management Plan.

- establishing and keeping an up-to-date web page with information on the Carbon Management Plan

- promote Faculty and Directorate awareness of the Carbon Management Plan and promote participation in initiatives that may arise

5.2.1 Embedding Carbon Management

Our institutional strategy is contained within the *Vision and Strategy for the Centennial 2016* and the *Estates and Infrastructure Strategy* which are approved by the Governing Body. These documents indicate our commitment to:

- reduce our energy consumption and carbon emissions

- good environmental practice

SOAS has already taken steps towards improving sustainable practice in the introduction of energy saving and recycling initiatives as well as seeking opportunities of bettering minimum statutory requirements in refurbishment projects.

The Carbon Management Plan collects these initiatives and projects into a coherent programme for improvement. Embedding the principles of carbon management at SOAS is key to ensuring the success of the Carbon Management Plan. The Carbon Trust's Carbon Management Matrix tool (Appendix A) will be used to identify and review the current position.

Key actions for improvement are summarised below:

- integrate Carbon Management into the Faculties and the Professional service Directorates plans

- regularly update the Carbon Management Group

- establish a 'Champions' network within the Faculties and Professional Services Directorates

- establish a communications strategy

One of the key aims to be developed in conjunction with the Environmental Manager is to ensure that as part of the embedding and awareness raising, that it is made clear that the responsibility in saving

carbon emissions rests with everyone in the long term. With the implementation of many of the measures listed in this plan, our stakeholders can see that we are leading by example and hopefully this will help to inspire them to play an active part in this journey.

5.2.2 Data Management – measuring the difference, measuring the benefit

Data on carbon performance will be coordinated and collated annually by the Head of Energy Management and will include information on Scope 1, Scope 2 and Scope 3 emissions. This data will be presented as an annual report to the Carbon Management Group and made available to the wider public through the SOAS website.

The report will also review projects implemented to report on their effectiveness and savings achieved from them as well as listing future measures planned and any other changes that may affect the benefits from being carbon efficient.

5.3 Resource commitment

5.3.1 Implementing the Initiatives

The responsibility of implementing this plan rests mainly with Estates and Facilities due to the nature of the projects identified to date but the plan covers the whole school and therefore, the Executive Board will take overall ownership for the implementation and ongoing maintenance of the plan. The project leader will be responsible for the annual reporting on the plan and the reports will be part of an agenda item on the Estates and Infrastructure committee and the Executive Board.

5.3.2 Maintaining quality over time

As discussed previously, progress of the plan will be reported on an annual basis. It is recommended that within 3 years of its publication, a comprehensive revision of the plan is undertaken to take into account any changes in scope, targets and legislation and also to plan for the 2020 target reduction in CO_2 emissions.

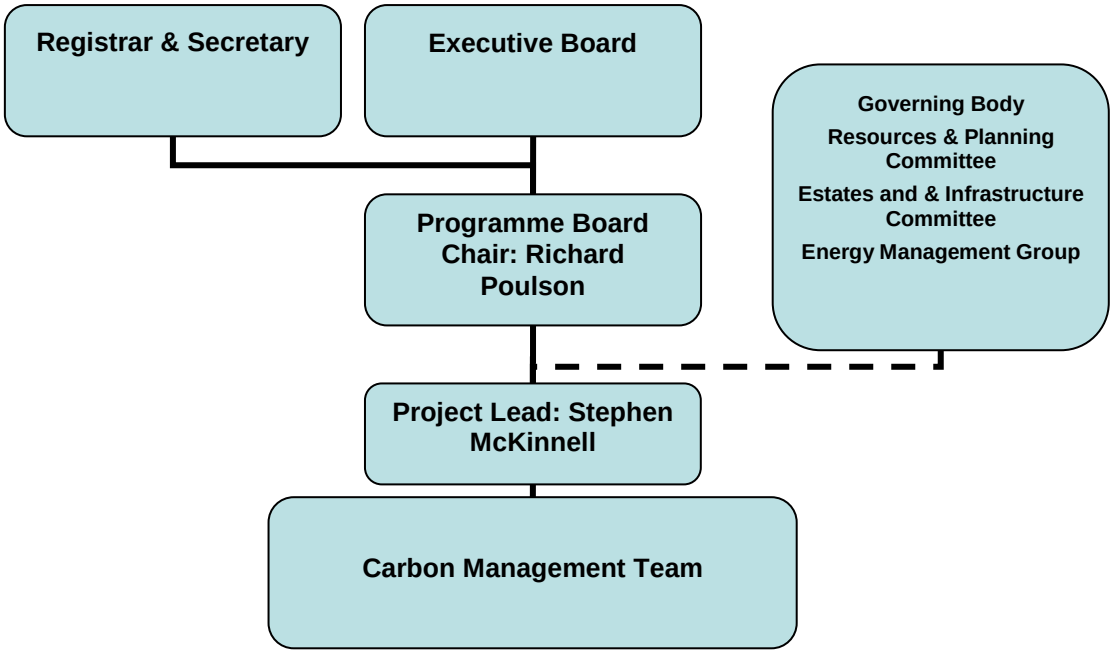
The plan is expected to be a ‘fluid’ document in that new ideas and initiatives can be incorporated into it at any point deemed suitable. This will help it to maintain relevance and keep up with changes to the higher education environment. Any amendments to the document will be discussed, reviewed and agreed by the Carbon Management Group.

5.3.3 Programme Management of the CM Programme

In order for this plan to be fully adopted it is essential that it has good governance and that the carbon targets are fully endorsed and supported by Senior Management. The support should include assisting to remove blockages to change, supporting new policies to improve our environmental performance and encouraging new ways of working in the organisation that will help SOAS to reach its carbon reduction targets.

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

The Carbon Management Plan is sponsored by the Registrar and Secretary who is a member of the Senior Management Team. The Carbon Management Plan will be implemented by the Estates and Facilities Directorate and this will be monitored by the Energy Management Group which has been convened for this purpose.



5.3.5 The Carbon Management Team – delivering the projects

The majority of the projects identified to date rest with Estates and Facilities and therefore with the project leader supported by the project sponsor. Because SOAS is a small institution, there are limited resources for these projects to be managed in any other way.

With regards to other areas of carbon management such as IT, procurement and waste and recycling, the wider Carbon Management Team will be utilised and working groups set up to develop and deliver projects. Many of these projects will require policy changes and endorsement from our senior management team and therefore, this group will form an important step in obtaining the necessary permissions for these areas.

The team meets monthly and current members are listed below.

Role	Name and position in the HEI	Contact details
Project Leader	Stephen McKinnell (Chair) Head of Energy Management	4846 sm124@soas.ac.uk
Project Sponsor	Richard Poulson Director of Estates and Facilites	4903 rp2@soas.ac.uk
Carbon Management Team members	David Martin Project Leader (Arts and Humanities)	4029 dm24@soas.ac.uk
	Adam Dobson Faculty Officer (Languages and Cultures)	4081 ej5@soas.ac.uk
	Sophie Elgood Centre Administrator (Art and Archaeology)	4830 se5@soas.ac.uk
	Barry Douglas Assistant Director of Finance	5025 bd11@soas.ac.uk
	Simon Button Purchasing Manager (Finance)	4902 sb131@soas.ac.uk
	Robert Courtney Communications Officer (Estates and Facilities)	4804 rc45@soas.ac.uk
	Joseph Yau Computing and Telecommunications Manager	4967 jy@soas.ac.uk
	Peter Baran General Manager (Students Union)	4996 pb14@soas.ac.uk
	Joceyln Mary Ames Environmental Officer (student representative)	226059@soas.ac.uk
	Stephanie Chesters Environmental Manager (shared resource)	s.chesters@bbk.ac.uk
	Maximilian Genard-Walton Environmental Officer (student representative)	232276@soas.ac.uk

5.3.6 Succession planning for key roles

The project leader and project manager roles are the critical ones for the implementation of the CMP and it is envisaged that the CMP will be incorporated into the job descriptions of these roles so that the CMP responsibilities will be picked up by any personnel change. As the school is small and lacks appropriately qualified staff, it is not feasible to assign deputy roles to this plan.

5.4 Implementation Plan

The implementation of this plan has already started with some of the Salix projects already having started. In terms of moving on, the plan will be approved by the executive board by the end of April 2011. Annual reporting on the plan will coincide with the University financial year which runs August to July so a report will be published around September/October each year once the key data has been gathered. The report will identify which projects have been implemented, carbon and financial savings being achieved, other business benefits that have arisen along with overall progress to date in meeting our targets and details of the plans for the following years.

Appendix A: Carbon Management Matrix Current Ranking

	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 process 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 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	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

Appendix B: Definition of Projects

Project: Reference:	**10. Main Site Hot Water Improvements**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install heat recovery equipment and replacement hot water plant to recover low grade waste heat from the SOAS CHP installation for pre-heat of the hot water.
Benefits	• Financial savings: £23,628 • Payback period: 4.2 years • CO_2 Emissions reduction: 194 tonnes of CO_2 • 27% of target  existing HWS plant
Funding	• Project cost £100,000 • Part funded by Salix and part from LTM funds. • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site. • Biggest risk is ensuring that the operational side operates as expected.
Measuring Success	• Heat meter installed to monitor savings on monthly basis. • Operation of district heating system will also be monitored to see if improvements are made.
Timing	• On site December 2010 • Project completion end March 2011 • Measurement of savings on going from March 2011
Notes	CHP plant is operated by Cofely and waste heat from turbochargers is currently extracted to atmosphere via heat rejection radiators and the building extract fans. These fans currently operate 24/7 to meet the demands of the engines. Additional benefits will occur through the use of variable speed drives on these fans and reducing operation to only when required – this forms another project. Additionally, the installation work associated with this project has enabled other plant relating to the heating and hot water service to be upgraded resulting in additional savings. Related projects are - Main building AHU upgrade and Research and infill block heating upgrades.

Project: Reference:	**11. Main Site Heating improvements to Research Block and College Infill**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install new heating equipment to above buildings as part of the hot water heat recovery project to convert CT to VT systems with new inverter pumps and BMS controls
Benefits	• Financial savings: £9,000 • Payback period: 6.7 years • CO_2 Emissions reduction: 74 tonnes of CO_2 • 10% of target  Existing CT heating pumps and missing insulation
Funding	• Project cost £60,000 • Part funded by Salix and part from LTM funds. • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site.
Measuring Success	• Reduced heat consumption through main SOAS heat meter • Reduced electrical consumption from less use of air conditioning and portable heaters
Timing	• On site December 2010 • Project completion end March 2011 • Measurement of savings on going from March 2011
Notes	Existing heating to these blocks operates at constant temperature and runs 24/7 with limited controls. New inverter driven pumps, plate heat exchangers, Trend BMS controls and improved insulation will all contribute to lower running costs and energy savings.

Project: Reference:	**1. Heating Zone Valves in Philips Building**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install 2-port motorised zone valves on each floor and elevation of the Philips building and link to Trend BMS
Benefits	• Financial savings: £42,000 • Payback period: 3 years • CO_2 Emissions reduction: 300 tonnes of CO_2 • 42% of target
Funding	• Project cost £125,000 • Funded from LTM funds. • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site. • Small amount of work to complete
Measuring Success	• Reduced heat consumption through main SOAS heat meter • Reduced electrical consumption from portable heaters • Improved comfort and reduced level of complaints from occupants.
Timing	• On site November2010 • Project completion end March 2011 • Measurement of savings on going from March 2011
Notes	Building heating was split up into two zones only and did not take account of solar and local heat gains. Each elevation on each floor is now controlled based on average space temperature and can also be controlled for different occupancy times.

Project: Reference:	**12. Vernon Square Boiler Replacement**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To replace the existing cast iron gas-fired boilers with condensing boilers
Benefits	• Financial savings: £5,162 • Payback period: 19.4 years • CO_2 Emissions reduction: 32 tonnes of CO_2 • 4.5% of target 
Funding	• Project cost £100,000 • Funded sought from Salix and LTM funds. • Project to be approved
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding is given and allowed to proceed • Project considers other issues such as removal of electric heaters and building zoning
Measuring Success	• Reduced gas consumption • Improved reliability • Improved comfort and reduced level of complaints from occupants.
Timing	• Earmarked for 2012
Notes	Existing boilers are 21 years old and whilst still functioning well, they are not as efficient as they could be. The installation of BMS controls now gives the opportunity to directly compensate the temperature they operate in relation to the weather which is ideal for condensing boilers. Whilst the payback is long, the boilers will need to be replaced in any case due to their age and savings will increase if other elements of work can be included.

Project: Reference:	**15. Philips Building AHU Upgrades**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To replace existing air handling plant in the east and west plant rooms and for the Khali lecture theatre
Benefits	• Financial savings: £28,335 • Payback period: 5.3 years • CO_2 Emissions reduction: 114 tonnes of CO_2 • 16% of target 
Funding	• Project cost £150,000 • Funded from LTM and part Salix funding sought for project
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding received • Project to interface with Phase 2 of library transformation project • To integrate with CHP operating strategy
Measuring Success	• Reduced electrical consumption for building • Increased heat recovery from building and CHP plant • Reduced heat consumption
Timing	• Dependant on phase 2 of the library transformation project taking place but anticipated for summer 2012 • Measurement of savings to commence at project completion
Notes	Existing plant operates 24/7 to support low grade heat rejection from CHP engine aftercoolers as heat rejection radiators are located in the extract chambers. There is the possibility that phase 2 of the library transformation project may not take place in 2012 if funding cannot be secured. If this happens, then there is the possibility of undertaking some interim measures to reduce energy consumption through the use of temporary controls and possible variable speed drives on the existing plant.

Project: Reference:	**2. Install Trend BMS to Faber Building Heating System**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install a Trend BMSto control the heating in the Faber building and link to central supervisor.
Benefits	• Financial savings: £2,000 • Payback period: 6.7 years • CO_2 Emissions reduction: 12 tonnes of CO_2 • 1.7% of target  Existing control panel
Funding	• Project cost £13,500 • Funded from Salix and LTM funds. • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site. • Small amount of work to complete
Measuring Success	• Reduced gas consumption • Reduced electrical consumption from portable heaters • Improved comfort and reduced level of complaints from occupants.
Timing	• On site November2010 • Project completion end March 2011 • Measurement of savings on going from March 2011
Notes	Existing heating controls were defunct and the heating was operating 24/7 with no temperature control. Heating is now time controlled with optimum start/stop and has weather compensation. There is also the opportunity to repair 2 existing valves to allow some further zoning of the building.

Project: Reference:	**3. Brunei Gallery Trend BMS Improvements**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To undertake a Trend energy audit and implementation of recommendations
Benefits	• Financial savings: £25,000 • Payback period: 0.5 years • CO_2 Emissions reduction: 109 tonnes of CO_2 • 15% of target
Funding	• Project cost £13,000 • Funded from Chiller replacement project and Salix • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site. • Small amount of work to complete as part of chiller replacement
Measuring Success	• Reduced gas consumption • Reduced electrical consumption • Improved comfort and reduced level of complaints from occupants. • Reduced running hours of plant and equipment
Timing	• On site September2010 • Project completion end May 2011 • Measurement of savings on going from start of project
Notes	Existing controls were in need of upgrade. New controllers have been installed under separate funding and changes made to operating strategy and installation of demand led control. PIR control added to main lecture theatre air handling plant and variable speed drives added to other units. Savings already being noticed. Chiller replacement will complete these works and this is a separate CMP project.

Project: Reference:	**5. Vernon Square Trend BMS for Heating**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install a Trend BMSto control the heating at the Vernon Square site and link to central supervisor.
Benefits	• Financial savings: £5,170 • Payback period: 3.4 years • CO_2 Emissions reduction: 32 tonnes of CO_2 • 4.5% of target
Funding	• Project cost £17,500 • Funded from Salix and LTM funds. • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and on site. • Small amount of work to complete
Measuring Success	• Reduced gas consumption • Reduced electrical consumption from portable heaters • Improved comfort and reduced level of complaints from occupants.
Timing	• On site November2010 • Project completion end March 2011 • Measurement of savings on going from March 2011
Notes	Existing heating controls were defunct and the heating was operating 24/7 with no temperature control and a significant number of user complaints. Heating is now time controlled with optimum start/stop and has weather compensation. There are further opportunities here to zone the heating system.

Project: Reference:	**6. Philips Building – Use Chilled Water Instead of DX/VRF**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install a chilled water system and chiller to the refurbished areas of the library as opposed to proposed VRF system
Benefits	• Financial savings: £10,507 • Payback period: 8.6 years • CO_2 Emissions reduction: 22 tonnes of CO_2 • 3% of target
Funding	• Project cost £90,000 • Funded from Library Transformation Project capital funds • Project approved and installed
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and installed. • Opportunity to expand and look to use absorption chillers linked to CHP in the future
Measuring Success	• Reduced cooling costs for library – difficult to quantify as some of the cooling is additional to before but other older installations have been replaced as part of project.
Timing	• On site August2010 • Project completion end February 2011
Notes	This provided the opportunity to move away from the proposed VRF system to chilled water which may open up the opportunity to run the CHP engines more intensively during the summer if an absorption chiller is added in the future. This will also reduce electricity consumption so is a double winner.

Project: Reference:	**4. Brunei Gallery Turbocor Chiller Replacement Project**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To replace 2 existing chillers with Turbocor energy efficient chiller
Benefits	• Financial savings: £50,000 • Payback period: 1.9 years • CO_2 Emissions reduction: 197 tonnes of CO_2 • 28% of target
Funding	• Project cost £95,000 (chiller only) • Funded from Chiller replacement project capital funding • Project approved and undergoing design and tendering
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded with planning permission. • Due to start on site in may 2011
Measuring Success	• Reduced electrical consumption • Improved comfort and reduced level of complaints from occupants. • Reduced running hours of plant and equipment
Timing	• On site May2011 • Project completion end May 2011 • Measurement of savings based on previous consumption
Notes	The existing chillers are time expired and one has failed. This has implications for the gallery conditions and the comfort of users of the lecture theatre. The wider project is also looking to install variable speed drive pumps, replace 3-port motorised valves and install zone valves to the heating system. One watch point is the fact that full cooling and humidification has not been provided to the building for the last 2 years. Therefore, energy consumption could increase but the use of the Turbocor chiller over a traditional type will ensure that any increase is far less than would have occurred.

Project: Reference:	**7. Voltage Optimisation Brunei and College Buildings**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install a 1MVA Powerperfector unit to the electrical supply to the above buildings to reduce electricity consumption
Benefits	• Financial savings: £16,489 • Payback period: 4.9 years • CO_2 Emissions reduction: 35 tonnes of CO_2 • 5% of target 
Funding	• Project cost £80,118 • Funded by Salix • Project approved and taking place
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project already funded and installed
Measuring Success	• Reduced electrical consumption for buildings • Voltage monitoring carried out indicating scope for additional 2% savings
Timing	• On site December 2010 • Project completion end December 2010 • Measurement of savings on going from January 2011
Notes	Savings are based on logging of voltages before units were installed. Further adjustment is possible following post installation logging.

Project: Reference:	**41. Philips BuildingVoltage Optimisation**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install a 1MVA Powerperfector unit to the electrical supply to the above building to reduce electricity consumption
Benefits	• Financial savings: £21,722 • Payback period: 3.8 years • CO_2 Emissions reduction: 46 tonnes of CO_2 • 6.4% of target
Funding	• Project cost £83,225 • Salix funding sought for project
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding received • Project successfully integrated with electrical infrastructure works
Measuring Success	• Reduced electrical consumption for building • Voltage monitoring to be carried out post project
Timing	• On site between June and August 2011 • Project completion end August 2011 • Measurement of savings to commence at project completion
Notes	Savings are based on logging of existing voltages. This unit was originally due to be installed during the Christmas break in conjunction with the transformer replacement but was postponed due to the short time frame available and complexities for the location of this unit. It will now be incorporated into the main LV panel replacement works as part of the electrical distribution replacement project due to take place over the summer 2011 recess.

Project: Reference:	**20. College Building Window replacement**
Owner (person)	Richard Poulson
Department	Estates and Facilites
Description	To replace existing single glazed Crittal windows with new double glazed units.
Benefits	• Financial savings: £2,875 • Payback period: immediate • CO_2 Emissions reduction: 24 tonnes of CO_2 • 3.3% of target 
Funding	• Works already funded through LTM budget due to condition of existing windows therefore £0 for the purpose of the CMP
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding received • Replacement windows to meet planning and conservation approval due to listed building status
Measuring Success	• Reduced heat consumption for building • Improved comfort conditions for building users
Timing	• Due to take place over summer 2011 • Measurement of savings to commence during next heating season
Notes	The existing single-glazed crittal windows are in poor condition and many of the opening sections do not close fully leading to draughts and excessive heat loss. The building is grade II listed meaning the replacement windows have to replicate the existing. However, a double glazed unit has been found that matches the existing and if it is improved, the double glazing and improved draught-proofing should reduce heat loss and improve comfort levels which may allow the heating to be reduced in this building.

Project: Reference:	**22. College Building kitchen equipment upgrade**
Owner (person)	Richard Poulson
Department	Estates and Facilites
Description	To upgrade the existing kitchen equipment as part of the new catering contract
Benefits	• Financial savings: £5,320 • Payback period: immediate • CO_2 Emissions reduction: 11 tonnes of CO_2 • 1.6% of target
Funding	• The new catering supplier will be funding these works as part of the new contract which has just been awarded
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project to be funded by supplier • Consideration to be given to sub-metering the catering areas to monitor and encourage efficiencies.
Measuring Success	• Reduced electrical consumption for building • Reduced gas usage
Timing	• Due to take place over summer 2011 • Measurement of savings to commence once complete
Notes	The existing catering equipment is old and in a poor condition. New energy efficient equipment is being specified by the new catering provider and will reduce energy consumption as a consequence. This is being funded entirely by the catering provider.

Project: Reference:	**27. Brunei Gallery Lighting Improvements**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install LED lighting to replace Tungsten Halogen lighting
Benefits	• Financial savings: £28,500 • Payback period: 1.4 years • CO_2 Emissions reduction: 60 tonnes of CO_2 • 8.4% of target
Funding	• A mixture of Salix and LTM funding will be sought for this project
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding to be secured • Project to be fully costed • Working closely with curator to ensure suitability
Measuring Success	• Reduced electrical consumption for building • Reduced maintenance costs
Timing	• During 2011/12 • Measurement of savings to commence once complete
Notes	The gallery areas are currently lit using tungsten halogen lighting. Replacing these with LED will have several advantages including reduced energy consumption from the lighting, reduced cooling requirements to remove the heat given off by the lights, reduced maintenance costs due to the significantly longer life of LED lamps and elimination of UV damage to exhibits and displays. Costs provided are estimates and a manufacturer of the lighting will be invited to submit a proposal to firm up project.

Project: Reference:	**40. Vernon Square Lighting improvements**
Owner (person)	Stephen McKinnell
Department	Estates and Facilites
Description	To install absence and daylight detectors to teaching rooms
Benefits	• Financial savings: £3,000 • Payback period: 10 years • CO_2 Emissions reduction: 16 tonnes of CO_2 • 2.3 % of target
Funding	• A mixture of Salix and LTM funding will be sought for this project
Resources	• Energy consumption data and operational data via existing M&T software and BMS
Ensuring Success	• Project funding to be secured • Project to be fully costed • Project to integrate with other works planned for this building
Measuring Success	• Reduced electrical consumption and carbon emissions for building • Reduced maintenance costs through longer lamp life
Timing	• During 2013/14 • Measurement of savings to commence once complete
Notes	The lighting installation at Vernon Square is relatively new and tends to consist of T5 fluorescent luminaires but there are no lighting controls and switches are not always positioned for easy access. Lighting tends to get left on in these areas due to the lack of ownership of the spaces and the transient nature of their use. The new controls will be set to switch off lighting should someone leave a space but not automatically switch back on when they return. This will avoid lighting being used when there is adequate daylight. The long payback for this project is partly due to the estimated cost of undertaking the work and the fact that the existing lighting is already quite efficient. However, lights being left on in unoccupied areas is not a good example to staff, students and visitors and the controls will also help to encourage further savings around the site.