

# Sustainable Buildings

Designing sustainable buildings that balance energy efficiency, thermal comfort, lighting and acoustics can be challenging.

At the Centre we believe that integrated design is essential to a project's success and in achieving affordable solutions.



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## Design advice

The Centre is in a unique position to provide design advice and provide research into innovative solutions and leading edge building design.

- **Natural and artificial lighting simulations and calculations**  
Maximising daylight minimises the need for artificial light and reduces energy use. However, the levels of daylight need to be controlled to limit heating effects from solar gain in the summer. The Centre can model a range of scenarios enabling design teams to make informed decisions.
- **Climate change and buildings**  
As part of the PROMETHEUS Project the Centre has created a series of predicted future weather files based on Met Office data. These files can be used in conjunction with thermal modelling software to help design buildings that are more resilient to the anticipated effects of climate change.
- **BREEAM assessments**  
The Centre can undertake BREEAM assessments for educational buildings.
- **Acoustics**  
The Centre offers a full range of acoustic design advice and testing services. Visit our acoustics page for more information. [www.exeter.ac.uk/cee](http://www.exeter.ac.uk/cee)
- **Building thermal modelling**  
We provide a range of thermal modelling services aimed at reducing energy consumption, improving comfort for the occupants and demonstrating compliance with the building regulations.

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## Compliance and Performance Assessment

The Centre has over thirty years' experience in monitoring and predicting energy use in both new and existing buildings. A range of monitoring and assessment procedures are available to help with meeting targets and legislative requirements.

- **Building energy certification**  
The Centre can provide Display Energy Certificates (DECs) and level 5 Energy Performance Certificates (EPCs).
- **Reducing energy use in existing buildings**  
Effective energy management is one of the Centre's principle areas of expertise. A combination of monitoring and assessment services are available which can help clients identify and prevent excessive energy use, saving money and helping meet carbon reduction requirements.
- **Renewable energy**  
Renewables can raise awareness of energy issues, save money and reduce a building's carbon footprint. However, efficiency measures need to be undertaken at the same time and to achieve the best from any renewable energy installation, suitable technology must be chosen which is suitable for the site and matches the building's energy profile. The Centre can produce feasibility studies and option assessments to suit individual requirements.
- **Approved Document L compliance**  
Energy performance requirements are becoming more demanding and the Centre can help organisations to comply with Part L (Conservation of fuel and power) of the building regulations. Our services include thermal modelling with IES and SBEM, bespoke design guidance and compliance documentation.
- **Energy and carbon auditing**  
Energy and carbon auditing services provided by the Centre can assist organisations in accounting for and reducing the energy and carbon use associated with buildings. Detailed reports show where energy is being used and options for reducing consumption. A range of solutions may be given, with indications of the likely return on investment. These may entail simple interventions, management strategies or improvements to the building fabric including renewable energy installations.

# Case Study

## Energy Auditing in Cornish Schools

### Background

Cornwall Council has long been committed to reducing the carbon produced by its operations. More than half the county's carbon emissions are from buildings, and a large proportion of these emissions are from schools. Reducing the emissions associated with schools is therefore a key element of the carbon reduction strategy.

### Post Construction Review Programme

The Centre was commissioned to undertake a post-construction review of four new and refurbished Cornish schools to identify areas where carbon savings could be made. This involved a year long monitoring programme of temperatures, energy consumption and air quality to provide data on the different aspects of building performance.

### Results

The data collected from the schools was analysed and benchmarked against national expectations. Although most schools performed well, meeting or exceeding the benchmarks, a number of simple and cost effective changes were identified that promised substantial energy and carbon savings. In one school, the Centre calculated that the out-of-hours energy use could be halved resulting in an overall reduction in energy use of up to 36%. This was achieved by switching off computers, lighting and other non-essential electrical items during unoccupied hours.





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