

# A-Z 'Beginner's Guide' to Sustainability in the Built Environment



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engineering and building services

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Building a more sustainable world is no easy job. It's a challenging and dynamic process that requires skills, innovation, energy, resource and waste minimisation - and more.

As you'd expect from a global challenge, sustainable development has its very own jargon. But whether you're a client, contractor or member of the wider public, it helps to speak the language. This A-Z guide, plus some occasional light commentary, will help you to speak 'sustainability' like a native, so you can engage more effectively with the serious challenges - and opportunities - ahead.

## A

### Alternative energy

An alternative to fossil fuel combustion - such as energy from wind, photovoltaics or hydroelectricity. 'Alternative energy' is often used interchangeably with 'renewable energy' but they are not exactly the same. Some technologies that are not based on renewable energy - notably nuclear power - are sometimes referred to as alternative energy.

### Air leakage rate

The uncontrolled movement of air in and out of a building, usually measured in cubic metres per hour, per square metre of building façade (see also air pressure testing).

### Air permeability

The rate of air flow through a known area, under a prescribed air pressure.

### Air pressure testing

Measuring the air leakage rate from a building - usually based on a standard 50 Pascal pressure difference.

### Air-source heat pumps

Small to medium-sized units that extract low grade heat (i.e. not very warm) from the outside air and convert it into useful heating inside a building or, in reverse, useful cooling in summer.

These pumps run on electricity, so there is no need for a gas connection or fuel storage. Air sourced heat pumps tend to look like air conditioning units, and they have a lot in common. See heat pumps.

### Asset rating

An energy efficiency rating given to new buildings, based on theoretical (which may not be actual) energy use.

### Audit

An audit is an objective (sometimes independent) check on whether something is happening as planned. An audit can check virtually anything, but done properly, it answers the question "how are we doing?". What matters most with an audit is what you do with the findings.

## B

### Benchmarking

Comparing performance with (comparable) others, either within or outside the organisation. Helps to assess where an organisation (or part of it) stands, in terms of good or best practice...

### Best practice

Best practice is what some organisations can do when they put in a determined effort. It tends to vary depending on who is doing it and under what circumstances, so it is not always transferrable to others. Best practice is not the same as good practice. Question: "What is the difference between good and best practice?" Answer: "About 20%" (quote from a major engineering plc manager).

### BREEAM

The Building Research Establishment Environmental Assessment Method (BREEAM) is an important way of assessing and describing the environmental performance of buildings. It sets standards for sustainable design and build. BREEAM assesses buildings against a variety of

criteria such as waste, pollution, energy, land use and ecology, materials, water and 'innovation'. Based on these criteria, BREEAM provides an overall rating that falls within a band of 'pass, good, very good, excellent or outstanding'.

## BS 8555

BS 8555 is a British Standard 'Guide to the phased implementation of an environmental management system - including the use of environmental performance evaluation'. It takes a six step approach to environmental management, and is aimed mainly at small businesses. It can be a route towards ISO 14001, or even EMAS.

## BS EN 16001

BS EN 16001 is an energy management systems standard. It is potentially useful to a range of organisations, and particularly those covered by the CRC Energy Efficiency Scheme. Although it emphasises energy management issues, it is similar in approach to ISO 14001.

## Building Emission Rate (BER)

The Building Emission Rate from a building in operation is compared to the Target Emission Rate (TER), to assess the level of compliance with the Building Regulations.

## Building services contractors

Building services contractors, notably those familiar with electrical and related design and installation, can help to assess the feasibility and scope of various energy saving and carbon reduction options. They can provide 'whole building' or 'integrated' approaches to the design and installation of electrical, mechanical and other building services.

# C

## CARBON

**In the context of climate change, 'carbon' has become shorthand for carbon dioxide - the now infamous 'greenhouse gas'. The carbon-related terms below illustrate how vitally important carbon has become to sustainability...**

## Carbon cap

The limit set on a Government, organisation or individual for carbon emissions under a carbon trading scheme.

## Carbon capture

Removing carbon dioxide from flue gas after fossil fuel combustion, before carbon storage. While not yet commercially viable, if we cannot significantly reduce carbon emissions in other ways, we may still see carbon capture in action.

## Carbon credit

A credit (or permit) arising from a greenhouse gas reduction scheme, such as carbon emissions trading.

## Carbon dioxide CO<sub>2</sub>

The most common man-made greenhouse gas by a country mile, most notably produced when burning fossil fuel for energy. Burning fossil fuel releases 'extra' carbon that had been previously locked in geological deposits. CO<sub>2</sub> is also produced by burning non-fossil fuels such as wood, but the growth of plant-based materials removes the equivalent carbon from the air, rather than from geological storage.

## Carbon dioxide equivalent

Carbon dioxide equivalent (CO<sub>2</sub> e) converts the masses of various greenhouse gases to a mass of CO<sub>2</sub> that gives the equivalent global warming potential (GWP) - generally over a 100 year timeframe. For example, the CO<sub>2</sub>-e of methane is 25 times that of carbon dioxide.

## Carbon Emissions Reduction Target

The Carbon Emissions Reduction Target runs to 2011. It requires significant domestic energy suppliers to boost energy savings. Suppliers must focus 40% of activity on vulnerable and low-income households, and pensioners over 70. Also has provisions for 'hard-to treat' homes (i.e. off-grid, or solid walled homes).

## Carbon footprint

The total amount of greenhouse gases (misleadingly, not just carbon dioxide) emitted directly or indirectly due to various activities (i.e. 'doing business'). It is typically expressed in equivalent tonnes of either carbon or carbon dioxide - though it is essential to say which, and to compare like with like.

## Carbon monoxide

Not to be confused with carbon dioxide, carbon monoxide (CO) is an odourless toxic gas that can kill in high concentrations or in enclosed spaces. It forms when there is not enough oxygen to produce carbon dioxide (CO<sub>2</sub>). It is not a greenhouse gas (though it may oxidise to form CO<sub>2</sub>), but what really matters is CO's acute health hazard.

## Carbon neutral

When applied to a building, it means running the building without net carbon emissions. The usual route to this is a combination of energy efficiency and the use of renewable energy, but can also include offsetting the carbon emissions, for example through tree planting schemes (see also zero carbon).

## Carbon offset

A reduction in emissions of carbon or other greenhouse gases that compensates for ('offsets') a greenhouse gas emission somewhere else. A tonne of carbon emitted elsewhere has the same climate change impact as a tonne of carbon emitted nearer home, but some carbon reduction measures are cheaper than others so sometimes, offsetting seems sensible. A common offset is renewable energy, but it can include a range of other measures, such as managed forestry or burning methane gas from landfill.

## Carbon reduction

Reducing the demand for energy obtained from burning fossil fuels (such as coal and gas at power stations).

## Carbon Reduction Commitment (CRC)

Views on the CRC Energy Efficiency Scheme range from "expensive and complicated" to "important and innovative". Either way, the CRC aims to reduce

commercial and public sector carbon emissions, by modifying the behaviour of organisations that use at least 6,000-megawatt hours of electricity p.a. These organisations must buy carbon emission allowances at £12/tonne from 2012. In October 2010, the coalition Government announced that all the money raised from selling carbon allowances will go to the Treasury, adding around 8% to commercial energy bills from 2012 – if the coalition doesn't change the rules yet again.

## Carbon storage

Keeping carbon dioxide out of the atmosphere by storing it underground (e.g. in empty oil and gas reservoirs or coal seams). This is sometimes called 'engineered carbon sequestration' but whatever it is called it is not cheap, and seldom easy.

An alternative is to lock carbon into forests or soils, though this process is slow and reversible (e.g. forest fires).

## Carbon trading

Carbon trading allows the buying and selling of carbon emission allowances. Organisations that reduce carbon below their allowance can sell the difference to others who want to buy them. To reduce overall carbon emissions, the total amount of allowances is reduced over time, to raise the price of carbon and encourage carbon reductions. The EU Emission Trading Scheme covers various greenhouse gas emissions by setting limits on total emissions.

## The Carbon Trust

The Carbon Trust is an independent UK organisation that encourages and promotes low carbon technologies and other carbon reduction measures by business and the public sector. It provides funding to support technological innovation and other carbon reduction measures.

## Certification

Process of third party assessment to see if an organisation or product meets a specified (environmental) standard, e.g. certification of an organisation's environmental management system to ISO 14001.

## Certification body

An organisation that offers third party certification of a management system. UK accreditation of these organisations is normally carried out by UKAS. So, for example, companies are not "accredited" to ISO 14001 - they are "certificated"...

## Climate change

This is usually taken to mean 'anthropogenic' climate change, i.e. climate change caused by human activity such as burning fossil fuels and land use that 'unlocks' carbon.

## Climate Change Act

Amongst other things, the *Climate Change Act* 2008 sets a UK target for 2050 for the reduction of targeted greenhouse gas emissions by 80% from a 1990 baseline, with an interim 34% reduction by 2020. It also paved the way for the CCC (below) and the CRC Energy Efficiency Scheme.

## Climate Change Levy

The Climate Change Levy is a tax on the commercial supply of energy for lighting, heating and power. Those paying the levy include industry, commerce, and public administration. In 2010 it was:

- electricity = £0.0047 per kilowatt hour
- gas of a kind supplied by a gas utility = £0.0016 per kilowatt hour
- petroleum gas, or other gaseous hydrocarbon as a liquid = £0.0105 per kilogram.

For electricity, the CCL adds around 5% to commercial energy bills.

## Code for Sustainable Homes

The voluntary Code that assesses a new home against categories of sustainable design, rating the 'whole home' as a complete package. It uses a 1 to 6 star rating system to communicate the overall sustainability performance of a new home. Code 6 is effectively a 'zero carbon' home. The Code also gives buyers information about the environmental impact of a new home and its potential energy costs, and offer builders a tool with which to differentiate themselves in terms of sustainable development.

## Committee on Climate Change (CCC)

The CCC is an independent body, established under the Climate Change Act 2008 to advise the UK Government on its ongoing carbon budgets, and to report to Parliament on how the UK is doing with regard to its greenhouse gas reduction targets.

## Coefficient of Performance (CoP)

The CoP is a ratio of the heating or cooling provided by a system to the energy consumed by the system. The most energy efficient systems have a relatively high CoP (basic electrical heating has a CoP of one).

## Combined heat and power (CHP)

Technology that produces electricity from the combustion of fuel and allows process heat to be utilised e.g. to heat buildings or for hot water. CHP can use fossil fuels such as gas but also fuels from renewable sources e.g. woodchip and organic waste. The heat is captured and supplied to premises or used in industrial processes. CHP plants are not suitable for all buildings but where they are, they can be over 90 per cent efficient, compared to power stations that may be less than 40 per cent efficient.

## Corporate social responsibility (CSR)

Corporate social responsibility refers to an organisation's responsibility to its stakeholders, which include employees, customers and the general public. CSR requires communication with key stakeholders, rather than just disseminating messages. CSR is becoming increasingly important in the supply chain, as organisations realise that stakeholders can significantly affect corporate objectives.

## D

## Demand-side management

Demand-side management is designed to help balance energy demand with supply. It is particularly important for

electricity, which is difficult or expensive to store. It influences the quantity or patterns of energy use, such as actions targeting reduction of peak demand during periods when energy-supply is constrained. Peak demand management may not decrease total energy consumption but may reduce the need for investment in networks and/or power plants.

## Deming cycle

In the 80s, Deming and Walton came up with a management model that uses a 'Plan, Do, Check and Act' cycle to pursue continual improvement. Today, the model is the basis of environmental, safety and quality management systems worldwide, including ISO 14001 (environment), OHSAS 18001 (occupational health and safety) and 9001 (quality).

## Display Energy Certificate

A certificate of energy performance that must be displayed in many public (i.e. government or publicly owned) buildings. It shows the energy consumption per unit area of the building, and compares it against a suitable benchmark to give an 'A-G' rating. An 'A' rating shows excellent energy performance.

## Duty of care

In the UK, a legal duty imposed on those who hold business waste (e.g. storing, treating or disposing) to prevent its escape, document its transfer and ensure transfer to authorised persons (e.g. registered carriers), and ensure that it is disposed of at appropriately licensed facilities. Also applies to hazardous waste, along with extra legal requirements (see waste).

# E

## Eco-tax

A financial measure that aims to modify organisations' behaviour so that they reduce environmental impacts. For example, an energy tax encourages energy efficiency, a carbon tax encourages moves to lower carbon technologies, including renewable energy, and a landfill tax encourages waste minimisation, re-use or recovery. Eco-taxes provide choice, to the extent that they don't specify what the modified behaviour should be, or to what extent it should be undertaken.

## EEE

Quite simply, electronic and electrical equipment (see WEEE).

## Embodied carbon

Assessing embodied carbon is a specific type of life cycle assessment. Embodied carbon assesses the carbon dioxide generated during the life cycle (or parts of it) of a product or equipment (e.g. it does not apply to energy consumed or generated during product use). The scope of the lifecycle may include raw material extraction, transport, manufacture, assembly, installation, disassembly, recyclability or burning for energy. The selected scope must be clear. Despite the name, it does not describe the amount of carbon in a product. Embodied carbon is similar to embodied energy.

## EMAS

The EU Eco-Management and Audit Scheme (EMAS) is a European third party assessment scheme that shows an organisation has an environmental management system

and that it reports publicly on its environmental performance. It is big in Germany (don't ask...) but has far fewer takers in the UK, where it tends to be eclipsed by ISO 14001. Even so, certification to ISO 14001 can be used as the foundation for EMAS registration.

## Energy Performance of Buildings Directive (EPBD)

The EPBD sets national requirements for improving the energy performance of buildings. The Directive:

- establishes a framework for a common method for calculating the energy performance of buildings
- sets minimum energy performance standards for new buildings, and buildings subject to refurbishment
- introduced energy performance certificates.

The requirements of the EPBD are implemented in the approved documents of Building Regulations Part F (Ventilation) and Part L (Fuel and power) for England and Wales, with similar rules in the rest of the UK.

## Energy Performance Certificate

A certificate required when a building is purchased, sold or has a change of lease or tenancy. It compares the design of the building with a model to give an 'A - G' energy rating. 'A' shows excellent energy performance.

## Energy review

An energy review shows where, how and what sort of energy is currently used in an organisation. A good energy review will:

- Establish the total amount of energy being used
- Identify wasteful energy use
- Identify opportunities for making carbon reductions and cost savings
- Highlight maintenance requirements, and
- Assess the scope for new technology and other energy saving measures.

## Energy Savings Trust

A Government backed organisation that issues energy saving information and advice, and manages programmes to improve energy efficiency, mainly in the domestic sector.

## Enhanced Capital Allowance (ECA)

The ECA allows end users to offset 100% of the cost of low energy, water conservation and low carbon equipment against tax in the year it is purchased. Qualifying products are shown in the Carbon Trust's Energy Technology List. Much as we are pleased to be associated with the benefits of this scheme, it is not linked to the Electrical Contractors' Association (ECA).

## Environmental aspect...

Part of an organisation's activities, products and services that can interact with the environment (an ISO 14001 definition). Aspects are the 'cause' of environmental impacts, and since you have control over them, they are the part to try and manage.

## ... and environmental impact

A good or bad effect on the environment as a result of various aspects (activities, products or services) of what an

organisation does. Impacts are the environmental 'effect'. Energy from renewables is sometimes expressed as a positive impact. Negative impacts are hard to control and if they are substantial, can be very expensive and affect reputation...

## Environmental management system (EMS)

Part of an organisation's overall management system that covers environmental and associated issues. It includes organisational structure, planning, responsibilities, practices, procedures, processes and resources for achieving, reviewing and maintaining a suitable environmental policy and objectives. The world's favourite third party assessed EMS is ISO 14001, though it is possible to run an EMS without third party certification.

## Environmental performance indicator (EPI)

Provides headline information about selected parts of an organisation's environmental performance. EPIs may cover 'aspects' (e.g. amount of carbon dioxide emitted per unit output) or 'management' (e.g. training)

# F

## Feed-in Tariffs (FITs)

FITs pay homeowners (and some businesses) to generate electricity from selected renewable sources. They are misnamed in that the bulk of the tariff is not made for 'feeding in' electricity to the national grid, but by simply generating renewable energy. There is a relatively small extra payment for feeding energy into the grid. Introduced in April 2010, FITs have notably kick-started the installation of domestic photovoltaics, for those who have the capital outlay.

## Fossil fuel

Organic sediments or pockets formed underground over geological time. Common fossil fuels are coal, natural gas and oil. These fuels are regarded as non-renewable (i.e. they cannot be replaced, which also has implications for energy *supply*) and burning them produces... (see carbon dioxide).

## Fuel cells

Fuel cells employ electrochemistry (electrodes and electrolyte) and hydrogen and oxygen to generate electricity. Fuel cells are different from conventional batteries – the former consume reactants while the latter store their own (chemical) electrical energy. Other combinations of fuels and oxidants are possible. Developments in renewable energy could conceivably lead to carbon-free large scale hydrogen production (using off-peak electricity to convert water into hydrogen and oxygen).

# G

## Global warming

An overall increase in the Earth's lower atmospheric (tropospheric) and surface temperature. This happens when energy that would otherwise radiate back into space is absorbed by greenhouse gases to give a so-called 'greenhouse effect'. Global warming does not mean that the whole world heats up to the same degree, and it can lead to increased rainfall and other weather, not just hotter, drier climates.

## Global warming potential (GWP)

GWP estimates how much a given greenhouse gas contributes to global warming. It is a relative scale that compares the greenhouse gas in question to that of the same mass of carbon dioxide. A GWP should ideally be expressed over a specific time, such as 100 years.

Example GWPs are:

Carbon dioxide (which is defined as 1)

Methane 21

Halocarbons 140 to 11,700

Sulphur hexafluoride 23,000.

## Good practice

What virtually everyone is required or expected to do. Can be fairly similar across sectors and is so transferrable that it is often backed up by legal requirements. Develops over time and often lags behind some types of best practice. It is not usually the same as best practice for a given sector but significantly, it may be much more widely applied...

## Ground source heat pumps

Systems that convert large amounts of low grade heat from the ground into smaller amounts of higher grade heat for use in a building. Ground source heat pumps typically provide the heating equivalent of 2.5 to 4 times the energy needed to make them work (the CoP). Best considered when other major building work is needed. See heat pump.

# H

## Heat and Energy Saving Strategy (HESS)

HESS aims to reduce carbon emissions from existing buildings to 'approaching zero' by 2050. HESS will need to be supported by specific, significant and short term actions to be meaningful.

## Heat pump

A heat pump uses compression (powered by electricity) to extract heat from a large volume (low grade) heat reservoir and deliver that heat to a smaller volume (higher grade) heat reservoir. In reverse it can be used to cool or refrigerate. A heat pump has three main parts:

- the evaporator coil – this absorbs heat from the outside air;
- the compressor – which pumps the refrigerant through the heat pump and compresses the gaseous refrigerant to the temperature needed for the heat distribution circuit (the part that tends to make the most noise); and
- the condenser/heat exchanger (e.g. the warm part at the back of a fridge) gives up heat to a hot water tank which feeds the distribution system.

# I

## Innovation

Typically, applying an existing technology or techniques in new ways, or applying a new technology or technique for the first time.

## ISO 14001

The pre-eminent international environmental management system standard. It applies to manage significant 'aspects', in order to prevent significant adverse environmental 'impacts'.

## K

### Key performance indicator (KPI)

KPIs are commonly used by Government and organisations to evaluate and publicise how much progress has been made towards selected, and ideally indicative, improvement targets. See also EPIs.

### Kyoto Protocol

A groundbreaking, though hardly ground shaking, United Nations agreement by over 150 countries to reduce greenhouse gas emissions. Industrialised countries committed to cut overall emissions to 5% below 1990 levels by 2008 - 2012. The protocol is now being overtaken by events, including far bigger international carbon reduction targets.

## L

### Landfill Tax

A tax that aims to encourage waste producers to produce less waste and recover more value from waste, for example through recycling or composting, before resorting to landfilling.

### Integrated photovoltaics

Systems where photovoltaic panels replace conventional building materials such as roof tiles or facades.

### Life cycle assessment (LCA)

An LCA compiles material, energy and waste flows to help evaluate the environmental impact of a product or service over its life cycle (i.e. previously referred to as 'cradle to grave', but these days often including reuse or recovery). An LCA needs good raw data, and it is more credible when it deals with simple products and supply chains. LCA is often used to compare the impacts of different products that are used for the same function. Depending on who is doing the LCA, they may show some bias and some include numerous assumptions and caveats.

### Life cycle thinking

An environmental management technique that considers the life cycle impacts of a product or service. It tends to be less rigorous than LCA but it still supports 'cradle' to 'new cradle' thinking and can be an important part of an organisation's approach to sustainability

### Low and Zero Carbon (LZC) technologies

Building services systems that are either carbon neutral or highly energy efficient, reducing carbon emissions from power generation or fossil fuel use. Also called 'low to no carbon' measures.

## M

### Marginal abatement cost curve (MACC)

MACCs show the cost per tonne of eliminating CO<sub>2</sub> emissions and the amount of CO<sub>2</sub> saved. A MACC curve ranks projects or measures based on their Whole-life Net Present Value (expressed as £/t CO<sub>2</sub> reduced). MACCs are typically produced to assess the relative cost and carbon reduction implications of potential energy saving or renewables projects.

### Market Transformation Programme

A programme to boost products, systems and services with reduced environmental impact. It supports a growing set of 'product' policies that aim to encourage supply-chain measures such as reliable product information, raising minimum 'green performance' standards and encouraging best practice.

### Micro-CHP

Typically, CHP with an output of less than 5kW electrical output, designed for use in suitable homes and small commercial buildings.

### Microgeneration

Small energy generating systems, typically up to 50kW output. They are installed close to the point of use, either in smaller businesses or homes. Such systems include CHP, air source heat pumps, renewables such as photovoltaics and less commonly, wind power.

### Microgeneration Certification Scheme (MCS)

The MCS is supported by the Government's Department of Energy and Climate Change. It is designed to evaluate products - and those who install them - against robust criteria. The scheme is open to firms involved in the supply, design, installation and commissioning of microgeneration technologies. It is not possible to benefit from Feed-in tariffs without using an installer who is registered with the MCS. Elecsa, an ECA group company, runs a leading MCS.

### Micro-wind turbines

Small wind turbines (usually up to 1kW output) designed to provide electric power to a home or other local site. Seldom at the top of the list for anyone looking to install renewables in built up or sheltered areas.

## N

### Notional Calculation Methodology

The Notional Calculation Methodology is a procedure for demonstrating compliance with the Building Regulations for non-domestic buildings. It requires the calculation of the annual energy use for a proposed building, which is then compared with the energy use of a standard 'notional' building.

## O

### Operational rating

A measure of a building's energy use (and resulting carbon emissions) compared to a benchmark for that type of building - usually based on at least 18 months of energy use information. (For new buildings see 'asset rating').

# P

## PAS 91

PAS 91 is a voluntary pre-qualification guide. It includes a set of environmental management (and other) questions for clients and main contractors to ask their sub-contractors, before considering them for tendering. It is supported by key Government Departments and many other bodies, including the ECA.

## Passive building

A well insulated and very airtight building that has mechanical inlet and extract ventilation. A dwelling that achieves the German 'PassivHaus' standard typically includes:

- very good levels of insulation with minimal thermal bridges
- effective utilisation of solar and internal gains
- excellent airtightness; and
- good indoor air quality, provided by a whole house mechanical ventilation system with highly efficient heat recovery.

## Passive solar energy

Key techniques include south-facing windows, natural shading and ventilation, and materials that absorb heat from the sun and then slowly release it.

## 'Payback' period

Traditionally, a description of how long it takes to recoup an investment. It can be used, for example, to assess the time before savings due to process efficiency equal the amount invested in the efficiency. However, the term is also being applied to the 'energy' or 'carbon payback' of 'low to no carbon' energy systems. Here, the payback is the time for the technology to save enough energy/carbon to match the energy/carbon required during stages such as production, installation, maintenance and decommissioning. Also relates to 'embodied carbon' and 'embodied energy' (see Carbon).

## Photovoltaics

Photovoltaics convert solar energy into electricity. They are usually made of two or more thin layers of semi conducting material, usually silicon (often referred to as 'solar cells'). When sunlight strikes the cell, electrons move toward the treated front surface. This causes electricity to flow – and up to a point, the greater the intensity of light, the greater the electricity. Easily the biggest driver has been the arrival of Feed-in tariffs.

## Polluter Pays Principle

A fundamental principle of EU environmental policy. It says that the cost of controlling an environmental impact should be borne by the producer of the impact, rather than by society as a whole.

## Process efficiency

Using fewer resource inputs (materials and energy) and generation of less waste (e.g. solid and liquid wastes, heat, emissions and effluent) for a given level of production or service. It incorporates waste minimisation and energy efficiency. Good business.

## Producer responsibility

Producer responsibility is a 'life cycle' extension of the 'polluter pays' principle. It aims to ensure that organisations that put substances or articles (products) on the market take responsibility for their environmental impact when they reach the end of their useful life.

# R

## Renewable Energy

Energy from resources that can be readily replaced. Examples include passive solar (building design), active solar heating (through collectors such as plates or tubes), photovoltaics, wind power, hydro-electricity and biofuels (using organic waste, timber or energy crops). The renewable aspect is most attractive because it contributes to energy sufficiency. However, renewables tend to greatly reduce carbon emissions for a given unit of energy, which is the main environmental benefit.

## Renewable Heat Incentive (RHI)

The Government-backed RHI is expected to start in June 2011. It aims to provide long term support for renewable heat technologies, from household solar thermal panels to commercial wood pellet boilers and heat pumps. The Government is committed to moving to 12% of all heat generated from a renewable source by 2020.

## Renewables Obligation

The renewables obligation is placed on licensed electricity suppliers, who must deliver a specified amount of electricity from eligible renewable sources. Energy companies are required to generate a minimum of 10% of their output from renewable sources, or buy renewables obligation certificates on the open market.

## Restriction of Hazardous Substances (RoHS)

The RoHS Directive came into force in July 2006. Among other things, it bans or restricts lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants in new EEE.

# S

## Significance assessment

The evaluation of environmental aspects and their environmental impact, carried out as part of environmental management. It is a prioritisation process where an organisation decides which environmental interactions must (or should) be managed. Prioritisation includes legal requirements and key stakeholder issues, in addition to significant environmental hazards.

## Simplified Building Energy Model

Calculation software to help building services designers comply with 'Part L' of the Building Regulations.

## Site waste management plan (SWMP)

SWMPs are required by legislation for all sizable construction projects. SWMPs aim to increase planning to boost waste reduction, re-use and recovery. The duty



holder must identify who is responsible for project resource management, the types of waste that will be generated, and how waste will be measured and managed.

## SKA

The SKA rating is a labelling method from RICS that is designed to rate and compare the performance of fit-out projects.

## SMART environmental target

SMART targets are 'specific, measurable, agreed, realistic and time bound'. They are often lined to objectives, and KPIs or EPIs.

## Solar gain

A temperature increase in a space or structure, due to incoming solar radiation. This can be a big problem with large south facing windows, extensions or atriums.

## Solar thermal heating

Using energy from the sun to provide hot water for a building. Solar thermal roof panels usually come in two types: flat panels or vacuum tubes.

## Stakeholder

Individuals, communities or other bodies that have a significant interest in an organisation or are affected significantly by its policy or behaviour. Stakeholders can include employees, customers, suppliers, local communities, neighbours, regulators, pressure groups and the media. They can influence the organisation's 'operating space' – what it can and cannot do in terms of its activities, products and services.

## Standard Assessment Procedure (SAP)

The SAP has been adopted by Government as the UK method for calculating energy performance within 'Part L' Approved Document L1A - Conservation of fuel and power in new dwellings and Approved Document L1B - Conservation of fuel and power in existing dwellings. It is based on a range of factors that contribute to energy efficiency, notably:

- materials used for construction of the dwelling
- thermal insulation of the building fabric
- ventilation characteristics of the dwelling and ventilation equipment
- efficiency and control of the heating system(s)
- solar gain
- the fuel used to provide space and water heating, ventilation and lighting
- renewable energy technologies.

## SUSTAINABILITY

For many, sustainability is the key to social, environmental and economic survival. For some, it is the dreaded 'S' word and the signal to slip off into neutral ... now pay attention at the back!!! Sustainability is a massive, long haul goal, with challenges and opportunities to match – and the route to getting there is sustainable development...

## Sustainable development

The Brundtland Commission's classic definition is: "development which meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable development is the process that heads towards the ultimate goal of 'sustainability'. The 1987 Brundtland Commission report, Our Common Future, highlighted three components of sustainable development: environment, society and economy (the latter two hinge on sufficient education and training, for example). But it has since been acknowledged that the environment has load bearing and resource limits that must not be exceeded, irrespective of the key importance of the other two. Too much carbon in the atmosphere is one limit, and excessive exploitation of resources and tipping waste into landfills are other prime examples.

## Sustainable procurement

A process that allows organisations to meet their needs for useful goods and services whilst avoiding significant social, financial or environmental impacts.

## T

### Target Emissions Rate (TER)

The preferred rate of greenhouse gas emissions from a proposed building or refurbishment project. It is set by the project team and client at the start of the design process. See BER.

### Thermal imaging

Infrared thermal imaging (thermography) is a non-contact temperature measurement and assessment technique...

In the context of energy saving, a thermographic camera shows heat losses from a building's façade and roof, which in turn shows where and what types of insulation or other energy saving measures are required.

### Thermal insulation

Material used to reduce heat transfer. Heat can transfer from one material to another by conduction, convection, radiation or by the overall movement of fluids. Insulators minimise the transfer of heat energy.

In home insulation, the 'R-value' is an indication of how well a material insulates.

### Thermal mass

The capacity of materials to store heat. Buildings composed mainly of bricks, blocks and concrete have a relatively high thermal mass.

## W

### WASTE

Waste materials are anything that a holder discards, or intends (or is required) to discard. An item is discarded when it is no longer part of the normal commercial cycle, or the chain of utility. It is of course, also possible to waste energy...

## Waste and Resource Action Programme (WRAP)

A leading Government-sponsored programme that includes waste minimisation. WRAP provides free information and advice to businesses.

### Waste minimisation

Providing a given product or service with less waste, notably during the production and delivery process. Also good business.

### Waste recovery

Processing waste so that extra value can be obtained from it, through recycling (recycling is a form of recovery), burning for energy (if it is combustible) or composting (if it is biodegradable). Yes, *composting* is one of our three big hopes for dealing with the burgeoning waste mountain. Another one is...

### Waste recycling

A key sub-set of waste recovery. The segregation, collection and reprocessing of waste into usable raw materials or products. Since recycling requires a process, which may itself require energy, re-use is often preferred, where possible.

## WEEE

Is waste EEE... that is, waste electrical and electronic equipment. The WEEE Directive aims to minimise the impact of waste EEE on the environment, by increasing re-use and recovery, and reducing the waste going to landfill. It makes producers responsible for financing the collection, treatment, and recovery of WEEE. For lighting, which is of particular concern to electrical contractors, recovery is normally achieved through recovery schemes (such as Recolight or Lumicon) or through distributor collection.

## Z

### Zero carbon building

Finally, we come to 'zero carbon' buildings. There aren't very many of these yet, so by themselves, they aren't going to deliver sustainability - but they show the way for new buildings and provide good cues for what to do when laying into existing buildings. The few that have been built have zero net carbon emissions as a result of clever 'passive' design, renewables or other so-called 'allowable solutions' (e.g. a separate wind turbine or CHP plant). The latest update to the EPBD says that the 'total annual primary energy consumption' of a 'net zero energy building' 'does not exceed the energy produced from renewable energy sources on-site'.

## About the Electrical Contractors' Association

The Electrical Contractors' Association (ECA) is the UK's leading trade association representing the interests of contractors who design, install, inspect, test and maintain electrical and electronic equipment and services. 'ECA Certification' is the ECA's UKAS-accredited independent, third party certification body.

### The ECA:

- Provides a comprehensive, first-class range of tools and expert support services to our 3000+ Registered Members. ECA Registered members range from local contractors to national building services organisations with broad building services capabilities. Collectively, our members have an annual turnover of more than £5 billion, employ over 30,000 operatives and support 8,000 apprentices in training.
- Works with regulatory bodies, government and opinion formers to help build an efficient and sustainable industry, based on high standards of training and practice. Through representation and lobbying, the ECA actively leads on key issues including safety, sustainability, training, qualification and technological development.
- Has formed a number of strategic relationships with those who specify electrical and related work, to enhance the profile and promote the use of Registered Members.



Darren Burford - Andromeda

This 'A-Z' guide provides general information, but legal, financial and other developments may overtake some of the information provided. As such, this guide is not intended, and should not be used, as the basis for any commercial plans or decisions.



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