

### An introduction to Building Energy Management Systems

Building Energy Management Systems (BEMS) provide the central point of control for the operation of building services throughout an estate. To a major extent, BEMS are used to control heating, ventilation and air conditioning, but can be extended to include all building support services. They also provide a way to monitor and rapidly adjust equipment, improving the reliability and performance of buildings and delivering substantial savings.

BEMS enables the optimisation of performance and savings in excess of **10%** can be easily realised in total building energy consumption and carbon footprint with proactive management and continuous improvement. In addition, the financial savings from reduced maintenance costs and improved plant longevity are often even more substantial than the energy efficiency gains.

The installation and expansion of building control systems represents a financially attractive opportunity that is generally compliant with the Salix investment criteria. Salix encourage clients to think comprehensively about control systems and ensure that all opportunities are considered prior to investment. For example, aspects such as incorporating:

- variable speed controls,
- insulation,
- CO2 sensing, or
- improved heating zones

may all be additional features that need to be installed or added to the existing building controls to fully optimise savings.

In these challenging fiscal times the opportunity to reinvigorate controls/BEMS represents a key technology to deliver fast-track savings usually with very attractive payback period. The development of BEMS also supports the value of AMR, with the BEMS enabling investigation of AMR identified saving opportunities.

### Salix - BEMS Investment Eligible for Funding

BEMS are a technology with great potential for Salix investment. But projects do require careful consideration in order to ensure their eligibility. Projects must be an installation or upgrade (physical or software) which will directly enable savings to be made i.e. switching equipment off, slowing equipment down.

For example:

- Installation of an entirely new BEMS system
- Software upgrades
- Addition of sensors and/or controls to an existing BEMS system

Examples of other projects linked to BEMS which would not be eligible for Salix funding include\*:

- Monitoring and Targeting systems and equipment
- Consultancy reports/surveys
- Re-commissioning /programme changes

While these may lead to reasonable energy savings, they would involve no capital investment or do not directly enable savings to be made and therefore cannot be funded by Salix.

\* There may, however, be opportunities for Recycling Fund clients to utilise their accrued Management Charge to invest in these projects.

### Client Case Study - University of Exeter

The Highton library covers an area of over 2000m<sup>2</sup>; it dates from the late 19th century and is one of seven libraries over three campuses.

It was refurbished over the summer of 2009, and alongside this project the heating controls were replaced with the Schneider Sigma BEMS.



The project was funded via Salix and included replacement of time clocks and compensator controls with BEMS. The existing gas fired boilers, hot water, heating to the library and other external buildings are connected to the BEMS system. The project completion was delayed until summer 2010 and from the point of completion 36% per annum less gas has been used; a saving of £9,300 and 81 tonnes of CO<sub>2</sub> per annum has been achieved for an investment of £9,000.

The building is heated to 21°C, with features such as optimum start/stop, economy off, boiler sequencing, compensated heating, frost & low temperature fabric protection, and the BEMS is accessed remotely via the University IT network.

*Steve Newberry, BEMS Control Engineer (University of Exeter)*

### Briar Associates - Identifying Opportunities and Estimating Savings from BEMS Installations

Irrespective of building construction and services type, a well controlled building should achieve reasonable standards of energy performance. As a quick estimate of savings potential, comparing building performance to the Carbon Trust benchmarks or your Display Energy Certificate can give a pragmatic estimate of the carbon and financial savings potential. We consider that the majority of buildings with good control can at least achieve a 'D' rated DEC certificate or 100 Operational Rating and hence any variance from this will be a quick estimate of savings.

In terms of utilising Salix funding for BEMS projects, we recommend undertaking a survey of the building services to evaluate the opportunities for savings. This creates a list of prioritised issues and savings, such as:

- Optimised Heating times
- Variable Temperature Compensation
- Operational times for peripheral plant (such as AHUs)
- Variable speed drive control strategies
- Zone control strategies
- Improved temperature control

For each issue the savings for both natural gas and electricity should be estimated from the reduced running time, reduced load to a motor via variable speed, or improved temperature control (on the basis that 1°C represents a 10% reduction in heating bill). Whilst this will require assumptions and estimates, the breaking down of the control features to individual functions will allow a good understanding of where the major savings will be delivered and enable justification of the Building Energy Management System on energy, financial and carbon grounds.



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- Specialists in optimising existing BEMS to deliver fast track savings
- Design and project management BEMS & Salix Projects



In September 2011, Salix and Briar Associates held a series of BEMS workshops. Through an open invitation to all members of the ESTA control group, Trend and Schneider offered to participate in these workshops. They presented to attendees and lent their considerable experience in the field of BEMS to the events.



Trend are the market leading Building Energy Management System (BEMS) manufacturer in the UK. The Trend BEMS system has proved to be a highly cost-effective way for Universities and Local Authorities to cut their energy consumption using equipment they already own, frequently reducing energy costs by more than 25% with proven payback periods of 1- 4 years for upgrading and improving systems. This can be achieved through Trend energy audits and site survey recommendations. Trend provide detailed specifications with payback calculations and through our route of approved Trend Partners can deliver a competitive project solution.

If you require any further assistance with this process please contact Mark Glitherow ([mark.glitherow@trendcontrols.com](mailto:mark.glitherow@trendcontrols.com)) or call 07885 296063



BEMS optimisation is important to reflect building changes and improve energy management and control of the building. Having the right technology and knowing how to apply it are crucial for achieving energy efficiency.

By installing modern systems, you can cut energy costs dramatically, and improve your asset value and profitability.

As the Global Specialist in Energy Management Schneider Electric offers a range of technology and services to help you reduce your energy usage and plan for the future. Our Building Energy Management Systems (BEMS) save energy through automation and control, subsequently improving productivity by creating a comfortable working environment.

Our integrated systems and comprehensive solutions reduce both capital and operational expenses to provide real business value and help you, make the most of your energy.

For more information regarding our solutions please call 0870 608 8608 or visit [www.schneider-electric.com/uk](http://www.schneider-electric.com/uk)

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Briar Associates are a Partnership of Chartered Energy Engineers established in 1989. They have worked throughout the Public Sector improving the performance of BEMS and have a wealth of experience designing and project managing control solutions.