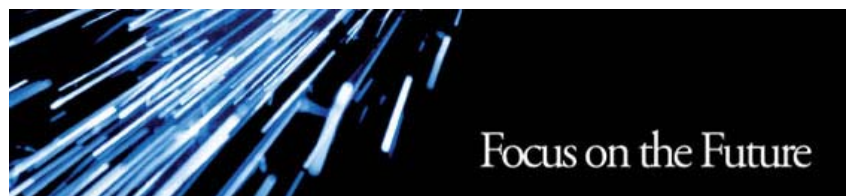


# Heriot-Watt University Carbon Management Programme

## Carbon Management Plan (CMP)

### Executive Summary



#### Our low carbon vision

Our vision for the next decade is to become a world-leading university which will produce the next generation of global leaders in business and technology with a sound understanding of the principles of sustainable development and in particular the need for us to reduce our Carbon Dioxide emissions and those of other greenhouse gases.

Creating a learning and working environment where carbon and its associated costs are fully appreciated and actively managed will help to instill this. To deliver this ambition, we are committed to growth and investment, both in staff and infrastructure whilst at the same time reducing our relative carbon footprint by 22.5% in the next 5 years.

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**Version number:** Edition 1 Executive Summary.  
**Owner:** Peter G Kerr  
**Author:** David A Jack

## Foreword

Increasing uncertainty and insecurity of energy supply, and challenging Government targets to reduce carbon emissions, make it essential to operate all aspects of the University's business in as sustainable manner as possible.

An element of our emerging vision for the next decade, being developed as part of the "Focus on the Future" strategy, is to become a world-leading university which will produce the next generation of global leaders in business and technology giving them a sound understanding of the principles of sustainable development and in particular the need for us all to minimise our contribution to global climate change by reducing our Carbon Dioxide emissions and those of other greenhouse gases.

Creating a learning and working environment where carbon and its associated costs are fully appreciated and actively managed will help to instill this. To deliver this ambition, we are committed to growth and investment, both in staff and infrastructure whilst at the same time reducing our relative carbon footprint by 22.5% in the next 5 years. This Carbon Management Plan and the ongoing support of the Carbon Trust will provide the framework to allow us to achieve our carbon management ambitions.

## Foreword from the Carbon Trust

Cutting carbon emissions as part of the fight against climate change should be a key priority for local authorities - 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 inline with its Kyoto commitments and the Public Sector 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.

Heriot-Watt University was selected in 2008, amidst strong competition, to take part in this ambitious programme. Heriot-Watt University 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 2013 and underpins potential financial savings to the organisation of around £ 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 Heriot-Watt University in their ongoing implementation of carbon management.

A handwritten signature in black ink, appearing to read "Richard Rugg".

Richard Rugg  
Head of Public Sector, Carbon Trust

The logo for Carbon Trust, featuring the text "CARBON TRUST" in blue with a stylized blue wave above it.

## Introduction

There is a growing mass of evidence that action must be taken on a global scale to mitigate against the many symptoms of a changing climate that are becoming more apparent. Governments have acted to begin to address the need to reduce Carbon Dioxide (CO<sub>2</sub>) emissions through the Kyoto Protocol and subsequent summits. However, global action must start at a local level.

Over the coming years it is safe to assume that further legislation will be introduced to drive emissions down in support of government targets. By introducing carbon management into the organisation now, the University will safeguard itself against potential negative impact of future legislation.

The Carbon Reduction Commitment (CRC) is a mandatory national carbon trading scheme. The CRC will include emissions from gas, electricity and other carbon based energy sources thus gathering up a much wider basket of organisations and their emissions than previous schemes. The CRC will require the University to outlay around £260K per annum from 2010 to 2013 to cover emissions with the potential prospect of recovering less depending upon whether their eventual position is in the bottom half of a national league table. Alternatively, if the University performs well in its Carbon Reduction performance and achieves a position in the top half of the league table it can recover more revenue from the scheme than its outlay to it.

Over the coming years it is safe to assume that further legislation will be introduced to drive emissions down in support of government targets. By introducing carbon management into the organisation now, the University will safeguard itself against potential negative impact of future legislation. An explicit outcome from the work undertaken for the Carbon Management Programme is the ability to achieve the Carbon Trust Standard to recognise the reality of good carbon management and actual quantifiable reductions. A side-effect of the standard is the potential of better placement in the CRC league table in the first phase of the scheme and the chance of recovering more from the CRC scheme rebates.

The University is also in the process of signing up to the Scottish Principals' Climate Commitment, a declaration similar to that endorsed by all of Scotland's Local Authorities, that recognises the challenges and opportunities that climate change brings and puts in place a Climate Action Plan that can make reference to or encapsulate the Carbon Management Plan.

By engaging with both staff, students and other stakeholders now, our ability to adapt to future requirements will be enhanced. The least expensive energy and the least damaging emissions are those that are avoided in the first place. It is therefore an explicit aim of the programme to help the organisation avoid using energy or creating emissions whenever possible.

This Carbon Management Plan sets out a framework for reducing carbon emissions at Heriot-Watt University over the next five years and beyond. The plan details a range of measures and actions to reduce carbon emissions across the University estate. These measures fall into two main categories: technical measures which may require capital investment to achieve a direct reduction in emissions; and enabling measures which help embed carbon management in the operational processes of the University.

The actions that we intend to take in support of this Carbon Management Plan can be pulled together into the Strategic Themes described in the University’s Focus on the Future strategy; People, Physical Infrastructure, Organisation and Process, Governance.

The targets and objectives of the Carbon Management Programme at Heriot-Watt University are

- Reduce Heriot-Watt University’s relative carbon emissions by 22.5% by 2013 on the 2007/2008 baseline.
- Reduce Heriot-Watt University’s Carbon Emissions by 5% during the first 2 years of the programme, on the 2007/2008 baseline.
- Gain a clearer understanding of the University’s energy consumption and carbon emissions
- Develop a greater awareness and involvement in carbon management and energy reduction throughout the University
- Bring together existing and future Carbon and related cost reduction projects into a managed and coherent portfolio by April 2009 with senior management commitment and involvement.
- Satisfy the requirements of the Carbon Trust Standard by April 2011 to enhance Heriot-Watt University’s carbon management credentials and CRC League Table Positioning.
- Increase earnings through improving attractiveness of the University to research and other funding providers
- Enhance the reputation of the University at local community, national and international levels and with present and future students and staff

## Our Carbon Footprint

The baseline year for the Plan was the academic year 2007/08, running from 01 August 2007 to 31 July 2008.

**Table 3.1 – Summary table of emissions for baseline year 2007/08**

	<i>Cost £000</i>	<i>Consumption kWh x 1000</i>	<i>tonnes CO2</i>	<i>%</i>
<b>Electricity</b>	1,837	21,884	11,752	60%
<b>Gas</b>	702	37,531	6,943	36%
<b>Water</b>	593	301	122	1%
<b>Waste</b>	63	1	456	2%
<b>Transport</b>	114	817	172	1%
<b>Total</b>	<b>3,308</b>	<b>60,536</b>	<b>19,445</b>	<b>100%</b>
<b>Target</b>	Reduce CO2 emissions by an absolute 5% pa 972 tonnes CO2			



## **Extending the Scope**

It is the intention of the Carbon Management team to widen the scope of the Carbon baseline during the subsequent years of the programme to cover those carbon sources that require to be addressed as part of the Carbon Trust Standard Accreditation Process. The areas most likely to be added would be air and rail travel to complete the business travel section. Commuting may well be added to allow the carbon reduction activities associated with the expansion in the use of public transport, car sharing, walking and cycling to work to be included.

There is also always the opportunity to include some of the embedded carbon from the procurement processes and supply chains at a later date to show improvements in resource usage and to spread influence along the supply chain. Fugitive emissions from processes and equipment using green house gases are also often a fertile source of emissions reductions.

## **Achieving Targets**

The identified projects that have been completed, are underway or have been presented for consideration by the Carbon Management Board of Heriot-Watt University appear to be well on track to achieve the planned CO<sub>2</sub> Emissions reduction targets.

This annual reduction target is covered by the quantified projects at a level of approximately 420% to 500%. There are currently 30 projects in the list with the first 14 being relatively well quantified. Quantification of several of the remaining 16 is well underway so should be added into the CMP in the very near future. These additional projects include server rationalisation, internal lighting in buildings and street lighting projects, each of which, if progressed, are likely to deliver good carbon savings.

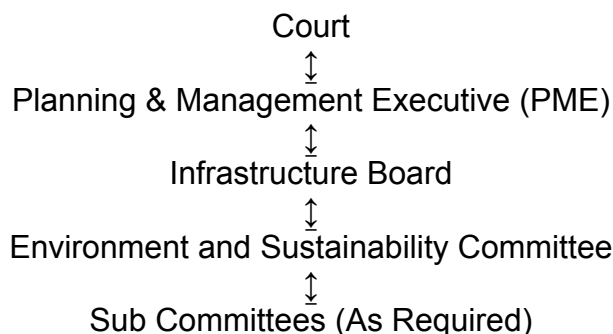
The majority of these first 14 or so projects have capital budgets allocated (Boilers and heating) or have already been completed (Roofs, heating controls, timing and hot water storage). The Management System Projects, (HWU001 to HWU005) have already attracted funding from existing Estates Budgets and their further development has been given a very positive view from the senior management team.

## **Embedding Carbon Management**

To embed Carbon Management into the University's processes it has been proposed that the existing Carbon Management Programme Board should form the core of a new Environment and Sustainability sub-committee / working group and that the Carbon Management Plan be one of the core environmental development frameworks.



Proposed Environment and Sustainability Sub-Committee/ Working Group.



A more formal approach to environmental and carbon management will greatly enhance the environmental profile of the University with its peers within the sector and also with many other stakeholder groups like investors, funding bodies, regulators and students as well as staff.

The sub-committee / working group will provide for the management of the University's diverse and sometimes conflicting set of environmental requirements and measures. It would be expected that the committee meet at least 3 to 4 times per year to review progress and set future direction. The Outline Remit of Environment and Sustainability Sub-Committee would include the development and communication of policies, strategies, procedures, objectives, targets reporting protocols and management systems relating to: -

- Carbon and Utilities Reduction and Management.
- Biodiversity of the Estate (Via Site Conservation Committee)
- Sustainable Development of the Estate.
- Ethical and Sustainable Procurement.
- Travel and Transportation.
- Resource Use, Waste and Recycling.
- Environmental and Sustainable Curriculum Development.
- Climate Change Declarations and Policies.

This Carbon Management Plan is a living document that will be added to and developed as necessary to drive Carbon Reduction at Heriot Watt University. As the University's experience of carbon management and reduction develops and as more personnel become involved in the process our targets and strategies will be adjusted. Similarly, the level of future investment in carbon reduction processes and technologies will be adjusted to suit the demands and capabilities of the University.



**1 Appendix A: Carbon Management Matrix – Embedding - Red Current State – Green Future State.**

	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 reviewed internally</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 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

## 2 Appendix B: Definition of Projects

<b>Project:</b>	<i>Devolved Budgets and recharges. Phase 1.</i>
<b>Reference:</b>	<i>HWU001</i>
<b>Owner (person)</b>	<i>David Jack</i>
<b>Department</b>	<i>Estate Services</i>
<b>Description</b>	<i>Devolving budgets and recharging of Utilities to all operational units of the University to raise awareness and encourage local action to actively manage and reduce consumption and associated carbon emissions.</i>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• <i>Financial savings: £ 71,500</i></li> <li>• <i>Payback period: 0</i></li> <li>• <i>CO<sub>2</sub> Emissions reduction: 389 tonnes of CO<sub>2</sub></i></li> <li>• <i>Assumption 2% of Utilities related emissions is potentially achievable by self policing within operational units. Target 975 tonnes per annum = 40% of target reduction.</i></li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• <i>Project cost, e.g. the initial cost of implementing the project was determined to be negligible as an extension of existing tasks and duties within the Estates department. Actual costs in man-hours currently being assessed but has been shown to be a significantly greater time commitment than expected.</i></li> <li>• <i>Operational costs, e.g. annual maintenance or running costs determined to have at least doubled because of the existing labour requirements.</i></li> <li>• <i>Source of funding: internal Estate Services and Finance Office Salaries. Specific ongoing resourcing issues under review.</i></li> <li>• <i>Paper to be submitted by Estate Services outlining options to Professional Services Theme Team Board by end of April 2009</i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• <i>Additional resource requirements to enable delivery may be provided internally or by a bureau service. Paper described above to be drawn up and submitted as above.</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Departmental budgets and recharging must persist beyond initial human resource issues. Accuracy and meter coverage an issue.</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• <i>Monthly performance against budget predictions.</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: August 2008</i></li> <li>○ <i>Expect to see savings by August 2009.</i></li> </ul> </li> </ul> <p><i>Key decisions and progress reviews at 1/4ly phasing points</i></p>
<b>Notes</b>	



<b>Project:</b>	<b>SYSTEMSLINK ENERGY MANAGEMENT SOFTWARE</b>
<b>Reference:</b>	<b>SET-UP AND POPULATION</b> HWU002
<b>Owner (person)</b>	David Jack
<b>Department</b>	Estate Services
<b>Description</b>	<p>Setting up and populating SystemsLink Energy Management software. SystemsLink offers a cost effective software solution for the validation of utility invoices and reporting on usage and expenditure. NIFES have considerable experience in the setting up and operation of these systems and thus can assist with the development and customisation of this system to suite the University's needs.</p> <p><b>Database set-up and population</b> Site data, Account data, Half hour data, Invoice data, Virtual accounts, Reporting, Installation, Training.</p> <p><b>Target setting &amp; reporting</b> Whilst SystemsLink offers a cost invoice validation system, it has limitations with respect to the setting of realistic targets based on actual consumption and driving factors such as degree days. An add-on target setting tool for SystemsLink allows individual targets to be set and performance to be reported in the form of an overspend league table. This reports the meters in order of their apparent overspend compared to the target setting priorities for remedial action</p> <p><b>Devolved budgets</b> The University has devolved utility budgets down to department level. To achieve this using SystemsLink will require the development of a number of bespoke ad-on tools to allow the system to apportion costs, produce invoices and reports and to be easily updated and maintained.</p>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £ 107,250</li> <li>• Payback period: 0 years</li> <li>• CO<sub>2</sub> Emissions reduction: 586 tonnes of CO<sub>2</sub></li> <li>• 3% of Utilities related emissions additional to HW001 is potentially achievable by improved self policing within operational units through improved information and targeted analysis directing resource application.. Target 975 tonnes per annum = 60% of target reduction</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £7500</li> <li>• Operational costs, £1000 licenses and updates. Less man-hours than current manual processes so net saving in time.</li> <li>• Source of funding: internal Estate Services Budget, external Carbon Trust Assistance £3000.</li> <li>• Funding in place and allocated.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• System operated by current staff. Adequate Time and Training Risk!</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Information to be made available to consultant.</li> <li>• Principal risks: technical Systemslink may struggle to cope with devolved budget demands. Add ons may not save the desired amount of time. Costs are very low and budget already allocated so very low financial risk.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• System delivery from Consultant. Training for HWU Personnel for operation. Period working in parallel with existing manual methods.</li> <li>• System live</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: November 2008</li> <li>○ completion date August 2009</li> </ul> </li> </ul> <p>System delivery end April 2009. Test Period May to August 2009. Live August 2009.</p>
<b>Notes</b>	



<b>Project:</b>	<b>Automatic meter reading with advanced monitoring and targeting.</b>
<b>Reference:</b>	<b>Option 1 BMS and manual data collection with driving factor analysis</b> HWU003.1
<b>Owner (person)</b>	David Jack
<b>Department</b>	Estate Services
<b>Description</b>	The University has a good metering base with which to monitor consumption. Although the majority of the meters are connected to the BMS system the data collection and logging does not appear to work in a number of cases and the data is poorly presented. This then requires readings to be taken manually every month. Analysis of the data is carried out purely on a month by month comparison. By fixing the BMS data logging system and applying the principles of good Monitoring & Targeting a saving could be achieved by highlighting and reducing waste. (See Carbon Trust publication CTG008 Monitoring & Targeting for further information).
<b>Benefits</b>	<ul style="list-style-type: none"> <li>Financial savings: £ 123,000</li> <li>Payback period: 0.62 years</li> <li>CO<sub>2</sub> Emissions reduction: 1017 tonnes of CO<sub>2</sub></li> <li>104 % of target – This is not entirely independent of the savings listed in HWU001 and HWU002 but would improve the data collection and presentation and also reduce the effort to deliver the analysis.</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>Project cost, £80,000+VAT</li> <li>Operational costs, No extra operational cost.</li> <li>Source of funding: initially internal funding or possibly from Theme team budgets.</li> <li>Decision will be made upon presentation of a paper looking at HWU 001, 003.1 and 003.2 to the Theme team working group.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>Additional manpower resource – more frequent meter reading resource will be required for smaller meters &lt;£4000 pa. Extra resource required to present data and carry out frequent investigations on site.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>Key success factors – Option appraisal complete, analysis complete BMS and M&amp;T modifications Complete.</li> <li>Principal risks: technical Time to connect up extra meters to the BMS. Time to reorganise BMS Meter readings and export data to M&amp;T package. Financial – high competition for scarce financial resources. Building down time and disruption to operations during meter installation.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>Delivery of system – system operational and delivering required information.</li> <li>Weekly analysis of data. Weekly reports to energy users.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>Milestones / key dates e.g. <ul style="list-style-type: none"> <li>start date TBC</li> <li>completion date</li> <li>Interim deliverable / decision points – Option decision by the end of May 2009.</li> </ul> </li> </ul>
<b>Notes</b>	

<b>Project:</b>	<b>Automatic meter reading with advanced monitoring and targeting.</b>
<b>Reference:</b>	<b>Option 2 Full automated data collection and analysis</b> HWU003.2
<b>Owner (person)</b>	David Jack
<b>Department</b>	Estate Services
<b>Description</b>	<p>Install a fully automated data collection system to collect data from all utility supplies consuming over £4,000 pa. The system would replace the BMS system for collecting data, and the use of driving factor analysis of consumption, it is anticipated that a saving of 10% will be achieved. To achieve this, the University would have to:</p> <p>Replace existing meters which do not have a pulse or similar output. Invest in a new dedicated automated meter reading system Invest in new software to collect and manage the data. Allocate sufficient resources to read the remaining meters every week and to analyse the data (estimated at 4 hours per week).</p>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £ 212,000</li> <li>• Payback period: 1.15 years</li> <li>• CO<sub>2</sub> Emissions reduction: 1754 tonnes of CO<sub>2</sub></li> <li>• 180% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £250,000 +VAT</li> <li>• Operational costs, No extra operational cost.</li> <li>• Source of funding: initially internal funding from Theme team budgets.</li> <li>• Decision will be made upon presentation of a paper looking at HWU 001, 003.1 and 003.2 to the Theme team working group. Operational costs,</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Additional manpower resource – more frequent meter reading resource will be required for smaller meters &lt;£4000 pa. Extra resource required to present data and carry out frequent investigations on site.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors – complete option appraisal, allocate budget, produce consultant brief, tender for meter installation works and new software if required. Award contract. Start works.</li> <li>• Principal risks: Longer project – higher cost – more external involvement. Longer delay to see savings and carbon reductions.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Regular review of project to ensure progress remains on track. Carbon savings delayed until 2010 but may deliver more in the long run?</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: TBC</li> <li>○ completion date installation of systems December 2009</li> </ul> </li> </ul>
<b>Notes</b>	



<b>Project:</b>	<b>Develop formal Carbon Management / Energy Policy and Strategy</b>
<b>Reference:</b>	<i>HWU004.</i>
<b>Owner (person)</b>	<i>David Jack</i>
<b>Department</b>	<i>Estate Services</i>
<b>Description</b>	<i>A formal policy is needed to secure commitment at all levels and to provide the basis for an effective strategy. This should provide the guidance required when making strategic decisions affecting energy performance. It should also set out the targets for energy performance and assist in the regular review process. It should summarise the key messages in the Carbon Management Programme.</i>
<b>Benefits</b>	<i>No direct savings are included as it is the actions taken in implementing the policy that will secure any benefits.</i>
<b>Funding</b>	<ul style="list-style-type: none"> <li><i>No direct funding is required to formulate the policy.</i></li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li><i>No additional resources required.</i></li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li><i>Principal risks: None. The recommended measures will in fact reduce the risks of managing energy costs.</i></li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li><i>Sign off by Senior Management Team, Publication on Estates Website</i></li> <li><i>When success will be measured / evaluated</i></li> </ul>
<b>Timing</b>	<i>Prepare Carbon Management and Energy policy document for endorsement by Infrastructure Board and PME by May 2009</i>
<b>Notes</b>	



<b>Project:</b>	<b>Carbon Management /Energy Awareness Campaign</b>
<b>Reference:</b>	HWU005
<b>Owner (person)</b>	David Jack
<b>Department</b>	Estate Services
<b>Description</b>	All staff and students have a direct influence on energy use. Awareness must therefore be spread beyond the central estates staff to involve all building users. This means academic staff, students and even contractors or visitors.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>Financial savings: £45,000</li> <li>Payback period: 0.3 years</li> <li>CO<sub>2</sub> Emissions reduction: 250 tonnes of CO<sub>2</sub></li> <li>26% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>Project cost, £10,000</li> <li>Operational costs</li> <li>Source of funding: internal estates and training budgets.</li> <li>Budget decision will be made at planning round stage if funded by estates or at infrastructure board if extra funding required from university staff training budget.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>Additional resource of trainer may be required depending upon delivery model. Face to face or web based. HR input required.</li> <li>Full / Part time resource £30,000 if required.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>Training must be made mandatory at induction / freshers' and annual refresh. Work with student association and student welfare to deliver during freshers'.</li> <li>Principal risks: technical – suitably qualified and experienced trainer required.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>Metrics for displaying performance or achievement – Records of attendance. % coverage.</li> <li>When success will be measured / evaluated – Apparent behaviour change. Questionnaire to determine knowledge / awareness.</li> </ul>
<b>Timing</b>	<p>Milestones / key dates</p> <p>Freshers' delivery by August 2009.</p> <p>Staff Induction by August 2009.</p>
<b>Notes</b>	

<b>Project:</b>	<b>Roof replacement and insulation</b>
<b>Reference:</b>	HWU006
<b>Owner (person)</b>	Stuart King – Building Officer
<b>Department</b>	Estate Services
<b>Description</b>	<p>Over clad existing roof structure with extra insulation and welded waterproof membrane as part of built fabric capital maintenance programme.</p> <p>William Perkin Spur – 625m<sup>2</sup> - £45,000  David Brewster Spur – 600m<sup>2</sup> - £46,800  Tom Patten Roof – 350m<sup>2</sup> - £26,200  Jim Brown Roof – 540m<sup>2</sup> - £26,000  Ecotherm Polyurethane Rigid Foam – 2400x 1200x70mm – 3.043m<sup>2</sup>K/W</p> <p>Roofs required to be made water tight. Opportunity taken to add extra insulation. Roof safety was a limiting factor in increasing the depth of the insulation.</p>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £4000</li> <li>• Payback period: years</li> <li>• CO<sub>2</sub> Emissions reduction: 15 tonnes of CO<sub>2</sub></li> <li>• 2% of target.</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, as above.</li> <li>• Operational costs, e.g. annual maintenance or running costs</li> <li>• Source of funding: internal estates capital maintenance budget 2008/2009</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Ensuring Success</b>	Project complete
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Monitor pre and post installation gas consumption for buildings. Buildings is not metered separately so some averaging may distort the results. Thermographic survey can be conducted to determine areas of continued heat loss.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ Projects complete</li> </ul> </li> </ul>
<b>Notes</b>	Annual CO <sub>2</sub> comparisons.



<b>Project:</b>	<b>Roof replacement and insulation – Hugh Nisbet James Watt</b>
<b>Reference:</b>	HWU007
<b>Owner (person)</b>	Stuart King – Building Officer – Andrew Isherwood Consultant
<b>Department</b>	Estate Services
<b>Description</b>	James Watt - Over clad existing roof structure with extra insulation and new cladding profile. Hugh Nisbet 1250m2 - Over clad existing roof structure with extra insulation and welded waterproof membrane as part of built fabric capital maintenance programme.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £2000</li> <li>• Payback period: years</li> <li>• CO<sub>2</sub> Emissions reduction: 7.2 tonnes of CO<sub>2</sub></li> <li>• 1% of Target.</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• James Watt Project cost £279K Tender exercise required. Hugh Nisbet Awaiting Tender costs.</li> <li>• Source of funding: internal Capital Maintenance Budget.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Approved contractor will deliver project.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors – Adequate funding &amp; water tight roofs.</li> <li>• Principal risks: Roofs continue to leak – No CO<sub>2</sub> is saved.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Monitor pre and post installation gas consumption for building. Building is not metered separately so some averaging may distort the results. Thermographic survey can be conducted to determine areas of continued heat loss.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date/ completion date TBC</li> </ul> </li> </ul>
<b>Notes</b>	



<b>Project:</b>	<b>Boiler, Heating Control and Hot Water Plant replacement Programme – Jim Brown</b>
<b>Reference:</b>	HWU008
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of standard modular boilers and associated plant and controls with high efficiency condensing boilers and associated equipment and controls. Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £ 6400</li> <li>• Payback period: 5 years estimated</li> <li>• CO<sub>2</sub> Emissions reduction: 60 tonnes of CO<sub>2</sub></li> <li>• 6% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £104,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: completion date TBC 2009/10</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.



<b>Project:</b>	<b>Boiler Heating Control and Hot Water Plant replacement Programme – John Coulson</b>
<b>Reference:</b>	HWU009
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of standard modular boilers and associated plant and controls (55% efficient) with high efficiency condensing boilers and associated equipment and controls (85% efficient). Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £ 4900</li> <li>• Payback period: up to 7 years</li> <li>• CO<sub>2</sub> Emissions reduction: 45 tonnes of CO<sub>2</sub></li> <li>• 5% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £120,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: completion date TBC 2009/10</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.

<b>Project:</b>	<b>Boiler Heating Control and Hot Water Plant replacement Programme – Leonard Horner</b>
<b>Reference:</b>	HWU010
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of standard modular boilers and associated plant and controls with high efficiency condensing boilers and associated equipment and controls. Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £26,000]</li> <li>• Payback period: Up to 7 years</li> <li>• CO<sub>2</sub> Emissions reduction: 210 tonnes of CO<sub>2</sub></li> <li>• 22% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £150,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: completion date TBC 2009/10</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.

<b>Project:</b>	<b>Boiler Heating Control and Hot Water Plant replacement Programme – Sports Centre</b>
<b>Reference:</b>	HWU011
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of standard modular boilers and associated plant and controls with high efficiency condensing boilers and associated equipment and controls. Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £10,500</li> <li>• Payback period: Up to 7 years</li> <li>• CO<sub>2</sub> Emissions reduction: 95 tonnes of CO<sub>2</sub></li> <li>• 10% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £146,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: completion date TBC 2009/10</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.



<b>Project:</b>	<b>Boiler Heating Control and Hot Water Plant replacement Programme – David Brewster</b>
<b>Reference:</b>	HWU012
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of standard modular boilers and associated plant and controls with high efficiency condensing boilers and associated equipment and controls. Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £ 28,500</li> <li>• Payback period: Up to 10 years</li> <li>• CO<sub>2</sub> Emissions reduction: 270 tonnes of CO<sub>2</sub></li> <li>• 28% of target</li> <li>• Match heat supply to demand.</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £180,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date: completion date TBC 2009/10</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.

<b>Project:</b>	<b>Boiler Heating Control and Hot Water Plant replacement Programme – Cameron Smail – Library Refurb</b>
<b>Reference:</b>	HWU013
<b>Owner (person)</b>	Alison Sheppard - Building Services Engineer / Manager
<b>Department</b>	Estate Services
<b>Description</b>	Replacement of Downgraded Cochran MTHW standard boilers and associated plant and controls with high efficiency condensing boilers and associated equipment and controls. Replacement of high volume hot water storage with plate heat exchangers and on demand systems. Adjustment of time clocks and temperature controls.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Financial savings: £25,600</li> <li>• Payback period: Up to 10 years depending on plant.</li> <li>• CO<sub>2</sub> Emissions reduction: 120 tonnes of CO<sub>2</sub></li> <li>• 12% of target</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Project cost, £250,000</li> <li>• Operational costs, Revenue costs are expected to decrease from current due to less intensive maintenance and repair requirements.</li> <li>• Source of funding: internal Capital Maintenance Budget</li> <li>• Budget allocated – works will begin when contractor is selected.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Contractor will provide service.</li> </ul>
<b>Ensuring Success</b>	<ul style="list-style-type: none"> <li>• Key success factors, Retain consultant, produce specification, tender contract, award contract, carry out works.</li> <li>• Principal risks: technical ensure that ensure that carbon / energy efficiency remains paramount in the specification and installation. Ensure that budget is not diminished significantly.</li> </ul>
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>• Analysis of gas consumption before and after installation. Consumption will be lower post installation.</li> </ul>
<b>Timing</b>	<ul style="list-style-type: none"> <li>• Milestones / key dates e.g. <ul style="list-style-type: none"> <li>○ start date/ completion date TBC 2010 to 2012</li> </ul> </li> <li>• Retain consultant, produce specification, tender contract, award contract, carry out works.</li> </ul>
<b>Notes</b>	Boiler replacement required due to age and condition.

<b>Project:</b>	<b>Sustainable IT – Server rationalisation Trial / Feasibility Phase 1</b>
<b>Reference:</b>	HWU014
<b>Owner (person)</b>	Andrew Aitken – Steven Salvini
<b>Department</b>	UICS / SBE
<b>Description</b>	<p>As part of the planning for Phase 2, a full financial model will be developed in Phase 1 showing how investment in virtualisation technologies will lead to significant savings far outweighing the requirement for initial pump-priming.</p> <ul style="list-style-type: none"> <li>Based on figures obtained from Sheffield Hallam University’s JISC award-winning virtualisation implementation in June 2007, capital costs can potentially be reduced by 40% while running costs could be reduced by as much as 85% with ROI periods as short as 6-12 months.</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>Benefits will arise in Phase 2 of the project.</li> <li>Budget allocated for Feasibility phase only.</li> </ul>
<b>Funding</b>	<p><b>Phase 1 (to October 2009)</b></p> <p>It is difficult to determine actual finite costs at this stage without further stakeholder engagement and investigation of potential solutions, however, for this initial pilot implementation, a maximum of <b>£60K</b> (range £40 – 60k) will be required to satisfy deliverable 1 in section 4 above. This is split approximately as follows (subject to final design):</p> <ul style="list-style-type: none"> <li>£10K – virtualisation infrastructure software</li> <li>£20K – 4 x Dual quad-core CPU, 64GB RAM</li> <li>£20K – 2 x 5TB iSCSI replicated SANs</li> <li>£ 5k – training courses</li> <li>£ 5k – power monitoring kit</li> <li>£ 0k – development of training package for users (will use existing web site)</li> </ul> <p>No additional HR resources required.</p> <p><b>The allocation of funding requested in FY 2008/09 is thus £40-60k of capital funding with £6 - 10k recurrent for maintenance and support with no additional HR resources required.</b></p>
<b>Resources</b>	<ul style="list-style-type: none"> <li>Refer to UICS Specifications.</li> </ul>
<b>Ensuring Success</b>	As part of the planning for Phase 2, a full financial model will be developed in Phase 1 showing how investment in virtualisation technologies will lead to significant savings far outweighing the requirement for initial pump-priming.
<b>Measuring Success</b>	<ul style="list-style-type: none"> <li>Reduced electrical loading at University and UICS levels.</li> </ul>
<b>Timing</b>	<p><b>Phase 1 (until Oct 2009)</b></p> <ul style="list-style-type: none"> <li>Setup up of “Proof of Concept” (PoC) deployment run jointly between UICS and SBE to demonstrate the effectiveness of the proposed architecture and the additional facilities provided as a by-product (such as improved Disaster Recovery)</li> <li>Investigate potential for virtualisation of desktop provision</li> <li>Plan implementation for consideration in phase 2 &amp; 3</li> </ul>
<b>Notes</b>	Full Project Brief available.

