

CPB Request Report

Business Case title	Essential Upgrades to Building Energy Management Systems
Submission date	17/03/2020
Date of CPB Meeting	
Prior Submissions	<p>First Submission request.</p> <p>Proposal to re-allocate funding, which was previously approved for energy efficiency works, primarily from funds agreed at CIPB 9th May 2018 for a combined heat and power unit at Wills Hall.</p>
Business case owner (and author)	John Brenton, Martin Wiles
Type of Submission including amount requested from CPB if funding required)	<p>Request to re-purpose circa £900k from previously agreed carbon management funding (for example L100011-101 but also L114371-101) to purchase fit-for-purpose Building Energy Management System (BEMS). The current BEMS has been a single point of failure, leading to emergency building shut-down. There is therefore an on-going and immediate issue with catastrophic risk of failure. Funding a replacement BEMS will:</p> <ol style="list-style-type: none"> 1. Prevent catastrophic failure 2. Provide improved data collection and space utilisation reporting, where we currently have significant paucity of data 3. Facilitate future utilities savings 4. Improve service resilience
Brief Outline of Project With Strategic Objectives	<p>Essential upgrades to our Building Energy Management System (BEMS) in order to:</p> <ul style="list-style-type: none"> - Replace a time-expired system prone to failure - Improve the resilience of the systems that the BEMS runs, which include ASU's - Allow energy savings by using advanced control available on upgrade to ensure that spaces are not simultaneously heated and cooled, or serviced unnecessarily out of hours. - Allow us to report on the occupancy of spaces served by the BEMS which have occupancy sensors
Benefits expected	<ul style="list-style-type: none"> - Reduce risk of failure of key systems and activities - Facilitation of faster reductions in Utility spend - Resilience improvements at some of our most sensitive sites - Information on the occupancy of spaces - Easier deployment of smart campus aspirations
How does this project fit in with or help to deliver the University Strategy?	This is key to the Sustainability strand of the University Plan, but also supports resilience, and staff and student experience as well as building a more reliable and informative data-set for future planning/ space utilisation and reporting
Dependency Projects? (if any)	This will enable us to get best value from all future building energy projects
Constraints (if any)	There will need to be a fast procurement process to derive greatest savings and reduce risk early.
Change Management impact	None
Anticipated start date	Procurement would start immediately with spend occurring in 2020-1
Anticipated end date	31 st July 2021

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Authorisation

Appropriate authoriser (DVC, Dean, Registrar, CFO, COO)	
Name, contact details and signature of contact in Estates Office	
PVC Education approval	
PVC Research approval	

Upgrade to Building Energy Management System

We request that capital funding previously agreed for energy efficiency measures is instead spent on upgrading our Building Energy Management System to aid utility spend reductions, improve resilience and reduce risk of catastrophic failure at sensitive sites.

An additional benefit would be ability to use lighting sensors to detect space occupancy levels and thus derive greater value from under-occupied areas of the Estate. It will in addition build more reliable data sets for future planning where there is currently a paucity of reliable data.

Background

To upgrade our Building Energy Management System using funds previously agreed as part of the Carbon Management Plan. This will:

- Address some serious risks to our ability to maintain environments at some of our most sensitive sites, including ASU's. Some of these sites have critical control systems which are currently running on unsupported Windows XP;
- Enable analytical work to reduce competition between systems (e.g. prevent simultaneous heating and cooling);
- Ensure heating, cooling and lighting services are provided only when needed;
- By reducing the hours run per day of equipment such as pumps and fans, to extend the life of that equipment;
- Allow data on occupancy to be gathered from sites with networked occupancy sensors, which can be used to optimise the use of space
- Provide resilience to critical control systems;
- Provide far deeper, more frequent metering data to help understand and control costs better
- Enable us to realise our aspirations for a smart campus

In many ways, the BEMS upgrade is foundational to fulfilling our aspirations for many of the issues we seek to address such as space optimisation, reducing carbon and reducing revenue costs per square metre. Further, it has the potential to reduce the Please return form to (grp-CapitalAppraisal@groups.bristol.ac.uk) at least 10 days before meeting date

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need for additional capital spend on space and equipment, by helping to ensure it is appropriately sized. It is key to the University understanding its Estate.

This now represents the best value option for the University on the next investment in our energy infrastructure. The bulk, and maybe all, of the cost can be met from a previously agreed (at CIPB 9th May 2018) amount of £900k allocated for a Combined Heat and Power (CHP¹) unit at Wills Hall. This would have had a payback of 6.5 years, and was made available under budget L100011-101.

CHP works best at sites with large heat demands. Deeper investigations revealed logistical barriers to implementing this due to the heritage nature of the site. Also, market and policy changes now make CHP a less compelling proposition than previously. We plan works to reduce energy consumption by less invasive means such as insulation and control at Wills.

Cost

The cost of the system, for an integration platform, remedials to critical alarms and replacement of the time expired Satchwell system, is estimated to be between £850k and £1250k.

Our cost estimates are derived from a 'first pass' rough order of costs and we believe the upper figure represents a maximum spend and includes a contingency.

We have asked our incumbent BEMS maintenance provider (Kendra) to refine the costs. However, at the deadline for this paper, they had not yet been received

We are giving the price as a minimum-maximum interval, as we feel that that is more transparent than attempting to give a single price at this stage. However, the increasing urgency of the situation, if we wish to avoid catastrophic failures and build a foundation for early savings, has compelled us to make the request despite some uncertainty in the figure.

Our BMS estate is complex and unique, so cost certainty is difficult whatever procurement route we take.

Our request is that the first £900k will be reallocated from within the carbon management plan budget L100011-101, originally allocated for CHP at Wills Hall. If more than this is required the difference (potentially up to £350k) could be met by further re-allocation from L114371-101, from our multi-year Lighting project or by topping-up from other budgets e.g. relevant IT budgets. Implementation will be project-managed by Hard FM. Reallocation from the Lighting budget would be appropriate as a new BEMS will enable us to derive more value from the lighting when it is installed, by using lighting sensors to measure occupancy, supporting our space strategy. £1.4m remains in this budget.

The availability of unspent funds in these carbon management plan budgets has been confirmed in meetings with Emma Clarke.

¹ CHP is highly efficient generation system that captures the heat created through the electricity generation process, producing heat and power simultaneously
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Savings

Although the system will not reduce costs of itself, it will enable substantial savings, for example in reducing out of hours electricity spend. Saving even a few percent of our £7.3m annual electricity spend and £2m gas spend releases significant amounts.

A new, robust system will allow staff time to be spend more effectively on looking for savings rather than addressing BEMS failures. This is currently a significant diversion of resource. By freeing up time and improving diagnosis, a BEMS upgrade will allow us to do work of the following type, which has been accomplished in the current financial year, in greater volume and depth:

- Pearson Building BEMS changes: £24k a year saving
- Contractual and BEMS changes to allow Richmond CHP to run continuously: £14k a year saving
- Barn One - BEMS changes to reflect occupancy £32k a year
- Beacon House - BEMS changes - early indications of 10-15% savings £15k a year?

The potential avoided cost of catastrophic failure at ASUs in financial, but also reputational terms is not easy to overstate.

Better understanding of our space usage could avoid the acquisition, or allow the disposal of, several thousand square metres of space.

Better control will help us to manage the limited electrical capacity we have at the Precinct as demand from new activities and buildings grows.

Risk of Inaction

Our current BEMS system relies on components that are unsupported and unrepairable and recent failures have put at risk an ASU unit, and MRI scanner and has resulted in the temporary closure of buildings. These pose significant risks to the University.

Request

We believe there is a compelling resilience and financial case for upgrading our BEMS at this time, which will be of greater benefit to the University than installing a new CHP at Wills Hall or doing nothing.

Recommendation

For CPB to approve the reallocation of the agreed carbon management funding for a BEMS upgrade to cover all costs OR with the addition of top-up from the relevant IT budget.

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