

Green Matters

Climate change has become an impetus for the acceleration of sustainable development and designing more efficient buildings. While climate change is believed to be accelerated by greenhouse gas (GHG) emissions from all energy end-use sectors (including transport, industry, agriculture, and waste management), buildings are responsible for as much as one-third of all global GHG emissions and approximately 40% of all global energy use. That said, However, the building industry - from construction through usage and management - also has the greatest potential for delivering GHG emission cuts at the least cost, using mature technologies and resources available today.¹

Regulatory Background

In recent years, the attention towards sustainability and climate change has become an increasingly political and economic issue. In 1992, countries from around the world agreed on the United Nations Framework Convention on Climate Change (UNFCCC), and, although the agreement had nearly universal membership, the voluntary commitments did little to establish binding government targets. The Kyoto Protocol, first adopted in 1997 and fully ratified in 2005, was designed to bind countries to a total cut in GHG emissions of 5% against 1990 levels between 2008-2012. This has been extended to 2020 by the Doha Amendment in 2012. The Paris Agreement from 2015 committed 127 nations to limit greenhouse gas emissions in order to limit the global warming to 1.5C.

The average target reduction includes the six main greenhouse gases as follows:

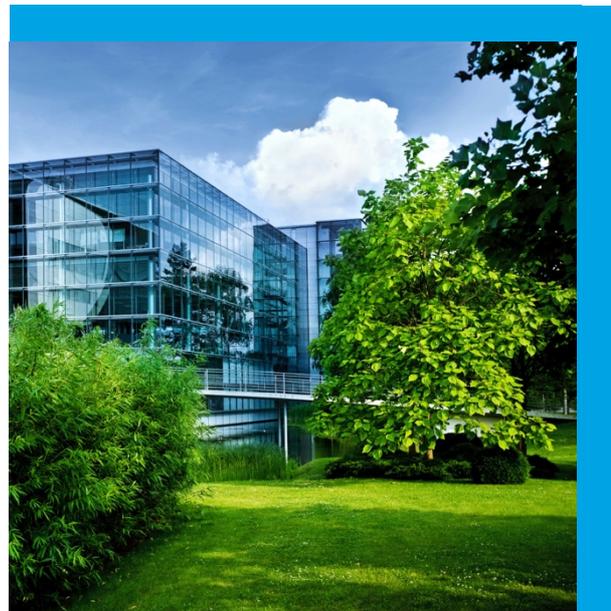
- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Petrofluorocarbons (PFCs)
- Sulphur hexafluoride (SF₆)

Under the agreement, the governments of participating industrialised countries divide their domestic targets among major emitters within the economy, primarily industry and agriculture.

Following the first commitment period of the Protocol that ended in 2012, a second commitment period was agreed, known as Doha Amendment, until 2020. Negotiations were undertaken on measures to be taken after the Doha Amendment ends in 2020. It resulted in the Paris Agreement adoption in 2015.²

¹ UNEP-SBCI, www.unep.org/sbcil/

² UNFCCC, <http://unfccc.int/>



Regional Targets and Regulations

With the delay in reaching a binding global pact to tackle climate change, individual countries are now beginning to introduce their own measures to achieve carbon reduction goals, including national building standards that will reduce emissions. In the UK, the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) is a mandatory regulatory incentive to improve energy efficiency and reduce carbon dioxide (CO₂) emissions, which are vital components to achieving the UK's overall target of reducing GHG emissions by at least 80% of 1990 level by 2050, compared to the 1990 baseline. Around 5,000 large public and private sector organisations will be required to participate fully in the CRC, meaning they must not only record and monitor their CO₂ emissions, but also purchase allowances equivalent to their emissions each year.³

In addition to the legislative requirements to reduce GHG emissions, there are increasing pressures on organisations from consumers to demonstrate their 'green credentials'. One of the ways companies can demonstrate proactive steps towards sustainability is by pursuing green building upgrades and certifications.

³ DECC, www.decc.gov.uk, CRC User Guide

What is a 'Green' Building?

The practice of using environmentally friendly and resource-efficient materials and processes in the construction and design of new structures is known as 'green building'. These techniques can be incorporated throughout a building's life-cycle, from siting to design, construction, operation, maintenance, renovation, and finally deconstruction. Building materials are often chosen for their sustainable features, such as their local availability to reduce travel miles, amount of recycled content, renewable sourcing, thermal insulating properties and recyclability.

Green Building Standards

Guidelines and ratings for buildings have been established to help achieve efficiencies and to set the standards and benchmarks for best practices in sustainable design. These tools also allow an objective assessment to determine sustainability levels by presenting a "menu" of all the green measures that can be incorporated into a building. Points are awarded to a building according to which measures have been incorporated, and, after appropriate weighting, a total score, or rating, is then determined.

Environmental assessment methods are available in many countries to score and rate buildings against set criteria. The resultant certification provides proof of a building's 'green credentials'. Three of the most widely used rating systems for green building assessments are:

BREEAM	UK
LEED	USA
Green Star	Australia

BREEAM in Focus

One of the biggest opportunities to address the UK's environmental impact lies in better management and improvement of existing building stock. The Building Research Establishment Environmental Assessment Method (BREEAM) is the leading and most widely used environmental assessment method for buildings in the UK, and the system is now expanding globally. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. BREEAM provides clients, developers, designers and others with:

- Market recognition for low environmental impact buildings
- Assurance that best environmental practice is incorporated into a building
- Inspiration to find innovative solutions that minimise environmental impacts
- A benchmark that is higher than regulation
- A tool to help reduce running costs, and improve working and living environments
- A standard that demonstrates progress towards corporate and organisational environmental objectives

In addition, BREEAM addresses wide-ranging environmental and sustainability issues. It also enables developers and designers to prove the environmental credentials of their buildings to planners and clients.

More specifically, BREEAM:

- Uses a straightforward scoring system that is transparent, easy to understand and supported by evidence-based research
- Has a positive influence on the design, construction and management of buildings
- Sets and maintains a robust technical standard with rigorous quality assurance and certification

Approved BREEAM assessors for new buildings evaluate buildings according to three tiers of questions in the following categories:

- Energy
- Water
- Materials
- Transport
- Waste
- Pollution
- Health & wellbeing
- Management
- Land use & ecology

Based on these criteria, buildings are rated as PASS, GOOD, VERY GOOD, EXCELLENT, or OUTSTANDING, and owners are issued an accompanying certificate. Assessment can also be undertaken for existing buildings as well as community scale developments.

Understanding the Risks

Green buildings have clear benefits and advantages from an environmental viewpoint and will increasingly satisfy new legislative demands and corporate objectives. However, sustainable building materials can, in some instances, introduce additional property risks that need to be identified, evaluated, controlled for and managed in order to avoid unnecessary losses. Some of the areas that need to be considered are:

- Building construction materials
- Energy technologies
- Water usage
- Waste recycling
- Planning consents

Building Construction Materials

Some common building materials can introduce increased fire loads due to their inherent combustible nature. For example, modern methods of construction (MMC) often includes more off-site built timber framing and greater use of combustible insulation materials (such as polyurethane or even polystyrene) to meet higher thermal demands. Whilst these materials can reduce the carbon footprint of the structure both from a construction and in-use point of view, the fire related performance can often be detrimental and needs to be fully considered.

Another aspect often included in designs is vegetative roofs, which typically utilise grass or sedum. Unless adequately watered, these roofs can become tinder dry in lengthy periods of drought, causing a fire hazard. A full risk-based review at the early stages of the design process should be undertaken to ensure that all appropriate construction materials and fire protection techniques are used to manage these types of risks. Retrofitting protection or changing materials and design at a later stage in the build process may be costly.

Energy Technologies

One of the ways in which green buildings can achieve energy savings is through the use of renewable energy technologies, including photovoltaic cells, wind turbines, fuel cells, bio-mass power and heating generators. Energy saving devices also includes more efficient lighting with automatic switching, energy-efficient glazing and low energy appliances. The introduction of any new energy technology needs to be carefully assessed and evaluated to minimise potential increased risks from hazards such as fuel storage (waste burners, or hydrogen generators) or exposure to natural perils (high wind or hailstorms affecting exterior photovoltaic cells, for example).

Water Usage

Minimising water usage within a building is achievable with low usage devices, such as toilets, and 'grey water' irrigation systems.

The provision of automatic sprinkler protection can be mistakenly regarded as detrimental in view of the water used during operation in a fire situation. However, the contrary is true, as the fire brigade will use up to 10,000 times more water to achieve the same result fighting a fire in a similar building that is not sprinklered. The effect of this is not only the amount of additional water used to fight a fire in a non-sprinklered building, but also the environmental effects of this large quantity of fire water run-off.

Waste Recycling

Recycling of waste is now commonly understood and often implemented in communities, homes and businesses. However, controlling the accumulation of recyclable materials on site is essential to avoid unnecessary fire loads or potential inception hazards. As there is now a drive to increase recycling efforts, it is

important that waste is managed with adequate segregation and removal from site on a frequent basis. Also, providing a suitable location for storage that accommodates large volumes of recycling waste is necessary to avoid storage in inappropriate areas near critical site and equipment or even externally against buildings, which could risk fire spread from overheating equipment or arson incidents.

Planning Consents

In the event of a fire or other major loss, either total or partial, there may be slightly longer delays associated with gaining the relevant planning approvals to meet increasingly higher standards imposed by legislation and building control. This needs to be taken into account when deciding on the length of indemnity periods for business interruption insurance.

Conclusion

Sustainability, including green building and energy efficiency, has become an increasingly important consideration within corporate strategies and future planning. Robust and trusted frameworks such as BREEAM set the standard for best practices in sustainable design. Yet, constructing buildings that meet the growing legislative demands for sustainability may also create additional challenges related to the potential for increased risks. Early involvement by AIG property risk engineers at the conceptual design stage will help to identify, evaluate and overcome these potential issues in a balanced way to mutual satisfaction.

For more information on BREEAM or "greening" your building, please visit:

<https://www.breeam.com/> or
contact: breeam@bre.co.uk.

Additional References:
LEED: www.usgbc.org/LEED
Green Star: www.gbca.org.au
www.greenbooklive.com
www.redbooklive.com

**For more information on risk issues,
please contact your local AIG risk
engineer.**

www.aig.co.uk

BELFAST

Forsyth House
Cromac Square
Belfast BT2 8LA
Tel: 02890 726002
Fax: 02890 726085

CROYDON

2-8 Altyre Road
Croydon, Surrey CR9 2LG
Tel: 020 8681 2556
Fax: 020 8680 7158

LEEDS

5th Floor Gallery House
123-131 The Headrow
Leeds LS1 5RD
Tel: 0113 242 1177
Fax: 0113 242 1746

MANCHESTER

4th Floor, 201 Deansgate
Manchester M3 3NW
Tel: 0161 832 8521
Fax: 0161 832 0149

BIRMINGHAM

Embassy House
60 Church Street
Birmingham B3 2DJ
Tel: 0121 236 9471
Fax: 0121 233 3597

GLASGOW

Centenary House
69 Wellington Street
Glasgow G2 6HJ
Tel: 0141 303 4400
Fax: 0141 303 4440

LONDON

58 Fenchurch Street
London EC3M 4AB
Tel: 020 7954 7000
Fax: 020 7954 7001

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