A Review of Decarbonisation Standards For Buildings

There are many internationally recognised standards relating to the decarbonisation of buildings. This article is intended to help navigate through these to arrive at a structure and a Standard that can aid the decarbonisation of buildings and, once adopted, add value to your organisation.

Executive Summary & SSE Recommendation

Selecting one of the many building standards, such as BREEAM or NABERS alone, does not guarantee either decarbonisation or compliance with requirements such as Building Regulations or ESOS.

SSE recommends the adoption of ISO 50001, ideally externally certified, and the inclusion of ISO 52120 as part of the documented process. In addition to working towards Net Zero, it will help to reduce energy costs as well.

Introduction

Energy Sustainability Managers (ESMs) are increasingly being employed, like SHE and Quality Managers, to provide an independent assessment of an organisation's performance in these areas and a mechanism for reporting these unbiased audits to Senior Management. As net zero and decarbonisation measures are increasingly being scrutinised by shareholders and during M&A discussions, a robust decarbonisation strategy, independently audited, can affect the value and direction of such negotiations.

To conduct their work, and to provide an independent framework for external auditors, it is considered best practice to adopt an internationally recognised Standard for decarbonising buildings.

Building Standards

Standards such as BREEAM, LEEDS, NABERS and the like have been developed over time by different organisations with different aims and objectives. The most recent, a pilot Standard called the UK Net Carbon Building Standard was released on 22nd September 2024 and so its impact has yet to be seen.

There are different advantages and disadvantages to each and Appendix I describes these. The main perceived disadvantages of such Standards are an increase in the initial cost of a building, and the potential to use them as "box-ticking" or "green-washing" exercises rather than an actual attempt to decarbonise.

ISO Standards

A longer-term and more effective approach, that is becoming increasingly popular, is the adoption of international ISO Standards that place an emphasis on audited continual improvement. Just as ISO 9001 requires an organisation to make continual quality improvements, so there is ISO50001 which improves energy use and decarbonisation. This makes it easy to integrate energy management into other efforts such as quality and SHE. Relevant ISO Standards are shown in Appendix II.

ISO 50001 Energy Management

This is an international standard for energy management systems (EnMS). It provides organisations with a framework to manage and improve their energy performance, including energy efficiency, energy use, and consumption. Many organisations and their shareholders have recognised that this Standard offers the best path to achieving and maintaining Net Zero.

Key Features

1 Systematic Energy Management

Provides a structured approach for organisations to integrate energy efficiency into their overall management practices.

2 Energy Performance Improvement

Helps organisations identify opportunities to reduce energy consumption and improve energy efficiency continuously.

sse Energy Solutions

3. Plan-Do-Check-Act Cycle

The standard follows the PDCA approach.

3.1 **Plan**: Establish an energy policy, objectives, targets, and action plans.

3.2. **Do**: Implement the energy management plans.

3.3. **Check**: Monitor and measure results, including energy performance and the effectiveness of the EnMS.

3.4. **Act**: Take actions to improve energy performance continuously.

Although it is possible to self-certificate, there is evidence that certification by external bodies increase energy and carbon savings by 60%

ISO 50001 is scalable to any size of organisation and is supported by a number of other ISO standards (See Appendix II) Of these, the most important is

ISO 52120 Energy performance of buildings — Contribution of building automation, controls and building management.

ISO 52120

This Standard is specifically designed to review BMS performance and strategy, and the influence it has on a building's energy consumption by comparing a building's BMS against the best practices as described in the Standard. It was created by the European (CEN TC 247) committee and has been independently verified by the Technical University of Dresden. Like the energy efficiency rating on your refrigerator, this standard divides BMS systems into efficiency classes, in this case from A to D.

Energy efficiency Class C is the baseline for buildings with a BMS. Buildings in which the BMS is not operating efficiently, or buildings without BMS, are rated as Class D and typically use 50% more energy than those with a Class C rating.

Extensive research has shown that moving from a simple time-based strategy (Class C) to a demand-led (Class A) strategy can result in significant energy and carbon reduction, depending on the building type.

Applying ISO 52120 as part of the overall strategy of ISO 50001 offers the best route for decarbonisation. This combined Standards approach has other advantages.

Energy Saving Opportunity Scheme (ESOS)

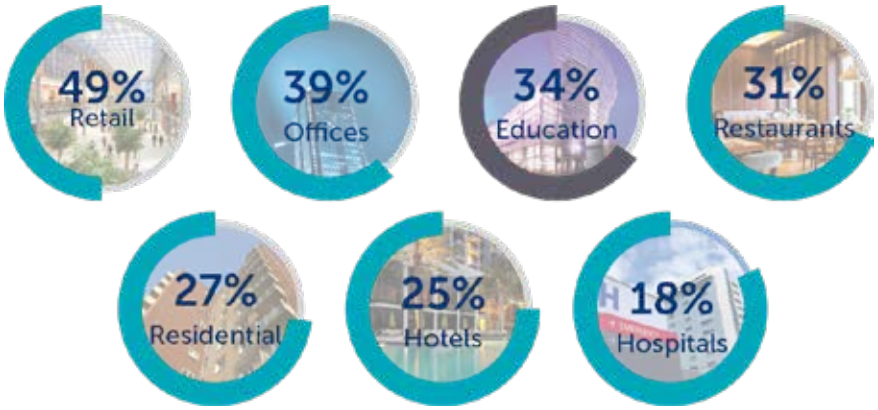
Administered by The Environment Agency, ESOS is a mandatory assessment of UK organisations that meet the qualification criteria:

- Employs 250 or more people, or
- Has an annual turnover of over £44m and an annual balance sheet total in excess of £38m, or
- Is an overseas company with a UK-registered establishment which has 250 or more UK employees (paying income tax in the UK)

Organisations that qualify for ESOS must carry out ESOS assessments every 4 years. These assessments are audits of the energy used by their buildings, industrial processes and transport. The assessment must be carried out by external accredited auditors. The ESOS audit is designed to identify tailored and cost-effective measures to allow participating businesses to save energy and achieve carbon and cost savings. The audit costs are estimated to be significantly outweighed by the savings from implementing the recommendations.

However, it is an expensive and time-consuming process. Moreover, it is seen by many organisations as a box-ticking exercise because, whilst ESOS reporting is mandatory for qualifying organisations, the implementation of the energy-saving measures is not!

Adoption of the ISO 50001 standard means that almost all of the information required by the auditor is already available, reducing the burden on both the organisation and the auditor.



Building Regulations Part L

Building Regulations Part L is a section of the UK Building Regulations focused on the conservation of fuel and power. It sets standards for the energy performance of buildings to improve energy efficiency and reduce carbon emissions. Part L2 specifically focuses on the conservation of fuel and power in buildings other than dwellings. It is subdivided into two further parts, Part L2A sets the standard for new buildings whilst Part L2B sets the standard for existing buildings.

ISO 52120 controls ratings are specifically referred to in the Regulations , and specify that...

> *"Controls for comfort cooling systems should meet [ISO 52120] Band C. "*

This is the baseline position for a building with a BMS, so not particularly challenging. However, in the specification for a building automation and control system, the Regulations state...

> *6.72 A building automation and control system installed in a new or existing building, where the building meets the space heating or cooling criteria in paragraphs 6.66 and 6.67, should be capable of carrying out all of the following functions.*
>
> *a. Fully complies with BS EN ISO 16484.*
>
> *b. Continuously monitors, logs, analyses and allows for adjusting energy use.*
>
> *c. Benchmarks the building's energy efficiency, detects losses in efficiency of heating, ventilation and air conditioning systems, and informs the person responsible for the facilities or building management about opportunities for energy efficiency improvement.*
>
> *d. Allows communication with connected fixed building services and other appliances inside the building and is interoperable with fixed building services across different types of proprietary technologies, devices and manufacturers.*

The Regulations further go on to state that...

> *An ISO 52120 Class A rated type system would meet these requirements.*

So, whilst currently falling short of specifying compliance with this standard as a requirement, a Class A rating would demonstrate compliance with these Regulations.

Conclusion

Selecting one of the many building standards, such as BREEAM or NABERS alone, does not guarantee either decarbonisation or compliance with requirements such as Building Regulations or ESOS.

Of far greater benefit to organisations is the adoption of ISO 50001, ideally externally certified, and the inclusion of ISO 52120 as part of the documented process.

In addition to working towards Net Zero, it will help to reduce energy costs as well.

Appendix I

Advantages and Disadvantates of different Building Standards

	Advantages	Disadvantages
BREEAM	• Comprehensive assessment • Encourages energy efficiency • Increased market value • Health and wellbeing benefits • Regulatory alignment • Improved risk management • Lifecycle approach - long-term environmental impacts • Third-party verification	• Cost of certification • Complexity and time-consuming • Focus on environmental rather than social sustainability • Not always tailored to specific building types • Potential for "box ticking" • Limited focus on operational performance
LEED	• Energy efficiency and reduced operating costs • Increased marketability and property value • Environmental benefits Well-being of occupants • Regulatory compliance • Flexible and adaptive system • Incentives and tax breaks • Third-Party Verification • Continuous Improvement	• High Certification Costs • Complex and Time-Consuming Process • Initial High Capital Expenditure • Limited Focus on Actual Performance • "Tick Box Checking" Mentality • Regional Adaptability Issues • Maintenance of Certification • Not Suited for All Building Types • Potential Greenwashing *Certification not Performance • Difficulty in Retrofitting Older Buildings
NABERS	• Focus on actual operational performance rather than design • Clear, quantifiable ratings • Cost savings from operational efficiency • Adaptable to different building types • Continuous Improvement through regular reassessment • Increased market value • Health and comfort for occupants • Benchmarking and transparency • Credibility and third-party verification	• Limited to operational performance not sustainability of design & construction • Upfront cost of implementation • Cost of annual recertification • Limited scope of assessment • Potential for "gaming" the system • Does not address embodied carbon • Tenants can impact ratings • Complexity in achieving high ratings • Limited focus on social sustainability
Soft Landings	• Improved Building Performance • Enhanced Occupant Comfort and Satisfaction • Better Communication and Collaboration • Reduced Performance Gap • Post-Occupancy Support • Energy and Cost Savings • User Training and Engagement • Sustainable Building Operations • Adaptability to Future Needs	• Higher Initial Costs • Extended Project Timeline • Ongoing Commitment and Resources • Potential Resistance from Stakeholders • Difficulty in Measuring Success • User-Dependent Outcomes • Complexity in Implementation • Post-Handover Responsibility • Training Requirements
UK NZC BS (Pilot)	• Contribution to climate goals • Reduction in energy costs • Boost to the green building market • • Use of Renewable Energy • Healthier Living and Working Environments • Alignment with Future Regulations • Government incentives • Long-term asset value • Reduced carbon footprint over the lifecycle	• Ongoing monitoring and compliance costs • Challenges with addressing embodied carbon • Impact of tenant behaviour • Potential for greenwashing • Longer return on investment • Uncertainty in carbon offsetting

Appendix II

Relevant ISO Standards

14001:2015

Environmental Management Systems (EMS) is the most widely used ISO standard for sustainability. It helps organisations develop a systematic approach to managing their environmental impacts.

1S0 14007 and 14008

Determining Environmental Costs & Benefits: This standard offers guidance on identifying and documenting both monetary and non·monetary costs and benefits associated with an organisation's environmental footprint.

ISO 14064:2018

Greenhouse Gas (GHG) and Organisations Quantification and Reporting help organisations quantify and report their greenhouse gas emissions and removals- This can help organisations track their progress in reducing their climate impact.

1S0 20400:2017

Sustainable Procurement helps organisations integrate sustainability considerations into their procurement processes. This includes considering the environmental and social impacts of products (Scope 3 emissions).

ISO 26000

Guidance on Social Responsibility. This isn't certifiable but provides a framework for integrating social responsibility practices into operations, which is a key ESC pillar.

1S0 20400:2017

Sustainable procurement helps organisations to integrate sustainability considerations into their procurement processes. This includes considering the environmental and social impacts of products.

ISO 37001:2016

Anti-Bribery Management Systems helps organisations establish and maintain an anti-bribery management system This can help organisations reduce the risk of corruption and bribery in their operations.

ISO 37301

Compliance Management Systems: This standard helps organisations manage ESC-related risks by establishing a strong compliance system.

1S0 50001:2011

Energy Management Systems (EnMS) helps organisations improve their energy efficiency and reduce their energy consumption.

ISO 27001:2013

Information Security Management Systems (ISMS) help organisations protect their information assets from unauthorised access, and use. Disclosure, disruption, modification, or destruction.

1S0 l4040 and 1044

These are the International Organisation for Standardisation (ISO) standards that define the framework and requirements for Life cycle Assessments (LCA).

ISO/WD 53001

Still under development, aims to provide a comprehensive management system for organisations to contribute to the UN Sustainable Development Goals (SDCs}. encompassing all aspects of ESC.