

University of Oxford Carbon Management Plan (CMP)



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Foreword from Pro-Vice-Chancellor (Planning and Resources)

As Chair of the Sustainability Steering Group, I have seen a significant shift in staff and students' expectations of environmental sustainability over the past year. Energy efficiency and carbon reduction are now considered 'business as usual' and an increasing number of staff want to reuse unwanted office items rather than throw them away. The University is under increasing pressure to demonstrate sustainability performance – for example the Higher Education Statistics Agency (HESA) greenhouse gas reporting requirements and the Green League table, which ranks universities' sustainability performance each year. In 2013 the University will continue its work to improve its environmental performance, by investing in energy and water efficiency and also by providing staff and students with the tools to reduce their environmental impacts.

Professor William James, Chair, Sustainability Steering Group



Executive Summary

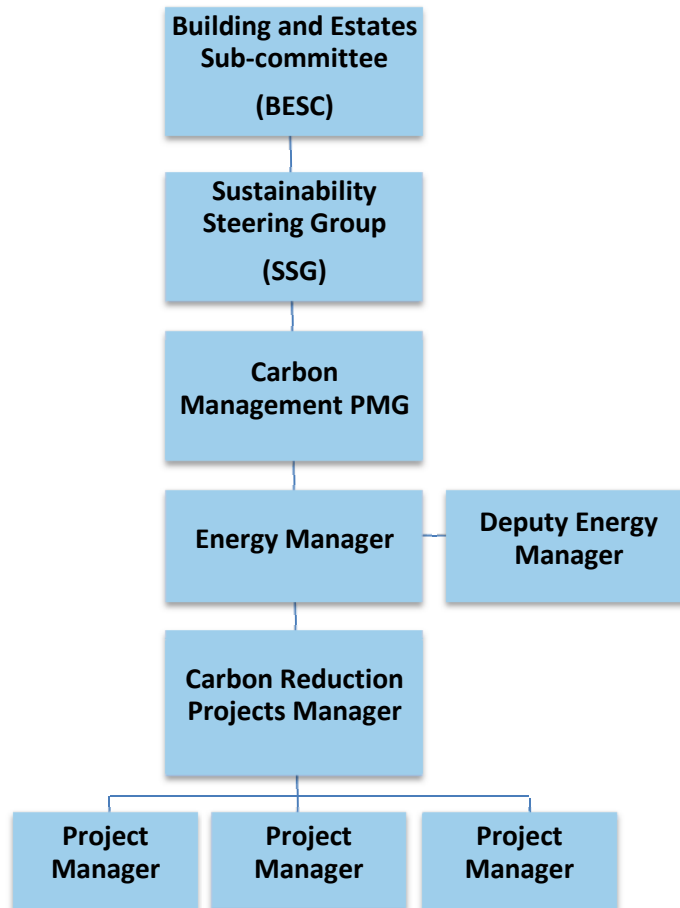
- This Carbon Management Plan (CMP) sets out the action plan for reducing carbon emissions from the University functional estate over the next seven years. It identifies the benefits of carbon management and describes the governance arrangements to keep the programme on track. The University has successfully implemented carbon management initiatives and will continue to build on this success.
- Reducing the University energy consumption not only reduces carbon emissions but also makes tangible cost savings. This programme therefore contributes directly to the goal of using energy in a sustainable manner.
- In 2011/12 energy cost the University £12.3 million and emitted 70,546 tonnes of CO₂ (tCO₂). These emissions were generated through use of gas (22%) and electricity (78%) for heating, refrigeration, lighting, operating equipment, standby generators and computer systems.

Using a 2005/6 baseline, the University has set an ambitious target to reduce its carbon emissions by 11% by 2015/16, and 33% by 2020/1.

The projects identified in this plan have the potential to reduce emissions by 12,262 tCO₂ per annum and achieve 38% targeted reduction measured against the 2005/6 baseline. This means that the University will need to identify more projects to make up a further 62%. To achieve this we will continue with the process of identifying new potential projects, continue expanding behaviour change programmes and ensure that major refurbishments and new builds comply with the University Sustainable Buildings Philosophy. This combined approach will ensure that as we move towards the 2020 deadline, carbon emissions will reduce.

The University has allocated a budget of £14.6 million to fund carbon reduction projects throughout the functional estate. The identified projects will save approximately 12,262 tCO₂ and £2,856,433 per year.

The diagram below shows the University governance structure which is used to deliver the CMP. The Energy Manager has overall responsibility for managing and reporting the progress of the plan. Progress will be reported to the Carbon Management PMG and then to the Sustainability Steering Group (SSG), every term in the form of a paper. The SSG will then decide if that report needs to be passed to the Building and Estates Sub-Committee (BESC).



1. Introduction

This Carbon Management Plan defines the carbon management programme of activity for the next seven years. It sets out the strategic context and the case for action, current carbon emissions, a programme of proposed projects and actions to reduce emissions, and how much this will cost and save, as well as the governance arrangements to keep the programme on track.

The University commissioned a Carbon Management Strategy (CMS) in 2011. This strategy was designed to address and manage the following risks:

- The impact on Higher Education Funding Council for England (HEFCE) funding relative to the University's performance on reducing carbon emissions
- The continuing financial impact on the University of rising energy costs
- The increasing financial burden of the Carbon Reduction Commitment (CRC) and the European Union Emissions Trading Scheme (EUETS)
- Reputational risk.

The strategy drove policy within Estates Services for carbon and energy-saving measures in both existing functional estate and new buildings.

In 2013 it was recognised that the strategy, although comprehensive, did not give specific direction on how to manage the risks listed above. The Sustainability Steering Group decided to commission a review of the existing strategy and carbon reduction targets. The review of the strategy included a comprehensive audit of the original 2005/6 data used, ensuring the review used data that was both accurate and reliable.

The review of the strategy was completed in July 2013. The Environmental Sustainability Team then produced this plan and subsequent list of carbon reduction projects in the form of a carbon tracking database. The plan and database use Carbon Trust and DEFRA methodologies and correction factors to track individual projects over their installation phase and operating lifespan. This will give an accurate indication of the progress that the University is making towards its targets.

The Carbon Trust uses a simple gap analysis tool to illustrate the progress an organisation has made in producing and implementing its CMP. The diagram below illustrates the individual stages:



The University has achieved the following:

1. **Mobilise:** the Estates Services Environmental Sustainability Team has three dedicated team members who work on energy management and carbon reduction. That team will be reinforced in 2013 with the appointment of a Sustainable Buildings Officer. The team has been confirmed as managing Scope 1, 2 and 3 emissions on the functional estate.

2. **Baseline and forecast:** the University's baseline was calculated for 2005/6 and this was used to calculate 2020 target.
3. **Identify and quantify:** the recent review of the CMS identified the risks that could stop the University achieving its targets. This process also described the steps needed to achieve those targets. Those steps are indicated in this plan and in the University's carbon-tracking database.
4. **Approve plan:** This plan has been approved by the Sustainability Steering Group and sent for consideration by the Building and Estates Sub-committee.
5. **Implement the plan:** Implementation is described later in the plan but will focus on projects with the highest pay back period and the greatest ease of implementation.

2. Strategic objectives and targets

2.1 The Higher Education Funding Council for England (HEFCE)

HEFCE has stated that it is planning to link the amount of funding allocated to specific institutions to their performance on carbon management, through the Capital Investment Framework. Exactly how HEFCE will make this link has not yet been established, although some means of assessing progress against carbon management targets was expected to be in place by 2011. HEFCE has suggested that data will be collected through the existing Estates Management Record collection system.¹

In line with Government targets², HEFCE has proposed that the Higher Education sector commits to reducing its CO₂ emissions from stationary energy and owned vehicles by 43% by 2020 against a 2005/6 baseline.³

The University's 2005/6 CO₂ emissions from stationary energy and owned vehicles were 65,980 tCO₂; the 2020/1 target of 43% less than this is 37,609 tCO₂; emissions in 2008/9 were 74,628 tCO₂. Roughly speaking, over the last five years the University's CO₂ emissions grew by a quarter; to meet HEFCE targets, in the next ten years they would need to reduce by half.

HEFCE has stated that it recognises the significant diversity of the HE sector with its range of missions, priorities, histories, subject mix, infrastructure and research; it asks that institutions set targets and develop plans that are appropriate to individual circumstances, but within the national target framework. These targets will be collated through the next Capital Investment Framework to determine whether collectively they are sufficient to meet the sector target.⁴

HEFCE has indicated that, rather than only using an absolute CO₂ reduction target, they may also employ a metric to take into consideration CO₂ emissions relative to income.⁵ HEFCE required all universities to have a Carbon Management Strategy in place by the end of 2010.⁶

2.2 Energy costs

As the UK's reserves of North Sea oil and gas run out, the Government predicts that up to 60% of the UK's gas could be imported by 2020. The UK is therefore going to become increasingly reliant on imported fossil fuels, which in turn will increase exposure to global energy price increases and fluctuations. Since many of the UK's power stations are gas powered, this means that electricity will also be subject to these price fluctuations.

Many of the measures outlined in this strategy will serve to reduce the University's susceptibility to this by reducing energy demand and increasing the University's ability to generate its own energy.

The potential carbon and energy cost savings of the plan are significant. If all of the opportunities identified in the target scenario set out in section 4 were to be fully implemented, the annual CO₂ saving could be nearly 33,000 tCO₂, potentially saving up to £3.5 million per year by 2020 compared to current energy costs. This would equate to saving around 23% on the University's £15 million annual energy bill.

2.3 The Carbon Reduction Commitment Energy Efficiency Scheme (CRC EEC)

Annually from April 2012 the University has had to 'buy' carbon allowances, at £12 for every tonne of CO₂ forecasted to be emitted as a result of its stationary energy use each year. The University has paid £840,000 for suitable CRC carbon shares to meet its compliance requirements for year 2012/13.

Prior to October 2011, the original scheme proposal was that each year the Government would 'recycle' all revenue generated by the sale of allowances back to the participating organisations. In 2012, each organisation involved would

¹ *Consultation on a carbon reduction target and strategy for higher education in England*, HEFCE, July 2009: p19.

² *The UK Low Carbon Transition Plan*, July 2009. Government targets are actually a 34% reduction against a 1990/1 baseline. However, as many institutions do not have robust data for their 1990/1 CO₂ emissions, HEFCE have proposed that the baseline year for CO₂ reduction targets should be 2005/6. HEFCE have stated that, considering the growth in emissions of the sector as a whole since 1990/1, a reduction of 34% against a 1990/1 baseline is equivalent to a reduction of 43% against a 2005/6 baseline.

³ *Consultation on a carbon reduction target and strategy for higher education in England*, HEFCE, July 2009: p19.

⁴ Ibid

⁵ *Consultation on a carbon reduction target and strategy for higher education in England*, HEFCE, July 2009: p21.

⁶ *Carbon management strategies and plans – A guide to good practice*, HEFCE, January 2010.

have received between 90% and 110% of the total they spent on allowances.⁷ How much money each organisation received in the recycling payment would have depended on its position in a publicly available league table showing all organisations in the CRC.

However, in the Comprehensive Spending Review statement of October 2010, the Government stated (in para. 2.108) that:

'the CRC Energy Efficiency scheme will be simplified to reduce the burden on businesses, with the first allowance sales for 2011–12 emissions now taking place in 2012 rather than 2011. Revenues from allowance sales totalling £1 billion a year by 2014–15 will be used to support the public finances, including spending on the environment, rather than recycled to participants. Further decisions on allowance sales are a matter for the Budget process.'

The financial impact of the CRC on Oxford University will be significantly greater than originally envisaged, as the individual price of CRC allowances will increase from £12 to £16 in April 2014. This will be followed by an annual increase based on inflation rates.

2.4 The European Union Emissions Trading Scheme (EUETS)

The EUETS covers a large proportion of the natural gas use in the University's Science Area. The scheme is not considered to be a strong driver for the University CO₂ reduction, as at present the University receives a substantial free allocation of carbon shares. However under Phase 3 of the EUETS Scheme (2013–20) the free allocation of shares will reduce at a rate of 5% per annum. This reduction will result in the University having to begin purchasing carbon shares from 2016, but the price of carbon shares is relatively low and does not have the financial impact of the CRC scheme. Additionally, in Phase 2 of the CRC scheme, which begins in April 2014, all areas that operate under the EUETS scheme are excluded from the CRC scheme. This will be a substantial economic advantage to the University.

2.5 Government non-domestic buildings targets

The Government Budget 2008 announced the Government's ambition that all new non-domestic buildings should be 'zero carbon' from 2019, with associated interim targets expected to be announced.

The exact definition of zero carbon is currently out for consultation, but meeting the requirement is likely to involve a combination of energy conservation, low-carbon energy, and initiatives such as investment in off-site low-carbon energy or similar⁸ (referred to as 'allowable solutions').

2.6 Oxford City Council Renewables requirement

Oxford City Council's Natural Resource Impact Analysis puts in place the relatively demanding target of requiring new building projects greater than 10 units (or 2000m²) to have 20% of their energy provided through on-site generation using renewable and low-carbon technologies.

2.7 Green League

The Green League is an annual ranking of universities according to environmental performance, by student environmental organisation People and Planet. Amongst the many criteria that contribute to an institution's ranking, the Green League awards points for annual reductions in CO₂ emissions per full-time equivalent staff member or student. Points are also awarded based on the percentage CO₂ reduction target that universities aim to achieve over a five-year period.

The Green League attracts publicity and is covered in the national press, therefore representing a potential reputational risk and/or opportunity to the University.

The table below shows that the member institutions of the Russell Group of research-intensive universities were spread throughout the rankings of the 2013 Green League.

⁷ As an example, if the University has emissions of 100 tCO₂ in 2011/12 and the total emissions from all participants in 2011/12 is 10,000 tCO₂ then the University's share is 1%. The basis for each future recycling payment to the University will therefore be 1% of the total revenue raised from the annual sale or auction of allowances each year. This is then adjusted by a bonus or penalty payment based on the University's position in the league table. The higher the University's position in the table, the bigger the bonus payment.

⁸ *Zero carbon for new non-domestic buildings: Consultation on policy options.* Department for Communities and Local Government, November 2009.

The rankings of the Russell Group Universities in *People and Planet's Green League 2013*

Russell Group University	Ranking	Overall Ranking
University of Exeter	1	13
Newcastle University	2	15
London School of Economics and Political Science	3	22
University of Bristol	4	23
University of Edinburgh	5	46
University of Sheffield	6	56
University of Leeds	7	58
University College London	8	61
University of Nottingham	9	70
University of Glasgow	10	77
Cardiff University	11	85
University of Southampton	12	85
King's College London	13	91
Queen's University Belfast	14	93
University of Manchester	15	96
Durham University	16	100
University of Birmingham	17	105
Queen Mary, University of London	18	107
University of York	19	109
University of Cambridge	20	113
Imperial College London	21	113
University of Warwick	22	113
University of Liverpool	23	119
University of Oxford	24	132

Target

The University of Oxford intends to reduce its carbon emissions from scope 1 and 2 activities by 11% by 2015 and 33% by 2020, from a 2005/6 baseline of 65,980 tCO₂.

3. Emissions baseline and projections

The carbon baseline is a record of approximate carbon emissions in a chosen year. Targets and performance in reducing emissions are measured against this figure as a percentage of the baseline value. This section outlines which parts of the organisation's emissions are included in the baseline, which year the University has chosen as the baseline and how the baseline was calculated.

3.1 Scope and data sources

The University's baseline emission calculations cover Scope 1 and 2 emissions, which are from all buildings on the functional estate as well as graduate accommodation (a list of buildings is detailed in Annex A). The emissions from fleet vehicles are also included as Scope 1 emissions. There is a separate Scope 3 emissions baseline that has been calculated from travel, procurement, waste and water data.

The emission sources included in the baseline are listed below, 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.

Emissions sources included in baseline scope	Data sources and quality
Scope 1 – includes all direct emissions from sources directly controlled by the organisation – fuels consumed on-site and from owned vehicles	
Fuel use in buildings and estates (eg gas and oil)	Revenue and owned meters – Excellent
Fleet transport emissions (eg petrol and diesel)	Fleet mileage details – Good
Refrigerant gas loss (from air conditioning and refrigeration systems)	Contractor maintenance reports – Excellent
Scope 2 – emissions from purchased energy produced off-site	
Electricity consumption in buildings and estates	Revenue and owned meters – Excellent
Imported heat	n/a
Scope 3 – all other emissions	
Business travel (public transport and staff vehicle use)	Purchasing Dept
Commuting for staff	Staff Surveys – Good
Travel for patients/visitors/students	Purchasing Dept
Waste	Purchasing Dept
Water consumption	Revenue and owned meters – Excellent
Procurement	Purchasing Dept – Fair

To calculate the University carbon emissions, the conversion factors used were the Defra GHG Conversion Factors 2011 (archive.defra.gov.uk/environment/business/reporting/conversion-factors.htm).

3.2 Baseline

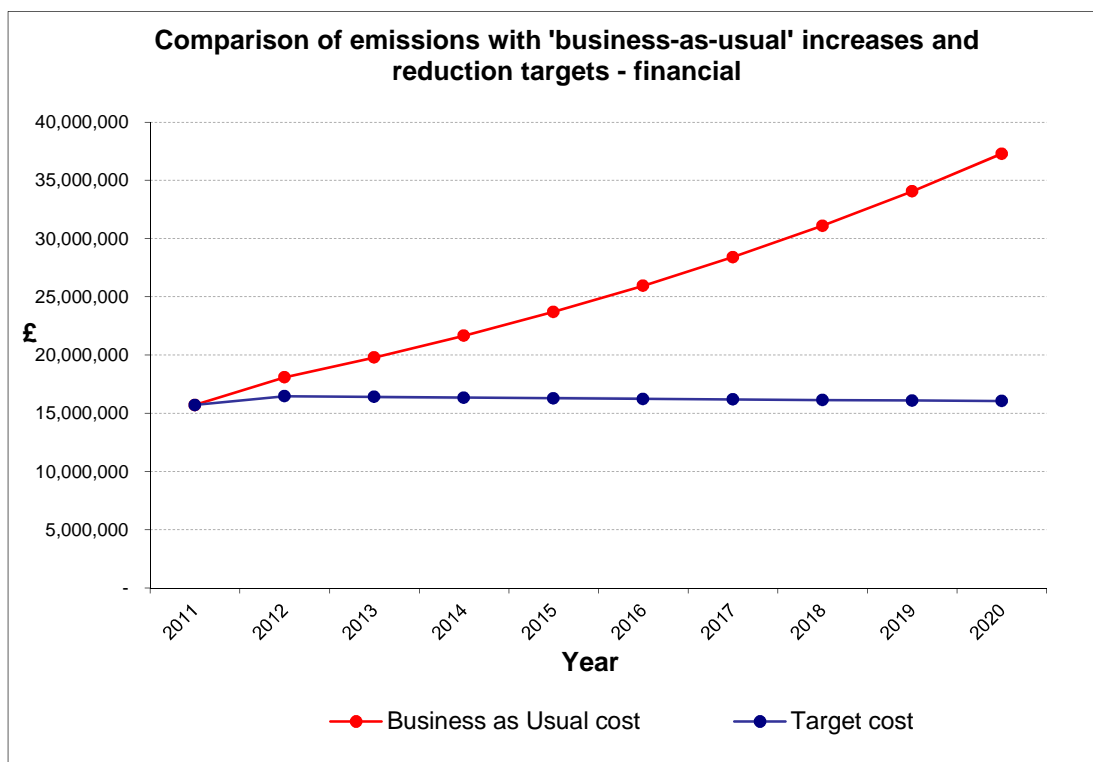
In line with HEFCE guidelines the University has set 2005/6 as the baseline year. In 2005/6 the University spent £6.5 million on energy and emitted 65,980 tCO₂.

3.3 Projections and target savings (value at stake)

The potential cost of taking no action on carbon reduction, compared to achieving the target in this plan, is a cumulative sum of £93,827,316 by 2020.

With fuel prices rising, the University of Oxford stands to spend a significant quantity of money on its energy bills unless action is taken. If the 'business as usual' (BAU) scenario (which shows the calculated growth in energy costs if nothing is done to reduce consumption) is compared against hitting the target (or reduced emissions scenario – RES) the 'value at stake' can be calculated. The capital costs of projects required to meet the target are not included in this analysis.

The graph below models potential target energy savings against BAU. This is based on an annual rise in fuel prices of 5.8%. By achieving the target savings the University could avoid paying a cumulative £93,827,316 by 2020, against BAU.



3.4 Display Energy Certificates

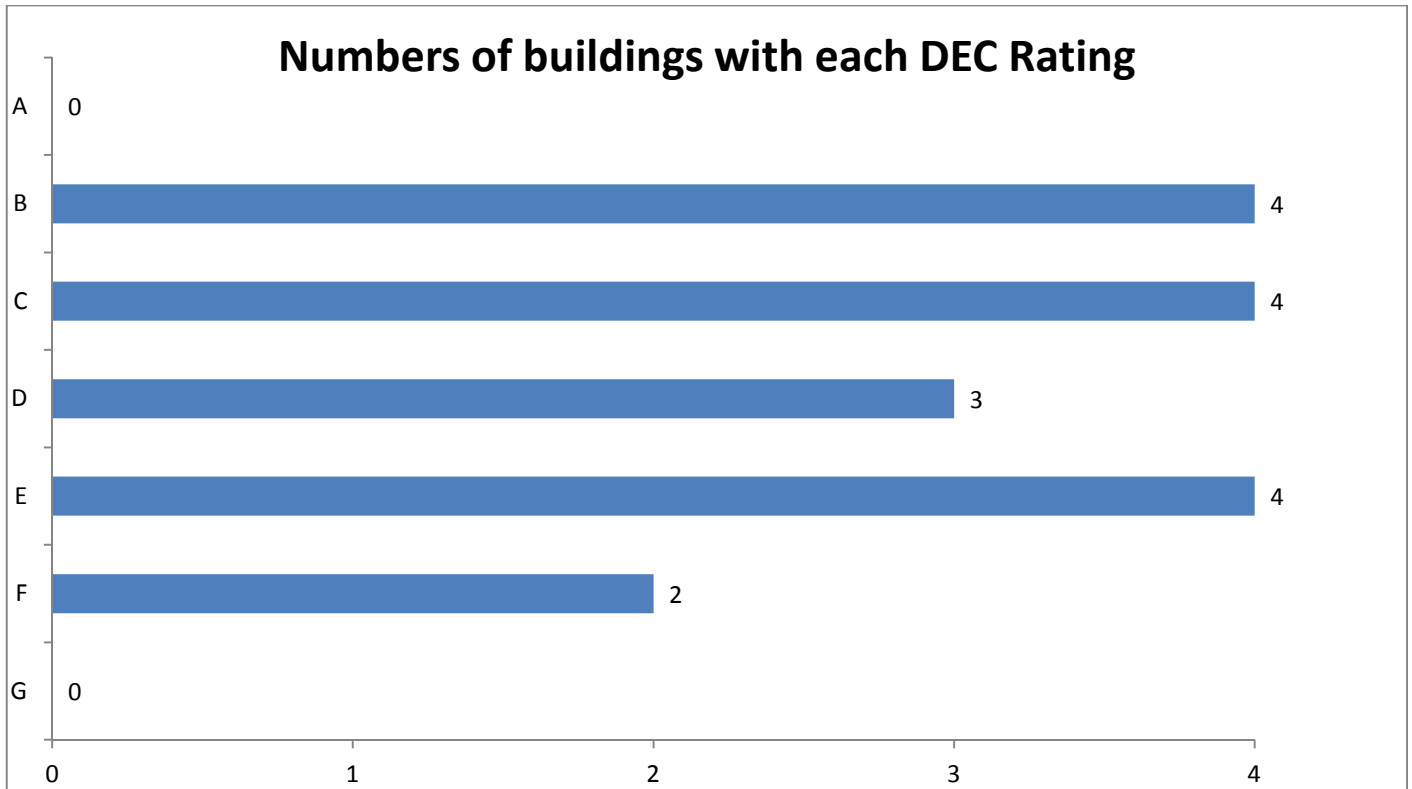
The University currently produces 17 Display Energy Certificates (DECs). The DECs are displayed in the entrances to buildings to supply simple information showing the energy consumption of that building. The production and display of the 17 DECs is a statutory requirement to comply with the Energy Performance of Buildings Directive 2008. In addition the DECs highlight opportunities for energy conservation and related savings. The certificates are being used extensively at other universities as a way of comparing energy consumption of individual buildings. An additional 50 buildings will be included in the 2013/14 DEC scheme and further expansion of the DECs will continue to cover all relevant buildings on the University estate. This extension of DECs will complement the roll-out of the 'Green Impact' behaviour change initiative across departments.

The table below shows the buildings that are included in the University's current DEC scheme and their corresponding scores.

	2010 Energy Performance Operational Rating	DEC	2011 Energy Performance Operational Rating	DEC	2012 Energy Performance Operational Rating	DEC	2013 Energy Performance Operational Rating	DEC
Bodleian Library (Old)	97	D	88	D	88	D	104	E
Ewert House	45	B	42	B	42	B	54	C
Examination Schools	40	B	47	B	47	B	62	C
Medical Sciences Teaching Centre	108	E	107	E	107	E	127	F
Pitt Rivers Museum	108	E	118	E	118	E	109	E
Radcliffe Camera	36	B	48	B	48	B	65	C
Radcliffe Science Library	82	D	91	D	91	D	84	D
Rothermere American Institute	68	C	56	C	56	C	51	C
Sackler Library	168	G	131	F	131	F	108	E
Said Business School	91	D	95	D	95	D	118	E
Sheldonian Theatre	32	B	38	B	38	B	47	B
Sports Centre – Iffley Road	87	D	74	C	74	C	80	D
St Cross Library	48	B	51	C	51	C	47	B
Taylor Institution	51	C	50	B	50	B	43	B
University Club – Mansfield Road	83	D	84	D	84	D	89	D
University Museum	44	B	44	B	44	B	49	B
Ashmolean Museum							139	F

The energy performance operational rating is based on consumption figures, floor area, activity and opening hours. Whilst the rating is a blunt instrument, these scores will further inform areas which should be prioritised for improvement or further investigation.

The graph below shows the range of DEC scores currently across the estate.



4. Carbon management projects

The Environmental Sustainability Team have identified projects that are predicted to save 12,282 tCO₂ and achieve 37% of the target (a 33% reduction against the 2005/6 baseline).

This section of the plan lists and prioritises the opportunities identified for carbon emission reduction. The projects were identified through a mixture of building energy surveys, data from DEC's and information or requests from building managers. The information sources complement the opportunities identified by the Buildings Maintenance team, Environmental Sustainability team, Building Managers, University employees and students.

The Energy Team quantified the projects to understand the cost and benefits of each. They were then prioritised based on ease of implementation, carbon performance, payback period and SALIX funding compatibility. A carbon tracking database will be maintained by the Environmental Sustainability team to record, quantify and evaluate projects on an ongoing basis including post-completion data.

The projects are split into the following sections:

Section title	Description	Total annual carbon savings (tCO ₂)	Total annual cost savings
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	1,325	£345,125
Planned/funded projects	Those that have already been approved and have funding allocated	10,464	£2,417,391
Potential future projects	Planned projects that have been quantified, but funding has not yet been allocated.	493	£93,917

The headings in the project tables below refer to:

- Location of project
- Project – short title
- Costs – financial figures for the capital or implementation cost
- Annual savings:
 - Gas savings (kWh)
 - Electricity savings (kWh)
 - Financial – energy costs
 - tCO₂ – tonnes of carbon dioxide
- Payback period – the overall cost divided by the annual saving
- % CO₂ reduction target – the percentage of your CO₂ saving target that this project will annually contribute
- Implementation year – the year of implementation
- Net present value (£) – future costs discounted to represent their value in today's money

Annex A gives an example of how projects over £25,000 will be reported.



4.1 Implemented projects

This section includes projects that are already underway or have been completed since the baseline year. The data entered in the table is estimated based on original surveys.

Location	Project description (Carbon tracking database reference number)	Project driver	Funding source	Stage	Annual savings Gas kWh	Annual savings Elec kWh	Carbon savings tCO ₂	Energy cost savings	Payback period years	% CO ₂ reduction target	Start year
Iffley Rd Sports Centre	Pool Cover (1)	Request from Bldg Manager	SALIX	Implemented	135,860	115,260	85	£17,640	2.58	0.26	2012
Botnar Bldg	Chilled water pumps(2)	Building Survey Report	Energy Levy	Implemented		53,846	28	£5,385	9.02	0.09	2012
New Biochemistry	Air Handling Units (11)	Midnight Oil report (recommendation 8)	Carbon Management Fund	Implemented		5,000	3	£500	-	0.01	2012
Old Bodleian	Lighting (45)	Request from Bldg Manager	Revolving Green Fund	Part Implemented		0	0	0	-	-	2013
Henry Welcome Building	Generator Heater (46)	Enhancement of repair project	Energy Levy	Implemented		0	0	0	-	-	2013
Malthouse	Lighting upgrade (47)	Building Survey Report	Response and Maintenance	Approved for implementation		1,688	1	£169	-	0.00	2013
Old Bodleian	Automatic controls on blinds (50)	Enhancement of repair project	Energy Levy	Part Implemented		5,304	3	£530	3.44	0.01	2013
Natural History Museum	Lighting upgrade (109)	Enhancement of repair project	Revolving Green Fund	Part Implemented		0	0	0	-	-	2013
Earth Sciences	Plate heat exchanger(37)	Enhancement of ground source heat project	Revolving Green Fund	Estimated costs		21,667	11	£2,166	5.54	0.03	2013
All Departments	EEM project (42)	Carbon Management Strategy	Revolving Green Fund	Estimated costs		795,511	417	£79,551	0.57	1.27	2013
Numerous Locations	Libraries Projects (43,53,54,60,61)	Request from Bldg Manager	Carbon Management Fund	Estimated costs		1,480,411	777	£239,183	1.84	2.36	2013
				Totals	135,860	2,478,688	1,325	£345,125			



4.2 Projects with estimated costs ready for detailed evaluation and implementation

This section shows projects that are definitely planned to take place and have a proposed funding route. They will be funded from the following:

- SALIX Funding (SF)
- Carbon Management Strategy Fund (CMSF)
- Energy Levy (EL)
- Meter Levy (ML)

Location	Project description (Carbon Project Tracker reference number)	Project driver	Funding source	Stage	Annual savings Gas kWh	Annual savings Elec kWh	Carbon savings tCO ₂	Energy cost savings	Payback period	% CO ₂ reduction target	Start year
Chemistry Research Lab	Chilled water valves (3)	Building Survey Report	EL	Estimated costs		122,980	65	£12,298	1.78	0.02	2012
New Biochemistry	Boilers Controls (4)	Midnight Oil report	CMSF	Estimated costs			0	0	-	-	2012
New Biochemistry	LTHW circuit pumps (5)	Midnight Oil report	CMSF	Estimated costs		26,874	14	£2,687	0.38	0.04	2012
New Biochemistry	Chilled water plant (6)	Midnight Oil report	CMSF	Estimated costs		24,500	13	£2,450	0.50	0.04	2012
New Biochemistry	Chilled water pumps (7)	Midnight Oil report	CMSF	Estimated costs		50,211	26	£5,021	0.24	0.08	2012
New Biochemistry	Under floor heating controls (8)	Midnight Oil report	CMSF	Estimated costs		686	0	£68	-	0.00	2012
New Biochemistry	BMS (9)	Midnight Oil report	CMSF	Estimated costs		77,667	41	£7,766	0.08	0.12	2012
New Biochemistry	Atrium vent system (10)	Midnight Oil report	CMSF	Estimated costs	170,352		31	£7,665	0.51	0.09	2012
New Biochemistry	Bio Informatics AHU (12)	Midnight Oil report	CMSF	Estimated costs		0	0	0	-	-	2012
New Biochemistry	Café AHU (13)	Midnight Oil report	CMSF	Estimated costs		2,000	1	£200	3.00	0.00	2012
New Biochemistry	Induction Units (14)	Midnight Oil report	CMSF	Estimated costs		0	0	0	-	-	2012
New Biochemistry	Trox VAV Systems (15)	Midnight Oil report	CMSF	Estimated costs		0	0	0	-	-	2012



Location	Project description (Carbon Project Tracker reference number)	Project driver	Funding source	Stage	Annual savings Gas kWh	Annual savings Elec kWh	Carbon savings tCO ₂	Energy cost savings	Payback period	% CO ₂ reduction target	Start year
New Biochemistry	Induction Units (16)	Midnight Oil report	CMSF	Estimated costs		275,570	145	£27,557	0.31	0.44	2012
New Biochemistry	BMS energy monitoring (17)	Midnight Oil report	CMSF	Estimated costs		41,100	22	£4,110	0.61	0.07	2012
New Biochemistry	BMS plant status (18)	Midnight Oil report	CMSF	Estimated costs		27,400	14	£2,740	1.91	0.04	2012
New Biochemistry	BMS air volume changes (19-22)	Midnight Oil report	CMSF	Estimated costs		0	0	0	-	-	2013
Old Rd Campus Research Facility	BMS occupancy sensing (23)	Midnight Oil report	CMSF	Estimated costs		0	0	£5,325	7.51	-	2012
Old Rd Campus Research Facility	BMS pumps (25)	Midnight Oil report	CMSF	Estimated costs		0	0	0	-	-	2012
Denys Wilkinson	Insulation of roof material (27)	Enhancement of roof repair project	EL	Estimated costs	270,000		49	£12,015	3.3	0.07	2013
Malthouse	PV Installation (36)	Building Survey Report	CMSF	Estimated costs		15000	8	1500	-	0.02	2013
Tinbergen	Replacement Pumps (38)	Building Survey Report	EL	Estimated costs		0	0	0	-	-	2013



Location	Project description (Carbon Project Tracker reference number)	Project driver	Funding source	Stage	Annual savings Gas kWh	Annual savings Elec kWh	Carbon savings tCO ₂	Energy cost savings	Payback period	% CO ₂ reduction target	Start year
Hirsch Bldg, Begbroke	PV installation (39)	Building Survey Report	CMSF	Estimated costs		72,127	38	£7,212	19.69	0.11	2014
Science Area	HV/LV Transformer replacement programme (40)	Building Survey Report	ML/ CMSF	Estimated costs		2,104,464	1,104	£210,446	2.85	3.35	2013
Swindon Bodleian	PV array (41)	Building Survey Report	CMSF	Estimated costs		40,570	21	£4,057	19.95	0.06	2012
Natural History Museum	Roof insulation (44)	Enhancement of roof repair project	EL	Estimated costs		0	0	0	-	-	2013
Pharmacology	Replacement – 80 freezer.(48)	Request from Bldg Manager	EL	Estimated costs		9,088	5	£908	6.42	0.01	2013
Wellington Square	Draught-proofing of windows.(49)	Enhancement of repair project	EL	Estimated costs		12,500	7	£562	-	0.02	2013
Numerous Locations	HPF Project List (55-107)	Building Survey Report & DEC reports	To be confirmed	Estimated Costs	16,612,823	11,076,681	8,861	£1,561,836	0-18	26.90	TBC
				Totals	17,050,175	13,979,418	10,464	£2,417,391		32	



4.3 Planned projects

This section lists projects that are in the planning stage.

Location	Project description (Carbon Project Tracker reference number)	Project driver	Funding source	Stage	Annual savings Gas kWh	Annual savings Elec kWh	Carbon savings tCO ₂	Energy cost savings	Payback period	% CO ₂ reduction target	Start year
Ashmolean Museum	Display lighting (28)	Request from Bldg Manager	SF / CMSF	Estimated Costs		939,174	492.69	£93,917	6.5	1.5	2013
Totals					0	939,174	493	£93,917			

4.4 Potential future projects

The list of future potential projects may be substantial, however the implementation of the projects outlined in 3.2 is a priority. Lessons learned from these projects will enable the team to replicate similar opportunities across the estate. The expansion of the number of DEC's will also indicate further opportunities across the estate. As each opportunity is identified it will be registered on the project tracker for evaluation and implementation. This will ensure a constant supply of opportunities that will enable the University to reduce its carbon emissions beyond 2020.

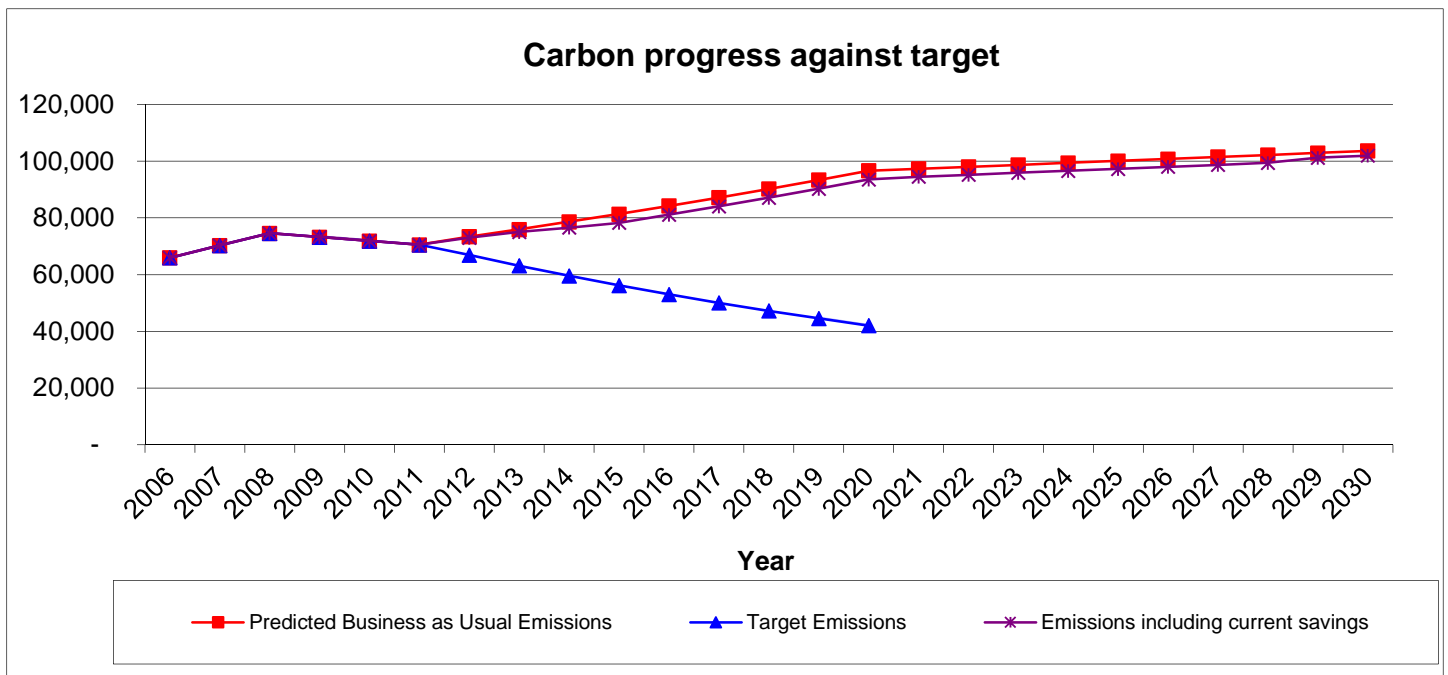
4.5 Projected achievement towards target

The graph below shows how far the quantified projects take us towards the target. If all these projects are implemented, the University is expected to achieve 37% of the targeted savings. A further 20,655 tCO₂ of emissions savings will need to be identified to fill the gap and make up for the BAU upwards drift. The following mechanisms have been put in place to ensure a sustained project pipeline:

- A programme of similar opportunities in other buildings based on successful completion of works from existing surveys
- Further energy surveys on buildings
- Evaluating opportunities identified by the DEC programme
- Enhancing the existing mechanical and electrical maintenance programme
- Evaluating opportunities identified by building managers
- Evaluating opportunities identified under the Green Impact Project.

The graph below shows predicted BAU emissions and target emissions. The ‘Emissions including current savings’ shows the emissions reductions from the projects scheduled across the years 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. The impact of project life is also included, so if a short-life project (eg awareness raising) is finished 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 the percentage of savings becoming smaller as a building becomes more efficient.

These effects are included as an attempt to model some of the real life factors that may impact on the University's ability to meet its targets. Because of these additional factors the plot does not directly agree with a simply summed list of the carbon-saving impact of the projects.



5. Carbon Management Plan financing

To implement the projects defined in this plan will cost £3,972,147. This will be financed from a combination of sources including the SALIX Fund, the Carbon Management Strategy Fund, the Energy Levy and the Meter Levy.

The implementation of all these projects will result in estimated annual financial savings/cost reductions of £2,856,433 and a carbon emissions reduction of 12,282 tCO₂.

The payback period of the projects ranges from 0 years to 18 years, with the majority paying back in under 10 years.

Section 3 described the projects that will be implemented to achieve the target. Capital and revenue costs for these projects have also been identified. 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.

5.1 Financial costs and sources of funding

The cost of implementing the projects in this plan has been estimated at £14.6 million over eight years, of which £2.3 million per year has already been allocated from the sources shown in the table below. The Carbon Management Fund is governed by the Sustainability Steering Group; funds are released to the Carbon Management Projects project management Group (CMPPMG), which is governed by Estates Services. In addition the Director of Estates has an annual allocation of £500,000 direct from the Carbon Management Strategy Fund. The table below shows an indicative spend profile on carbon reduction projects although by using more of the carbon management fund at the beginning of the term carbon emissions would be reduced at a faster rate.

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Carbon Management Fund	£1.6m	£1.6m	£1.6m	£1.6m	£1.6m	£1.6m	£1.6m	£1.1m
Salix Fund	£500k	£500k	£500k	£500k	£500k	£500k	£500k	£500k
Energy Levy	£200k	£200k	£200k	£200k	£200k	£200k	£200k	£200k
Meter Levy	£75k	£75k	£75k	£75k	£75k	£75k	£75k	£75k

5.2 Assumptions

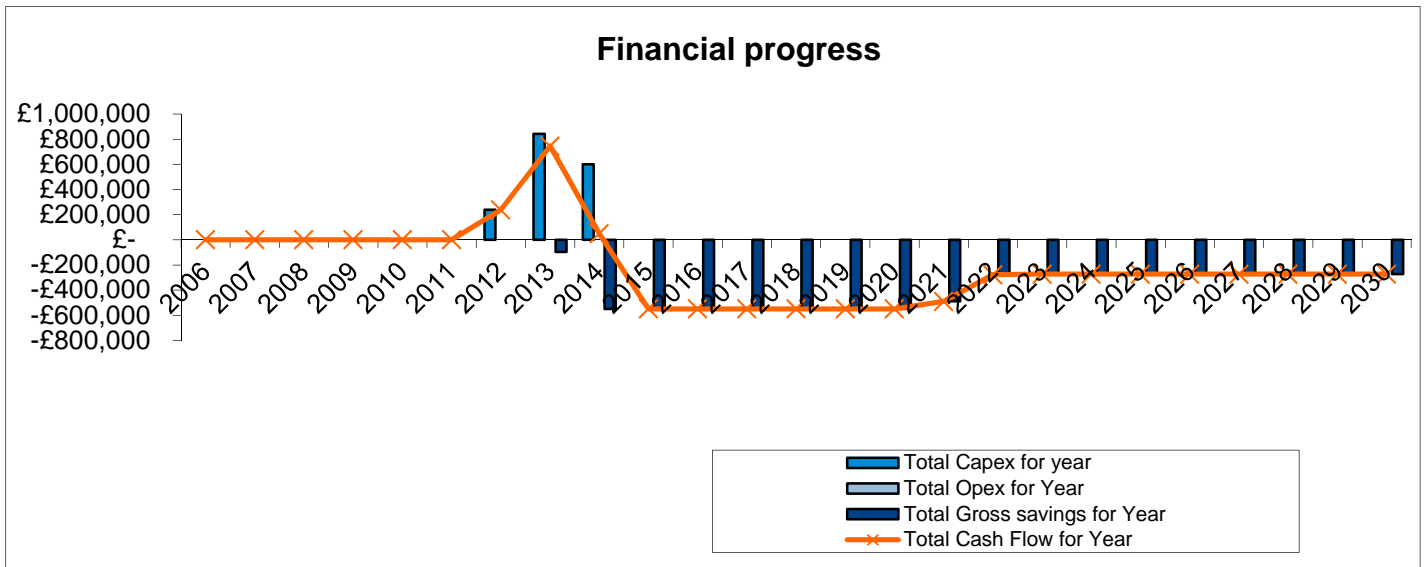
Key assumptions underlying financial projections are:

- Electricity cost of 10p/kWh in the baseline year and an annual increase of 5.8% in the following years
- Gas cost of 4.5p/kWh in the baseline year and an annual increase of 5% in the following years
- BAU consumption will increase by 0.7%
- Utility prices will increase by 5.8%
- Transport prices will increase by 3.7%.

5.3 Benefits and savings – quantified and unquantified

The graph below summarises the financial savings that have been achieved to date. The information is taken directly from the carbon tracking database, and will change as more projects are implemented.

Carbon savings against BAU emissions and target emissions.



In addition the University will achieve a number of unquantified benefits such as:

- [Enhanced / continued..? Regulatory compliance
- Improved reputation for environmental sustainability performance
- Better engagement with staff, students and the public.

6. Embedding carbon management across the organisation

To embed a culture of carbon management across the organisation we need to ensure that organisational changes (processes, strategies and activities) are put in place, in addition to the more technical projects listed above, to support the transition to achieve and sustain the University's carbon reduction targets.

The Carbon Management Maturity Matrix at Appendix B shows the different areas of embedding carbon management and the University's current achievements. This will be reviewed with the Sustainability Steering Group on an annual basis.

6.1 Corporate strategy and policy alignment

To ensure that carbon management becomes, and is maintained as, an organisational priority, it needs to be considered as part of all decision making. This is achieved by the following list of actions:

Ref	Change Action	Owner	When complete
1	Senior management endorsement of the Carbon Management Plan and the carbon reduction target	Head of Environmental Sustainability (HoES)/ Energy Manager (EM)	
2	Reference to the carbon management target in strategic documents such as the Estates Strategy, Sustainable Procurement Strategy, Travel Strategy	HoES	
3	Enabling departments to improve their environmental sustainability performance through the Green Impact initiative	HoES	
4	Investigating setting carbon reduction targets at departmental level	HoES/EM/PRAC	
5	Publishing guidelines on funding for carbon reduction projects	EM	
6	Use of the carbon tracking database to appraise all potential projects	EM	
7	Carbon reduction risks identified on the BESC risk register	HoES	

6.2 Responsibility – being clear that saving carbon is everyone's job

To make sure that carbon reduction is not just seen as the responsibility of a few people in the organisation but is truly embedded, and part of the University organisational culture, the following actions will be taken:

Ref	Change Action	Owner	When complete
8	Eco representatives will be given energy reduction training	HoES / Environmental Sustainability Projects Manager (ESPM)	
9	Behaviour change projects such as Green Impact and Student Switch Off will be rolled out to encourage a culture of shared responsibility for environmental sustainability performance	ESPM	
10	Carbon reduction responsibilities will be added into to job descriptions where appropriate	HoES	
11	An environmental management system (EMS) will be implemented ensuring that all new staff have environmental sustainability induction training covering carbon emissions reduction	ESPM	
12	The EMS will identify areas of further training required on energy management	ESPM	
13	Staff surveys will monitor staff and student awareness of energy management and carbon reduction	HoES	

6.3 Stakeholder engagement and communications

To keep carbon management a priority in people's minds and behaviours it needs to be regularly communicated to stakeholders. The following actions will be taken to ensure this:

Ref	Change Action	Owner	When complete
	Regular reports to the Sustainability Steering Group and Buildings Estate Sub-Committee on progress toward carbon reduction targets	HoES / EM	
	Regular updates on progress reported in the Estates Services newsletter and on the Environmental Sustainability Team website	HoES / EM	
	Feedback to Building Managers through the Facilities Management Forum	EM	
	Feedback to eco representatives through Green Impact workbook scores	ESPM	
	Annual Environmental Sustainability Report for all staff and students	ESPM	
	A recognisable brand will be developed by the environmental sustainability team for use on social media to communicate regular carbon reduction progress	HoES / ESPM	

7. Programme management of carbon management programme

In this section the 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. The Director of Capital Projects and Property Management holds overall responsibility for the implementation of this Carbon Management Plan, and the Head of Environmental Sustainability is responsible for coordinating the activity to ensure results are achieved. The carbon-tracking database is maintained by the Energy Manager, who is responsible for appraising potential projects.

7.1 The Programme Board

The senior management group that has strategic ownership and oversight of our carbon management programme is the Sustainability Steering Group. This group meets once a term and is chaired by Professor William James. The remit and membership of the steering group can be downloaded [here](#).

7.2 The Carbon Management Team – doing the projects

The Carbon Management Team is the group responsible for doing the projects contained within this plan. A project Management Group meets monthly and has the following membership:

Director of Capital Projects and Property Management	Mike Wigg	Chair
Head of Environmental Sustainability	Harriet Waters	
Head of Building Services	Stephen Pearson	
Energy Manager	Rhian Atkins	
Deputy Energy Manager	Jonathan Walford	
Carbon Reduction Projects Manager	tbc	
Project Managers	tbc	

The meetings follow the standard project management format. Areas covered at each meeting are:

- Progress of projects towards carbon reduction
- Finance update to ensure all funding streams are being well managed
- Risk register.

7.3 Succession planning

One significant risk to the successful implementation of this plan is the loss of the Project Sponsor and/or Project Leader. Good succession planning is therefore essential. In the event of the Project Sponsor moving on, the Director of Capital Projects and Property Management will take on the role and responsibility for this plan; in the event of the Project Leader leaving, the Head of Environmental Sustainability will coordinate the implementation of this plan. Key information such as the carbon-tracking database and the building energy surveys is stored on a shared site. The handover process to the new personnel will consist of a thorough briefing covering the following:

- Carbon Management Strategy
- Carbon Management Plan
- Carbon-tracking database

7.4 Monitoring and reporting

This section describes the reporting system for carbon emissions both internally and externally. The following actions will be taken to ensure regular, clear reporting on carbon reduction:

Ref	Change Action	Owner	When complete
	Provision of a carbon dashboard for the Sustainability Steering Group, including: <ul style="list-style-type: none"> • Energy consumption compared with several different activity indicators such as turnover, FTE, size of estate • Current DEC ratings • Previous 12 months of energy consumption 	HoES / EM	
	Scope 1, 2 and 3 carbon emissions will be reported to HESA on an annual basis covering the functional estate	HoES / ESPM / EM / Travel Officer (TO)	
	Carbon emissions from Scope 1, 2 and 3 will be reported annually in the Environmental Sustainability report	HoES / ESPM / EM / TO	

Appendix A: Scope of projects

All major projects above the value of £25,000 will include a 'Scope of Project' template. This will complement the data entered on the Carbon Project Tracker and will be a reference document for the Carbon Projects Management PMG.

Project:	Ashmolean Museum Display Lighting Upgrade
Reference:	48
Owner (person)	Jonathan Walford/Rob Gregg
Department	Environmental Sustainability
Description	Replacement of existing halogen light fittings with LED fittings
Benefits	<ul style="list-style-type: none"> Financial savings: £93,917 per year Payback period: 6.5 years CO₂ emissions reduction: 493 tCO₂ 1.5% of target: the percentage of the CO₂-saving target this project will annually contribute Confidence – High
Funding	<ul style="list-style-type: none"> Project cost:***** Operational costs: not known Source of funding: SALIX, Carbon Management Strategy Fund. Decision date: Dec 2013
Resources	<ul style="list-style-type: none"> Additional resource: not known Will this project be implemented within current resources: yes
Ensuring Success	<ul style="list-style-type: none"> Key success factors: 1. Final agreement on scope, 2. No change to scope Principal risks: 1. Single supplier of led fittings, 2. Access issues due to nature of building
Measuring Success	<ul style="list-style-type: none"> Metrics/indicators for displaying performance or achievement: 1. Revenue and owned sub meters, 2. Reduced cooling demand, 3. Reduced labour demand due to longevity of lamps When success will be measured/evaluated: Immediately post installation.
Timing	<ul style="list-style-type: none"> Milestones/key dates <ul style="list-style-type: none"> start date: Feb 2014 completion date (when it will deliver savings): Feb 2014 interim deliverable/decision points: Dec 2013
Notes	<p>Include a note of the assumptions made in estimating the costs and benefits (eg quantification) or a reference to where the more detailed calculation can be found. This audit trail will be very valuable for others unfamiliar with your initial work.</p> <p>The estimated energy/carbon savings were calculated using a combination of existing building demand data, manufacturers' data and industry standard data.</p>



Now	5	5	4	3	5	2	4
In 5 Years							
	POLICY	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION AND TRAINING	FINANCE AND INVESTMENT	PROCUREMENT	MONITORING AND EVALUATION
5 Best	<ul style="list-style-type: none"> SMART Targets signed off by Board and linked to their priorities Carbon reduction target fully costed and underpinned by quantified projects Action plan contains clear goals and regular progress reviews 	<ul style="list-style-type: none"> CM is full-time responsibility of a few people CM integrated in responsibilities of senior managers Chief Exec support Involvement of clinicians Part of all job descriptions 	<ul style="list-style-type: none"> Quarterly or better collation of CO₂ emissions for Scope 1 and 2 Systems being set up for Scope 3 Data externally verified M&T in place for: <ul style="list-style-type: none"> Buildings Waste 	<ul style="list-style-type: none"> Key staff given formalised CM: <ul style="list-style-type: none"> Induction and training Incentives Communications CM matters regularly communicated to: <ul style="list-style-type: none"> Full internal and external community, including patients Key partners 	<ul style="list-style-type: none"> Granular and effective financing mechanisms for CM projects Finance representation on CM Team Whole life costing embedded into procedures Ring-fenced fund for carbon reduction initiatives 	<ul style="list-style-type: none"> Senior purchasers consult and adhere to sustainable procurement policy Sustainability integrated in tendering and evaluation criteria Whole life costing Collaborative procurement 	<ul style="list-style-type: none"> Senior management review CM process Core team regularly reviews CM progress and target Plan and progress reports publically available Visible board level review
4	<ul style="list-style-type: none"> SMART Targets developed and quantified but not implemented 	<ul style="list-style-type: none"> CM is full-time responsibility of an individual CM integrated in to responsibilities of department managers, not all staff 	<ul style="list-style-type: none"> Annual collation of CO₂ emissions for: <ul style="list-style-type: none"> Buildings Transport wWaste Data internally reviewed 	<ul style="list-style-type: none"> All staff given CM: <ul style="list-style-type: none"> Induction Communications CM communicated to: <ul style="list-style-type: none"> External community Key partners 	<ul style="list-style-type: none"> Regular financing for CM projects Cost estimate complete for most projects Some external financing 	<ul style="list-style-type: none"> Environmental demands incorporated in tendering Familiarity with OGC and other best practice Whole life costing for all major purchases 	<ul style="list-style-type: none"> Core team regularly reviews CM progress: <ul style="list-style-type: none"> Actions Profile and Targets New opportunities quantification
3	<ul style="list-style-type: none"> Draft policy Climate Change reference Carbon target set but not quantified 	<ul style="list-style-type: none"> CM is part-time responsibility of a few people CM responsibility mainly within Estates 	<ul style="list-style-type: none"> Collation of CO₂ emissions for limited scope ie buildings only 	<ul style="list-style-type: none"> Environmental / energy group(s) give ad hoc: <ul style="list-style-type: none"> Training Communications 	<ul style="list-style-type: none"> Ad hoc financing for CM projects Limited task management No allocated resource 	<ul style="list-style-type: none"> Whole life costing occasionally employed Some pooling of environmental expertise 	<ul style="list-style-type: none"> CM team review aspects including: <ul style="list-style-type: none"> Policies / Strategies Targets Action Plans



<p>2</p>	<ul style="list-style-type: none"> No policy or target Carbon reduction aspiration 	<ul style="list-style-type: none"> CM is part-time responsibility of an individual No departmental champions 	<ul style="list-style-type: none"> No CO₂ emissions data compiled Energy data compiled on a regular basis 	<ul style="list-style-type: none"> Regular poster/awareness campaigns Staff given ad hoc CM: <ul style="list-style-type: none"> Communications 	<ul style="list-style-type: none"> Some idea of investment needed to reach target Limited task coordination resources 	<ul style="list-style-type: none"> Green criteria occasionally considered Products considered in isolation 	<ul style="list-style-type: none"> Ad hoc reviews of CM actions progress
<p>1 Worst</p>	<ul style="list-style-type: none"> No policy No climate or carbon reference 	<ul style="list-style-type: none"> No CM responsibility designation 	<ul style="list-style-type: none"> CO₂ emissions not measured Estimated billing 	<ul style="list-style-type: none"> No communication or training 	<ul style="list-style-type: none"> No internal financing or funding for CM related projects 	<ul style="list-style-type: none"> No Green consideration No life cycle costing 	<ul style="list-style-type: none"> No CM monitoring

