

# The University of Aberdeen Carbon Management Programme

## Carbon Management Plan (CMP) 2009-2014



**Suttie Centre**  
**Completed Aug '09**



**University Library**  
**Due to open Sep '11**

**Both achieved 'Excellent' BREEAM ratings for 'Design and Procurement'.**

**CMP Target: The University of Aberdeen aims to reduce its CO<sub>2</sub> and equivalent emissions by 20% from the baseline over the five year period to 2014.**

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**Owner: John Kingsland, Utilities Manager**

**Approval: University Management Group and CSR Steering Group**

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## Management Summary and Foreword

The University of Aberdeen is pleased to present its first Carbon Management Plan. It has been produced in collaboration with the Carbon Trust and outlines a comprehensive programme to reduce carbon emissions, increase energy efficiency and to devolve ownership of the actions necessary to achieve these goals to all parts of the University.

The University of Aberdeen recognises the considerable threats, but also opportunities, presented by climate change and the world's current dependency on fossil fuels. We recognise the need to mitigate volatile and rising energy prices and acknowledge the financial and moral imperative for all organisations, in particular those receiving public funds, to lead in the drive to reduce carbon emission.

The University of Aberdeen is committed to reducing its carbon footprint and to playing its part in limiting the worst effects of climate change. This plan sets out the measures that the University will take over the next five years to achieve this aim. The headline target for the plan is that:

***The University of Aberdeen aims to reduce its CO<sub>2</sub> and equivalent emissions by 20% from the baseline over the five year period to 2014.***

This plan sets out a range of initiatives to achieve that target. It also outlines the cost of the individual measures as well as their predicted carbon and financial savings. We expect to be able to achieve a total emissions saving in the region of 6,500 tonnes of carbon dioxide, which in turn will save the University around £1.5 million by 2014. The scope of the plan is not, however, limited to five years. The initiatives outlined and the commitments made are the start of our journey towards a low-carbon future. The plan will be reviewed and updated annually to reflect longer term goals and new projects.

The University of Aberdeen is well placed to contribute to the emerging low-carbon economy, with world leading research in areas such as future fuels, sustainable transport and the digital economy. We recognise, however, that such intellectual capital must be matched by a commitment to the highest standards of operational performance. This requires the promotion of energy efficiency and the reduction of CO<sub>2</sub> and equivalent emissions to be embedded as institutional goals.

This plan is the foundation upon which we will build towards those goals. We will encourage in our staff and students the individual behaviours required to support this transition. We will introduce new measures where required and will adapt existing policies and procedures (e.g. risk management), to allow staff to make appropriate decisions in key areas such as construction, procurement, waste and transport but also in their teaching, research and other activities to support this institutional priority.

We acknowledge that achieving this initial target will be challenging but also that it is only the first step towards much deeper emissions reductions required by 2050. It is a challenge that will only increase, with national and international targets likely to be revised upwards, while the University itself continues to expand. Our new iconic library is due to open in 2011 while a new, energy-intensive, home for the Rowett Institute of Nutrition and Health will be in place by 2013.

In these circumstances only be embedding this plan across the University, delivering the projects outlined and raising staff and student awareness of its importance can we set ourselves on a course towards a low carbon future.

**Mr Steve Cannon**  
University Secretary and  
Convener of the CSR Steering Group

**Professor Steve Redpath**  
Director of ACES and  
Academic Sponsor of the CMP

## Foreword from the Carbon Trust

Cutting carbon emissions as part of the fight against climate change should be a key priority for the higher education sector - it's all about getting your own house in order and leading by example. The UK government has identified the public sector as key to delivering carbon reduction across the UK in line with its Kyoto commitments. The Higher Education Carbon Management programme is designed in response to this. It assists organisations in saving money on energy and putting it to good use in other areas, whilst making a positive contribution to the environment by lowering their carbon emissions.

The University of Aberdeen was selected in 2009, amidst strong competition, to take part in this ambitious programme. The University of Aberdeen partnered with the Carbon Trust on this programme in order to realise vast carbon and cost savings. This Carbon Management Plan commits the organisation to a target of reducing CO<sub>2</sub> by 20% by 2014 and underpins potential financial savings to the organisation of around £1.5 million.

There are those that can and those that do. Public sector organisations can contribute significantly to reducing CO<sub>2</sub> emissions. The Carbon Trust is very proud to support the University of Aberdeen in its ongoing implementation of carbon management.



Richard Rugg

Head of Public Sector, Carbon Trust



## **1 Introduction**

The University of Aberdeen recognises the critical role of the Higher Education sector, and of individual institutions, in taking action to tackle climate change. While our major contributions will come through research and innovation, as well as our role in educating the leaders of tomorrow, it is important that we recognise the impact of our core business and of our campuses and manage them effectively.

Through our maintenance of sizable estates, through our extensive business related travel, through the daily and term-end commuting of our staff and student and through our extensive procurement footprint, it is incumbent on us to promote changes in institutional practice that will limit our carbon impact.

We recognise that there are considerable financial risks associated with failing to act now. These include rising energy costs and their impact on life-cycle costing, an anticipated link between carbon emissions and core funding, and the emerging Carbon Reduction Commitment. The business imperative to reduce carbon is, therefore, clear.

In this endeavour we recognise also the need to work with staff and students to deliver a fundamental shift in behaviours and attitudes. Only by doing so can we hope to achieve institutional goals and to contribute to the ambitious national carbon reduction targets. Indeed, as a part publicly funded body we will be expected to lead in this area.

Our Carbon Management Plan details the steps the University of Aberdeen will take to reduce its CO<sub>2</sub> and equivalent emissions. It establishes an initial target to reduce those emissions by 20% from the base line year of 2008/09 over the five year period to 2014.

The Carbon Management Plan is the framework document around which we will develop our commitment to adapt to a low carbon future. It will form an integral part of our sustainability and social responsibility agenda and will, over the life of the plan, be embedded as an integral strand of institutional strategy.

## 2 Carbon Management Strategy

### 2.1 Context and Drivers

There is now a widespread acceptance that the reduction of CO<sub>2</sub> and equivalent emissions represents the principal mechanism by which human beings can attempt to mitigate the anticipated worst effects of climate change. Despite recent challenges to the rigour of the science under-pinning climate predictions, the University of Aberdeen recognises that it has a moral responsibility to contribute to the development of a low-carbon future.

But even without such moral altruism the need to act is clear. Rising energy prices and the Carbon Reduction Commitment make improving energy efficiency and reducing CO<sub>2</sub> emissions a financial necessity. The latter is a mandatory emissions trading scheme that obliges all major energy consumers to buy and trade carbon allowances (in the first instance at £12 per tonne of CO<sub>2</sub>) with a financial bonus (or penalty) based on emissions performance. The bonus/penalty will escalate over time, from 10% of the cost of allowances to 50% by 2015. The University currently estimates the cost of allowances to be in the region of £250k per annum, with the bonus (or penalty) a percentage of this sum.

In the context of the HE sector we note with interest the Higher Education Funding Council for England's decision to link capital allocation to performance against carbon plans<sup>1</sup>, including a link to the 34% reduction target by 2020 contained in the Climate Change Act (2008). In recent years the Scottish Funding Council (SFC) has acted by linking capital funding to BREEAM criteria in capital projects. We anticipate that the Climate Change (Scotland) Act will prompt the SFC to go further and to establish an explicit link between funding and emissions reduction performance.

While the search for a global deal on emissions reduction targets remains elusive, with Copenhagen failing to provide a comprehensive follow-up to Kyoto, the Climate Change (Scotland) Act (2009)<sup>2</sup> did establish an interim reduction target of 42% by 2020, with a longer term target of 80% by 2050.

These targets provide reference points for our long-term planning in this area. We note also that the Act places duties on public bodies, including Universities and Colleges, to act in relation to climate change. These duties, which come into force on 1 January 2011, require that a public body, in exercising its functions, will act in ways that contribute to the delivery of these national targets. As such, public sector bodies will be expected to take a lead in delivering them.

Alongside the legislative, moral and financial drivers that oblige us to take action, we recognise that a range of existing and emerging sector benchmarking schemes are using environmental and social responsibility performance as another means of ranking HE institutions and that this is likely to become one of the many factors affecting a student's choice of institution.

### 2.2 Our Low Carbon Vision

***The University of Aberdeen is committed to the management and reduction of our carbon dioxide and equivalent emissions. We will embed this issue at the heart of institutional strategy and will ensure that our reductions targets and the reasons for establishing them are understood at all levels of the organisation. We will encourage a culture of collective responsibility and will ensure that staff and students are empowered to act to achieve those targets. In so doing we aim to play a full part in the transition towards a low-carbon future.***

<sup>1</sup> See HEFCE's report entitled "Carbon reduction target and strategy for higher education in England" available at [http://www.hefce.ac.uk/pubs/hefce/2010/10\\_01/](http://www.hefce.ac.uk/pubs/hefce/2010/10_01/)

<sup>2</sup> For details see the Scottish Government website <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact>

## 2.3 Strategic Themes

Five strategic themes will support the delivery of this institutional vision:

- a) *Embedding in Institutional Strategy*
- b) *Devolved Ownership & Management*
- c) *Personal Responsibility & Behaviour Change*
- d) *Technical and Infrastructure Projects*
- e) *Learning from and Sharing Best Practice*

### a) **EMBEDDING IN INSTITUTIONAL STRATEGY:**

We will embed carbon management into institutional strategy, securing recognition for the Carbon Management Plan as the delivery mechanism for emissions reduction across the University. We will ensure that our Strategic Plan reflects this commitment and will instruct that the operational planning of all major administrative sections, including our Colleges, detail the role they will play in this process.

By so doing we will ensure that all strategic decision making is informed by an awareness of the need to reduce CO<sub>2</sub> and equivalent emissions.

### b) **DEVOLVED OWNERSHIP & MANAGEMENT:**

We recognise that success in this endeavour will require energetic leadership, devolved ownership and collective responsibility for action. We will devolve local responsibility for this issue to all senior administrative and academic managers, encouraging them to take ownership of the management of this issue and to empower their sections to identify innovation and opportunities to tackle wasteful practice.

We will encourage all sections to ensure that carbon management is embedded into appropriate policies, staff inductions, student handbooks and standard operating procedures.

### c) **PERSONAL RESPONSIBILITY & BEHAVIOUR CHANGE:**

Achieving our ambitious target and moving beyond it achieve the deeper reductions required by 2020 and 2050 will require every member of our community to recognise their role in this challenge. While institutional strategy and devolved management will provide a leadership framework, we recognise that changing ingrained behaviour and encouraging, supporting and advising staff on how to make those changes will be required to support the institution's low carbon journey.

We will continue to support voluntary initiatives across the University, such as our Environmental Champions, but will also investigate formalising this scheme to recognise that such activity should be integral to individuals' roles. In procurement choices, the disposal of waste and in the choice of transport option we aim to encourage staff at all levels to be aware of their individual responsibilities.

We will also work in partnership with our Students' Association to encourage carbon reducing behaviour among our students. We will encourage and support initiatives to drive down emissions associated with student travel and in student residences. We will also, through initiatives like our Curriculum Reform, encourage students to engage in discussion of climate change and of sustainable development.

### d) **TECHNICAL AND INFRASTRUCTURE PROJECTS:**

In the first phase of our Carbon Management Plan, we recognise that most of our emissions reductions will come from activity linked to our Estate and our use of IT and other major pieces equipment.

To that end we have identified a range of projects and technical solutions (see Section 4) that will drive the early stages of our carbon reduction programme. Such projects will build on the successes already enjoyed by our Combined Heat and Power Plant, the introduction of power management software on campus PCs, and our achievement of BREEAM 'Excellent' rating for our Suttie Centre and new Library.



We recognise, however, that while new build projects offer the ideal opportunity to embed energy efficiency at the outset of a project, it is through refurbishment and retro-fitting that the vast majority of our emissions reductions will eventually be made. Thus, we will continue to promote the achievement of BREEAM 'Excellence' in all new projects, but have also committed £10M to a refurbishment programme, during this 5 year timescale, that is increasingly defined by the need to reduce emissions and improve energy efficiency.

**e) LEARNING FROM AND SHARING BEST PRACTICE:**

This CMP spells out how we intend to reduce emissions locally. Yet tackling climate change is a collective endeavour facing all of society. While developments such as the Carbon Reduction Commitment and the possibility of a funding link to carbon emissions performance will introduce a degree of intra-sector rivalry, the HE sector has consistently demonstrated a willingness to work together to share best practice and to lead the public sector in tackling emissions reduction.

To that end we are committed to sharing our successes and learning from those of others. We again acknowledge the role of the Carbon Trust in facilitating the Carbon Management Programme and in so doing enabling the sharing of initiatives and experience across the public sector.

We acknowledge also the role of bodies such as the Environmental Association for Universities and Colleges (EAUC) in promoting the sharing of best practice case studies, providing practitioner focussed training and encouraging HEIs to take action. Indeed, given the close relationship between the two processes, we intend to submit our Carbon Management Plan as our contribution to the EAUC supported Universities & Colleges Climate Commitment for Scotland (UCCCFs).

## 2.4. Targets and Objectives

The carbon baseline year for the University of Aberdeen's Carbon Management Plan is 2008/09.

Our baseline includes the following:

- Building Energy Use
- Business Travel
- University Owned Vehicles
- Commuting
- Waste
- Water.

***The University of Aberdeen aims to reduce its CO<sub>2</sub> and equivalent emissions by 20% from the baseline over the five year period to 2014.***

The University's performance against this target will be reviewed annually. As part of these annual reviews, the University will identify fresh opportunities to develop and incorporate longer term projects and will gradually extend the time frame of this initial program.

It is our intention that this five-year CMP will be a 'live', rolling document, constantly evolving to reflect emerging best practice and to keep pace with legislative and sector requirements.



## Emissions Baseline and Projections

### 3.1 Scope

There are a large number of factors to consider as part of the potential scope for a Carbon Management Plan. The following is a list that details what is included in the plan and those areas not currently included, some of which may be incorporated at a later date:

Heading	Description	Status
Fuel Use in Buildings	Electric, Gas, Oil etc.	Included
Owned Transport	Vans, Tractors etc.	Included
Process Emissions	NOx from combustion	Excluded (1)
Fugitive Emissions	Refrigerant leaks	Excluded (1)
Water	Washing, drinking etc.	Included
Business Travel	Planes, Train, Buses etc.	Included
Commuting	Staff and Students	Included
Contractors Vehicles	Deliveries in and out	Excluded (2)
Waste	Land Fill Emissions, Transportation	Included
Purchasing	Embedded Carbon	Excluded (2)

#### Notes

- (1) This data was not available for the baseline year, but this figure will be included for the year 10/11
- (2) It is not currently planned to include this data in the scope of the CMP, but this will be reviewed going forward

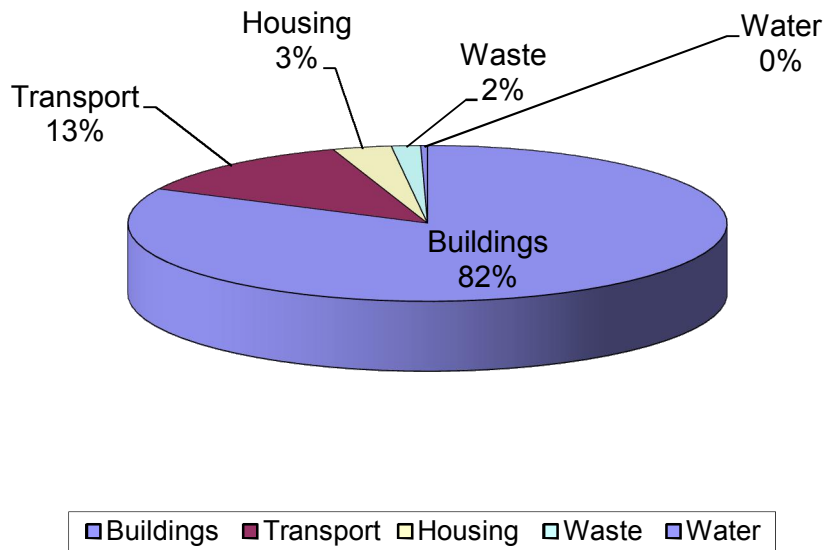
### 3.2 Baseline

The Baseline year is 01/08/08-31/07/09. The data used to calculate the baseline was sourced from Utilities Report August 08 – July 09, Waste Management Report August 08 – July 09, Travel Survey Report 2008, and an assessment of Business Mileage carried out by Finance.

The conversion from recorded information in to carbon dioxide was undertaken using the Carbon Trust “Baseline Tool” spreadsheet. The spreadsheet has built in to it a series of conversion factors which are provided by Defra, Berr, AEA, and BRE.

	Total CO <sub>2</sub> Emission (tonnes)	Buildings	Transport	Housing	Waste	Water
Baseline CO <sub>2</sub> emissions (tonnes)	29,336	24,132	3,705	931	460	108
Baseline Cost (£)	£6,106,678	£4,806,267	£1,053,747	£ -	£246,665	£545,829

## Baseline CO2 emissions (tonnes)



**Figure 3.2 Summary of emissions for baseline year 2008/2009**

The graph demonstrates that the majority of emissions arise from energy use in buildings. This will therefore be the main area of focus for reducing consumption, and emissions. That said it is worth noting that included in business travel is over 3,000,000 km of air travel.

### 3.3 Projections and Value at Stake

To determine the Business as Usual projections of emissions baseline going forward the Carbon Trust “Baseline Tool” spreadsheet has been completed adding in information changes to Estate including new buildings starting operation, and existing buildings being de-commissioned. Further the spreadsheet incorporates the following assumptions:

BaU Increase in Demand for all stationary sources, 0.7%, source DTI/DBERR EP68

BaU Increase in demand for Fleet, 0.7%, source DTI/DBERR EP68

BaU Increase in demand for Commuting, 1%, source 2005 and 2006 internal commuting survey

The major new buildings due to come on line are the New Library, the Rowett Building Foresterhill

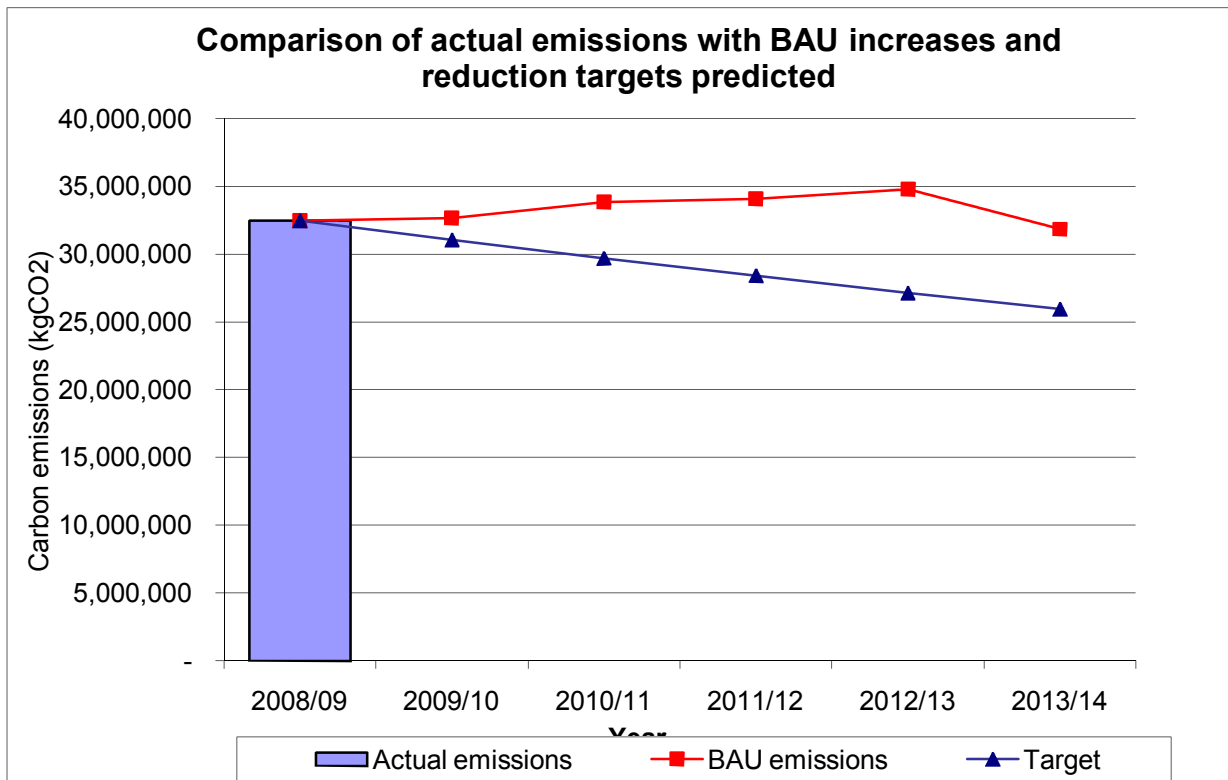


Figure 3.3 Projection of Business as Usual increases and reduction targets

## 4 Carbon Management Projects

### 4.1 Existing projects

Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
1	Suttie Centre - exceed Building Regs		£0	£0	£21,672	110.4 tCO <sub>2</sub>	0.0	1.70%	2009
2	Fraser Noble Refurbishment		£0	£0	£5,880	31.9 tCO <sub>2</sub>	0.0	0.49%	2009
3	Oceanlab 2 - exceed building regs		£0	£0	£5,503	28.5 tCO <sub>2</sub>	0.0	0.44%	2009
4	Regent Building - Insulate Roof		£14,000	£0	£2,828	16.1 tCO <sub>2</sub>	5.0	0.25%	2009
5	Marine BioDiscovery - pumps		£34,000	£0	£10,627	2.1 tCO <sub>2</sub>	3.2	0.03%	2009
6	Butchart - Insulate Roof		£11,000	£0	£1,463	8.3 tCO <sub>2</sub>	7.5	0.13%	2009
11	Remote Switching Computers		£78,842	£0	£18,659	126.1 tCO <sub>2</sub>	4.2	1.94%	2009
12	University Office - TRVs		£21,848	£0	£5,578	28.9 tCO <sub>2</sub>	3.9	0.45%	2009
13	EW - Chillers Free Cooling		£92,151	£0	£18,095	88.3 tCO <sub>2</sub>	5.1	1.36%	2009
14	Johnston - Replace GLS bulbs		£21,297	£0	£21,400	104.5 tCO <sub>2</sub>	1.0	1.61%	2009

## 4.2 Planned / funded projects

Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
7	University Office - Windows		£210,000	£0	£1,950	11.1 tCO <sub>2</sub>	does not payback	0.17%	2009
15	23 St Machar - Lighting		£918	£0	£880	4.3 tCO <sub>2</sub>	1.0	0.07%	2010
16	23 St Machar - BMS		£15,741	£0	£3,698	21.8 tCO <sub>2</sub>	4.3	0.34%	2011
17	23 St Machar Drive - Insulate Pipework		£700	£0	£276	1.6 tCO <sub>2</sub>	2.5	0.02%	2010
18	23 St Machar Drive - TRV's		£500	£0	£156	.9 tCO <sub>2</sub>	3.2	0.01%	2010
19	23 St Machar Drive - Fresh air cooling		£30,000	£0	£8,250	40.3 tCO <sub>2</sub>	3.6	0.62%	2011
61	Replacement of Hand Dryers		£15,862	£0	£3,300	16.1 tCO <sub>2</sub>	4.8	0.25%	2010
64	Marischal - VSD		£3,000	£0	£1,100	5.4 tCO <sub>2</sub>	2.7	0.08%	2010
65	Library - Absorption Chiller		£400,000	£0	£110,875	524.2 tCO <sub>2</sub>	3.6	8.08%	2011
68	Automatic Meter Reading		£100,000	£0	£124,275	751.4 tCO <sub>2</sub>	0.8	11.58%	2011

### 4.3 Near term projects

Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
24	University Office - Corridor lighting control		£2,200	£0	£297	1.4 tCO <sub>2</sub>	7.4	0.02%	2010
44	William Guild - Remove corridor spotlights		£100	£0	£22	.1 tCO <sub>2</sub>	4.5	0.00%	2010
45	Linklater - Replace Candle Tungstens		£300	£0	£264	1.3 tCO <sub>2</sub>	1.1	0.02%	2010
49	Fraser Noble - Compressed air check		£2,000	£0	£2,200	10.7 tCO <sub>2</sub>	0.9	0.17%	2010
50	Meston - Compressed air check		£2,000	£0	£2,200	10.7 tCO <sub>2</sub>	0.9	0.17%	2010
51	IMS - compressed air check		£2,000	£0	£2,200	10.7 tCO <sub>2</sub>	0.9	0.17%	2010
52	External Lights - dawn/dusk controls		£10,000	£0	£4,730	23.1 tCO <sub>2</sub>	2.1	0.36%	2011
55	Insulate DHWS cylinders		£800	£0	£1,040	5.9 tCO <sub>2</sub>	0.8	0.09%	2010
56	Insulate Lofts		£234,000	£0	£81,738	465.2 tCO <sub>2</sub>	2.9	7.17%	2012
57	Insulate Flat Roofs		£487,000	£0	£97,500	554.9 tCO <sub>2</sub>	5.0	8.55%	2012
59	IMS Boiler Controls		£7,755	£0	£5,980	34. tCO <sub>2</sub>	1.3	0.52%	2010
63	IMS - Power Factor correction		£7,297	£0	£1,980	9.7 tCO <sub>2</sub>	3.7	0.15%	2013
66	Foresterhill CHP - Sub 5		£2,780,000	£0	£232,500	1056.2 tCO <sub>2</sub>	12.0	16.27%	2011
67	Foresterhill - Rowett		£4,000,000	£0	£503,750	2288.3 tCO <sub>2</sub>	7.9	35.26%	2013

#### 4.4 Medium to long term projects

Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
8	Taylor Building - Windows P1		£500,000	£0	£20,800	118.4 tCO <sub>2</sub>	does not payback	1.82%	2010
9	Taylor Building - Windows P2		£300,000	£0	£35,200	171.8 tCO <sub>2</sub>	8.5	2.65%	2011
10	50/52 College Bounds Refurbishment		£5,000	£0	£419	1.9 tCO <sub>2</sub>	11.9	0.03%	2011
20	EW - Data Centre Replacement		£100,000	£0	£14,850	72.5 tCO <sub>2</sub>	6.7	1.12%	2013
21	UO - Remove Data Centre		£75,000	£0	£10,450	51. tCO <sub>2</sub>	7.2	0.79%	2013
22	Regent - Windows		£60,000	£0	£683	3.9 tCO <sub>2</sub>	does not payback	0.06%	2012
23	Hillhead - Windows		£490,000	£0	£5,655	32.2 tCO <sub>2</sub>	does not payback	0.50%	2013
25	Fraser Noble - LT Vent control CO <sub>2</sub>		£5,760	£0	£1,408	6.9 tCO <sub>2</sub>	4.1	0.11%	2010
26	Kings College - LT Vent control CO <sub>2</sub>		£34,560	£0	£8,448	41.2 tCO <sub>2</sub>	4.1	0.64%	2010
27	MacRobert - LT Vent control CO <sub>2</sub>		£11,520	£0	£2,816	13.7 tCO <sub>2</sub>	4.1	0.21%	2010
28	Meston - LT Vent Control		£23,040	£0	£5,632	27.5 tCO <sub>2</sub>	4.1	0.42%	2010
29	Regent - LT Vent Control CO <sub>2</sub>		£5,760	£0	£1,408	6.9 tCO <sub>2</sub>	4.1	0.11%	2010
30	New Kings - LT Vent Control CO <sub>2</sub>		£8,640	£0	£2,112	10.3 tCO <sub>2</sub>	4.1	0.16%	2010
31	William Guild - LT Vent control CO <sub>2</sub>		£5,760	£0	£1,408	6.9 tCO <sub>2</sub>	4.1	0.11%	2010

4.4 Contd

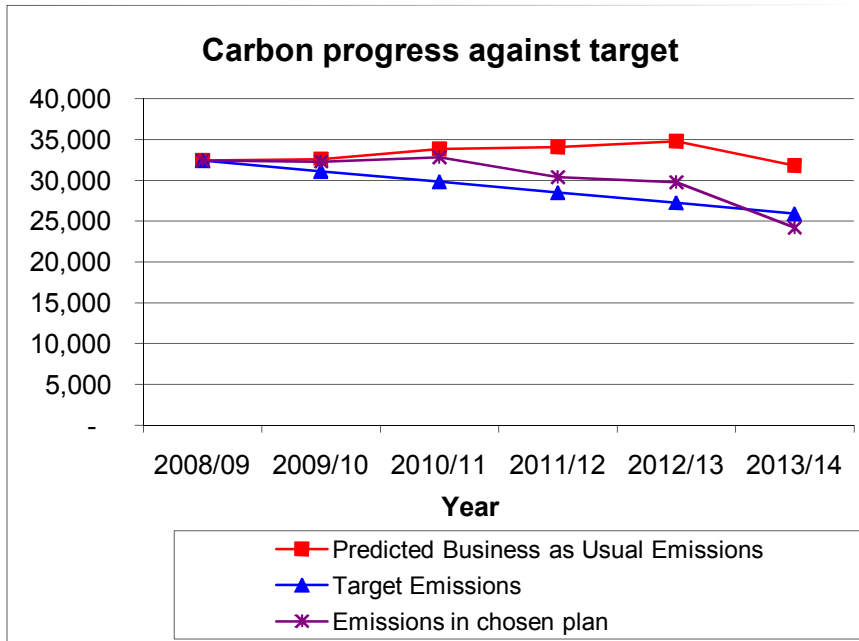
Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
32	Zoology - LT Vent Control CO2		£5,760	£0	£1,408	6.9 tCO2	4.1	0.11%	2011
33	Medical Library - LT Vent control CO2		£5,760	£0	£1,408	6.9 tCO2	4.1	0.11%	2011
34	Polwarth - LT3 Vent Control CO2		£5,760	£0	£1,408	6.9 tCO2	4.1	0.11%	2011
35	Lecture Theatre Exit Lighting		£3,535	£0	£1,980	9.7 tCO2	1.8	0.15%	2011
36	110 High Street - Replace electric Heating		£6,000	£0	£2,140	9.4 tCO2	2.8	0.15%	2011
37	46/48 College Bounds - Replace electric heating		£10,000	£0	£3,629	16. tCO2	2.8	0.25%	2011
38	Elphinstone Road Flats - Replace electric heating		£20,000	£0	£3,469	15.3 tCO2	5.8	0.24%	2012
39	Kings Hall - Replace electric heating		£20,000	£0	£3,514	15.5 tCO2	5.7	0.24%	2011
40	The Barn - Replace electric heating		£10,000	£0	£12,752	56.2 tCO2	0.8	0.87%	2011
41	Balgownie Sport Centre - Replace Boiler		£5,000	£0	£780	4.4 tCO2	6.4	0.07%	2012
42	Polwarth - Free Cooling		£46,000	£0	£9,020	44. tCO2	5.1	0.68%	2012
43	IMS - Remove atrium spotlights		£500	£0	£110	.5 tCO2	4.5	0.01%	2010
46	University Office - Cavity Wall Insulation		£20,000	£0	£2,178	12.4 tCO2	9.2	0.19%	2012
47	Regent Building - Cavity Wall Insulation		£10,000	£0	£1,073	6.1 tCO2	9.3	0.09%	2012
48	Hillhead - Cavity Wall Insulation		£30,000	£0	£3,185	18.1 tCO2	9.4	0.28%	2012



4.4 Contd

Ref	Project	Lead	Cost		Annual Saving		Pay back	% of Target	Year
			Capital	Operational	Financial	CO <sub>2</sub>			
53	Cruickshank - Wind catcher		£22,000	£0	£5,280	25.8 tCO <sub>2</sub>	4.2	0.40%	2011
54	23 St Machar Drive - Connect to CHP		£10,000	£0	£6,123	27.8 tCO <sub>2</sub>	1.6	0.43%	2011
58	Medical Library BMS		£68,394	£0	£8,078	43.3 tCO <sub>2</sub>	does not payback	0.67%	2010
60	New Kings Draught Stripping		£3,278	£0	£683	3.9 tCO <sub>2</sub>	4.8	0.06%	2010
62	Install External LEDs		£11,000	£0	£630	4.3 tCO <sub>2</sub>	17.5	0.07%	2013
69	Lighting Replacement		£200,000	£0	£33,000	161.1 tCO <sub>2</sub>	6.1	2.48%	2010
70	Lighting Replacement		£200,000	£0	£33,000	161.1 tCO <sub>2</sub>	6.1	2.48%	2013

#### 4.5 Projected achievement towards target



The above graph includes a line detailing the profile for the reduction in carbon dioxide emissions based on the actual saving measures detailed in this report.

## 5 Financing the Carbon Management Plan

The options currently open to the University to finance the measures in the carbon Management Plan include: University Capital budget, University Revenue budget, and Salix. In addition, when available and applicable, the University can access specific grant schemes for energy efficiency and renewables technologies.

### 5.1 Assumptions

Fuel costs for the University are affected by a number of factors:

- The University is a large organisation and purchases energy from a number of different sources.
- Some of the electricity is generated using on site CHP.
- An allowance is made when projecting savings forward for anticipated future fuel cost increases

Currently the costs used to determine savings are based on the following general values, but may vary dependant on the specific measure.

- Electricity Imported – 11.00 p/kWh
- Electricity from CHP station – 4.50 p/kWh
- Gas – 3.25 p/kWh
- Steam – 4.50 p/kWh
- Water - £2.05/m<sup>3</sup>

At Hillhead a feasibility study will be undertaken to compare the benefits of replacing part of the existing central gas fired boiler plant with 1) A waste incinerator with heat recovery, 2) A biomass boiler, or 3) a gas fired CHP engine.

### 5.2 Benefits / savings – quantified and un-quantified

	2009/10	2010/11	2011/12	2012/13	2013/14
<b>Annual cost saving</b>	<b>£65,168</b>	<b>£198,670</b>	<b>£743,440</b>	<b>£978,682</b>	<b>£1,548,733</b>
<b>Annual CO<sub>2</sub> saving</b>	<b>315.00</b>	<b>981.68</b>	<b>3697.90</b>	<b>4996.03</b>	<b>7613.79</b>
<b>% of target achieved</b>	<b>5%</b>	<b>15%</b>	<b>57%</b>	<b>77%</b>	<b>117%</b>

#### Unquantified benefits:

In addition to the direct financial benefits the University will get from carrying out the carbon reduction measures there are a number of other benefits, and these include:

Reducing the cost of regulatory compliance for the EU-ETS scheme by reducing emissions from the CHP station

Improving our environmental performance compared with other Universities which will help attract students

Improve reputation with the public

### 5.3 Additional resources

A certain amount of the data necessary for the Carbon Management Report is currently already collected as part of existing duties. Some of this data needs to be re-calculated to allow for it to be

included in the carbon management report, for example the Travel survey figures need to be produced in terms of total distances travelled which is an addition to existing work loads (1). Similarly where refrigerant leaks are now recorded under the F – Gas regulations this will now need to be supplied for inclusion in the Carbon Management Plan. The main areas where changes are needed are in provision to collate mileage arising from use of University owned vehicles, and recording business mileage travelled by University Staff. This last point may entail revision of the University’s expenses sheets (2).

## 5.4 Financial costs and sources of funding

figures in £ 1000's	2009/10	2010/11	2011/12	2012/13	2013/14
<b>Annual costs:</b>					
<b>Total annual capital cost</b>	£345,296	£905,347	£3,739,556	£912,000	£4,883,297
<b>Total annual revenue cost</b>	£0	£0	£0	£0	£0
<b>Total costs</b>	£345,296	£905,347	£3,739,556	£912,000	£4,883,297
<b>Committed funding:</b>					
<b>Committed annual capital</b>	£345,296	£905,347	£959,556	£912,000	£883,297
<b>Committed annual revenue</b>					
<b>Total funded</b>					
<b>Unallocated funding</b>					
<b>Unallocated annual capital</b>	£ -	£ -	£2,780,000	£ -	£4,000,000
<b>Unallocated annual revenue</b>					
<b>Total unfunded</b>					

The specific sources of funding will be dependent on the specific project some examples are given below:

- New Build incorporating energy efficiency measures as part of the design – Central University Capital funding
- Major Refurbishments of buildings – Re-current capital budget
- Specific Carbon reduction measures over £20,000 – Re-current capital budget or Salix Finance
- Specific Carbon reduction measures less than £20,000- Revenue budget Maintenance and Projects
- The potential for grants will be investigated

The University has a long term cash flow model to fund institutional and recurrent capital projects based on a mixture of funding streams including borrowing, fund raising, and cash generated from surpluses. In the event that the University is unable to achieve projected cash flow mitigating action of delay or postponement of projects may be required.

## 6 Actions to Embed Carbon Management

In recent years the University of Aberdeen has made progress towards embedding carbon management into 'environmental' policy and has implemented a number of high-profile initiatives to improve energy efficiency and reduce CO<sub>2</sub> and equivalent emissions. We are justifiably proud of our Combined Heat and Power plant and our achievement of BREEAM 'Excellent' ratings for our new Library and the Suttie Centre, while the installation of power management software on most campus-based PCs demonstrates that unobtrusive action can deliver significant carbon reductions.

We recognise, however, that more work is required to ensure that carbon management informs institutional strategy and is reflected in every decision making process. The five Strategic Themes at Section 2.3 provide a framework for the action required to embed carbon management across the organisation. Further specific details are outlined below.

### 6.1 Corporate Strategy – embedding CO<sub>2</sub> saving across your organisation

In order to secure backing at the highest level we will, in the six months from March 2010, ensure that the University's Carbon Management Plan is considered and approved by both the University Court and its Operating Board.

Our Strategic Plan update for 2009/10 included reference to the development of a CMP. Future versions will reflect the targets embedded in the CMP and progress being made towards them.

With the backing of the University Court, we will cascade the CMP to administrative and academic managers with instruction to identify local opportunities to embed carbon management into all routine operating procedures of administrative sections and Colleges.

#### Key Actions:

- Secure approval of the CMP at University Court and Operating Board.
- Embed CMP targets in institutional Strategic Plan.
- Secure public/demonstrable support of senior management for the CMP.
- Cascade the CMP to 'operational' areas for inclusion in administrative and College planning.
- Integrate into section objectives and by extension into the appraisal of senior managers.
- Report progress against the CMP goals annually to the University Court.
- Embed sustainable development and carbon management into Risk Management processes.

### 6.2 Programme Management – bringing it all together effectively

Section 7 details the membership of the Carbon Management Board and the Carbon Management Team. In addition to these bodies, routine monitoring of the CMP will be by the University's Corporate Social Responsibility (CSR) Steering Group. Chaired by the University Secretary, the CSR Steering Group is the main advisory group responsible for sustainability and social responsibility matters. The CSR Steering Group approved the University's participation on the Carbon Management Programme and was responsible for signing off the final draft of the Carbon Management Plan.

The CSR Steering Group in turn reports to the University Management Group (UMG) and onward via the Operating Board to Court, establishing clear reporting lines for updating CMP progress.

While disseminating responsibility and devolving ownership of this issue to all appropriate levels in the organisation is integral to the success of the CMP, day-to-day responsibility for delivering the CMP resides with the named operational Project Sponsors and the Project Leader, for whom carbon emissions reduction is an integral part of their core function.

### 6.3 Responsibility – being clear that saving CO<sub>2</sub> is everyone's job

When, in 2006, the University established an Environment Office, it was set up with the aim of reducing the University's impact in areas such as Energy, Transport, Waste, Water, and Biodiversity. In doing so it reports to the University's CSR Steering Group.

To support this mission, the University established a network of over forty Environmental Champions. Their role is voluntary and covers a wide range of environmental topics including energy efficiency, waste reduction and encouraging behaviour change.

We recognise, however, that specialist staff and volunteers can only achieve so much. Securing widespread awareness and encouraging individual responsibility are vital if we are to instil a carbon reduction 'culture'.

#### Key Actions:

- Formalise and recognise the existing voluntary Environmental Champions scheme (e.g. by appointing formal building or section Energy Officers).
- Investigate mechanisms to ensure that carbon management and energy efficiency is reflected in the roles and performance reviews of all appropriate staff.
- By including carbon management in operational planning, cascade responsibility to all staff.
- Ensure that recognition is given to staff that identify and address energy inefficiency.
- Embed carbon management/carbon targets as a strand in institutional induction.
- Enhance existing awareness mechanisms (e.g. e-bulletins, newsletters) to communicate CMP targets to all staff.

### 6.4 Data Management – measuring the difference, measuring the benefit

Data for carbon management is collected from a variety of sources by the University's Utilities Manager. Section 2.4 outlines the scope of the CMP, with data on energy consumption, water, waste and University owned vehicles currently well understood.

Such information needs to be collated on a consistent basis year-on-year if we are to track and report on our progress accurately. It is also a pre-requisite in identifying the relative success of individual carbon saving projects.

The mechanisms for capturing this data need to be simple and, where possible, automated. An energy management system is currently being identified to provide immediate access to all buildings related energy consumption data.

Business travel and commuting data are currently less robust and, during the first cycle of the CMP, we will put in place mechanisms to capture staff and student travel data. In the case of staff this may require a simple change to expenses sheets, while we will work with the Students' Association to establish both the commuting and term-time travel habits of our students.

Once collated, we will use this data to support management reporting as well as tailored internal and external stakeholder communications (see Section 6.5).

### 6.5 Communication and Training – ensuring everyone is aware

To support the necessary behaviour change and to encourage awareness across the staff and student community we have previously outlined our intention to devolve responsibility and ownership of this issue throughout the organisation.

To secure appropriate buy-in and to reinforce continually the institutional commitment to this project, we will provide updates on progress towards CMP goals in a variety of formal and informal guises. We will

encourage staff to undertake appropriate training to embed new operating procedures and will invite staff to help us identify where they believe training is required.

#### Key Actions:

- Conduct staff surveys to gauge awareness of the CMP and attitudes towards it.
- Continue to support (and build on) the Environment Office's successful 'able' campaign.
- Provide regular awareness opportunities e.g. our Signposting Sustainability events and Fresher's Fayres etc with strong focus on emissions reduction and energy efficiency.
- Continue to provide road shows where the Environment Office visit colleagues across campus.
- Provide high-level management reporting and tailored stakeholder reporting of carbon and cost savings and progress towards our CMP goals.
- Showcase successful institutional projects e.g. CHP and BREEAM awards, and seek recognition, where appropriate, for new projects.
- Share examples of best practice through sector outlets such as AUDE & EAUC.
- Continue to provide ad hoc training e.g. by the Environment Office.
- Introduce issue specific training to promote positive behaviours e.g. training for buyers on sustainable procurement, and ask staff to help us identify training requirements.

## 6.6 Finance and Investment – the money to match the commitment

Full details of the financial investment required to support the CMP are outlined in Section 5.

## 6.7 Policy Alignment – saving CO<sub>2</sub> across your operations

Our existing environmental and sustainability policies<sup>3</sup> provide a framework for the CMP. These statements include an over-arching Sustainability & Social Responsibility Policy an Environmental Policy and a sub policies covering Waste, Utilities, Transport and Sustainable Buildings.

These policies are reviewed by the CSR Steering Group on an annual basis. The next such review will be in December 2010 and will ensure that all policies align with the targets in the CMP and highlight their contribution to carbon management. Where policy gaps exist, they will be addressed; as a matter of urgency we are developing a Sustainable Procurement policy and strategy that will in part highlight the integral role of appropriate procurement decisions in securing carbon reduction.

The 2009/10 update to the institutional Strategic Plan<sup>4</sup> included a section on Sustainability and Social Responsibility that outlined the following commitments:

- Identify opportunities to reduce our carbon footprint, meet the requirements of Carbon Change legislation, and promote consciousness of, and policies supporting, environmental sustainability.
- Produce a five year carbon reduction plan in conjunction with the Carbon Trust as part of our contribution to the Universities & Colleges Climate Commitment for Scotland.
- Embed consideration of sustainability and social responsibility into the University's governance structures and recognise these as integral strands of risk management.
- Implement processes to ensure that the social and environmental, as well as economic, impacts of all major decision are given due consideration.

Future updates will include specific reference to the emissions reduction target included in the CMP, while the CMP itself will serve as a catalyst for the widespread institutional consideration of carbon management by highlighting the legal, financial and moral obligations on the University to act.

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<sup>3</sup> See <http://www.abdn.ac.uk/estates/environment/about/download.php#Policies>

<sup>4</sup> See <http://www.abdn.ac.uk/ppg/uploads/files/22/Strategic%20Plan.doc>

## 7 Managing the CM Programme

While the Programme Management structure detailed at Section 6.2 provides routine operational oversight of the CMP process, the formal CMP management structure is as follows.

### 7.1 The Carbon Management Board

Providing strategic ownership and oversight of the CMP is the Carbon Management Board:

Role	Name	Title
Sponsor	Angus Donaldson	Director of Estates
Deputy Sponsor	Robert Murray	Deputy Director of Estates
Executive Sponsor	Steve Redpath	ACES Director
Project Leader	John Kingsland	Utilities Manager
Finance Representative	Linda Jowett	Planning Account
Board Members	Lynne Fraser	Secretary
	Fraser Lovie	Policy Advisor
	Robin Parker	Student President

### 7.2 The Carbon Management Team

Developing and delivering the projects in the CMP is the Carbon Management Team:

Role	Name	Title
Sponsor	Angus Donaldson	Director of Estates
Deputy Sponsor	Robert Murray	Deputy Director of Estates
Executive Sponsor	Steve Redpath	ACES Director
Project Leader	John Kingsland	Utilities Manager
Finance Representative	Linda Jowett	Project Officer
Team members	Lynne Fraser	Secretary
	Alan Wight	AED (Projects)
	Bob Philp	AED (Maintenance)
	Gary McKinnon	Purchasing Officer
	Mike Whymant	Project Manager, DIT
	Amy Gray	Waste and Environmental Officer
	Chris Osbeck	Travel Plan Co-ordinator
	Fraser Lovie	Policy Advisor
	Shaunagh Kirby	Head of Communications
	Robin Parker	Student President

### 7.3 Succession Planning: Key Roles





The University's normal operating processes will apply in the event of there being a need for succession of key roles. There will be no specific additional instruction issued for the Carbon Management Plan.

This reflects the institutional desire to embed carbon management across organisational functions, ensuring that it is acknowledged in the strategic and operational planning of all administrative sections and Colleges, not merely in the responsibilities of named individuals.

## 7.4 Ongoing Stakeholder Management

Communicating progress, sharing our successes and being open about the challenges will be a critical factor in building and maintaining institutional momentum. While such activity already forms a major part of the role of the Utilities Manager and other Environment Office staff, further work is required to secure buy-in across the University and to raise awareness.

Thus, alongside the formal reporting process (see Section 6 and 7.5) a variety of less formal reporting and information sharing will be undertaken to ensure that internal and external stakeholders are kept up to date with the University's carbon performance. These will include:

- Inclusion of carbon management as a key strand of 'Able' campaign newsletters and literature.
- Use of staff surveys to gauge awareness and to seek input on future projects.
- Regular EO briefings at College executive meetings and at meetings of technical staff.
- Regular discussion of CMP progress at CSR Steering Group.
- Building by building energy graphs to demonstrate 'local' performance.
- Sharing of best practice examples through networks such as AUDE & EAUC.
- Regular dissemination of data on carbon and financial savings to all staff and students.
- Identification of suitable recognition/awards mechanisms for successful projects.
- Continued close liaison with the Students' Association across the sustainability agenda.
- Ongoing participation in cross-sector climate change networks such as the North East Scotland Climate Change Partnership (NESCCP).
- Briefings to community stakeholders such as the local Community Councils.

## 7.5 Annual Progress Review

An annual report will be produced on behalf of the Carbon Management Board for review by all appropriate internal and external stakeholders. This report will be discussed by the University Court.

This annual reporting will detail institutionally aggregated progress against targets, carbon reductions made and financial savings. The report will be tailored (see Section 7.4) for dissemination in a form that allows internal stakeholders to compare performance, with building-by-building data made available to complete a feedback loop that will allow outcomes to inform the ongoing operational planning process.

Outcomes from staff surveys undertaken to gauge levels of awareness will be incorporated to give an indication of behaviour change and modal shift. It will link to existing Utilities, Waste and Travel reports to ensure that the annual CMP Report provides a complete picture of carbon performance.

Between annual reports, monthly performance data will continue to be made available on a local and institutional basis, while quarterly reports will be produced for the University Management Group.

The information produced will be used as the basis for reporting as part of the Universities and Colleges Climate Commitment for Scotland (UCCCfS) and other benchmarking mechanisms requiring data on carbon performance e.g. Universities that Count.

## Appendix A: Carbon Management Matrix – Embedding (For Information)

	CORPORATE STRATEGY	PROGRAMME MANAGEMENT	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION & TRAINING	FINANCE & INVESTMENT	POLICY ALIGNMENT *
<b>BEST</b>  <b>5</b>	<ul style="list-style-type: none"> <li>• Top level target allocated across organisation</li> <li>• CO<sub>2</sub> reduction targets in Directorate Business Plans</li> </ul>	<ul style="list-style-type: none"> <li>• Senior Management Team/Committee/Court review progress against targets on quarterly basis</li> <li>• Quarterly diagnostic reports provided to Directorates</li> <li>• Progress against target published externally</li> </ul>	<ul style="list-style-type: none"> <li>• CM integrated in responsibilities of senior managers</li> <li>• CM part of all job descriptions</li> <li>• Central CO<sub>2</sub> reduction advice available</li> <li>• Green Champions leading local action groups</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly collation of CO<sub>2</sub> emissions for all sources</li> <li>• Data externally verified</li> <li>• M&amp;T in place for: <ul style="list-style-type: none"> <li>○ buildings</li> <li>○ street lighting</li> <li>○ waste</li> <li>○ transport</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• All staff given formalised CO<sub>2</sub> reduction: <ul style="list-style-type: none"> <li>○ induction and training</li> <li>○ communications</li> </ul> </li> <li>• Joint CM communications with key partners</li> <li>• Staff awareness tested through surveys</li> </ul>	<ul style="list-style-type: none"> <li>• Finance committed for 2+ yrs of Programme</li> <li>• External funding being routinely obtained</li> <li>• Ring-fenced fund for carbon reduction initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> friendly operating procedure in place</li> <li>• Central team provide advice and review, when requested</li> <li>• Barriers to CO<sub>2</sub> reduction routinely considered and removed</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> reduction commitment in Corporate Strategy</li> <li>• Top level targets set for CO<sub>2</sub> reduction</li> <li>• Climate Change Strategy reviewed annually</li> </ul>	<ul style="list-style-type: none"> <li>• Sponsor reviews progress and removes blockages through regular Programme Boards</li> <li>• Progress against targets routinely reported to Senior Mgt Team</li> </ul>	<ul style="list-style-type: none"> <li>• CM integrated in to responsibilities of department heads</li> <li>• Senior Management Team/Committee/Court regularly updated</li> <li>• Staff engaged through Green Champion network</li> </ul>	<ul style="list-style-type: none"> <li>• Annual collation of CO<sub>2</sub> emissions for: <ul style="list-style-type: none"> <li>○ buildings</li> <li>○ street lighting</li> <li>○ transport</li> <li>○ waste</li> </ul> </li> <li>• Data internally reviewed</li> </ul>	<ul style="list-style-type: none"> <li>• All staff given CO<sub>2</sub> reduction: <ul style="list-style-type: none"> <li>○ induction</li> <li>○ communications</li> <li>○ CM matters communicated to external community</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Coordinated financing for CO<sub>2</sub> reduction projects via Programme Board</li> <li>• Finances committed 1yr ahead</li> <li>• Some external financing</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive review of policies complete</li> <li>• Lower level policies reviewed locally</li> <li>• Unpopular changes being considered</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> reduction vision clearly stated and published</li> <li>• Climate Change Strategy endorsed by Cabinet and publicised with staff</li> </ul>	<ul style="list-style-type: none"> <li>• Core team regularly review CM progress: <ul style="list-style-type: none"> <li>○ actions</li> <li>○ profile &amp; targets</li> <li>○ new opportunities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• An individual provides full time focus for CO<sub>2</sub> reduction and coordination across the organisation</li> <li>• Senior Sponsor actively engaged</li> </ul>	<ul style="list-style-type: none"> <li>• Collation of CO<sub>2</sub> emissions for limited scope i.e. buildings only</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental / energy group(s) given ad hoc: <ul style="list-style-type: none"> <li>○ training</li> <li>○ communications</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• A view of the cost of CO<sub>2</sub> reduction is developing, but finance remains ad-hoc</li> <li>• Some centralised resource allocated</li> <li>• Finance representation on CM Team</li> </ul>	<ul style="list-style-type: none"> <li>• All high level and some mid level policies reviewed, irregularly</li> <li>• Substantial changes made, showing CO<sub>2</sub> savings</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>• Draft Climate Change Policy</li> <li>• Climate Change references in other strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Ad hoc reviews of CM actions progress</li> </ul>	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> reduction a part-time responsibility of a few department champions</li> </ul>	<ul style="list-style-type: none"> <li>• No CO<sub>2</sub> emissions data compiled</li> <li>• Energy data compiled on a regular basis</li> </ul>	<ul style="list-style-type: none"> <li>• Regular awareness campaigns</li> <li>• Staff given CM information on ad-hoc basis</li> </ul>	<ul style="list-style-type: none"> <li>• Ad hoc financing for CO<sub>2</sub> reduction projects</li> </ul>	<ul style="list-style-type: none"> <li>• Partial review of key, high level policies</li> <li>• Some financial quick wins made</li> </ul>
<b>1</b> <b>Worst</b>	<ul style="list-style-type: none"> <li>• No policy</li> <li>• No Climate Change reference</li> </ul>	<ul style="list-style-type: none"> <li>• No CM monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• No recognised CO<sub>2</sub> reduction responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• No CO<sub>2</sub> emissions data compiled</li> <li>• Estimated billing</li> </ul>	<ul style="list-style-type: none"> <li>• No communication or training</li> </ul>	<ul style="list-style-type: none"> <li>• No specific funding for CO<sub>2</sub> reduction projects</li> </ul>	<ul style="list-style-type: none"> <li>• No alignment of policies for CO<sub>2</sub> reduction</li> </ul>

\* Major operational policies and procedures, e.g. Capital Projects, Procurement, HR, Business Travel

## Appendix B: Definition of Projects

<b>Project:</b>	<i>University Office – Replacement of Windows</i>
<b>Reference:</b>	<i>007</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Replacement of single glazed windows with double glazed windows</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,950</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 11.1</i></li> <li>• <i>% of target 0.17%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 210,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>• <i>Part of Budget cycle</i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources</i></li> <li>• <i>Current Resource Small works</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Good quality installation</i></li> <li>• <i>Principal risks Disruption to building users</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings initial U value calculations</i></li> <li>• <i>Measurement of savings comparison with historical data using U-value correction</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>23 St Machar, replacement of lecture theatre lighting</i>
<b>Reference:</b>	<i>015</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Replacement of existing tungsten gls bulbs in the lecture theatre</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 880</i></li> <li>• <i>Payback period: years 1.0</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 4.3</i></li> <li>• <i>% of target 0.07%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £918</i></li> <li>• <i>Operational costs, £ p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources No</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Quality of existing fittings</i></li> <li>• <i>Principal risks</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation of energy saving</i></li> <li>• <i>Measurement of savings Comparison with historical data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>23 St Machar Drive – Installation of BMS</b>
<b>Reference:</b>	<b>016</b>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The building has a number of different heating zones with varying time and temperature control. Connection of the building management system (BMS) would greatly improve heating control in this building</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,698</i></li> <li>• <i>Payback period: years 4.3</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 21.8</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.34%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £15,741</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Correct set up of controls</i></li> <li>• <i>Principal risks existing zoning insufficient</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation of savings</i></li> <li>• <i>Measurement of savings comparison against historical monthly data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>23 St Machar Drive – Insulate Heating Pipework</b>
<b>Reference:</b>	<b>017</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Insulation of heating pipework at high level in glazed corridor</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 276</i></li> <li>• <i>Payback period: years 2.5</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 1.6</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.02%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £700</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget for maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on U-values</i></li> <li>• <i>Measurement of savings based on calculations, too small to measure</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>23 St Machar Drive – Installation of thermostatic radiator valves (TRV's)</b>
<b>Reference:</b>	<b>018</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Install TRV's with a limited temperature range to prevent over heating in corridor areas in particular.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 156</i></li> <li>• <i>Payback period: years 3.2</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 0.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.01%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 500</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Selecting correct type of TRV's</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on temperature settings</i></li> <li>• <i>Measurement of savings assessed on calculations, too small o measure</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>23 St Machar Drive – Fresh air cooling</b>
<b>Reference:</b>	<b>019</b>
<b>Owner (person)</b>	<i>John Kingsland/John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are a number of -80 and other large freezers in one room in the building. Currently the room is too hot which will reduce the efficiency of the chillers. To improve the situation it is proposed to duct in fresh air to the space.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 8,250</i></li> <li>• <i>Payback period: years 3.6</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 40.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.062%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £30,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Re current capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Possibly some design</i></li> <li>• <i>Current Resource in part</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Getting the correct plant arrangement</i></li> <li>• <i>Principal risks</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings are based on calculations in reducing existing energy consumption</i></li> <li>• <i>Measurement of savings by comparison with historical monthly energy consumption</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<b>Replacement of Hand Dryers</b>
<b>Reference:</b>	<b>061</b>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The existing hand dryers in the University are of an old type that relies on heated air and low velocity air flow. The new hand dryers use high velocity air with no heating which is much more effective and uses less energy</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,300</i></li> <li>• <i>Payback period: years 4.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 16.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.25%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £15,862</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Major refurb recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Like for like replacement</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculated from times of operation</i></li> <li>• <i>Measurement of savings based on calculations, this measure is too widely distributed for it's size to be measured accurately</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Marischal College – Installation of Variable speed drives (VSDs)</b>
<b>Reference:</b>	<b>064</b>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The existing pumps at Marischal College operated flat out when not fully loaded. To overcome this, and reduce energy consumption variable speed drives can be installed</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,100</i></li> <li>• <i>Payback period: years 2.6</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 5.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.08</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 3,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on calculations from current pump sizes and loads</i></li> <li>• <i>Measurement of savings by comparison with monthly recorded electricity data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Library Absorption chiller</i></b>
<b>Reference:</b>	<b><i>065</i></b>
<b>Owner (person)</b>	<i>Calum Proctor/Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The new library is due to be fitted with an absorption type chiller. This uses heat to generate cold air. This heat demand will mean that the CHP engine can operate for longer hours, primarily during the summer.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 110,875</i></li> <li>• <i>Payback period: years 3.6</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 524.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 8.08</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 400,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: New Building Central University Capital Funding</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources New Build Design team</i></li> <li>• <i>Current Resource In addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Correct design including assessment of loads</i></li> <li>• <i>Principal risks Relatively new technology</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on calculations of heat load and CHP performance</i></li> <li>• <i>Measurement of savings by comparison with CHP performance from previous years</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This is a significant project in terms of reducing carbon emissions and highlights the importance of think about buildings in terms of the overall site, and not just as standalone units.</i>

## Appendix B:

<b>Project:</b>	<b>Automatic Meter Reading</b>
<b>Reference:</b>	<b>065</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>This project is to set up a system whereby utility meters are recorded automatically in buildings over 1,000 m2. The system will highlight possible overconsumption due to leaks, equipment left on out of hours, etc. In addition it will be used to show real time consumption to building users to increase awareness.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 124,275</i></li> <li>• <i>Payback period: years 0.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 751.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 11.58%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 100,000</i></li> <li>• <i>Operational costs, £p.a. 3000</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Consultant for commissioning</i></li> <li>• <i>Current Resource in addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors correct scoping</i></li> <li>• <i>Principal risks</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings based on current site energy use</i></li> <li>• <i>Measurement of savings Using the metering data recorded by the system</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This is a major project in terms of reducing carbon emissions for a number of reasons, it will allow measurement of other saving projects, identify existing areas of waste, and help increase awareness.</i>

## Appendix B:

<b>Project:</b>	<b>University Office – Corridor lighting control</b>
<b>Reference:</b>	<b>024</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The finance corridor is currently lit overnight for security. The same level of security could be achieved if automatic lighting controls were installed, and energy consumption could be reduced</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 297</i></li> <li>• <i>Payback period: years 7.4</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 1.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.02</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £2,200</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget for maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing lighting loads and hours of operation</i></li> <li>• <i>Measurement of savings Using half hourly AMR installed in the building</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>William Guild – Remove corridor spotlights</i>
<b>Reference:</b>	<i>044</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are some spotlights on the stairwell that were used to light pictures. The pictures have been removed, but the lights remain.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 22</i></li> <li>• <i>Payback period: years 4.5</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 0.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £100</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on lighting load installed</i></li> <li>• <i>Measurement of savings Calculation, as saving too small to measure</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Linklater – replace candle tungstens</i>
<b>Reference:</b>	<i>045</i>
<b>Owner (person)</b>	<i>Graeme Reid</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are a large number of tungsten candle bulbs used in chandeliers in this area. It is planned to replace these with more efficient ones that use less than 2/3rds the energy.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 264</i></li> <li>• <i>Payback period: years 1.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 1.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.02%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 300</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on lighting loads and hours of operation</i></li> <li>• <i>Measurement of savings based on half hourly metering present</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>Longer term it may be possible to change these lights to LEDs</i>



## Appendix B:

<b>Project:</b>	<i>Fraser Noble – Compressed air check</i>
<b>Reference:</b>	<i>049</i>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The work shops at Fraser Noble use compressed air. This is a very expensive form of energy. By checking consumption out of hours it possible to identify leaks. These can then be repaired.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,200</i></li> <li>• <i>Payback period: years 0.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 10.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.17%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 2,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on existing consumption</i></li> <li>• <i>Measurement of savings Comparison with historical consumption</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<i>Meston – Compressed air check</i>
<b>Reference:</b>	<i>050</i>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The work shops at Meston use compressed air. This is a very expensive form of energy. By checking consumption out of hours it possible to identify leaks. These can then be repaired.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,200</i></li> <li>• <i>Payback period: years 0.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 10.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.17%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £2,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on existing consumption</i></li> <li>• <i>Measurement of savings Comparison with historical consumption</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>IMS – compressed air check</i>
<b>Reference:</b>	<i>051</i>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The work shops at IMS use compressed air. This is a very expensive form of energy. By checking consumption out of hours it possible to identify leaks. These can then be repaired.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,200</i></li> <li>• <i>Payback period: years 0.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 10.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.17%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £2,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Calculation based on existing consumption</i></li> <li>• <i>Measurement of savings Comparison with historical consumption</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>External Lights – dawn/dusk controls</i>
<b>Reference:</b>	<i>052</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Where external lights are used for decorative purposes they could be off for a large part of the night. This type of control uses a combination of a photocell and timeclock to control the lights over night.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 4,730</i></li> <li>• <i>Payback period: years 2.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 23.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.36%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £10,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Acceptance of the fact that the lights are not needed to be on all night long</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on installed lighting</i></li> <li>• <i>Measurement of savings local measurement of electricity consumption in areas where this is installed.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Insulation of DHWS cylinders</i>
<b>Reference:</b>	<i>055</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are some Domestic hot water cylinders that need their insulation upgraded to reduce heat loss.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,040</i></li> <li>• <i>Payback period: years 0.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 5.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.09%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 800</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on U values</i></li> <li>• <i>Measurement of savings calculation as too small to show clearly on meters</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Insulate Lofts</i>
<b>Reference:</b>	<i>056</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>A number of lofts have been identified within Academic and Campus Services buildings where insulation needs to be installed or upgraded. This measure greatly reduces heat loss from buildings.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 81,738</i></li> <li>• <i>Payback period: years 2.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 465.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 7.17%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 234,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix/ Re-current capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks asbestos</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on areas and U values</i></li> <li>• <i>Measurement of savings comparison with historical data and factoring in degree day correction</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This measure represents a significant reduction in carbon dioxide emissions</i>

## Appendix B:

<b>Project:</b>	<i>Insulate flat roofs</i>
<b>Reference:</b>	<i>057</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are a large number of flat roofs at the University and when these are refurbished the opportunity to add or upgrade insulation is taken.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 97,500</i></li> <li>• <i>Payback period: years 5.0</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 554.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 8.55</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £487,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on roof areas and U-values</i></li> <li>• <i>Measurement of savings comparison with historical data and factoring in degree day correction</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>IMS Boiler Controls</b>
<b>Reference:</b>	<b>059</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Installation of boiler controls that prevent dry cycling of the boilers, and the associated waste of energy.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 5,980</i></li> <li>• <i>Payback period: years 1.3</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 34.0</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.52</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 7,755</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Plant being configured correctly</i></li> <li>• <i>Principal risks: relatively new technology</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing consumption profile</i></li> <li>• <i>Measurement of savings comparison with historical consumption data and degree day correction.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>IMS – Power Factor Correction</b>
<b>Reference:</b>	<b>063</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The power factor for theism supply is relatively poor which results in increased energy losses in the supply of electricity to site. This incurs penalty charges from the supply company.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,980</i></li> <li>• <i>Payback period: years 3.7</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 9.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.15%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £7,297</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing supply data</i></li> <li>• <i>Measurement of savings comparison with half hourly data provided by the electricity supplier</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<b>Foresterhill CHP connection to Sub 5</b>
<b>Reference:</b>	<b>066</b>
<b>Owner (person)</b>	<i>John McManus/NHS Trust</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Grampian NHS Trust is building a new CHP station incorporating a biomass boiler at the Foresterhill site. The University is proposing to connect to this system and have electricity from it supplied via the Sub 5 supply.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 232,500</i></li> <li>• <i>Payback period: years 12.0</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 1056.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 16.27%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £2,780,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Central University Capital Funding</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Design consultants</i></li> <li>• <i>Current Resource in addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Partnership with the Trust, sufficient capacity throughout the system</i></li> <li>• <i>Principal risks sufficient funding being available</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing load profiles and estimated generation figures.</i></li> <li>• <i>Measurement of savings comparison with historical consumption data and new Trust metered consumption data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This is a major component in the plan to reduce carbon emissions, and key to this is the partnership between the University and the Trust.</i>

## Appendix B:

<b>Project:</b>	<b>Foresterhill Rowett</b>
<b>Reference:</b>	<b>067</b>
<b>Owner (person)</b>	<i>Alan Wight/NHS Trust</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The University y has merged with the Rowett Institute and as part of this the Rowett will be relocating from their existing site to Foresterhill. The new building is scheduled to be supplied with energy off the new NHS Trust CHP scheme.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 503,750</i></li> <li>• <i>Payback period: years 7.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 2,288.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 35.26%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £4,000,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Central University Capital Funding</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Design consultants</i></li> <li>• <i>Current Resource In addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Partnership with the Trust, sufficient capacity through out the system</i></li> <li>• <i>Principal risks: . sufficient funding being available</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing load profiles and estimated generation figures</i></li> <li>• <i>Measurement of savings comparison with historical consumption data and new Trust metered consumption data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This is a major component in the plan to reduce carbon emissions, and key to this is the partnership between the University and the Trust.</i>

## Appendix B:

<b>Project:</b>	<i>Taylor Building – Phase 1</i>
<b>Reference:</b>	<i>008</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Taylor building currently has single glazing and this is due to be replaced with double glazing in 2 phases.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 20,800</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 118.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 1.82%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £500,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Good quality installation</i></li> <li>• <i>Principal risks: .Disruption to building users</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on window areas and U-values</i></li> <li>• <i>Measurement of savings comparison with historical energy use</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Taylor building windows phase 2</i>
<b>Reference:</b>	<i>009</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Taylor building currently has single glazing and this is due to be replaced with double glazing in 2 phases.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 35,200</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 171.8</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 2.65%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 300,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Good quality installation</i></li> <li>• <i>Principal risks: . Disruption to building users</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on window areas and U-values</i></li> <li>• <i>Measurement of savings comparison with historical energy use</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings:2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>50/52 College Bounds Refurbishment</b>
<b>Reference:</b>	<b>010</b>
<b>Owner (person)</b>	<i>Debbie Butler</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The building at 50/52 College bounds is due to be refurbished. As part of this works it is planned to connect the building to the Old Aberdeen campus CHP scheme</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 419</i></li> <li>• <i>Payback period: years 11.9</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 1.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.03%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 5,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Central University Capital Budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Ease of connection</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historic energy consumption and data on the CHP performance</i></li> <li>• <i>Measurement of savings based on comparison of metered data with historic performance, and CHP station performance</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings:2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Edward Wright – Data Centre Replacement</b>
<b>Reference:</b>	<b>020</b>
<b>Owner (person)</b>	<i>Brian Robertson/John Kingsland</i>
<b>Department</b>	<i>DIT/Estates</i>
<b>Description</b>	<i>The existing data centre can no longer meet the data storage requirements of the University and needs to be upgraded. As part of the new design the plan it is planned to improve the energy performance of the centre and in particular reduce the amount of air-conditioning required.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 14,850</i></li> <li>• <i>Payback period: years 6.7</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 72.5</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 1.12%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £100,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Specialist Design consultants</i></li> <li>• <i>Current Resource in addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors partnership between DIT, Estates, Design team</i></li> <li>• <i>Principal risks The increase in data storage requirements</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing electricity use</i></li> <li>• <i>Measurement of savings comparison with historical energy use.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This ties in with project 021</i>

## Appendix B:

<b>Project:</b>	<b>University Office – Removal of Data Centre</b>
<b>Reference:</b>	<b>021</b>
<b>Owner (person)</b>	<i>Brian Robertson/John Kingsland</i>
<b>Department</b>	<i>DIT/Estates</i>
<b>Description</b>	<i>The existing data centre in Edward Wright is due to be refurbished. When this is complete the data centre in University Office will no longer be required.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 10,450</i></li> <li>• <i>Payback period: years 7.2</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 51.0</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.79%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 75,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: recurrent Capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Specialist design consultants</i></li> <li>• <i>Current Resource in addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors partnership between DIT, Estates, Design team</i></li> <li>• <i>Principal risks: . The increase in data storage requirements</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing electricity use</i></li> <li>• <i>Measurement of savings comparison with historical energy use</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings:2013</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>Linked to project 020</i>

## Appendix B:

<b>Project:</b>	<i>Regent – Replace windows</i>
<b>Reference:</b>	<i>022</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Regent building currently has single glazing and this is due to be replaced with double glazing</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 683</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 3.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.06%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 60,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Good quality installation</i></li> <li>• <i>Principal risks: . Disruption to building users</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on window areas and U-values</i></li> <li>• <i>Measurement of savings comparison with historical energy use</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings:2012</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<i>Hillhead – Replace Windows</i>
<b>Reference:</b>	<i>023</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Some of the blocks at Hillhead currently have single glazing and this is due to be replaced with double glazing</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 5,655</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 32.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.50%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £490,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Good quality installation</i></li> <li>• <i>Principal risks: . Disruption to building users</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings Based on window areas and U-values</i></li> <li>• <i>Measurement of savings comparison with historical energy use</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Fraser Noble – Lecture Theatre ventilation control</b>
<b>Reference:</b>	<b>025</b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Kings College – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>026</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 8,448</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 41.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.64%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £34,560</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>MacRobert – Lecture Theatre ventilation control</b>
<b>Reference:</b>	<b>027</b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,816</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 13.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.21%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £11,520</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Meston – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>028</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 5,632</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 27.5</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.42%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Regent – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>029</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>New Kings – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>030</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,112</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 10.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.16%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £8,640</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>William Guild – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>031</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings:2010</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<b>Zoology – Lecture Theatre ventilation control</b>
<b>Reference:</b>	<b>032</b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings:2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Medical Library – Lecture Theatre ventilation control</b>
<b>Reference:</b>	<b>033</b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings:2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Polwarth – Lecture Theatre ventilation control</i></b>
<b>Reference:</b>	<b><i>034</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The ventilation system for the lecture theatre is solely controlled by the time settings in the Building Management System. By installing carbon dioxide sensors and linking them to variable speed drives on the ventilation fans it will be possible to adjust the amount of ventilation dependant on occupancy levels in the lecture theatre.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,408</i></li> <li>• <i>Payback period: years 4.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.11%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,760</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• <i></i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: Fans not suitable for VSDs</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on the fan motor sizes and hours of operation.</i></li> <li>• <i>Measurement of savings Calculation due to small size, possibly installation of a portable meter.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings:2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Lecture Theatre Exit Lighting</b>
<b>Reference:</b>	<b>035</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The main lighting for the lecture theatres is controlled from the lecterns, or near the stage. In some instances there are no light switches by the exits, and it is not possible to turn off all the lights on leaving the lecture theatre. Additional switches are required by the exits</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,980</i></li> <li>• <i>Payback period: years 1.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 9.7</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.15%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £3,535</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Setting up switching of aisle lights</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on lighting loads and hours of operation</i></li> <li>• <i>Measurement of savings comparison of half hourly load profiles where available</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>110 High Street – Replacement of electric heating</b>
<b>Reference:</b>	<b>036</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates/Campus Services</i>
<b>Description</b>	<i>110 high street currently uses electrical heating and the electricity is purchased off the grid. It is proposed to change this out and install a gas fired boiler with radiators.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,140</i></li> <li>• <i>Payback period: years 2.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 9.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.15%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £6,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks proximity of gas supply</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historical figures for consumption, and DECC conversion figures for CO<sub>2</sub> emissions</i></li> <li>• <i>Measurement of savings comparison with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>46/48 College Bounds – Replacement of electric heating</b>
<b>Reference:</b>	<b>037</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>46/48 College Bounds currently uses electrical heating and the electricity is purchased off the grid. It is proposed to change this out and install a gas fired boiler with radiators.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,629</i></li> <li>• <i>Payback period: years 2.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 16.0</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.25%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £10,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks proximity of gas supply</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historical figures for consumption, and DECC conversion figures for CO<sub>2</sub> emissions</i></li> <li>• <i>Measurement of savings comparison with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Elphinstone Road Flats – Replacement of electric heating</i></b>
<b>Reference:</b>	<b><i>038</i></b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates/Campus Services</i>
<b>Description</b>	<i>Elphinstone Road Flats currently uses electrical heating and the electricity is purchased off the grid. It is proposed to change this out and install a gas fired boiler with radiators.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,469</i></li> <li>• <i>Payback period: years 5.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 15.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.24%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £20,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks proximity of gas supply</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historical figures for consumption, and DECC conversion figures for CO<sub>2</sub> emissions</i></li> <li>• <i>Measurement of savings comparison with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This site could be connected to the existing CHP scheme</i>

## Appendix B:

<b>Project:</b>	<b><i>Kings Hall – Replacement of electric heating</i></b>
<b>Reference:</b>	<b><i>039</i></b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates/Campus Services</i>
<b>Description</b>	<i>Kings Hall currently uses electrical heating and the electricity is purchased off the grid. It is proposed to change this out and install a gas fired boiler with radiators.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,514</i></li> <li>• <i>Payback period: years 5.7</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 15.5</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.24%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £20,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks proximity of gas supply</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historical figures for consumption, and DECC conversion figures for CO<sub>2</sub> emissions</i></li> <li>• <i>Measurement of savings comparison with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This site could be connected to the existing CHP scheme</i>



## Appendix B:

<b>Project:</b>	<b><i>The Barn – Replacement of electric heating</i></b>
<b>Reference:</b>	<b><i>040</i></b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Barn currently uses electrical heating and the electricity is purchased off the grid. It is proposed to change this out and install a gas fired boiler with radiators.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 12,752</i></li> <li>• <i>Payback period: years 0.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 56.2</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.87%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £10,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks proximity of gas supply</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on historical figures for consumption, and DECC conversion figures for CO<sub>2</sub> emissions</i></li> <li>• <i>Measurement of savings comparison with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	<i>This site could be connected to the existing CHP scheme</i>

## Appendix B:

<b>Project:</b>	<b>Balgownie Sports Centre – Replace Boiler</b>
<b>Reference:</b>	<b>041</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The existing boiler is old, and inefficient. It is proposed to replace this with an energy efficient condensing boiler.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 780</i></li> <li>• <i>Payback period: years 6.4</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 4.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.07%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £5,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing consumption, and projected improvement in efficiency.</i></li> <li>• <i>Measurement of savings comparison of new consumption with historical consumption data taking in to account degree day data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>Polwarth – Free Cooling</i></b>
<b>Reference:</b>	<b><i>042</i></b>
<b>Owner (person)</b>	<i>John McManus</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The Polwarth building has a number of rooms fitted with local air-conditioning units. It is proposed to replace these with one central system that has facility for free-cooling. This means that when the outside air-temperature is below a certain value it is not necessary to use the compressors for cooling.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 9,020</i></li> <li>• <i>Payback period: years 5.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 44.0</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.68%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £46,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources Design Consultants</i></li> <li>• <i>Current Resource in addition</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks available routes for ductwork</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing units</i></li> <li>• <i>Measurement of savings comparison of new consumption with historical consumption data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>IMS – Remove atrium spotlights</i>
<b>Reference:</b>	<i>043</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>There are a large number of tungsten spotlights in the IMS atrium which serve no useful purpose and are very inefficient. It is proposed to remove these as they are not necessary.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 110</i></li> <li>• <i>Payback period: years</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 0.5</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.01%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 500</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Revenue budget maintenance and projects</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on lighting load and projected hours of use.</i></li> <li>• <i>Measurement of savings based on calculations</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>University Office – cavity wall insulation</b>
<b>Reference:</b>	<b>046</b>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>University Office has a cavity wall construction. The cavity could be insulated to reduce heat loss from the building.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 2,178</i></li> <li>• <i>Payback period: years 9.2</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 12.4</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.19%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 20,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on wall surface areas and U values.</i></li> <li>• <i>Measurement of savings comparison between metered consumption data, and historical consumption data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Regent Building – cavity wall insulation</i>
<b>Reference:</b>	<i>047</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Regent Building has a cavity wall construction. The cavity could be insulated to reduce heat loss from the building.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 1,073</i></li> <li>• <i>Payback period: years 9.3</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 6.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.09%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 10,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on wall surface areas and U values.</i></li> <li>• <i>Measurement of savings comparison between metered consumption data, and historical consumption data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Hillhead – cavity wall insulation</i>
<b>Reference:</b>	<i>048</i>
<b>Owner (person)</b>	<i>Bob Watson</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Some of the blocks at Hillhead are of cavity wall construction. These cavities could be insulated to reduce heat loss from the building.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 3,185</i></li> <li>• <i>Payback period: years 9.4</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 18.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.28%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £ 30,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on wall surface areas and U values.</i></li> <li>• <i>Measurement of savings comparison between metered consumption data, and historical consumption data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2012</i></li> <li>○ <i>start date for savings: 2012</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<i>Cruickshank – Wind Catcher</i>
<b>Reference:</b>	<i>053</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>A lab at the Cruickshank building is experiencing high temperatures due to the large amount of heat producing equipment within it. This could be overcome using air-conditioning, but the preferred option is to install a wind catcher.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 5,280</i></li> <li>• <i>Payback period: years 4.2</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 25.8</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.40%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £22,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent Capital Budget</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .Sufficient air-changes can be achieved</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on air-conditioning requirements</i></li> <li>• <i>Measurement of savings calculation as there is no air-conditioning currently in use in this area.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	



## Appendix B:

<b>Project:</b>	<b>23 St Machar Drive – Connect to CHP</b>
<b>Reference:</b>	<b>054</b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>23 St Machar Drive could be connected to the CHP system</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 6,123</i></li> <li>• <i>Payback period: years 1.6</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 27.8</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.43%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £10,000</i></li> <li>• <i>Operational costs, £p.a. nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Connection points for CHP available</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing energy consumption and DECC energy conversion factors to CO<sub>2</sub>.</i></li> <li>• <i>Measurement of savings comparison of new energy consumption with historical energy consumption.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2011</i></li> <li>○ <i>start date for savings: 2011</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b>Medical Library – Building Management System</b>
<b>Reference:</b>	<b>058</b>
<b>Owner (person)</b>	<i>Martin Smith</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The existing BMS controls at the Medical Library are time expired and need to be replaced. This will improve the energy efficiency of these controls.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 8,078</i></li> <li>• <i>Payback period: years N/A</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 43.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.67%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £68,394</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget.</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on current usage and anticipated improvement</i></li> <li>• <i>Measurement of savings comparison of new consumption data with historical consumption data, taking in to account degree day correction</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<b><i>New Kings – Draught Stripping</i></b>
<b>Reference:</b>	<b><i>060</i></b>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The windows at New Kings has a very poor seal and are draughty. It is proposed to use a solid setting mastic to create a decent seal when these windows are closed.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 683</i></li> <li>• <i>Payback period: years 4.8</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 3.9</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.06%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £3,278</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: condition of windows</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on existing energy use and projected improvement in performance</i></li> <li>• <i>Measurement of savings comparison of new energy consumption with historical energy consumption data</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Install LEDs in External light fittings</i>
<b>Reference:</b>	<i>062</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>Currently external lighting is supplied by a variety of lighting types. The energy efficiency of these lights could be improved by replacing these with LED lighting.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 630</i></li> <li>• <i>Payback period: years 17.5</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 4.3</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 0.07%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £11,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Salix</i></li> <li>• </li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources none</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors</i></li> <li>• <i>Principal risks: .relatively new technology</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on current lighting load and hours of operation.</i></li> <li>• <i>Measurement of savings based on calculation, and possible some local monitoring.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Lighting Replacement – Phase 1</i>
<b>Reference:</b>	<i>069</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The University has a wide range of fluorescent tube light fittings in use. Some of these are very dated and inefficient. These can be retrofitted with adaptors to allow more energy efficient tubes to be used.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 33,000</i></li> <li>• <i>Payback period: years 6.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 161.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 2.48%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £200,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Suitability of fittings for retrofit</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on current lighting loads and the projected improvement in performance</i></li> <li>• <i>Measurement of savings comparison of new energy consumptions with historical data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2010</i></li> <li>○ <i>start date for savings: 2010</i></li> </ul> </li> </ul>
<b>Notes</b>	

## Appendix B:

<b>Project:</b>	<i>Lighting Replacement – Phase 2</i>
<b>Reference:</b>	<i>070</i>
<b>Owner (person)</b>	<i>John Kingsland</i>
<b>Department</b>	<i>Estates</i>
<b>Description</b>	<i>The University has a wide range of fluorescent tube light fittings in use. Some of these are very dated and inefficient. These can be retrofitted with adaptors to allow more energy efficient tubes to be used.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 33,000</i></li> <li>• <i>Payback period: years 6.1</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: tonnes of CO<sub>2</sub> 161.1</i></li> <li>• <i>% of target – the percentage of your CO<sub>2</sub> saving target will this project annually contribute 2.48%</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost £200,000</i></li> <li>• <i>Operational costs, £p.a. Nil</i></li> <li>• <i>Source of funding: Recurrent capital budget</i></li> <li>•</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resources None</i></li> <li>• <i>Current Resource Yes</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Key success factors Suitability of fittings for retrofit</i></li> <li>• <i>Principal risks: .</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Assessment of savings calculation based on current lighting loads and the projected improvement in performance</i></li> <li>• <i>Measurement of savings comparison of new energy consumptions with historical data.</i></li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• <i>Milestones / key dates e.g.</i> <ul style="list-style-type: none"> <li>○ <i>start date for works: 2013</i></li> <li>○ <i>start date for savings: 2013</i></li> </ul> </li> </ul>
<b>Notes</b>	