

# HEALTHCARE ENERGY MANAGEMENT

The fast-track guide to using a Building Energy Management System (BEMS) in healthcare environments



TREND

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## The fast-track guide to using a Building Energy Management System (BEMS) in healthcare environments.

The healthcare sector is transforming. In the UK, the NHS faces pressure to improve quality of service and commit to meeting environmental targets. Consequently, there's a growing need for solutions that can strike the right balance between energy management and patient care.

One strategy to consider is a BEMS. A BEMS is an automated solution designed to enable greater visibility and control of a building's energy consumption. By aligning your building's HVAC systems with occupant use, a BEMS offers a convenient and cost-effective aid for driving energy management goals and supporting a better built environment for patients, staff and visitors.

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Anästhesie / Intensivmedizin  
Schmerztherapie



**CHIRURGISCHE AMBULANZ**  
ABTEILUNG FÜR ALLGEMEIN-, VISCERAL- UND UNFALLCHIRURGIE

Anmeldung Chirurgische Ambulanz



Treppenhaus

ABER

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Inkretion!  
Bitte  
stand halten.  
Danke!

Signage  
Anmeldung Chirurgische Ambulanz  
Abgabe  
Entlassung  
Beschwerden

# INTRODUCTION

The NHS is under pressure to invest in modern technology and deliver a more efficient level of service.

Meanwhile, healthcare organisations are increasingly looking for ways to streamline operations.

Healthcare building managers must now take steps to manage energy as much as possible.

This resource guide shows how using a Building Energy Management System, or BEMS, can assist in this task.

## SHRINKING HEALTHCARE'S CARBON FOOTPRINT

According to the British Medical Association, the NHS, as the country's largest public sector organisation, contributes around 4-5% of total UK carbon emissions. The NHS in England alone accounts for 40% of the public sector's emissions.<sup>1</sup>

Although the NHS has made progress towards its decarbonisation plans, with initiatives being implemented locally and nationally, more support is needed.



In October 2020, the NHS committed to reaching carbon net zero with an ambitious aim to become **the world's first net zero national health service**.

On 1 July 2022, the NHS became the first health system to embed its net zero plans into legislation, through the **Health and Care Act 2022**.

1. British Medical Association.  
"More Support Needed to Help the NHS Reach Net Zero." BMA. Last modified 14 October 2020.  
<https://www.bma.org.uk/what-we-do/population-health/protecting-people-fromthreats-to-health/more-support-needed-to-helpthe-nhs-reach-net-zero>.

# STRIDES IN ENERGY MANAGEMENT

## How can technology help healthcare facilities manage energy?

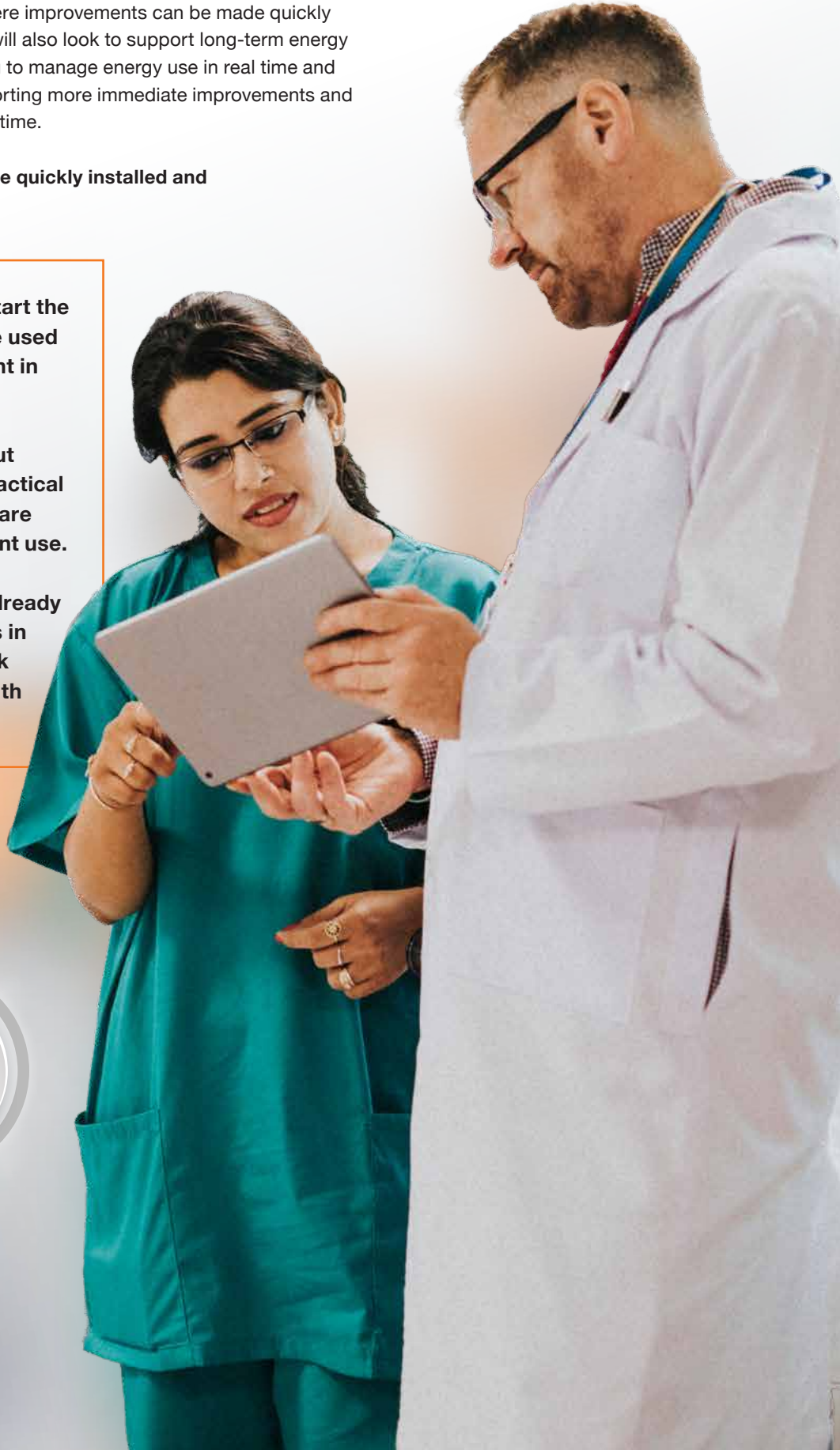
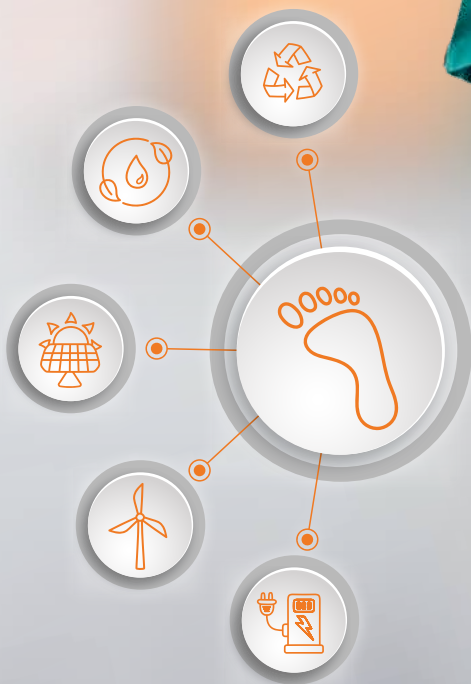
Typically, the focus will be on areas where improvements can be made quickly and easily. However, the right solution will also look to support long-term energy management goals. A BEMS allows you to manage energy use in real time and digitise manual tasks proactively, supporting more immediate improvements and helping to slash engineering effort over time.

**In any case, A BEMS is designed to be quickly installed and easily maintained.**

**A BEMS is ready 24/7 to kickstart the data-led insights which can be used to improve energy management in buildings.**

**With actionable feedback about your facilities, you can take practical steps to optimise your healthcare environment based on occupant use.**

**As most healthcare facilities already have traditional HVAC systems in place, a BEMS offers a low-risk installation or upgrade path with minimal disruption.**



# BEMS BASICS

## What is a Building Energy Management System (BEMS)?

Designed for site-wide energy management, a BEMS enables users to monitor, control and automate building services such as heating, ventilation and air conditioning, supporting higher levels of efficiency and economy.

By constantly tracking occupancy levels and climate parameters, a BEMS supports an optimum balance between environmental conditions, energy usage and operating requirements.

### KEY COMPONENTS OF A BEMS:



#### CONTROLLERS

Microcomputer controllers receive signals from field devices. Based on their settings, controllers can be programmed to prioritise control of plant equipment.



#### SUPERVISORS

Supervisors are user interfaces that can be used to view or amend system data as well as provide a wide range of energy analysis and maintenance functions.



#### NETWORKS

Networks allow devices to communicate locally, remotely or across a wide area network (WAN). They can be accessed from a visual dashboard or mobile device to facilitate remote building management.



#### FIELD DEVICES

Field devices like sensors can process and transmit critical building data directly to controllers. When you can measure the power demand of each device, you can optimise the entire system.

## Set the BEMS for max effectiveness.



A BEMS can function as an energy monitoring and targeting (M&T) system. Energy M&T is a technique based on the idea that you can't manage what you can't measure.

The goal of energy M&T is to provide feedback on operating practices and guidance on expected energy use in a certain period. This involves analysing field data and results from energy management projects to identify excess energy use, and taking appropriate actions to improve performance.

Employing a BEMS in your healthcare environment could effectively keep you informed and in control of building services. Moreover, you can set the BEMS to alleviate areas of concern based on your priorities, including:

- Maintaining indoor air quality, temperatures, humidity and lighting levels in high dependency and critical areas
- Monitoring, logging and reporting data about environmental conditions
- Tracking and adjusting hot and cold water services to help reduce the risk of Legionella bacteria
- Complying with environmental, social and governance standards, building regulations and legislation
- Digitising building services and maintenance regimes through remote connectivity
- Virtualising data to assess energy consumption trends, specific areas of energy waste and inadequate space utilisation



# YOUR BUILDING'S ENERGY PERFORMANCE

## Where to focus for better energy management?

Incorrect settings, such as temperature setpoints, are a common problem. Settings are frequently altered and not always restored to their original values. This often leads to unnecessary energy use.

Poor energy management can occur when parts of a system are manually overridden but not returned to automatic settings, which can and does happen, even to the extent of control linkages being permanently disconnected.

**In intermittently occupied rooms, occupation hours may be extended or reduced as needed.**

**Often, no record is made to facilitate a return to normal settings during unoccupied hours.**



Most buildings undergo change. The use of a particular area could be altered, for example, or floors repartitioned. Such changes will generally require system reoptimisation.

Failing to optimise systems regularly may lead to heating or cooling of unoccupied areas, rooms being overheated and sensors being wrongly positioned – all of which can lead to suboptimal consequences.

Inefficient provision of maintenance regimes is another common reason for decreasing system performance.

Components such as sensors, valves and actuators can go out of calibration, resulting in reduced control accuracy and possible energy waste.



# ENABLE GREATER CONTROL

## FOUR ESSENTIAL STEPS

### STEP 1 – REVIEW

A BEMS energy audit is a critical first step that reviews existing controls for building services and identifies opportunities where improvements can be made. Generally, an energy audit includes a set of common control criteria:

- Heating and cooling operating at the same time
- Inappropriate temperature and humidity setpoints
- Demand led control strategies missing
- Heating and cooling control loops in need of tuning
- Heating and cooling dead bands not set up correctly
- Sensors in inappropriate positions
- Sensors not calibrated correctly
- Incorrect time scheduling of plant
- Lack of optimum start and stop routines

A site survey is also useful to identify potential improvements that can be made through simple adjustments of BEMS settings or by adding individual components like variable speed drives on the air handling plant.

From the energy audit and site survey, a report can be generated to outline any issues and provide guidance to improve decision making.

### BEMS BEST PRACTICE EXAMPLE 1

A BEMS energy audit was carried out at Sidmouth Hospital in Devon.

During the engineer's time on site, improvements to the BEMS settings were made, which included changing heating times in intermittently occupied areas from 24 hours a day to only between 06:00 and 22:00, and by reducing heating setpoints to 21°C.





## STEP 2 – MONITOR

The next step is to monitor energy consumption with a goal to highlight any tendency for system performance to decline. Software tools are available to assist in this task, one example being Trend's IQ™ENERGY.

IQENERGY is a versatile software platform designed to collate and present information in a range of visualisation and reporting formats. It can process data from energy and utility meters, sensors and field devices, comparing actual energy use to expected energy use. When the difference is too great, the BEMS generates instant and automatic alerts to notify users.

### BEMS BEST PRACTICE EXAMPLE 2

At Charing Cross Hospital, energy meters were installed in the main plant rooms, which are monitored by a Trend BEMS. The resulting data has helped users identify and eliminate energy wastage without causing disruption to patients, staff and visitors.

The hospital operates 24/7, but some offices are not used overnight. The BEMS provides a graphical interface for facility managers to see which HVAC systems are running when they should be switched off.

Using the BEMS, facility managers examined all building areas and matched heating times with periods of occupation.



## STEP 3 – MAINTAIN

After monitoring, maintenance serves to diagnose and resolve causes of energy overuse. For this purpose, a web-based performance tool can assess the BEMS, its control loops and sensors.

These tools can also highlight events such as valves becoming stuck open, controls being manually overridden and other potential sources of energy waste.

Digital maintenance allows a problem to be identified, diagnosed and rectified until a full repair is possible.

### BEMS BEST PRACTICE EXAMPLE 3

Building technology has contributed to the energy management initiatives made by St James' Hospital, Portsmouth and 17 other NHS premises in the Hampshire area.

Progress has also been made through good housekeeping practices and investments in modern solutions, which included installing a Trend BEMS.

Notably, the BEMS has enabled greater monitoring and control of domestic hot water services.



## STEP 4 – DEMONSTRATE

With renewed focus on carbon emissions within NHS organisations, it has become vital to demonstrate how energy is being managed.

Healthcare building owners and users, therefore, demand accurate, timely data to show improvements in energy management control and resource efficiency.

By using a BEMS and applying best practices, NHS Trusts can visualise their efforts to balance performance and productivity against sustainability targets.

Furthermore, successful outcomes may provide valuable support in advocating sustainability initiatives to stakeholders and the local community.



# SUMMARY

**While the healthcare sector faces many challenges, cost-effective solutions are ready now to aid the optimisation of building services.**

Considering rising energy costs and mounting pressure to save resources, a BEMS plays an important role in helping healthcare leaders meet their energy management targets, suited to the changing needs of patients, staff and visitors.

### WANT TO LEARN MORE?

Visit Trend Control Systems' website to discover more **smart solutions designed to deliver healthier facilities.**

With a worldwide distribution and support network covering more than 50 countries, Trend Control Systems is a major international supplier of Building Energy Management Systems (BEMS).

Trend's BEMS are supplied, engineered and commissioned by approved systems integrators. Trend Control Systems is part of **Honeywell Building Technologies.**

By employing a BEMS to gather utility meter readings, NHS Trusts throughout the Hampshire area can present information to staff and stakeholders on large format displays, demonstrating a continually updated record of energy distribution and management.



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**For more information**

Please **contact your Trend consultant.**

Or visit **[trendcontrols.com](https://trendcontrols.com)**.

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