This guide has been designed to help architects build sustainability into their daily practice.

Identifying the drivers of sustainability and some of the wider context, the guide looks at the strong business case for sustainability, the benefits for clients and 10 steps architects can take to help build sustainability in practice.
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Foreword from Angela Brady

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The drive towards sustainability in the built environment represents both a challenge and business opportunity for architects. It is something we simply cannot ignore. Our buildings are responsible for almost half of our global carbon footprint and they are dependent upon the world’s natural resources.

As architects we know that good design improves our quality of life, in all areas of work, rest and play and impacts on our health. Our work as professionals seeks to create a healthy built environment which enhances the environment, society and our economy.

This is a long term aim for a long-term project. We need to build, collect and share knowledge and experience right now. International and European policy, as well as forward-thinking UK policy makers, are driving a rapidly moving sustainability agenda. We need to gain and maintain skills to stay abreast of legislative changes vital for the years ahead and for the future of our planet.

We hope that this guide serves as a helpful step to enable architects to integrate sustainability into their daily practice.
The architect’s role is to synthesise environmental, social and economic requirements for buildings in the design and delivery of projects.

Environmental requirements for project briefs have been steadily increasing since the early 1990s, when the Building Research Establishment’s (BRE) voluntary Environmental Assessment Methodology (BREEAM) was created for non-domestic buildings. Once the Kyoto protocol of 1997 was signed by the EU the following year, public bodies such as Local Planning Authorities started to set environmental requirements for building projects. www.bre.co.uk/index.jsp

‘Sustainable’ development ties together the concern for the carrying capacity of natural systems with the social challenges facing humanity. The United Nations World Commission on Environment and Development 1987 report, often referred to as the Brundtland report, contains the most accepted definition of this: ‘Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ www.un-documents.net/wced-ocf.htm

What is sustainable development?

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

UN, Brundtland report, 1987

Sustainable development: the interaction of social, environmental and economic factors.

Role of the architect

Arguably, the role of an architect in responding to environmental, social and economic requirements in projects has become even more pivotal over the last decade as a result of changes in UK Building Regulations.

Responding in part to the influence of European legislation, primarily the Energy Performance in Buildings Directives (EPBD) 2002, UK Building Regulations legislation has introduced measures and controls including:

- Standards for reducing energy and CO₂ emissions in buildings
- Targets for reduced water consumption in buildings
- Controls on harmful substances
- More strictly defined ventilation provisions

Wider environmental targets are now regularly included in client requirements and embedded into project briefs and planning conditions, sometimes referencing benchmark standards such as:

- BREEAM (Building Research Establishment Environmental Assessment Methodology)
  www.breeam.org
- the Code for Sustainable Homes
- LEED (Leadership in Energy and Environmental Design)
  www.usgbc.org/leed
- SKA (Royal Institution of Chartered Surveyors, system for office fit outs and retail projects)
  www.rics.org/ska

There is more on standards in the Appendix.

This guide will show how upskilling your practice on sustainability does not need to be costly or burdensome, and can create significant benefits for clients and building users. From the briefing process onwards, architects can influence the sustainability of project outcomes if they can integrate traditional creative and technical skills with an up-to-date understanding of environmental, social and economic impacts. The guide includes 10 steps to help architects build sustainability into practice.
The principal drivers for sustainability in the built environment are climate change, resource depletion, population increase and urbanisation. Adding to these increasing expectations of health, wellbeing, justice and social inclusion, sustainable development can be characterised as that which responds to:

- **Environmental needs** – including mitigation and adaptation to climate change; resource husbandry
- **Social needs** – including quality and accessibility
- **Economic needs** – including value creation

These categories are reflected in the five guiding principles from the UK’s Sustainable Development Strategy 2005. [www.archive.defra.gov.uk/sustainable/government/publications/uk-strategy](http://www.archive.defra.gov.uk/sustainable/government/publications/uk-strategy)

The Department for the Environment, Food and Rural Affairs (DEFRA) hosts the Sustainable Development in Government website, which sets out the Government’s vision and commitments for sustainable development. [www.sd.defra.gov.uk](http://www.sd.defra.gov.uk)

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**The five guiding principles of sustainable development:**

**Living within environmental limits:**
Respecting the limits of the planet’s environment, resources and biodiversity – to improve our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.

**Ensuring a strong, healthy and just society:**
Meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity for all.

**Achieving a Sustainable Economy:**
Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and in which environmental and social costs fall on those who impose them (polluter pays), and efficient resource use is incentivised.

**Promoting Good Governance:**
Actively promoting effective, participative systems of governance in all levels of society – engaging people’s creativity, energy, and diversity.

**Using Sound Science Responsibly:**
Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the precautionary principle) as well as public attitudes and values.

Source: DEFRA
Criteria such as social usefulness and whole-life energy reduction are now more regularly included in project briefs. For example, clients may seek to differentiate their buildings and property beyond the minimum standards for reasons of their own Corporate Social Responsibility (CSR) commitments. Some organisations owning and managing their own estates may desire extremely low-energy buildings to minimise their exposure to rising energy prices in the future, or costs under the Carbon Reduction Commitment Energy Efficiency Scheme (CRC). www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx

As referred to in the Low Carbon Construction IGT Final Report 2010 ‘It is often said that buildings are responsible for about half the country’s CO₂ emissions’ and this excludes embodied energy consumption. Because of this a plethora of UK law and policy such as the CRC now drive sustainability efforts in the built environment, influenced by both EU regulation and international agreements. www.bis.gov.uk/assets/biscore/business-sectors/docs/l/10-1266-low-carbon-construction-igt-final-report.pdf

These policies include the UK’s ambitious trajectory towards ‘zero carbon’ regulated building energy – 2016 for newbuild homes, 2019 for non-domestic buildings – to be delivered through Part L of the UK Building Regulations. The steps to achieving this aim include consultation currently underway on changes to Part L for 2013.

The EU’s EPBD 2010 sets a target for all new buildings to be ‘nearly zero-energy’ by 2020, including existing buildings undergoing major renovation. Policy makers are therefore concentrating much effort on increasing the uptake of building energy efficiency retrofit, and the UK Government intends to introduce its ‘Green Deal’ scheme to support this in 2012. More information on the Green Deal can be found in Section 4. www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx

The 2011 Consultation Draft of the Government’s proposed National Planning Policy Framework (NPPF) calls for a streamlined planning system to support a ‘presumption in favour of sustainable development’ and has generated much debate around the potentially competing demands of environmental, social and economic issues on the built environment. www.communities.gov.uk/planningandbuilding/planningsystem/planningpolicy/planningpolicyframework/

Sustainability issues are changing rapidly, and having a good understanding of the regulatory and policy landscape is key to spotting new business opportunities and requirements in this growing area.

There is more detailed information in the Appendix about the wider background of EU and UK policy.
Section 2
How the RIBA is responding to the challenge of sustainable development

The RIBA is responding to the challenge of sustainable development through a number of different initiatives

The Sustainability Hub
The Sustainability Hub area of the RIBA website includes case studies, blogs, videos and best practice references.
www.architecture.com/SustainabilityHub/
SustainabilityHub.aspx

Green Overlay to the RIBA Plan of Work
The Green Overlay to the RIBA Outline Plan of Work sets out a project process where key additional tasks and issues are clearly highlighted to achieve sustainable outcomes. There is more information on the Green Overlay in Section 5 Step 9.

Activities and contribution to the debate
The RIBA aims to achieve progress towards sustainable development in the built environment through a full range of activities on behalf of the profession – from industry leadership and political influence to knowledge-sharing and education.

One of the RIBA’s strategic objectives is to stimulate demand for architecture that delivers environmental, social and economic value and to become the hub for knowledge on sustainable development. The RIBA are actively working with Government on the development of new law and policy. www.architecture.com/SustainabilityHub/Consultations.aspx

The RIBA is working to stimulate demand for architecture that delivers environmental, social and economic value
Professionals in the built environment community have come together to debate sustainability in design and to consider how this requires a new ethos, including a commitment to:

- share knowledge and experience
- share feedback and review of performance in use
- promote integrated design and design teams

Feedback from Soft Landings and post-occupancy evaluation has, for instance, highlighted the need for manageability and useability in buildings to achieve desired outcomes. www.bsria.co.uk/services/design/soft-landings/

CarbonBuzz – building the data

CarbonBuzz is a free web resource that collects anonymous building energy consumption data to highlight the performance gap between design figures and the actual readings, and is producing valuable data on energy use. www.carbonbuzz.org

RIBA climate change toolkits

These toolkits are designed to give an overview and introduction to the science and issues behind global warming, and the technical skills, tools and design solutions necessary to tackle carbon reduction in building projects. Each toolkit gives an introduction to a particular area of professional knowledge, and provides a detailed guide to further sources of authoritative information. The second edition of toolkits includes:

- 01 Climate Change Briefing
- 02 Carbon Literacy Briefing
- 03 Principles of Low Carbon Design and Refurbishment
- 04 Low Carbon Standards and Assessment Methods
- 05 Low Carbon Design Tools
- 06 Skills for Low Carbon Buildings
- 07 Designing for Flood Risk
- 08 Whole Life Assessment for Low Carbon Design

www.architecture.com/FindOutAboutSustainabilityandclimatechange/ClimateChange/Toolkits.aspx
The RIBA publication, ‘Sustainable Buildings: The Client’s Role’ invites clients to lead by example in setting out a vision for good design which embraces sustainable objectives and delivers increased value by:

- future-proofing
- reducing operating costs
- delivering comfort and health benefits

www.ribabookshops.com/item/sustainable-buildings-the-clients-role/74295

The Carbon Trust’s 2011 research into Corporate Social Responsibility (CSR) showed that a majority of the UK’s top-quoted companies now declare targets to improve their environmental performance. However, closer examination of FTSE 100 reporting revealed that not all targets are equal and there is a wide variation in their level of ambition and rigour. www.carbontrust.co.uk/news/news/newsletter-archive/2011-07/Pages/2011-07-corporate-leadership-carbon.aspx

The Carbon Trust report highlights key areas for future consideration including:

- balancing environmental targets with other sustainability drivers
- considering whole-life impacts of products, embodied energy and water
- future energy security

The Carbon Trust research showed that only 59% of FTSE 100 companies have clear, robust targets to cut carbon emissions
The tenants in green buildings experienced increased productivity and fewer sick days

**Improving compliance and CSR**

The potential benefits to clients of driving sustainability in projects include:

- compliance with their stated aims in CSR or Environmental Management protocol, for example, the environmental management standard ISO 14001, from the International Organisation for Standardization
- compliance with corporate governance and other legislation such as Landfill Tax or the Aggregates Levy
- the desire for improved staff retention and productivity

**Green buildings work better**

Feedback on improved productivity in sustainable buildings was researched by, among others, CABE (Commission for Architecture and the Built Environment, now Design Council/Cabe) which, in a study of five new academic buildings and campuses, found that more than 70 per cent of staff and students believed that the functions and facilities of the buildings they work in improved the way they felt and behaved.


In the commercial sector, a landmark study ‘Do Green Buildings Make Dollars and Sense?’ conducted by the University of San Diego and the CBRE Group in 2009, found that tenants in green buildings experienced increased productivity and fewer sick days, and that green buildings have lower vacancy and higher rental rates.


The Royal Institution of Chartered Surveyors (RICS) in 2010 referenced evidence of increasing rental and investment value in green buildings in Europe and America, quoting Social Responsible Investing (SRI) and Responsible Property Investing (RPI) as important drivers for major investment funds. www.rics.org


**Importance of knowing energy performance**

Knowing the actual energy performance of a building is important for all companies where shareholders and consumers require reassurance about good governance, and where Display Energy Certificates (that disclose actual energy performance in compliance with the EPBD) are required in public buildings or are subject to voluntary disclosure as recommended by UK Green Building Council. [www.ukgbc.org](http://www.ukgbc.org)

Large Government buildings are required to disclose energy performance through a Display Energy Certificate, so if an investor wishes to attract public bodies as tenants then low energy consumption is a prerequisite, as is a high BREEAM rating.

**Brand value of sustainability**

The brand value of sustainability in built assets is considered to have a direct benefit on shareholder value, and the disclosure of data is becoming increasingly associated with having the right business values.

The FTSE group recently stated that: ‘Companies which consistently manage and measure their responsible business activities outperformed their FTSE 350 peers on total shareholder return in seven out of the last eight years.’ [www.bitc.org.uk/resources/publications/the_value_of.html](http://www.bitc.org.uk/resources/publications/the_value_of.html)
The business case for sustainability is extremely compelling.

In spite of the current global economic stagnation, current business forecasts point towards a greener economy. As the Minister of State, Cabinet Office, stated in the run-up to the Durban summit 2011: ‘The global low carbon goods and services sector is forecast to grow from £3.2 trillion in 2009/2010 by 3.8 per cent per year over the next five years.’ www.unep.org/environmental/governance/PerspectivesonRIO20/OliverLetwin/tabid/55737/Default.aspx

Integrating sustainability into practice enables architects to:

- provide the service that clients need to build to the necessary environmental standards, and reap the benefits from better design (see Section 3)
- future-proof their own business for the up-and-coming workload

The Green Deal – kickstarting construction activity

For refurbishment projects, the Green Deal is designed to kickstart £14billion in construction activity over the next decade, and offers architects’ clients an additional source of financing where a comprehensive refurbishment project includes energy efficiency measures eligible for the Green Deal under its ‘Golden Rule’. www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx

Building Regulations Part L currently require: ‘consequential (energy efficiency) improvements’ in works to existing buildings over 1,000m², i.e. mainly non-domestic. The 2012 Part L consultation proposes to extend and expand the regulatory requirement for consequential energy efficiency improvements in existing buildings to include residential.

What is the Green Deal?

The Green Deal removes the upfront cost of energy efficiency measures (like loft, cavity and external wall insulation, draught proofing and energy efficiency glazing and boilers) making expensive home improvements affordable. The energy-saving work will be repaid over time through a charge on the home’s energy bill.

The repayments must obey a ‘golden rule’ whereby the charge is no more than the expected savings.

Source: DECC
Evaluating the benefit to a practice

It may be important to invest upfront in order to reap longer-term benefits. The steps outlined in Section 5 involve very little extra expenditure, bearing in mind that sustainability is one of 10 topics in the RIBA’s new core curriculum of Continuing Professional Development (CPD) which all chartered practices must engage in. www.architecture.com/EducationAndCareers/CPD/NewCPDCoreCurriculum.aspx

Many of the issues relating to sustainable development are also a requirement of planning conditions and building regulations.

The degree to which sustainable processes can be integrated into architectural practice may depend on:
- the nature of a practice itself
- how it wishes to evolve
- whether it wishes to ‘own’ more of the design tools which enable iterative analysis of sustainability in design and project development

It is vital to be aware of the issues and be up-to-date with the options.
Section 5
10 steps to building a sustainable practice

Step 1: Commit to leadership

The first step is for a practice to support the sustainable development ethos, and commit to leadership from the most senior level downwards to promote a healthy balance between people, planet and profit.

Benefits
Commitment from the top helps generate:
- enthusiasm from all members of a practice, including those at the start of their careers
- confidence to promote a sustainable approach to clients, collaborators, suppliers and the general public through professional advice on sustainability issues
- expertise in showing how sustainability issues can be integrated into the construction process

Step 2: Benchmark practice impacts

Before starting to measure the impact of a building project at any stage, it is just as important to understand the direct impacts a practice makes on the environment and on people’s lives.

A business can benchmark its performance using a carbon footprinting measurement of business impacts. There is more on how to do this on the DECC website.

In terms of its social and economic impacts, a practice could consider measuring and benchmarking staff satisfaction through, for example, surveys, annual reviews and measurement of staff turnover rates.

The annual RIBA Business Benchmarking Survey provides vital business knowledge about how a practice compares to others across a broad spectrum of criteria.

www.architecture.com/TheRIBA/AboutUs/Ourstructure/RIBAProfessionalServices/Departments/Practice/TheRIBABusinessBenchmarkingSurvey.aspx
Some practices may opt for an environmental accreditation such as ISO 14001 – the latter can be linked to ISO 9001 – but even the smallest practices can measure their impacts year on year and aim for improvements using a self-help tool such as the BRE Managing Sustainable Communities (MaSC) benchmarking tool.

http://projects.bre.co.uk/masc/index.html

RIBA Chartered Practices are required to have an Environmental Management Policy that includes ISO 14001.

ISO 9001
www.iso.org/iso/catalogue_detail?csnumber=46486
ISO 14001
www.iso.org/iso/catalogue_detail?csnumber=31807

Benefits

Benchmarking a range of impacts could also provide a useful example of how sustainability:

- is an integral part of the way that day-to-day business is carried out
- can be integrated in forward planning

Benchmarking environmental, social and economic impacts, such as energy use in buildings and the impact of CO₂ on travel can become a starting point for:

- setting targets for strategy and improvements
- communicating the impacts of staff behaviours in terms of the real consequences
Step 3: Demonstrate practice performance

In order to be able to communicate and promote the importance of sustainability in projects to clients and to a wider audience, it is important that a practice understands how its projects contribute to the wider knowledge bank.

It is therefore useful to benchmark projects using current methodologies. This can be done in-house even when the projects themselves are not subject to specific scoring systems such as BREEAM, the Code for Sustainable Homes or LEED.

Beyond the design stage, some benchmarking systems consider actual performance in use and the real impacts on people and the environment.

In an architectural practice, knowledge-sharing can become an issue for project competence and succession planning. Regular ‘lessons learnt’ sessions can be carried out on project completion, and comparable data (including sustainability targets and outcomes) can be stored in an accessible digital location as part of a Knowledge Management system.

Soft Landings procedures

Where possible Soft Landings procedures should be promoted to clients and adopted through the project process to measure a building’s performance in use and to share data. www.bsria.co.uk/services/design/soft-landings

Benefits

- Even where clients prefer to keep performance data private, it should be possible for the architect to benefit from the knowledge and understanding that real data can provide, e.g. by promoting the provision of anonymised data to a knowledge-sharing site such as Carbon Buzz
- A post-occupancy evaluation is invaluable for feedback on the successes and failures of a project including social and environmental impacts
- Actual energy data as used in a Display Energy Certificate (DEC) can be compared with benchmark data to improve the energy efficiency of a building

Even where clients prefer to keep performance data to themselves, it should be possible for the architect to benefit from the knowledge that real data can provide.
Step 4: 
Build on existing resources

All practices maintain some kind of Knowledge Management system, and store reference material and project-specific data irrespective of whether they are ISO 9001 or ISO 14001 accredited. Existing staff members may have experience of applying sustainability principles to projects or meeting certain benchmarks and standards – it is worth carrying out an audit of skills, experience and enthusiasm in the existing personnel.

Practices may find they have existing staff who already have the expertise or who are willing to upskill for a relatively small capital outlay. The benefit of in-house capability is in terms of the ‘ownership’ when carrying out options appraisals in design development.

Benefits
It is a worthwhile exercise to introduce sustainability topics into practice discussions and personal reviews. This will:
- raise awareness of sustainability issues; and
- encourage those designers who are interested in specialising or develop their knowledge of sustainability

Step 5: 
Upskill with CPD

To deliver truly sustainable building projects it is important for an architect to have a good working knowledge of all the sustainability issues.

Knowledge development is important for all practices and requires CPD about sustainability issues, together with a commitment to share that knowledge with partners where possible. For example:
- through engagement with research and cross-industry programmes such as CarbonBuzz, the Technology Strategy Board, or Zero Carbon Hub
- sharing the lessons learned
- committing, where possible, to publish feedback on performance in use, Soft Landings and post-occupancy evaluation

Staff training and CPD can be tailored to specific project needs
Benefits
Collaborating with other team members and specialists is a vital part of:

- synthesising social, economic and environmental demands
- gaining knowledge of specialist areas on a project-by-project basis

Staff training and CPD can be:

- tailored to specific project needs
- tailored to personal development targets
- regarded as a general upskilling objective when decisions regarding business planning or software acquisition are made

Step 6: Develop collaborative project methodologies

Practices differ in their project process methodologies. Some have a series of protocols and rules attached to each stage of the work flow and clients can be predisposed to use specific benchmark standards and procurement methods. These will influence the project process, creating different ‘ownership’ of sustainable tasks and outcomes. In May 2011 the Government Construction Strategy outlined the processes needed ‘to ensure the Government consistently gets a good deal and the country gets the social and economic infrastructure it needs for the long-term.’ www.cabinetoffice.gov.uk/resource-library/government-construction-strategy

Building Information Modelling (BIM)

Practices may find they have existing staff who already have the expertise or who are willing to upskill for a relatively small capital outlay

What is BIM?

BIM is a managed digital information 3D model of an asset, be it a building or an infrastructure project (both new-build or retained estate) that is infused with data. This information model can be used to inform the decision-making process and answer questions throughout the entire project lifecycle.

Source: David Philp, Head of BIM Implementation at the Cabinet Office, NBS National BIM Report 2012, p4
New BIM library
The new National BIM library opens in March 2012. It is a free resource offering construction-industry professionals the facility to locate and download a wide selection of generic BIM objects for a comprehensive range of systems. [www.nationalbimlibrary.com](http://www.nationalbimlibrary.com)

Benefits
The use of BIM can enable:
- collaborative working among project teams to achieve sustainable outcomes
- monitoring of design environmental targets and produce early visualisations for user and planning consultations
- measurements of whole-life costs and Life Cycle Analysis including embodied energy calculations
- facilities management team to measure actual performance and record future changes and upgrades

Step 7: Consider the uses of software
It is becoming increasingly possible to integrate CAD and BIM software with environmental design tools. Using open data formats many software platforms are beginning to talk to each other more effectively. This guide does not go into the various software packages in any detail. It is strongly recommended that practices research for their own specific needs.

Energy modelling and compliance tools
Energy modelling and compliance are becoming increasingly important considerations of design development in newbuild and refurbishment projects with low-energy targets.

Early specification of building elements can enable data to be used with software applications for building environmental modelling and simulation.
As the Government Construction Strategy develops so do software opportunities that enable it and many of these software platforms can be integrated around a BIM model. Early specification of building elements can enable construction production information data to be used with software applications for building environmental modelling and simulation.

The Construction Project Information Committee is responsible for providing best practice guidance on the content, form and preparation of construction production information. www.cpic.org.uk/

The Passivhaus Standard
The Passivhaus Standard has been successfully adopted in up to 30,000 buildings across Europe and equates to a ‘near zero’ heating standard where annual space heating demand does not exceed 15kWh/m² per annum.

Passivhaus certification requires an accreditation of design and build/commissioning quality, and a maximum Primary Energy Demand from all energy uses for new buildings of not more than 120kWh/m² per annum.

Design performance against the Passivhaus Standard is assessed using Passivhaus Planning Package (PHPP) software which is a user-friendly Excel-based calculation of projected energy performance. www.passivhaus.org.uk

Benefits
Knowledge and understanding of environmental analysis software can be empowering in order to carry out:

- preliminary energy modelling to inform design options and appraisals
- early specification for cost planning
- dialogue with engineers

Passivhaus in practice:
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The Passivhaus Standard can be applied to different building typologies: Residential, Non-Residential and Residential Refurbishment (the latter known as the ‘EnerPHit’ standard).

Enerphit has different certification criteria with a maximum annual space heating demand standard of 25kWh/m² and an adjusted total primary energy demand target.

The aim of Passivhaus is to deliver thermal comfort in buildings with minimal energy consumption, demanding superinsulation fabric standards, very low air leakage and thermal bridging, and purpose-provided fresh air ventilation with heat recovery. The PHPP calculation is based on localised weather data and factors in solar as well as occupant and internal heat gains, and calculates overheating potential.
Step 8: Adopt a Knowledge Management framework

Knowledge Management systems may already include a practice’s existing projects and other case studies. To increase sustainability awareness it might be helpful to cluster construction knowledge around sustainability themes, perhaps based on BREEAM topics or similar, subject to practice needs.

For example, the BRE’s GreenPrint framework covers eight key areas of sustainability, echoed in the assessment methodologies of BREEAM and the Code for Sustainable Homes. These could be adopted as a framework for knowledge capture, best practice case studies and feedback. www.bre.co.uk/page.jsp?id=1290

Benefits
Knowledge systems can be extended to include data, when available, on:
- energy and other benchmarks
- performance of projects in use
- project feedback data
- lessons learned workshops

The GreenPrint framework: eight key areas of sustainability

- **Climate change** - Ensures developments mitigate, and are appropriately adapted to, present and future climate change impacts.
- **Resources** - Promotes the sustainable use of resources including water, materials and waste, both in construction and operation.
- **Transport** - Ensures transport hierarchy issues are fully addressed and catered for within the development.
- **Ecology** - Ensures the ecological value of the site is conserved and enhanced.
- **Business** - Ensures that the development contributes to the sustainable economic vitality of the local area and region.
- **Community** - Ensures the development supports a vibrant, diverse and inclusive community that integrates with surrounding communities.
- **Placemaking** - Ensures the design process, layout structure and form provide a development that is appropriate to the local context.
- **Buildings** - Ensures that the design of individual buildings does not undermine the sustainability of the overall development.

Source: BRE GreenPrint
Step 9:  
Follow the RIBA Outline Plan of Work

The impact of climate change and broader environmental concerns has started to have a major impact on design and construction practice. Recognising this move towards more sustainable construction, led by innovative clients, designers and construction teams, the RIBA is reviewing its Outline Plan of Work.

The Green Overlay

For all the variations of project methodologies, it is important for the architect to understand who holds the responsibility for the actions required to deliver sustainable outcomes, including the need for design development to be integrated with input from other specialists.

The Green Overlay to the RIBA Outline Plan of Work with its clear prompts and guidance gives a useful summary of tasks and checkpoints to better embed sustainability into the appraisal, briefing, design and construction process of an individual project.

It is an invaluable tool for architects and construction professionals to engage clients in conversation about truly sustainable design that aspires to go beyond the regulatory compliance of the standard service and product.

www.ribabookshops.com/green-overlay

The BIM Overlay

The RIBA will launch a BIM overlay in May 2012 to update the succinct wording of the RIBA Outline Plan of Work and reflect the market’s growing expectation that BIM issues are actively considered in the design and construction of building projects. This is being undertaken by a broad collection of construction industry professionals and further develops the work of the Green Overlay. This document will be available to download for free on:

www.ribabookshops.com

Benefits

- The RIBA Plan of Work is the most widely-used framework for building design and construction
- The Green Overlay provides a simple set of adjustments to each of the work stages with which to engage clients in sustainable design

What is the RIBA Outline Plan of Work?

The Outline Plan of Work organises the process of managing, and designing building projects and administering building contracts into a number of key Work Stages.

The Green Overlay is an invaluable tool for architects and construction professionals to engage clients in conversation about truly sustainable design.
Step 10: Monitor sustainable projects

Embedding a sustainable design approach into the business process also helps in-house monitoring of integrated design thinking and the delivery of specific sustainability targets throughout the project process.

Using a simple Knowledge Management structure, for example, one that is based on the BRE GreenPrint framework (described in Step 8), a sustainable design process map can be developed in line with any relevant BREEAM, Code for Sustainable Homes or LEED targets, and can easily be used as a prompt at in-house technical and design review sessions.

Topic headings can be developed into detailed criteria as appropriate such as:
- milestones
- performance targets
- contract conditions

A practice could develop a simple customised knowledge and sustainability mapping process which aligns to specific project targets while remaining unique to each practice’s own strengths and aspirations.

Life Cycle Assessment: operational and embodied carbon

Whole Life Carbon Assessment draws together operational energy and embodied carbon calculation in line with CEN (the European Committee for Standardization) TC350 methodology. In this way comparisons can be made between:
- capital costs and costs in use
- embodied and operational energy

As operational energy usage in buildings is reducing, embodied energy is playing an increasingly greater part in a building’s energy consumption over its lifetime. Therefore an architect’s involvement in specification, detailing and product selection has an even greater significance in the effort to keep energy usage down.
Benefits

- In a Life Cycle Assessment the implications of key factors can all be measured in CO₂ terms as well as financial ones, including:
  - materials specification and manufacturing
  - transport delivery to site
  - building construction
  - in-use operation and maintenance

- Design to reduce embodied as well as operational energy could become an important role for the architect once the CEN TC350 methodology evolves into sustainability standards, testing procedures and regulatory requirements

- Arguably costs very little
- Gives structure to regular design and technical review
- Can work for small as well as large practices
In the area of climate change policy, where there is no international accord, often the EU drives change at UK level. The UK has also developed some of it’s own ambitious policies leading the way on sustainable development.

This section takes a quick look at some of the current and forthcoming EU and UK legislation and policy (and other trends) that drive sustainability in the built environment.

**EU**

**EU ‘20-20-20’ targets**

In 2007, EU leaders agreed demanding climate and energy targets, to be met by 2020. These are commonly referred to as the ‘20-20-20’ targets. These are:

- A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
- 20% of EU energy consumption to come from renewable resources
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency

Different EU countries have different targets to meet in these areas (e.g. the UK must achieve 15 per cent renewables by 2020 as noted below).

Importantly, it has recently been assessed that the EU is only on track to achieve around half the desired improvement in energy efficiency. A draft Energy Efficiency Directive is making its way through Brussels at the time of writing to further drive improvements in this area, where existing buildings are particularly important. Therefore, in part, this is designed to better facilitate building retrofit.


The first EPBD in 2002 mandated the requirements that led to Part L of the Building Regulations. Other familiar UK requirements which stem from the EPBD include the requirement for certain public buildings to declare their energy performance through Display Energy Certification, and the requirements for Energy Performance Certificates.

The 2010 recast of the EPBD sets a target for all new buildings to be ‘nearly zero-energy buildings’ by 2020, including existing buildings undergoing ‘major renovation’ (see ‘Building Regulations’ below).

**New European standards**

In the EU a suite of new standards is being developed to assess the sustainability of construction products and the built environment, by the Technical Committee at CEN, the European Committee for Standardization for the sustainability of construction works.

[Links to websites]

CEN is responsible for:

- the development of voluntary standardised methods for the assessment of the sustainability aspects of new and existing construction works
- standards for the environmental product declaration of construction products

Until these standards are published (the product standard is due in March 2012 at the time this guide is being published) it is not clear how they will affect sustainability benchmarking longer term, although a Whole Life Carbon assessment and a Life Cycle Assessment are being referenced as future requirements for publicly-funded buildings.
UK

As noted in Section 1, DEFRA is the Government department leading sustainable development, but various other departments originate policy in this area. These include the Department of Energy and Climate Change (DECC) and the Department for Communities and Local Government (CLG).

The Climate Change Act 2008 commits us to reducing greenhouse gas emissions by at least 80% over 1990 levels by 2050

The UK’s Climate Change Act 2008
The Climate Change Act 2008 commits the UK to reducing greenhouse gas emissions by at least 80 per cent over 1990 levels by 2050, requiring legally binding carbon budgets for five-year periods. www.decc.gov.uk/en/content/cms/legislation/cc_act_08/cc_act_08.aspx

Carbon Reduction Commitment Energy Efficiency Scheme
The CRC requires many companies to audit and report on their annual emissions related to energy use. A sufficient number of emissions allowances must be purchased to cancel these out. Performance of all those companies included in the CRC is published, which along with the cost of emissions allowances, provides a driver to reduce energy use. www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx

Carbon Plan 2011
The first Low Carbon Transition Plan for the UK was published in 2009 and included the emissions reductions targets that applied to workplaces, homes and communities. The subsequent Carbon Plan 2011 sets out the actions and milestones for achieving the Government’s CO₂ reduction targets. www.decc.gov.uk/en/content/cms/tackling/carbon_plan/carbon_plan.aspx

Building Regulations
The Building Regulations for England and Wales have increasingly stringent targets for:
- conservation of fuel and power (Part L, currently under review)
- reduced water consumption (Part G)

There are also requirements for other aspects of buildings that affect health and safety, for example:
- toxic substances (Part D)
- ventilation (Part F)

Part L carbon reduction targets are currently driven by a stated policy to achieve zero carbon in new domestic buildings by 2016 and in non-domestic buildings by 2019, in line with the Carbon Plan 2011 (see above on the EPBD).

The Energy Act 2011
The Energy Act 2011, as well as creating the ‘Green Deal’ (see below), provides the powers to ensure that, as from April 2018, it will be unlawful to rent out a residential or business premises that does not reach a minimum energy efficiency standard. www.decc.gov.uk/en/content/cms/legislation/energy_act2011/energy_act2011.aspx

Around 40 per cent of commercial buildings in the UK could start to rapidly lose value as these future energy standards approach unless improvement works are undertaken, according to a study by property consultant DTZ. www.dtz.com/UK/Tougher+Government+energy+standards+could+significantly+impact+commercial+property+values

Around 70% of buildings that will be in use in the mid-21st century already exist

Around 70 per cent of buildings that will be in use in the mid-21st century already exist, and the Committee on Climate Change’s first report in 2008, Building a Low Carbon Economy, acknowledged that energy efficiency upgrade of our existing stock, especially in the residential sector, is a most cost-effective way of tackling reduction in CO₂ emissions. www.theccc.org.uk/pdf/TSO-ClimateChange.pdf

The Green Deal – upgrading existing stock
The Energy Act 2011 includes provisions to create a new financing framework, called the Green Deal to enable energy efficiency improvements to be carried out on households and non-domestic properties. The upfront cost of the improvements, generally the biggest barrier to uptake, will be paid for by a loan. These loans will be paid back over time through a regular charge placed on the property’s energy bill. The idea is that the energy bill should be lower after the improvements, so even with the charge added, money should still be saved. The Green Deal is expected to be launched in autumn 2012. For more information see Section 4.
The Energy Act also includes provisions to ensure that from April 2016 private residential landlords will be unable to refuse a tenant’s reasonable request for consent to energy efficiency improvements where finance (e.g. under the Green Deal or the Energy Company Obligation) is available.

Sustainability benchmarking schemes
The most widely used voluntary sustainability benchmarking systems in the UK are BREEAM and its ‘family’ of building assessment methodologies, including the Code for Sustainable Homes, which have acted as a focus for improved sustainability. LEED is a sustainability benchmarking system mainly used in the USA and the Royal Institution of Chartered Surveyors created the SKA Rating, a system for office fit outs and retail projects.

www.communities.gov.uk/planningandbuilding/sustainability/codesustainablehomes/
www.breeam.org
www.usgbc.org/leed
www.rics.org/ska

These systems create a score from the evaluation of various sustainability requirements. However, because the scoring in most of the requirements is on a sliding scale, it means different levels of ‘Pass’ are offered.

As some topics are optional, a project does not need to score in all areas, which means that a requirement for reconciling all the sustainable issues is absent. However, it should be noted that a Code for Sustainable Homes ‘Level 3’ is currently a minimum requirement for schemes funded by the Homes and Communities Agency (HCA).

GreenPrint is designed to provide a full assessment for an individual site in order to maximise that site’s sustainability potential

Post-Construction Assessments
More recently, both BREEAM and the Code for Sustainable Homes have introduced a Post-Construction Assessment as an option to achieve higher sustainability levels (although this does not yet extend to monitored energy performance in use) as well as some criteria relating to building management.

GreenPrint methodology from the BRE
The BRE has developed their GreenPrint methodology to assist design teams in delivering ‘master plans’ that maximise the potential for sustainable communities. The methodology works alongside BREEAM, the Code for Sustainable Homes and other industry recognised tools and standards. It is designed to provide a full assessment of an individual site in order to maximise that site’s sustainability potential. The assessment is carried out in consultation with the client and key stakeholders, who may include the master planners, the design team and developer, as well as the planning authority and other statutory bodies.

Greenprint covers eight key areas which impact on sustainability (see also Section 5, Step 8). There is more information, including a downloadable brochure, on the GreenPrint area of the BRE website.

www.bre.co.uk/page.jsp?id=1290

The National Planning Policy Framework
The Government’s 2011 consultation draft of the National Planning Policy Framework calls for a streamlined planning system to support a ‘presumption in favour of sustainable development’. This has proved a controversial document with environmental groups calling for:

- a single detailed definition of sustainable development, produced by the Government, to guide planners in drawing together the sometimes competing demands of environmental, social and economic issues
- more detail on issues such as energy efficiency, recycling and low-carbon energy targets

Although the NPPF sets out the Brundtland definition of sustainable development (see Introduction), it is difficult to come up with a more technical and detailed definition that would be appropriate in all local areas and stand the test of time. It is in the nature of localism that local authorities should be able to apply the definition of sustainable development in a way that meets their local circumstances, while ensuring all relevant themes are considered and evaluated.

The RIBA produced a ‘Guide to Localism: Opportunities for architects’ in 2011. Further information on Localism and the NPPF following its introduction will be made available on the RIBA website. www.architecture.com/TheRIBA/AboutUs/InfluencingPolicy/Localism/Supportingtheprofession.aspx
The UK’s Renewable Energy strategy
The UK’s Renewable Energy strategy 2009 is designed to comply with the European Renewable Energy Directive 2007, and sets a target for the UK to achieve 15 per cent of its energy from renewable sources by 2020.

The UK’s Renewable Energy strategy sets a target for the UK to achieve 15% of its energy from renewable sources by 2020

The Feed-in Tariff
The Feed-in Tariff (FIT) for renewable electricity offers financial incentives to those in a position to sell surplus energy generated locally. Through the use of FITs, DECC hopes to encourage the deployment of additional small-scale low-carbon electricity generation, particularly by organisations, businesses, communities and individuals that have not traditionally engaged in the electricity market.

This will allow many people to invest in small-scale low-carbon electricity, in return for a guaranteed payment from an electricity supplier of their choice for the electricity they generate and use, as well as a guaranteed payment for unused surplus electricity they export back to the grid. At the time this guide is going to press, the details of the FIT are being clarified. All the latest information is on the DECC website at: www.decc.gov.uk/en/content/cms/meeting_energy/Renewable_ener/feedin_tariff/feedin_tariff.aspx

The Renewable Heat Incentive (RHI)
The Renewable Heat Incentive (RHI) involves a financial support scheme to those generating heat from renewable or low-carbon sources. These schemes may incentivise building owners to incorporate such measures into their projects. www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/incentive/incentive.aspx

The Merton Rule
Against the background of broader Government policy statements, some planning authorities have policies that set out a minimum percentage of renewable energy to meet building energy demand, following the 10 per cent renewable energy precedent established by Merton Council. Many authorities also have policy requirements relating to sustainable urban drainage ‘SUDS’ and other biodiversity initiatives.

What is the Merton rule?
____________________________________________________________________________________
The London Borough of Merton was the first to conform to the Government’s renewable energy targets by setting the target for onsite energy generation from renewables for all new major developments in the borough (over 10 domestic dwellings) at 10%.

www.merton.gov.uk/environment/planning/planningpolicy/mertonrule.htm

The Low Carbon Construction Action Plan

The response identifies several key pointers including:
- the need to align design and construction with operation and asset management
- referencing the need to close the gap between modelled and actual performance of buildings
- advocating the use of the ‘Soft Landings’ project methodology to encourage user and building management input during the briefing and design development process
- extending post-contract monitoring and feedback through to occupation.

The objective to ‘close the performance gap’ was also highlighted in the Zero Carbon Hub’s Carbon Compliance report 2010 where an objective was headlined for an output-based verification of actual performance by 2020. www.zerocarbonhub.org/resourcefiles/CC_TG_Report_Feb_2011.pdf
Glossary

BIM – Building Information Modelling
BRE – Building Research Establishment
BREEAM – Building Research Establishment Environmental Assessment Methodology
CAD – Computer Aided Design
Design Council Cabe – formerly The Design Council and The Commission for Architecture and the Built Environment
CEN – European Committee for Standardization (Comité Européen de Normalisation)
CRC – Carbon Reduction Commitment
CSR – Corporate Social Responsibility
DEC – Display Energy Certificate
DECC – Department of Energy and Climate Change
DEFRA – Department for the Environment, Food and Rural Affairs
EPBD – Energy Performance in Buildings Directives
FIT – Feed-in Tariff
IES – Integrated Environmental Solutions
LEED – Leadership in Energy and Environmental Design
NPPF – National Planning Policy Framework
PHPP – Passivhaus Planning Package
RHI – Renewable Heat Incentive
RICS – Royal Institution of Chartered Surveyors
SAP – Standard Assessment Procedure
SBEM – Simplified Building Energy Model
SUDS – Sustainable Urban Drainage Systems
TSB – Technology Strategy Board
UKCIP – UK Climate Impacts Programme
UKGBC – UK Green Buildings Council

Where to find more information

Please note: the online version of the guide has many of the following links embedded in the text.

The RIBA’s Sustainability Hub
The RIBA Sustainability Hub is a great starting point: www.architecture.com/SustainabilityHub/SustainabilityHub.aspx

Government bodies
Department of Energy and Climate Change www.decc.gov.uk
Department for the Environment Food and Rural Affairs www.defra.gov.uk
Also includes the 2005 Sustainability Strategy at: http://archive.defra.gov.uk/sustainable/government/publications/uk-strategy/

Environment Agency website has a section on SUDS research, techniques and policy at: www.environment-agency.gov.uk/business/sectors/136252.aspx

Department for Communities and Local Government www.communities.gov.uk/corporate/

Legislation, regulations and policy initiatives
Building information Management (BIM)
For background and more information see the National BIM Report 2012 at www.thenbs.com/pdfs/NBS-NationalBIMReport12.pdf
BIM library opening 2012 www.nationalbimlibrary.com
CarbonBuzz www.carbonbuzz.org/
Check your carbon footprint www.decc.gov.uk/en/content/cms/tackling/saving_energy/individual/calculator/calculator.aspx
Feed-in Tariff (FIT)
www.decc.gov.uk/en/content/cms/meeting_energy/
Renewable_energy/feedin_tariff/feedin_tariff.aspx

Green Deal
www.decc.gov.uk/en/content/cms/tackling/green_deal/
green_deal.aspx

GreenPrint framework from BRE
www.bre.co.uk/page.jsp?id=1290

Low Carbon Construction Action Plan 2011
www.bis.gov.uk/assets/biscore/business-sectors/docs/
11-976-low-carbon-construction-action-plan

National Planning Policy Framework
www.communities.gov.uk/planningandbuilding/
planningsystem/planningpolicy/planningpolicyframework

Renewable Heat Incentive
www.decc.gov.uk/en/content/cms/meeting_energy/
renewable_energy/incentive/incentive.aspx

Soft Landings
www.bsria.co.uk/services/design/soft-landings

European standards

CEN
www.cen.eu/cen/pages/default.aspx

Energy Performance in Buildings Directive
www.europa.eu/legislation_summaries/other/l27042_en.htm

Sustainability benchmarking schemes in UK
Code for Sustainable Homes
www.communities.gov.uk/planningandbuilding/
sustainability/codesustainablehomes/

BREEAM
www.breeam.org

Other organisations

BRE – Building Research Establishment
www.bre.co.uk/index.jsp

Royal Institution of Chartered Surveyors
www.rics.org

Technology Strategy Board
www.innovateuk.org/ourstrategy/innovationplatforms/
lowimpactbuilding.ashx

UK Green Buildings Council
www.ukgbc.org