Transactional Agents Sustainability Toolkit

A guide for commercial property sales and lettings

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LEADING TO A GREEN LONDON

BETTER BUILDINGS PARTNERSHIP

Contents

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Chairman's Statement

Transactional agents sit at the heart of activity within the property industry as the brokers who match supply of space with potential occupiers across the markets. Whilst they may tell you they only reflect what their clients want, this is not the whole story.

Clients, both owners and occupiers, seek their advice on what is a complex product. So the agents can, and inevitably do, influence the finer details of what occupiers will request and what owners provide. We see this every day in the specification of new and refurbished commercial property. The agent is effectively at the centre of the (all too familiar) circle of blame and hence the key to transforming it into a circle of change. An agency community that is well informed about sustainability has the power to raise expectations rapidly and, with them, standards within the commercial stock.

Given the foregoing it is perhaps odd that transactional agents have not previously been a focus for the myriad of sustainability tools available to the property market. But it is surely a sign that our understanding of sustainability is maturing that the Better Buildings Partnership (BBP) is in a position to provide agents with clear, practical advice as to what they should be asking owners to provide, and suggesting occupiers demand, in an effort to bring about change within the market. The BBP Transactional Agents Sustainability Toolkit is a simple way for agents to improve their service to clients and generate reputational and competitive advantage whilst contributing to the greening of our industry and the economy as a whole.

To ensure as far as possible that it is widely used, the Toolkit is very simple in concept. It provides transactional agents with concise, clear information on the pros and cons of a range of sustainable features for buildings, from plant to fittings. A Quick Start download provides concise information on key areas. The whole is designed to be non-technical, easy to use and applicable to office, retail and industrial property. Agents from several practices have contributed to the development of the Toolkit to ensure that it is as appropriate for its target audience as possible.

As with all the BBP Toolkits, this is the product of the hard work and commitment of a dedicated Working Group, willing to find time in busy schedules, not just for the meetings but for reading and commenting on drafts, ideas and prototypes. Like so many things in our industry it is the willingness of people from different and often competing organisations to work together that takes us forward and ultimately makes the production of a resource such as this a challenge but never a chore. My sincere thanks to everyone who contributed. I hope what we have produced brings some clarity to an increasingly complex topic for this key industry group.

Louise Ellison
Chairman, BBP Transactional Agents Working Group

Key Messages

Increasing demand for more sustainable buildings

- **Occupiers –** are growing more and more concerned about the environmental and social impacts of their business operations. The drivers for this range from reputation to customer interest, attracting the best employees, limiting risk exposure to the continued growth of environmental legislation and basic cost reduction. Sustainable buildings will help support them in delivering on sustainability commitments and policies.

  Occupiers are also increasingly focused on their total property occupancy costs. This goes beyond rent and rates and includes service charges, utility costs and any costs associated with CRC, for example. They need clear guidance on how two otherwise similar buildings might differ from one another in this regard.

- **Owners –** with a growing demand from occupiers to reduce environmental impacts, efficient buildings which have higher sustainability credentials should be more attractive. There is no clear evidence that sustainable buildings achieve higher capital or rental values, but sustainability credentials are increasingly seen as a standard characteristic of good quality commercial space. Failure to meet what are increasingly market norms may have an adverse effect on the time a property takes to let, lease lengths achieved and the propensity of occupiers to renew.

- **Investors –** fund managers are becoming increasingly interested in the sustainability performance of property funds in which they invest. The growth in environmental legislation presents a clear risk and requires owners to both understand and take responsibility for the environmental performance of their buildings.

- Many organisations now have aspirations or requirements relating to the environmental performance of the buildings they own and/or occupy e.g. minimum Energy Performance Certificate (EPC) or BREEAM / LEED ratings, or corporate targets for reducing adverse environmental impacts. Understanding how these objectives impact on an organisation's property decisions will help provide a better, more differentiated, service to clients.

Sustainability can be a powerful marketing tool

- New buildings and buildings which have undergone refurbishment to be repositioned will often have a number of design and operational features to provide for their efficient operation. Typically, sustainability characteristics are not heavily promoted in marketing material, but can be an important driver in attracting occupiers and should not be overlooked.

Consider costs over the lease period

- Sustainable buildings will have lower operational costs for an occupier over the length of a lease period and should, therefore, be more attractive. An agent should be able to effectively advise on the benefits of the measures implemented on a specific building, while also being able to understand and allay any fears an occupier may have about taking space in a building which uses new or innovative technologies.

Raise the subject of sustainability early

- It is often the case that both owners and occupiers have sustainability aspirations, but these are not discussed until a deal is negotiated and maybe even after fit-out has taken place. Raising the issue of sustainability performance early in the process will allow both parties to identify opportunities to work together and further support each other's goals/aspirations.

Operational performance is more important than design

- It is possible to achieve significant improvements in the sustainability of a building through design and specification even during a refurbishment or retrofit. However, the full benefit of these investments will only be realised through the effective management of the building in use. Understanding how environmental performance is implemented through the building management process will be important to any occupier.

Energy

Energy consumption is an increasingly significant issue for businesses for a number of reasons:

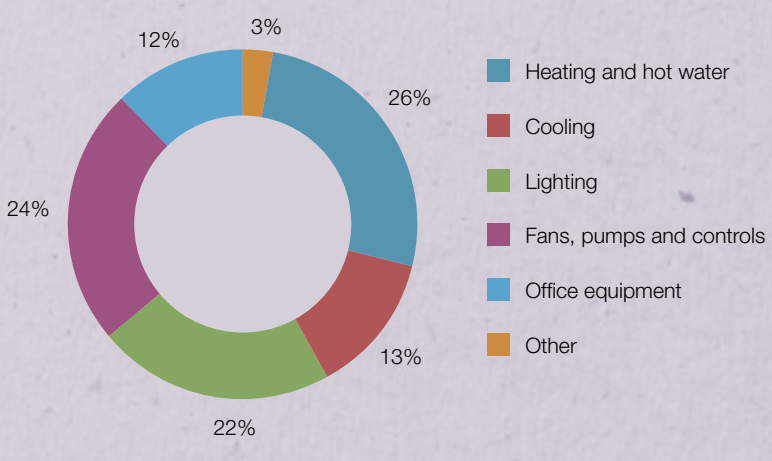
- Energy costs increased by over 80% in the 6 years to 2011[1], a trend that looks set to continue.
- As a key source of CO_2 emissions, energy consumption incurs additional costs through the Carbon Reduction Commitment Energy Efficiency Scheme and other similar initiatives.
- Security of energy supply is becoming less certain as we rely on imported energy and infrastructure needs upgrading.
- Greater transparency and corporate reporting focuses attention on a company's energy consumption.

The energy efficiency of a building is therefore an important issue for occupiers. Ultimately, a building that is more energy hungry than alternative offers in a market may let for less rent or take longer to let as occupiers become aware that it is more expensive to occupy and more of a liability in terms of corporate reporting and CO_2 emissions. Both occupiers and owners need to be aware of the energy risks associated with a building.

Key issues to consider:

- Typical annual energy costs of the building.
- The existing systems relating to energy consumption e.g. climate control plant, lighting, renewable energy, building management systems, energy metering.
- The ability for the building's energy efficiency to be improved.

Typical CO_2 emissions from an air-conditioned office[2]



1 According to DUKES, Q4 2011, page 36

2 Energy use in offices (ECG019), Carbon Trust, 2003

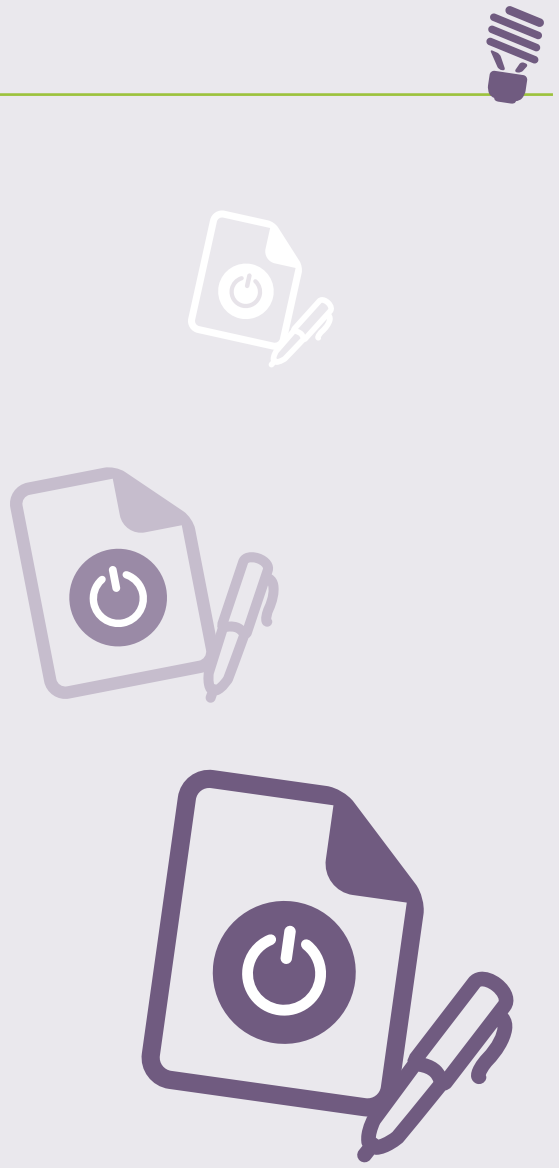
Energy Management

Managing down energy demand should be the first step in any organisation's energy efficiency strategy – ahead of investment in renewables or other technologies. This requires accurate measurement and monitoring of a building's energy use and communication of that information to the respective users of the building.

Appropriate metering and sub-metering systems, installed so as to record the individual energy consumption of different elements throughout the building, are key to efficient building management. They have become an increasingly valuable tool for owners and a necessary requirement for occupiers given their many benefits. These include the potential for energy, cost and CO_2 savings, as well as the provision of data to support corporate reporting and compliance with increasing environmental legislation such as the Carbon Reduction Commitment Energy Efficiency Scheme.

Furthermore, transparency in terms of utility tariff selection and the detailed breakdown of costs is becoming increasingly important for occupiers.

Energy inefficiency and wastage not only results in unnecessary costs to business, but is detrimental to corporate efforts to drive down CO_2 emissions in line with the Government's ambitious, but necessary, reduction targets.



Smart / AMR Metering and Sub-metering

What is it?

'Automatic Meter Reading' (AMR) technology provides the ability to read an electricity or gas meter remotely (via the internet), automatically and at frequent intervals, reducing the need for manual readings. Such meters are also often termed 'advanced'. The technology is applicable to main utility meters and sub-meters.

AMR capable main utility meters allow a utility company to remotely access energy consumption data. Energy readings are typically recorded on a half-hourly basis, providing much more accurate and up-to-date energy usage data than is available through monthly or quarterly bills.

AMR capable sub-meters operate in much the same way as AMR main utility meters. They provide more accurate and up-to-date energy consumption data for a sub-meter which measures a specific location or energy load – storing and transmitting readings typically on a half-hourly basis. Data for these meters is not transmitted to a utility company but is used by a BMS where performance can be analysed to ensure efficient operation and identify energy reduction opportunities.

Smart meters have the same functionality as AMR meters but in addition allow the utility company to both remotely read and instruct the meter. They therefore provide two-way communication, whereas advanced / AMR meters only allow one-way communication. This additional functionality allows a number of additional operations which include updating metering software, changing the read frequency and updating the tariff.

The half-hourly data from the meters is transmitted over a communications network to a data collector or aggregator (often a utility company). The data can then be passed on to the building management team for analysis. Utility companies are required to provide annual consumption data from all half-hourly meters to customers for Carbon Reduction Commitment Energy Efficiency Scheme (CRC) reporting purposes.

Advantages / Disadvantages

Provides better understanding of energy consumption and where energy efficiency opportunities exist.	✓
Supports reporting for the purposes of the CRC and / or the production of Display Energy Certificates.	✓
Enables benchmarking of performance, setting targets and influencing behaviour change.	✓
Allows owners and occupiers to cross check that they are being billed correctly.	✓
Reduces facilities management costs in a building where regular manual readings take place by reducing the requirement for manual meter inspections.	✓
Requires time and resource for the active monitoring and reporting of data and setting targets and actions for reducing energy consumption.	✗

Energy efficiency

Smart, AMR and sub-metering can be used to provide a better understanding of when and where energy is being used within a building. This allows waste to be identified and suitable corrective measures to be taken. The data itself has little value without analysis and positive action.

Running costs

There will be additional maintenance, data collection and analysis costs associated with a Smart / AMR metering strategy. However, the benefits of accurate billing and CRC reporting and the availability of information to take informed actions to reduce consumption will warrant the investment.

Continue

Smart / AMR Metering and Sub-metering continued

Retrofit / improvement opportunities

It is straightforward to replace or retrofit Smart / AMR capable sub-meters in an existing building outside of normal office hours to avoid disruption to occupiers.

Applicable buildings

Smart / AMR meters can be used in all building types.

Government Licence Conditions state that by 6th April 2014, the following buildings must have AMR metering installed:

- Electricity: All non-domestic premises which fall into electricity tariff profile classes 5, 6, 7 and 8.
- Gas: All non-domestic premises with an annual consumption of more than 732MWh. This will include most medium and large office buildings (>5,000m²) depending on use.

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

The energy utility company will carry out all necessary maintenance on the main electricity or gas meter. Periodic checking and servicing of any sub-metering will need to be undertaken by the building owner who typically installs them.

How to identify it

Meters will typically be found in plant areas and riser cupboards. Dedicated meters should also be provided to major items of plant.

Questions to ask

- Is there a Smart / AMR system in place covering both the mains electric and gas meters and sub-metering?
- How extensive is the sub-metering strategy e.g. location specific (such as each floor or occupier) or energy user specific (such as lighting, power, heating or cooling)?
- Who monitors and reports the data and is taking action to reduce energy consumption?
- On what basis are energy bills split and recharged to occupiers?

More information

Better Metering Toolkit

Building Management System (BMS)

What is it?

A building management system (BMS) is a computer based central control system which is installed within a building to manage the operation of its services – heating, cooling, ventilation, hot water and lighting, and in some cases the integration with the building envelope through control of shading devices and windows.

Advantages / Disadvantages

Programmable to meet occupier's requirements.	✓
If well managed, will reduce energy consumption and costs and improve occupier comfort.	✓
Requires skilled personnel to operate with regular monitoring and review.	✗
Can result in unnecessary energy wastage and occupier discomfort if not set up and maintained correctly.	✗

Energy efficiency

A correctly set up and well managed BMS should result in energy savings of up to 20% together with lower maintenance requirements. It provides building management with a 'real-time' understanding of how the building is operating and can help to flag issues such as high energy use and abnormal out-of-hours consumption.

Running costs

Low cost to run, but annual maintenance and regular monitoring is required to ensure control settings are appropriate for the occupancy requirements of the building.

Retrofit / Improvement opportunities

An existing BMS can be easily upgraded or extended to provide greater control of a building's services, although in some cases outdated systems may require a full replacement.

Installing a BMS into an existing building will require a feasibility study to identify the type and complexity of system required. Space is required in a plant area to accommodate the central control panel.

Applicable Buildings

Applicable to all buildings, but generally large buildings with complex services systems. Rarely installed in industrial units, warehouses or shop units.

Floor plate implications

None.

Occupier comfort

A building with a well-managed BMS installed should provide occupiers with a high level of comfort in relation to heating, cooling, ventilation and lighting requirements.

Maintenance implications

Requires regular monitoring and review by building management to ensure the system is operating efficiently in relation to the occupancy requirements of the building.

Requires annual maintenance, which is typically undertaken by the system supplier under a service agreement.

Continue

Energy Management

Smart Metering and Sub-metering

Building Management System

Building Management System (BMS) continued

How to identify it

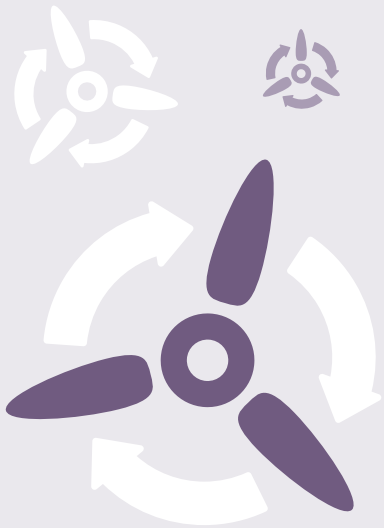
A BMS system comprises two key elements: a large electrical control panel and a central 'supervisor' computer. The control panel sends and receives signals to / from the various items of building services equipment and the central computer provides an interface with the building services, showing real-time temperatures and plant operating conditions, allowing the user to change and program system settings.

Questions to ask

- Does the building have a BMS?
- When were the BMS control settings last reviewed?

More information

Carbon Trust Building Controls Technology Overview (CTV032)



Climate Control

Climate control systems, otherwise known as heating, ventilation and air conditioning (HVAC), typically consume more energy than any other function in an air conditioned office building, closely followed by lighting. They also have a significant impact on occupier satisfaction. A working knowledge of the key facts about different systems will enable an agent to provide either the owner or occupier with valuable information and advice on what they might expect from the climate control system within a building.

Different climate control systems are appropriate for different types of building in different locations. Systems vary in terms of how a space is ventilated and cooled / heated and whether air, water, refrigerant, or a combination, is circulated within a building. Some systems keep almost all equipment within the owner's demise, whereas other systems require some or all of the equipment to be located in the occupier's demise. The occupier's responsibilities for operations and maintenance can change as a result.

There is a strong perception that air conditioning is a necessity in all modern commercial buildings, however, this is not necessarily true. The reality is that many different systems are available for providing cooling and heating which have a range of environmental and financial benefits and disadvantages. Understanding the needs and requirements of a client and how appropriate the system in place is in relation to operational costs, occupier satisfaction and environmental impacts is crucial.

Details on the various systems are provided within this section, with a summary table provided below:

	Energy use / running costs	Maintenance requirements	Implications for floor plate	Applicable buildings	Temperature control / occupier comfort	Replacement required (years)
Variable air volume system	High	Medium	High	All	Good	15–20
Fan coil unit systems	Medium	Medium	Medium	All	Good	15–20
Refrigerant systems	Medium	Medium	Medium	All	Good	15–20
Chilled beams and ceilings	Low	Low	Medium	Some	Good	20–30
Displacement ventilation	Low	Medium	Medium	Some	Medium	15–20
Natural ventilation	Very low	Low	High	Some	Limited	N/A

Fan Coil Unit Systems

What is it?

A fan coil unit (FCU) contains a fan which draws the air in a space into the unit then blows it over a cooling or heating coil. The air comes out of the FCU either cooler or hotter than before. They are commonly used in office buildings and are currently the typical specification for speculative developments, principally because of their rapid heating and cooling response and ability to cope with high demand for cooling.

FCUs will either have 2, 3 or 4 pipes for temperature control. The fluid in the pipes is traditionally water (not refrigerant) that comes from the central boiler and / or chiller.

2-pipe FCUs can provide either heating or cooling, but not both. 4-pipe FCUs are the most common system type and provide both heating and cooling through dedicated coils.

An air handling unit (AHU) will often be responsible for maintaining adequate ventilation by providing filtered pre-heated or cooled outside air into the space.

Advantages / Disadvantages

High level of flexibility in terms of subdivision and rearrangement of space.	✓
The system is energy hungry if standard FCUs, boilers and chillers are used, but more efficient models are now available.	✗

Energy efficiency

FCU systems are typically the standard specification for developers. They are not particularly energy efficient compared to alternative systems such as chilled beams and ceilings and displacement ventilation. It is straightforward, but expensive, to replace all FCU plant with energy efficient versions (FCUs with direct current or electronic commutation drives) and significant energy savings can be achieved by doing this.

Running costs

The age and specification of FCU systems will significantly affect running costs. Modern systems can be up to 75% more efficient than older ones. Running costs will generally be higher than, for example, chilled beams and ceilings and displacement ventilation.

As with all systems, efficiency will be improved by good management and commissioning, but this is particularly important with an energy hungry FCU system. A building management system (BMS) will provide a high level of control and if well managed will help reduce running costs.

Retrofit / improvement opportunities

Ageing FCUs can be replaced by modern units which are quieter, more energy efficient and more reliable. Typical life expectancy is 15–20 years for AHUs and boilers, 20+ years for FCUs and 15 years for chillers. It is relatively straightforward to replace all plant with energy efficient versions and significant energy savings can be achieved. Efficiency can be improved by fitting direct current or electronic commutation drives.

Boilers can be replaced during summer months providing the provision of hot water to toilet areas can be maintained. Replacing a central AHU or chiller requires a vacant building, whereas multiple AHU and chiller units can be replaced on an ad hoc basis when areas of the building become vacant. The replacement of FCUs will need to be undertaken when a floor is vacant or part occupied.

Applicable buildings

Found in a wide range of commercial building types and particularly common in modern offices due to its rapid heating / cooling response.

Continue

Fan Coil Unit Systems continued

Floor plate implications

Positioning of existing FCUs may adversely affect the subdivision of space. Units can, however, be moved and / or supplemented to accommodate different floor space configurations.

Temperature control / Occupier comfort

FCUs are common and familiar to many occupiers. They provide a high degree of occupier control. Older units might be considered noisy for a modern office environment.

Maintenance implications

FCUs are simple to operate and are relatively straightforward to maintain.

How to identify it

An FCU will typically be installed flush in a suspended ceiling. The visible parts will be either a pair of supply and extract grilles, or a ceiling cassette. FCUs may also be found mounted on the wall, on the ground, or occasionally in a floor void.

Questions to ask

- Have more efficient direct current or electronic commutation drive FCUs been fitted?
- Is there a building management system (BMS)?
- Is the system regularly maintained (at least annually) and seasonally commissioned?

More information

Comfortable Low Energy Architecture

CIBSE Ventilation / Air conditioning / Technical Glossary

Carbon Trust Air conditioning technology guide (CTG005)

Variable Air Volume Systems

What is it?

Variable air volume (VAV) systems supply air at a constant temperature from an air handling unit (AHU). The AHU draws in fresh air and either heats or cools it before reaching the occupier's space. By supplying more or less air, the temperature in the occupied space can be controlled. VAV systems either use a central AHU in the owner's demise or multiple smaller units throughout the occupier's demise.

Advantages / Disadvantages

Offer a high degree of occupier control.	✓
High energy consumption compared to a fan coil unit system.	✗
Inefficient use of space – the ducts can be large and need considerable space in risers between floors and in ceiling voids.	✗
Doesn't cope well with high cooling loads generated by high density occupation.	✗

Energy efficiency

VAV systems have high energy consumption as blowing air around a building requires more energy than pumping chilled water or refrigerant. The system will be more energy efficient if it includes a heat recovery unit because this will reuse the heated or cooled air being extracted from a space to warm or cool the incoming fresh air.

Running costs

This is a relatively expensive form of mechanical cooling. As with all systems, efficiency will be improved by good management and commissioning, but this is particularly important with an energy hungry VAV system. A building management system (BMS) will provide a high level of control and if well managed will help reduce running costs.

Retrofit / improvement opportunities

AHUs and boilers have a 15–20 year lifespan. It is straightforward to replace the AHU and / or boiler with an energy efficient version such as an AHU with low energy fans, heat recovery and a 95% efficient condensing boiler. Boilers can be replaced during summer months providing the provision of hot water to toilet areas can be maintained. Replacing a central AHU or chiller requires a vacant building whereas multiple AHU and chiller units can be replaced on an ad hoc basis when areas of the building become vacant.

A VAV system will not be retrofitted into buildings.

Applicable buildings

VAV systems are typically found in pre-1990s offices and shopping centres.

Floor plate implications

The size of riser ducts can be very large for multi-storey buildings served from a central AHU (located, for example, on the roof or in the basement). The risers may restrict flexibility on floor plates. On each floor, a suspended ceiling is generally used to conceal ductwork. The ceiling void will be deeper than for fan coil unit systems. Consequently, floor to ceiling heights might be lower.

Temperature control / Occupier comfort

VAV systems can offer a high degree of temperature control.

Continue

Variable Air Volume Systems continued

Maintenance implications

The AHU fans will require routine maintenance. Smaller units in the occupier's demise will require their air filters to be cleaned periodically.

How to identify it

VAV systems are commonly found in pre-1990s buildings. There will be a series of supply and extract grilles fitted in the suspended ceiling and either an AHU in the owner's area or multiple AHUs in the occupier's demise. These will be connected to both a boiler and chiller, which control the air temperature.

Questions to ask

- Does the system have heat recovery to improve energy efficiency?
- Is there a building management system (BMS)?
- Is the system regularly maintained (at least annually) and seasonally commissioned?

More information

CIBSE Ventilation / Air conditioning / Technical Glossary

Carbon Trust Air conditioning technology guide (CTG005)

Refrigerant Systems

What is it?

Typically known as 'split units', variable refrigerant volume (VRV) or Variable refrigerant flow (VRF) systems, these common cooling systems involve circulating refrigerant around the building within pipework.

Split units cool individual spaces and consist of an indoor cooling unit (typically ceiling or wall mounted) and an external condenser. The refrigerant pipework connects the two units.

VRV / VRF systems are used, particularly in larger buildings, where multiple indoor units are connected to a large external condenser via pipework. The indoor units may also be referred to as fan coil units (FCUs). Refrigerant systems are typically 3-pipe systems which can provide both heating and cooling to different areas in the building at the same time.

A variety of refrigerant types exist which can be used in refrigerant systems. Some of these are now being phased out, through legislation, because of their negative impact on the environment. This is particularly relevant for systems using HCFC refrigerants. EU legislation banned, from 2010, the use of new (or 'virgin') HCFC refrigerants, predominantly 'R22', when servicing or repairing refrigerant based air conditioning systems. It is still possible to use existing stockpiled or reclaimed HCFC refrigerants, although this practice will also be banned from 2015. Substitute refrigerants can be used, but adjustments will need to be made to the system or the system may need to be replaced.

Advantages / Disadvantages

Lower energy consumption compared to fan coil unit (FCU) systems.	✓
Space saving in central plant areas and occupier areas.	✓
All HCFC based refrigerants being phased out between 2010 and 2015, meaning it will be increasingly difficult to maintain such systems and they will have to be replaced.	✗

Energy efficiency

VRV / VRF systems are more energy efficient compared to FCU systems and performance can be improved through the addition of heat recovery.

Running costs

The main running cost for the system is for the energy and maintenance costs of the external condensers. If the system is well managed and controlled (turned down or fully off when the building's cooling demand is low e.g. evenings / nights, weekends, colder seasons) then energy costs will be lower compared to FCU systems. If the controls are badly set-up and the external condensers run 24 hours a day 365 days of the year then the running costs will be high. A building management system (BMS) will provide a high level of control.

Continue

Refrigerant Systems continued

Retrofit / improvement opportunities

These systems typically have a 15–20 year life span. External condensers can be replaced with more efficient ones with minimal disruption to the internal distribution system in the occupied spaces. Split units and VRV / VRF units can be relatively straightforward to retrofit in part or as a full system to replace outdated VAV systems for example. The replacement of internal units will need to be undertaken when a floor is vacant or part occupied. Compatibility can also be an issue if just replacing the external condenser, which may require replacing the whole system. This is a costly and disruptive exercise and will need to be undertaken when the building is vacant.

Applicable buildings

VRV / VRF systems typically can be installed in any building type, age and location.

Floor plate implications

Split systems are suitable for use in small / individual spaces with a particular cooling requirement, such as meeting rooms. VRV / VRF systems will be required for larger, complex, or multi-zoned buildings. In both cases, relatively small areas of internal plant space are required.

Temperature control / Occupier comfort

There is a high degree of control, particularly with VRV / VRF systems, which can simultaneously provide heating and cooling to different zones.

Maintenance implications

Maintenance requirements are similar to an FCU system.

A significant concern is the phasing out of all HCFC based refrigerants from 2010; meaning systems containing it will have to be replaced.

How to identify it

The external condenser(s) may be located at ground or roof level. The indoor cooling units may either be ceiling cassettes set within the suspended ceiling or set above the ceiling and linked to standard diffuser grilles.

Questions to ask

- How many indoor units are there, and what is the control strategy (to determine possibilities for subdivision of space)?
- Is there a building management system (BMS)?
- Is the system regularly maintained (at least annually) and seasonally commissioned?
- Does the system contain HCFC based refrigerants which are being phased out?

More information

CIBSE Ventilation / Air conditioning / Technical Glossary

Carbon Trust Air conditioning technology guide (CTG005)

Chilled Beams and Ceilings

What is it?

Chilled beams are essentially a cooling coil attached to the ceiling via a beam. Chilled water is circulated through the coil, thereby cooling the air in the room. The cooling happens either by natural movement of air (passive chilled beams) or by drawing the air across the beam using a fan (active chilled beams).

A chilled ceiling uses water flowing through pipes like a passive chilled beam, however, the pipes in a chilled ceiling lie behind metal ceiling plates.

These systems are significantly less energy intensive than standard efficiency fan coil unit (FCU) systems, with passive chilled beams being more efficient than active chilled beams. Chilled beams are more energy efficient than chilled ceilings.

As with other types of cooling system, chilled beams / ceilings are served by central air handling units (AHUs) and chillers.

Advantages / Disadvantages

High energy efficiency and low running costs compared to a standard FCU system.	✓
Quiet operation.	✓
Low maintenance costs.	✓
Reduced ductwork and AHU size compared to an FCU system.	✓
Reduces flexibility of internal space.	✗

Energy efficiency

Chilled beams and ceilings typically have lower energy consumption and running costs than all forms of FCU and variable air volume (VAV) system, however, energy efficient FCUs can be on a par with some active chilled beams. Active chilled beams incorporate a small fan, which makes them less energy efficient than passive chilled beams. Passive chilled beams work best when there is an exposed ceiling soffit, but can also be used in conjunction with a suspended ceiling.

Running costs

Chilled beams / ceilings can be expected to have lower running costs than a standard FCU or VAV system. There will be less demand placed on boilers and chillers which will, therefore, consume less energy. The fan in an active chilled beam will have a small running cost. A building management system (BMS) will provide a high level of control and if well managed will help reduce running costs.

Retrofit / improvement opportunities

Chilled beams / ceilings can be retrofitted into existing buildings if there is sufficient floor to ceiling height. Retrofitting would, however, need to be undertaken when a building is vacant.

For existing chilled beam / ceiling systems, boilers, AHUs and chillers can be replaced with more efficient versions when they reach the end of their economic life. Boilers can be replaced during summer months providing the provision of hot water to toilet areas can be maintained. Replacing a central AHU or chiller requires a vacant building whereas multiple AHU and chiller units can be replaced on an ad hoc basis when areas of the building become vacant.

Continue

Chilled Beams and Ceilings continued

Applicable buildings

Mainly used in office buildings although can be used in retail units.

Floor plate implications

Chilled beams are often fixed to the ceiling, which may have implications for floor to ceiling heights. Chilled beam grilles are also longer than FCU grilles and require careful attention when planning their positions on a floor plate.

Temperature control / Occupier comfort

Passive chilled beam / ceiling systems can be slow to respond if the demand for heating or cooling increases rapidly and can be less effective at dealing with peak temperatures than more conventional systems.

An active chilled beam system has a small fan which can provide greater control compared to a passive system, which is an important feature for maintaining comfort levels.

Maintenance implications

Passive chilled beams and ceilings have very low maintenance requirements and a 30+ year life span. Active chilled beams have approximately a 20 year life span. Maintenance of active systems should be less than FCUs or refrigerant systems.

How to identify it

Chilled beams have long grilles. Passive chilled beams are typically fixed to the ceiling like a long strip light. Active chilled beams can be either fixed to or integrated into a suspended ceiling. A chilled ceiling is typically identified by metal ceiling plates similar to standard metal suspended ceiling tiles and is therefore not immediately obvious.

Additional services can be integrated with the chilled beam, such as lighting, BMS controls & sensors, fire alarms & sprinklers and other pipe or ductwork. These are known as multi-service chilled beams (MSCB).

Questions to ask

- Are they passive or active chilled beams?
- Is there a building management system (BMS)?
- Is the system regularly maintained (at least annually) and seasonally commissioned?

More information

Chilled Beam Technology

Federation of Environmental Trade Associations

Displacement Ventilation

What is it?

Displacement ventilation uses the principles of natural convection to maintain a comfortable internal air temperature. Air is blown into a space at floor level (normally through floor grille diffusers or columns) and is extracted at high level (normally at ceiling height). As the air rises through the space, it collects heat from people and equipment, which provides a cooling effect.

As with other types of cooling system, displacement ventilation systems are served by central air handling units (AHUs) and chillers.

Advantages / Disadvantages

Very low energy option.	✓
Air quality is generally better compared to fan coil units (FCUs) or variable air volume (VAV) systems.	✓
Large floor to ceiling height required.	✗
Space required at floor level for air supply fans.	✗
May not provide sufficient cooling in a building with a high cooling load, in which case a supplementary cooling system will be required.	✗

Energy efficiency

This is a low energy solution which requires lower fan power and less energy for cooling compared to a FCU system. However, it is unable to provide for high cooling requirements.

Running costs

Running costs should be lower than conventional FCU or refrigerant based systems. Displacement ventilation is often supplemented by localised cooling systems for areas with higher than normal cooling requirements, such as IT server rooms. Typically, these areas will form a small proportion of the total floor space. Therefore the overall benefits will not be negated. A building management system (BMS) will provide a high level of control and if well managed will help reduce running costs.

Retrofit / improvement opportunities

The constraint to retrofit is floor to ceiling height because there is a requirement to duct fresh air across each floor plate through a floor void.

For existing displacement ventilation systems, boilers, AHUs and chillers can be replaced with more efficient versions when they reach the end of their economic life. Boilers can be replaced during summer months providing the provision of hot water to toilet areas can be maintained. Replacing a central AHU or chiller requires a vacant building whereas multiple AHU and chiller units can be replaced on an ad hoc basis when certain areas of the building become vacant.

Applicable buildings

Best suited to building / space type with high ceilings, such as atria and auditoria and low density office space with 3m+ floor to ceiling heights.

Floor plate implications

These systems require a high ceiling (ideally 3m+) and a floor void / plenum (with a depth of 0.3–0.45m) to operate.

Continue

Displacement Ventilation continued

Temperature control / Occupier comfort

These systems can provide a comfortable working environment as they are based on fresh air rather than chilled air. In some instances, however, they can be perceived as creating uncomfortable temperature gradients or draughts. Floor grilles are sometimes covered over by occupiers (deliberately or accidentally), which adversely impacts on the system's performance.

Maintenance implications

Low maintenance requirements compared to FCU systems due to simplified system design and controls.

How to identify it

Supply grilles will typically be located at floor level (requiring a raised floor) or in walls / columns, at low level. Extract grilles will be located at ceiling level (normally around the perimeter of a suspended ceiling). Floor to ceiling heights will be greater than average (ideally 3m or more).

Questions to ask

- Is there a supplementary cooling system in any space or capacity for one to be fitted?
- Is there a building management system (BMS)?
- Is the system regularly maintained (at least annually) and seasonally commissioned?

More information

Displacement ventilation

Carbon Trust Air conditioning technology guide (CTG005)

Night Cooling

What is it?

Night cooling is used in conjunction with other forms of natural and mechanical cooling.

Night cooling is where a building operates a natural ventilation strategy, normally automatically opening windows or louvres, at night to purge excess heat and cool the building. It is otherwise known as 'free cooling' which is a generic term to describe ways of cooling the internal occupied space of a building without the need to rely on energy consuming mechanical chillers.

Advantages / Disadvantages

Reduces the overall mechanical cooling demand of the building.	✓
Pollution and security can be a problem as windows / louvres are open overnight.	✗
Requires exposed ceiling soffit to maximise benefit (but can also be used with a suspended ceiling).	✗

Energy efficiency

Night cooling reduces the temperature of the building fabric and space overnight which means that heat gains from occupiers and equipment place less demand on the mechanical cooling systems of the building during the day. Motorised controls will draw a small amount of power to operate mechanical windows / louvres however there will be a net energy saving overall.

Running costs

A very small amount of power will be required to operate the motorised controls and some additional maintenance is necessary, however this will be substantially offset by the energy saved.

Retrofit / improvement opportunities

Potential to retrofit motorised controllers whilst a building is occupied if there are openable windows, but cost of control gear and wiring may outweigh the anticipated energy savings. Night cooling works best when there is an exposed ceiling soffit but can also be used in conjunction with a suspended ceiling.

Applicable buildings

Applicable to all office buildings where external pollution is not an issue. However, it requires openable windows and / or louvres at each floor level. Security can be a concern where night cooling is based on the principle of open windows.

It is most effective in buildings with a high thermal mass, for example, buildings with brick and concrete façades and frames, because the building structure and fabric is better at retaining the cool night air compared to lightweight glass and steel buildings.

Floor plate implications

None.

Continue

Night Cooling continued

Temperature control / Occupier comfort

There is potential for the building to feel cool early in the day with the temperature slowly rising as the internal heat gains take effect.

Maintenance implications

There is a small increase in maintenance requirements because night cooling requires motorised window and louvre controllers.

How to identify it

Night cooling relies on natural ventilation into each space so there will be motorised windows and / or high level louvres. It typically works best where there is no suspended ceiling present although it can be used with a suspended ceiling providing there are extract grilles to allow the removal of air from the office space.

Questions to ask

- Is there a night cooling strategy in place and is it fully automated?
- Does it use the windows or louvres or both?
- Is it automatically controlled by the building management system (BMS)?
- Is it regularly maintained?
- How is security maintained?

More information

RIBA

Carbon Trust Air conditioning technology guide (CTG005)

Natural Ventilation

What is it?

A natural ventilation system uses external air to cool the building without using mechanical cooling. Air supply and extract is provided through opened windows and / or air intake louvres, either manually controlled or automatically linked to a building management system (BMS). More complex systems make use of the 'stack effect', by which the natural buoyancy of warm air moves air up to high level exhausts (e.g. atria). Pressure differences caused by external wind can also be used to enhance air movement and cooling. For example, 'windcatchers' can be placed on roofs to provide downward ventilation into a space. Natural ventilation is typically supplemented with a heating system incorporating a boiler and radiators.

Office buildings can be designed to be 'mixed mode', a system which uses natural ventilation when external temperatures are moderate and air conditioning when higher temperatures are experienced. A system can be included which informs occupiers when windows should be opened to optimise internal comfort and when they should be closed and the mechanical system relied upon.

Advantages / Disadvantages

No energy is required to provide ventilation or cooling where the building operates a natural ventilation strategy only. A mixed mode strategy will have low energy requirements compared to conventional FCU systems for example.

Difficult to naturally ventilate modern buildings because cooling demand is high and floor plates are deep. Mixed mode strategies are more appropriate for modern commercial buildings.

Energy efficiency

A very low energy solution as there are no fans or chillers where the building operates a natural ventilation strategy. A heating system is still required for winter months.

A mixed mode strategy will also be a low energy solution compared to conventional systems, although actual savings will depend on how frequently the mechanical cooling system is used instead of natural ventilation.

Running costs

The cooling effect from opening a window is 'free'. If windows are open and a mechanical cooling system is also running then this will waste energy. Effective building management will help reduce running costs in this situation e.g. if the system is automatically controlled by a building management system (BMS).

Retrofit / improvement opportunities

Replacing non-openable windows with openable windows to provide natural ventilation is not a cost effective solution to saving energy. If, however, a building has been provided with openable windows in addition to an air conditioning system, that system may be turned off at some points during the year to save energy / cost and become a mixed mode building.

Applicable buildings

Natural ventilation is typical for older office developments and light industrial space, although it is sometimes also found in other commercial building types. Modern offices are occasionally naturally ventilated or have a mixed mode system and will have been designed specifically to achieve this. Natural ventilation is typically not suited to buildings with surrounding pollution issues e.g. city centres.

Continue

Natural Ventilation continued

Floor plate implications

Opened windows on a single elevation will only ventilate to a depth of circa 7m, which increases to 15m (including allowance for 1m wide central walkway across floor plate) if windows are on opposing elevations. Spaces deeper than 15m need a more complex ventilation strategy which typically requires an open central atrium to achieve the required stack effect.

Temperature control / Occupier comfort

Natural ventilation is generally unsuitable for buildings with a high cooling demand or in city centres where noise and pollution make opening windows undesirable. Windows provide limited control of how much air enters a space, which will differ depending on external conditions. For example, air flow will fluctuate depending on whether it is a still or windy day.

Maintenance implications

Manual windows will require occasional adjustment to ensure they are in a fully operable condition. Automatic window / louvre opening devices will require more maintenance.

How to identify it

There will be no or very few air grilles and no mechanical plant where the building operates a natural ventilation strategy. The majority of windows will be openable. There may be a horizontal transfer grille for the air to leave a room or floor area and enter an atrium.

A building operating a mixed mode strategy will feature an air conditioning system.

Questions to ask

- Is the building wholly or partly naturally ventilated?
- Do the windows open automatically?
- If windows open automatically, how are they controlled?
- Are the windows regularly maintained?

More information

Whole Building Design Guide

RIBA

Carbon Trust Air conditioning technology guide (CTG005)

Internal Blinds

What is it?

Internal window blinds will reduce the amount of 'solar gain' (or heat) entering a space, cutting glare and reducing the requirement for cooling. This is particularly useful on south facing façades.

Advantages / Disadvantages

Reduces the need for air conditioning.	✓
Reduces natural light, therefore increases the need for artificial lighting.	✗

Energy efficiency

Reduces the cooling demand in a building, thereby saving energy. The level of energy saving will depend on the level of solar gain avoided and how the blinds are used by occupiers.

Running costs

Minimal maintenance requirements.

Retrofit / improvement opportunities

Easy to retrofit with minimal disruption to occupiers.

Applicable buildings

All building types.

Floor plate implications

None.

Temperature control / Occupier comfort

Will improve temperature control and comfort if used effectively.

Maintenance implications

Low maintenance costs. Blinds need to be kept in full working order, require regular cleaning and typically require replacement after 5–10 years.

How to identify it

Venetian, vertical or roller blinds fitted on the internal face of windows.

Questions to ask

- Are there areas of the building where solar glare is a problem?
- Have blinds been fitted and if so when were they fitted?

More information

Carbon Trust How to implement solar shading (CTL065)

External Shading Devices

What is it?

External shading can either take the form of:

- 'Brise soleil', which is a series of architectural fins attached to the façade of a building;
- Reflective film that can be applied to glazing; or
- 'Fritting', which is architectural glazing with an applied opaque pattern.

They all act by deflecting the sun's rays, thereby reducing solar gain within the occupied space.

Advantages / Disadvantages

Reduces the need for air conditioning.	✓
More effective at reducing solar gain than internal blinds.	✓
Higher cost to retrofit than internal blinds.	✗
Reduces natural light and therefore increases the need for artificial lighting.	✗
Can impact on occupier views.	✗

Energy efficiency

Reduces the cooling requirement in a building, therefore saving energy. The effectiveness of the shading depends on building form, the amount of glazing and orientation.

Running costs

The existence of brise soleil on a building will add to the cost of cleaning the external façade. Maintenance costs will be higher if a brise soleil system is automated because there are moving parts that require periodic overhaul and adjustment.

Retrofit / improvement opportunities

Brise soleil is technically challenging to retrofit depending on the type of building façade. For example, glazed curtain walling does not readily allow sufficient fixing points to allow installation. It can also be difficult to retrofit from a planning perspective because the external appearance of the building will be affected. Adding brise soleil to an existing building is typically undertaken as part of any façade modernisation works.

Solar film does not typically require planning approval unless it alters the external appearance of the building or the building is listed or in a conservation area.

Applicable buildings

All building types.

Temperature control / Occupier comfort

Will improve temperature control and comfort if positioned effectively. Can reduce the amount of natural light entering a space.

How to identify it

External fins or a louvre system on the external face of the building – either a fixed system or automatically adjustable depending on sunlight levels. Reflective film or fritting on glass are alternative types of external shading systems.

Questions to ask

- If there is a brise soleil system present on the building, is it fixed or automatically controlled?

More information

Carbon Trust How to implement solar shading (CTL065)

CIBSE TM37 Design for Improved Solar

Lighting

Inefficient lighting systems in commercial buildings can be responsible for consuming as much energy as the air conditioning or IT system. The provision of energy efficient lighting and careful management of the lighting system substantially reduces energy consumption and therefore the occupancy costs of a building. There are a number of straightforward energy efficient lighting options that can and should be considered.

Are the lights too bright?

If the lighting is too bright in a building then it goes without saying that energy is being wasted.

Light intensity in a space is known as the 'lux level'. Lower lux levels will save energy. CIBSE (Chartered Institute of Building Services Engineers) design guidelines for architects and engineers recommend minimum lux levels to be achieved in different spaces, depending on the use of the space. For instance, an open plan office requires higher lux levels compared to a store room.

If the lighting system is controllable through the building management system (BMS) then it may be possible to turn down lux levels at minimal cost. This will provide a double energy saving. Firstly, there will be a reduction in the electricity consumed by the lighting system and secondly, the heat generated by the lights will be less, thereby reducing the need for mechanical cooling in the building.

Fluorescent Lamps

What is it?

Fluorescent lamps (FLs) are commonly used across a range of commercial buildings. The T12 and T8 diameter FLs are commonly found in older buildings but the T5 diameter tube is more energy efficient and is increasingly being fitted as standard.

Advantages / Disadvantages

Straightforward to replace existing T12 and T8 tubes with more efficient T5 tubes, the additional cost is typically paid back in 1 to 2 years.	✓
High energy consumption compared to LED lamps.	✗

Energy efficiency

FLs use less electricity to provide the same light output as incandescent lamps. The heat output is also less which means that there is a lower cooling demand in the building. T5 tubes are more efficient than either T8 or T12.

Running costs

Tubes, starters and ballasts (an internal switching device) will require replacement from time to time. Maintenance costs are equivalent for all tube types, however, energy savings are greater for the T5 tube.

Retrofit / improvement opportunities

T5 FLs are a very cost effective energy saving measure and should be favoured when replacing lamps. It is possible to fit T5 tubes into existing T8 luminaires although an adaptor will often be required. Upgrading to T5 tubes may, however, require the entire luminaire to be replaced depending on the age of the existing fitting. Tube replacement can be undertaken out of office hours, whereas luminaire replacement is best carried out when a space, floor or building is vacant.

Applicable buildings

All building types.

Occupier comfort

FLs can take a few seconds to 'warm up', but there will no noticeable difference for the occupiers.

Maintenance implications

Lower maintenance requirements compared to traditional incandescent lamps as tube replacement intervals are significantly longer.

How to identify it

FLs have two components – a gas filled tube and an electronic ballast. They are typically housed within a luminaire to provide a uniform spread of light and form part of the suspended ceiling or part of a multi-service chilled beam. A T5 tube has a diameter of approximately 16mm compared to 25mm for a T8 tube and 38mm for a T12 tube.

Questions to ask

- What lighting tubes are installed – T5, T8 or T12?

More information

Carbon Trust Lighting Technology Overview (CTV021)

LED Lamps

What is it?

Light emitting diode lamps (LEDs) are ultra-low energy compared with alternative lamps; an LED lamp will consume approximately 30% of the electricity consumed by a fluorescent lamp (FL) to produce an equivalent illumination. LEDs are increasingly being used in commercial office applications and are considered to be best practice. As demand increases it is expected LEDs will become more competitive in terms of price when compared to FLs.

Advantages / Disadvantages

Significant energy savings can be achieved when LEDs are used for general office lighting, close task lighting and display lighting.	✓
Long life expectancy compared to FLs.	✓
Initial cost is high compared to FLs.	✗
The intensity of light output can be less than FLs, in which case more fittings are required to compensate.	✗

Energy efficiency

LEDs use less electricity to provide the same light output as incandescent and FLs. The heat output is also less which means that there is a lower cooling demand in the building.

Running costs

Maintenance costs are lower for LEDs because lamps have longer replacement intervals compared with FLs. Energy savings are greater compared with FLs. LEDs, as with all types of fitting, will require regular cleaning to maintain light output levels.

Retrofit / improvement opportunities

Luminaires may need to be replaced if retrofitting LEDs, which can significantly add to the replacement cost. This would need to be undertaken when a space, floor or building is vacant. LED luminaires can be deeper than FL luminaires in which case the suspended ceiling void may need to be increased accordingly.

Applicable buildings

All building types.

Occupier comfort

No issues.

Maintenance implications

Lamp replacement intervals are significantly longer for LEDs than FLs.

How to identify it

LEDs are available in a variety of design formats and colours. They are distinguishable by the small dots of light emitted, which are often clustered into a fixture that resembles a halogen spotlight.

Questions to ask

- Have LEDs been installed in the building and if so, where?

More information

Carbon Trust Lighting Technology Overview (CTV021)

Natural Light

What is it?

Natural light most commonly enters a building through windows but also by other means such as skylights, atria, sun-pipes (which take light from roof level into single storey buildings) and north lights. Natural light can be used to supplement artificial lighting. Any obstructions outside the window, such as buildings and trees, will reduce how much natural light enters a building.

Advantages / Disadvantages

Reduces the amount of electricity consumed to provide general and task lighting.	✓
Natural light has a health and wellbeing benefit for staff.	✓
Direct sunlight can cause glare and 'solar gain', which increases the cooling demand in a space.	✗

Energy efficiency

Natural light enables artificial lighting to be switched off to save energy.

Running costs

Natural light provides a cost saving from the reduced use of artificial lighting. Lighting controls can be provided which automatically adjust artificial lighting to reflect the amount of natural light entering the space. Windows that are large or south facing may result in additional energy consumed for cooling during summer months due to solar gain.

Retrofit / improvement opportunities

Increasing window size and introducing atria is costly and impractical. Retrofitting sun-pipes or north lights into the roof of a single storey building or the top floor of a multi-storey can be practical solutions.

Applicable buildings

All building types.

Floor plate implications

Natural light entering through a window diminishes across a deep floor plate. Sky lights, atria or sun-pipes can be used to provide natural light to internal spaces although these have implications on building form and configuration.

Occupier comfort

Occupier health, wellbeing and productivity benefits are often cited for buildings with high levels of natural light compared to those with limited natural light or entirely lit using artificial lighting.

Maintenance implications

Windows need to be cleaned regularly as dirt will reduce the light entering the building.

How to identify it

Sufficient natural light in a building is the point at which tasks can still be performed if the lights are off.

Questions to ask

- Is artificial lighting regularly switched off during the day because natural light is sufficient to perform tasks?
- Are there areas of the building where solar glare is a problem during the year?

More information

Carbon Trust Lighting Technology Overview (CTV021)

Lighting Controls

Lighting makes up a significant portion of energy demand in a building and measures should be taken to avoid lighting areas that are not in use. Natural light can be used to light areas close to windows and atria instead of artificial lighting. This can be assisted by lighting controls which automatically adjust artificial lighting to reflect the amount of natural light entering the space, and by ensuring lighting circuits are designed so that whole floors do not remain lit whilst a small area is in use or where there are sufficient levels of natural light.

PIR Sensors

What is it?

Passive infrared sensors (PIRs) detect people moving in the building and can be used to automatically switch lights on and off. Typically, the light will turn off following a set period of inactivity in a space and on again once activity is detected, usually when someone enters the space.

Advantages / Disadvantages

Energy is saved by the automatic switching off of lighting in unoccupied areas.	✓
A low cost feature, this typically achieves payback in less than 5 years.	✓
Reputational advantages as buildings are not lit unnecessarily at night.	✓
Lights can switch off when occupiers are still in an area where sensitivity settings have not been set correctly.	✗

Energy efficiency

Energy is saved by the PIR sensor switching off the lights after a period of inactivity in a particular area.

Running costs

PIR sensors require periodic checking to ensure they are functioning correctly. Overall running costs will reduce due to the energy savings achieved.

Retrofit / improvement opportunities

PIR sensors typically need replacement every 15–20 years. PIR sensors can be easily retrofitted to modern lighting systems and can be fitted out of hours to minimise disruption to the occupier.

Applicable buildings

PIR sensors are suitable for buildings with steady patterns of occupier movement to prevent lights being frequently switched on / off. PIR sensors are typically used in offices, warehouses and in ancillary areas in retail buildings.

Floor plate implications

PIR sensors will be regularly spaced across a floor plate. The position of sensors will need to be adjusted if the floor plate is subsequently subdivided.

Occupier comfort

Frequent switching of lights caused by incorrect timer or sensitivity settings can be frustrating for occupiers. Occupiers are unlikely to object to PIR control in infrequently used areas. An override switch can be provided so lights can be kept on when required, for example, for viewings when letting a space.

Maintenance implications

PIR sensors have low maintenance requirements but need to be kept clean. The operation of the sensors should be routinely checked.

How to identify it

Sensors mounted high on the wall, in a suspended ceiling or as part of a light fitting. Typically one sensor per four desk spaces (40m²).

Questions to ask

- Are PIR sensors in place?
- When were the PIR sensors last checked / maintained?

More information

Carbon Trust Lighting Technology Overview (CTV021)

Photocell Sensors

What is it?

Photocell sensors are daylight sensors that dim artificial lighting levels when there is enough natural light entering a space.

Advantages / Disadvantages

Energy is saved through automatic dimming.	✓
A low cost feature, this typically achieves payback in less than 5 years.	✓
Can be frustrating for occupiers if lighting levels keep changing (on sunny / cloudy days).	✗

Energy efficiency

Photocell sensors can reduce the energy consumed by artificial lighting close to windows. Artificial lighting in areas a few metres from windows (distance depends on window height) will not benefit from photocell sensors as natural light will have negligible impact in these areas.

Running costs

Photocell sensors require periodic checking and recalibration to ensure they are functioning correctly. Overall running costs will reduce due to the energy savings achieved.

Retrofit / improvement opportunities

Photocell sensors typically need replacement every 15–20 years. Photocell sensors can be easily retrofitted to modern lighting systems and can be fitted out of hours to minimise disruption to the occupiers. Photocells are only applicable for lights adjacent to windows.

Applicable buildings

Photocell sensors are applicable to a wide range of building types and are commonly used in open plan offices adjacent to windows. Buildings with good levels of natural light will particularly benefit.

Floor plate implications

None.

Occupier comfort

Photocell sensors will prevent the areas adjacent to windows becoming too bright by reducing artificial lighting levels accordingly. Natural light is considered to improve wellbeing. An override switch should be provided so lights can be kept on when required, for example, for viewings when letting a space.

Maintenance implications

Photocell sensors have low maintenance requirements but need to be kept clean. The operation of the sensors should be routinely checked.

How to identify it

Sensors situated close to the perimeter of the floor plate and either mounted high on the wall, in a suspended ceiling or as part of a light fitting.

What to ask for

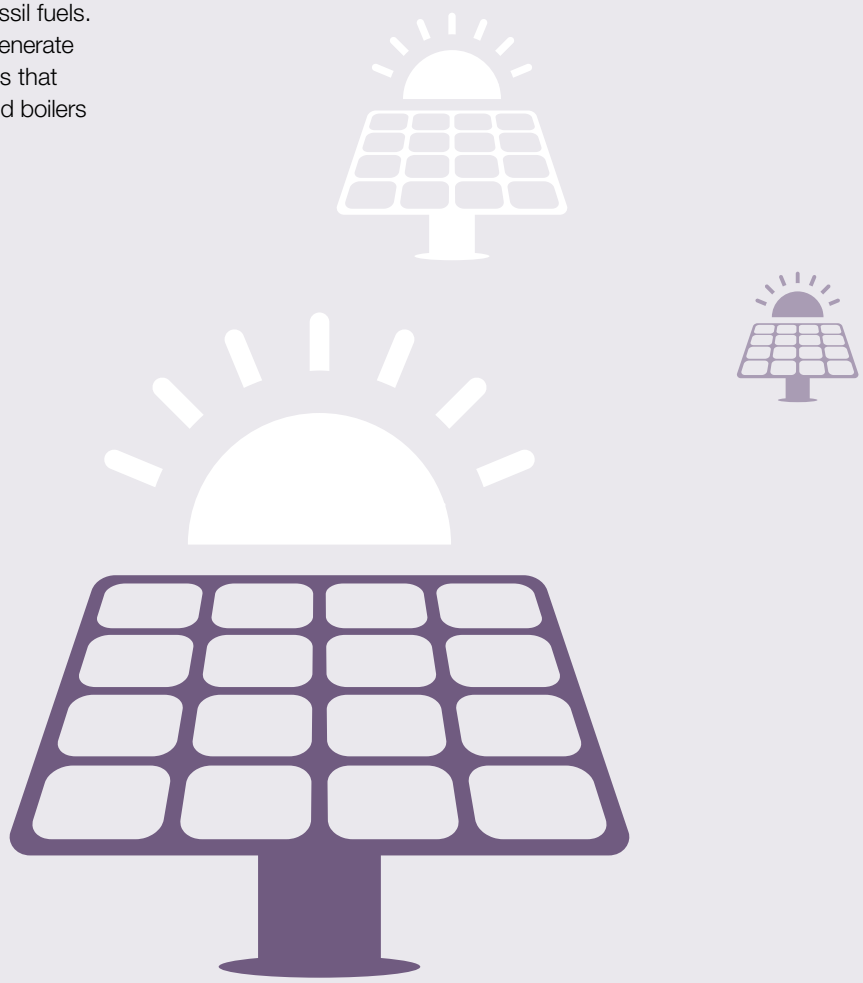
- Does the perimeter lighting have photocell sensors in place?
- When were the photocell sensors last checked / maintained?

More information

Carbon Trust Lighting Technology Overview (CTV021)

On-site Generation

On-site generation of renewable energy refers to energy that is generated from sources that are naturally and easily replenished, as opposed to non-renewable energy supplies such as fossil fuels. Renewable technologies include photovoltaic panels that generate electricity from sunlight, wind turbines, solar thermal panels that generate heat from sunlight, ground source heat pumps and boilers that run on biomass.



Photovoltaics

What is it?

Photovoltaic (PV) panels generate electricity from sunlight and are typically referred to as 'solar panels'. PV panels are different to solar thermal panels which utilise sunlight to heat water. PV panels need direct line of sight to the sun, so are usually mounted on a south-facing pitched roof or on a flat roof using an A-frame (facing south) to support them. Electricity generated can be consumed by the building to which they are attached or exported and sold to the national grid.

Advantages / Disadvantages

Provide a strong and visible environmental / sustainability message.	✓
Provide a secure (although in the UK typically limited) source of electricity to the building.	✓
Low maintenance as panels need periodic cleaning only.	✓
Installation costs are still relatively high although prices have fallen significantly in the last five years. Feed-in Tariff incentive available but only provides a limited financial incentive to install.	✗
The technology is only appropriate to use on buildings where a close to south-facing orientation can be achieved. Consideration also needs to be given to roof loadings and if the guarantee for the roof covering will be affected.	✗

Energy efficiency

A PV panel uses sunlight to generate DC electricity that can be converted into AC electricity and used in the building. This reduces the energy required from the national grid. Excess electricity produced by the PV panels can be exported back to the national grid.

Running costs

The electricity generated will reduce the amount of energy purchased from the national grid, thereby reducing running costs. If the equipment has been installed by the owner the energy generated could be sold to the occupier. This will normally be at a rate less than that charged for grid electricity, reducing occupier costs. Additional revenue may be available to the owner of the equipment from the Feed-in Tariff. This additional revenue may be shared with the occupiers to reduce the cost of occupying the building or may be used to pay back the money invested in the equipment. If a third party installed and owns the panels then the Feed-in Tariff will be claimed by them.

Retrofit / improvement opportunities

PV panels should work effectively for at least 25 years after installation before needing replacement. The DC / AC invertors (located inside the building on a distribution board) will typically need replacing once over this period.

PV panels can be easily retrofitted to a roof with adequate accessible space and where an unshaded southerly facing orientation can be achieved. An important consideration is whether the roof structure is strong enough to withstand the additional load and also if the guarantee for the roof covering will be affected.

If the building is located in close proximity to another which overshadows the PV panels, their efficiency will be significantly reduced.

Continue

Photovoltaics continued

Applicable buildings

All buildings with available roof space and where an unshaded southerly facing orientation can be achieved will benefit from the application of PV panels. Consideration needs to be given to whether the roof is strong enough to withstand the additional load and if the guarantee for the roof covering will be affected.

As the electricity is generated from sunlight they are best suited to buildings located in more southerly areas.

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

PV panels are very low maintenance as only periodic cleaning is required. The DC / AC invertors located inside the building typically require replacing every 15 years.

How to identify it

PV panels will normally be on the roof and orientated to receive maximum sunlight. The panels have a shiny / reflective appearance and there will be electrical connections to them. There will not be any insulated water pipework connected to the panels.

Questions to ask

- Who owns the PV panels?
- Who in the building receives the power that the PV panels generate?
- What costs / savings do the panels create for the occupier?
- Was the system registered for the Feed-in Tariff and if so, who gets the income generated?

More information

DECC

British Photovoltaic Association

Planning Portal

Solar Thermal

What is it?

Solar thermal (ST) panels utilise sunlight to heat water and are typically referred to as 'solar panels'. ST panels are different to photovoltaic panels which produce electricity from sunlight. ST panels transfer the sun's energy to a liquid which is heated and then circulates between the panel and the building. It is used to heat water either for use in the heating system or to provide domestic hot water.

To maximise their efficiency, ST panels are usually mounted on a south-facing pitched roof or on a flat roof using an A-frame (facing south) to support them. ST panels will be approximately 15% less efficient if east-west orientated.

Advantages / Disadvantages

Provide a strong and visible environmental / sustainability message.	✓
Provide a secure (although in the UK typically limited) source of hot water to the building.	✓
Low maintenance as panels need periodic cleaning and checking only.	✓
The technology is usually only appropriate to use on buildings where a southerly facing orientation can be achieved and which aren't overshadowed.	✗

Energy efficiency

ST panels generate hot water to contribute to the heating and hot water system, which means less gas or oil is consumed by the boiler in the building.

Running costs

The hot water generated will offset the import of a proportion of energy from the national grid. The cost of energy will reduce and additional revenue from the Renewable Heat Incentive (RHI) may be available. If a third party installed and owns the panels then the RHI will be claimed by them.

Retrofit / improvement opportunities

ST panels should work effectively for 20 to 25 years after installation before needing replacement. Pumps will need replacing once or twice over this period.

ST panels can be easily retrofitted to a roof providing the building has a demand for hot water and a hot water distribution system (i.e. not point-of-use electric water heaters). Adequate, accessible roof space with exposure to the sun is important. Consideration needs to be given to roof loadings and if the guarantee for the roof covering will be affected.

If the building is located in close proximity to another which overshadows the ST panels, their efficiency will be significantly reduced.

Applicable buildings

All buildings with available roof space and where an unshaded south-facing orientation can be achieved will benefit from the application of ST panels. Careful design is required to ensure that the building can use or adequately store the hot water produced otherwise the panels can be damaged. Consideration also needs to be given to whether the roof is strong enough to withstand the additional load and if the guarantee for the roof covering will be affected.

Continue ▶

Solar Thermal continued

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

ST panels have relatively low maintenance requirements. Periodic cleaning is required and a leak inspection and check of pumps should take place every year. The associated pumps typically require replacing every 10 to 15 years.

How to identify it

ST panels are likely to be south-facing or as close to south-facing as possible to maximise their output. Panels either have a shiny reflective appearance or are a series of tubes mounted together into a panel formation. There will be insulated water pipework connected to them.

Questions to ask

- Who owns the ST panels?
- Who in the building receives the hot water that the ST panels generate?
- What costs / savings do the panels create for the occupier?
- Was the system registered for the Renewable Heat Incentive (RHI) and if so, who gets the income generated?

More information

DECC

Planning Portal

Biomass Boilers

What is it?

Biomass is wood or a specially cultivated crop used to produce a fuel in the form of small chips or pellets. A biomass boiler burns the biomass fuel instead of a fossil fuel to produce hot water for heating and domestic hot water.

Advantages / Disadvantages

Reduces demand for fossil fuels and related CO_2 emissions.	✓
May be unsuitable for buildings in urban environments because air quality is typically an issue.	✗
Storage space is needed for fuel and suitable access for deliveries.	✗
The true sustainability of the fuel source is questionable in terms of land use and transportation impacts.	✗

Energy efficiency

By burning wood, less fossil fuel has to be burned, which reduces CO_2 emissions. In a large building a gas boiler would typically be provided as a back-up heating source.

Running costs

Heat from the biomass boiler will offset a proportion of the gas required to meet the heating demand of the building. Biomass fuel is typically more expensive than gas which will increase total energy costs. Revenue from the Renewable Heat Incentive may be available.

Retrofit / improvement opportunities

Biomass plant requires much more space than gas plant. If there is an adequate plant room space and accessibility for fuel deliveries then a retrofit could be feasible. If the building is in an urban environment and especially in an Air Quality Management Area (AQMA), then early engagement with the local planning department is essential.

A biomass boiler can be retrofitted with minimal disruption to the building occupier if scheduled for the summer period and the existing gas boiler is not used to provide domestic hot water.

Applicable buildings

Suitable for buildings with adequate fuel storage space and within close proximity to a fuel source.

The air quality issue and the requirement for delivering and storing biomass fuel means there are very few biomass boilers in use in urban centres. Buildings in rural locations with local fuel sources are able to use this technology more readily.

Floor plate implications

None.

Occupier comfort

None.

Continue

Biomass Boilers continued

Maintenance implications

Biomass boilers typically have high maintenance requirements compared to gas boilers because the fuel burner requires regular checks to ensure it is burning the fuel efficiently. Generally speaking, wood pellet boilers have lower maintenance requirements than wood chip boilers because of the higher grade (and cost) of the fuel. For wood chip systems, a consistent quality and moisture content is important for minimising maintenance and increasing plant longevity.

The presence of a back-up gas boiler, typically designed to provide 100% of the heating load for periods when the biomass boiler is down for maintenance, ensures that there will not be any disruption to the heating provision.

How to identify it

Biomass boilers are larger than gas boilers and the solid biomass fuel (chips or pellets) has to be stored in close proximity. A means of transporting the fuel from the road or delivery area to the fuel store should be apparent. Biomass fuel can be tipped or blown into a store which can be situated above or below ground.

Questions to ask

- How much do occupiers pay for each unit of heat from the biomass boiler and how does this compare to the current tariff for gas?
- What is the source of heating when the biomass boiler is not online?
- Was the system registered for the Renewable Heat Incentive and if so, who gets the income generated?

More information

DECC

Planning Portal

Combined Cooling, Heat and Power

What is it?

A combined heat and power (CHP) unit (also known as 'co-generation') is usually an on-site electricity generator that is fuelled by gas from the national grid. The heat produced by the generator is captured for the building's hot water system. This means both heat and electricity is being generated.

'Tri-generation' refers to the production of electricity, heat and chilled water otherwise known as combined cooling, heat and power (CCHP). Chilled water is achieved by incorporating an absorption chiller into a co-generation system. Absorption chillers take the waste heat from a CHP plant to create chilled water for cooling a building.

A back-up gas boiler system is typically provided to meet the entire heating demand for periods when the CHP / CCHP unit is down for maintenance.

Advantages / Disadvantages

A more efficient way of using gas by providing power as well as heat.	✓
Provides the building with a degree of energy security although a supply of gas is still required.	✓
CHP is only efficient where the building (or a nearby building) has a significant demand for heating (or heating and / or cooling in the case of CCHP) for most of the year.	✗

Energy efficiency

Less electricity has to be imported from the national grid as it is being generated on-site. CO_2 emissions are reduced because the gas used provides both electricity and heat rather than just heat from a boiler. CHP and CCHP are best suited to sites with a simultaneous year-round demand for heating / cooling and power, such as data centres and office buildings with large IT suites and server rooms (for example, trading floors).

Running costs

The heat / chilled water from the CHP / CCHP unit will offset a proportion of the energy imported from the national grid required to meet the demand of the building. CHP / CCHP units have high maintenance requirements compared to conventional boilers and are therefore more costly to maintain.

Revenue from the Renewable Heat Incentive is not currently available for CHP / CCHP units.

Retrofit / improvement opportunities

CHP / CCHP plant (including a hot water store) requires more space than conventional gas boiler plant. If there is adequate plant room space then a retrofit is feasible. The plant room is likely to require an acoustic upgrade.

There will be disruption to the occupiers when the CHP / CCHP plant replaces the boiler plant, but this can be minimised if undertaken during summer months and there is sufficient plant room space available to install the CHP / CCHP unit alongside the boiler whilst it is still in operation.

Continue

Combined Cooling, Heat and Power continued

Applicable buildings

The building should have a high demand for heat and / or cooling if the CHP / CCHP unit is to be cost-effective. For example, modern offices have a low demand for heat and therefore CHP may not be economically viable. However, modern offices will often have significant cooling demands that can be met through the use of a CCHP system.

Floor plate implications

None.

Occupier comfort

Noise levels can be a problem, so it is important to ensure that there is sufficient acoustic treatment to the plant room housing the CHP / CCHP unit.

Maintenance implications

Maintenance requirements are more frequent and complicated than for conventional gas boilers. This extra cost can be an important factor when considering affordability.

How to identify it

Large and noisy compared to a conventional gas boiler providing an equivalent amount of heat. A large water tank is typically adjacent to the CHP / CCHP unit.

Questions to ask

- Who maintains the CHP / CCHP unit and at what cost to the occupiers?
- How much, if any, of the energy generated is exported to the grid?
- Who benefits from the revenue from these exports and at what rate?

More information

Carbon Trust Introducing Combined Heat and Power (CTV024)

DECC

Combined Heat & Power Association (CHPA)

Ground Source Heat Pumps

What is it?

A ground source heat pump (GSHP) system uses the ambient temperature of the ground to heat or cool the water used in a heating or air conditioning system. Pipes (known as 'ground loops') are installed underground and circulating water is either cooled or heated in them before it is passed through a heat pump. The GSHP can be used in a building for space heating or in reverse mode, used for cooling during summer months. GSHPs run on electricity, however the heat / coolth output is typically three to four times greater than using the same amount of electricity in conventional heating and cooling systems.

The ground loops will either be laid horizontally under a very large external area, or vertically under the building, car park or other open space adjacent to the building.

Advantages / Disadvantages

Energy efficient means of heating and cooling a building.	✓
Low maintenance costs.	✓
Visually unobtrusive compared to other low and zero carbon technologies.	✓
Expensive to install and disruptive to retrofit because of the requirement to install vertical boreholes or lay pipes horizontally across large areas.	✗

Energy efficiency

The energy saved using a GSHP system is typically three to four times the electricity required to run the heat pump. Therefore there will be a net energy saving. However, it should be remembered that electricity is both more expensive and requires more CO_2 to generate than the equivalent amount of gas energy.

The efficiency of the system will be maximised where the system is used for both winter heating and summer cooling.

Running costs

The heating and cooling provided by a heat pump will reduce gas consumption and provide a net saving in electricity which will reduce energy bills. Revenue from the Renewable Heat Incentive (RHI) may be available.

Retrofit / improvement opportunities

GSHP systems are rarely retrofitted because they are expensive to install and because of the disruption caused to the building and the occupiers.

GSHPs are very reliable with expected lifetimes of 30 years or more.

Applicable buildings

All buildings, providing there is sufficient space to install the pipework, either horizontally or vertically.

Continue

Ground Source Heat Pumps continued

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

The GSHP will require periodic servicing and maintenance, comparable with conventional heating and cooling plant.

How to identify it

A GSHP is about the same size as a gas boiler and will be connected to a series of lagged water pipes.

Questions to ask

- Who maintains the heat pump unit and at what cost to the occupiers?
- Is there a back-up heating / cooling supply during periods of GSHP maintenance?
- Was the system registered for the Renewable Heat Incentive (RHI) and if so, who benefits from the income generated?

More information

DECC

Heat Pump Association

Planning Portal

Air Source Heat Pumps

What is it?

An air source heat pump (ASHP) uses the ambient temperature of the air to provide heating or cooling. The ASHP absorbs the heat / coolth from the outside air and either raises it for use in the building's space heating or in reverse mode, cools it so it can be used for cooling during summer months (similar to a refrigerant based air conditioning system).

Advantages / Disadvantages

Energy efficient means of heating and cooling a building.	✓
Low cost to install compared with other low and zero carbon technologies.	✓
Efficiency is relatively low compared with other low and zero carbon technologies but is improving with new technologies being developed.	✗
Less efficient ASHPs will be more expensive to run than efficient gas boilers because the cost of electricity is significantly higher than gas.	✗

Energy efficiency

ASHPs run on electricity, however the heat / cooling output is typically two to four times greater than using the same amount of electricity in conventional heating and cooling systems. ASHPs are least efficient in winter months when outside air is coldest. Unfortunately this coincides with the greatest demands being placed on the system.

The efficiency of the system will be maximised when the system is used for both winter heating and summer cooling.

Running costs

The heating and cooling provided by a heat pump will reduce gas consumption and provide a net saving in electricity which will reduce energy bills. Revenue from the Renewable Heat Incentive (RHI) is not currently available for ASHP systems in non-domestic buildings.

Retrofit / improvement opportunities

ASHP systems are straightforward to retrofit because the external unit can either be ground or wall mounted. The heating / cooling distribution system (e.g. radiators) may require an upgrade as the system will operate at different temperatures to normal.

ASHPs have expected lifetimes of 20 years or more.

Applicable buildings

All buildings providing there is sufficient external space for the heat collection units, which are equivalent in size to conventional air conditioning units.

Floor plate implications

None.

Occupier comfort

No issues.

Continue

Air Source Heat Pumps continued

Maintenance implications

The ASHP will require periodic servicing and maintenance, comparable with conventional heating and cooling plant.

How to identify it

ASHPs have an external (wall or ground mounted) heat / coolth collection unit and an internal cassette for heating / cooling the building.

Questions to ask

- Who maintains the heat pump unit and at what cost to the occupiers?
- Is there a back-up heating / cooling supply during periods of ASHP maintenance?

More information

DECC

Heat Pump Association

Planning Portal

Wind Turbines

What is it?

Wind turbines generate energy from wind. They come in a variety of designs and sizes. They will only generate energy when the wind blows sufficiently to turn the turbine blades. The speed of the wind is critical to the power output. The energy they generate can be exported back to the grid or used within a building.

Advantages / Disadvantages

Very efficient at generating electricity in locations where wind speeds are consistently high.	✓
A clear statement of the environmental / sustainability credentials of a building.	✓
Micro turbines in urban locations where wind speeds are typically low or erratic will produce little energy.	✗
Noise and appearance can make wind turbines unpopular.	✗

Energy efficiency

The turbine generates DC electricity that can be converted into AC electricity and used in the building. This reduces the energy required from the national grid.

Running costs

The electricity generated by a wind turbine will reduce the electricity imported from the national grid to meet building demand and therefore save money. Revenue from the Feed-in Tariff may be available.

Retrofit / improvement opportunities

Retrofitting turbines to the roof of a building will depend on the structure's ability to withstand the additional loadings in a location that is exposed to the prevailing winds.

Wind turbines have an expected lifetime of 20 years or more.

Applicable buildings

Wind speed is critical to generating power and therefore wind turbines are only appropriate for buildings on exposed windy sites with sufficient external space to accommodate them. Wind turbines can be noisy, so proximity to other buildings is also important.

Wind turbines that are attached to buildings may be affected by turbulence close to the edge / roof of the building and as a result their power output may be lower than surrounding wind speeds would indicate.

Floor plate implications

None.

Occupier comfort

None, however it is important to ensure that there is no risk of 'flicker' caused by the blades due to poor positioning of the turbine between the sun and windows.

Maintenance implications

Require regular servicing to ensure they remain fully operational.

How to identify it

Either roof mounted or ground mounted near to the building.

Continue

Wind Turbines continued

Questions to ask

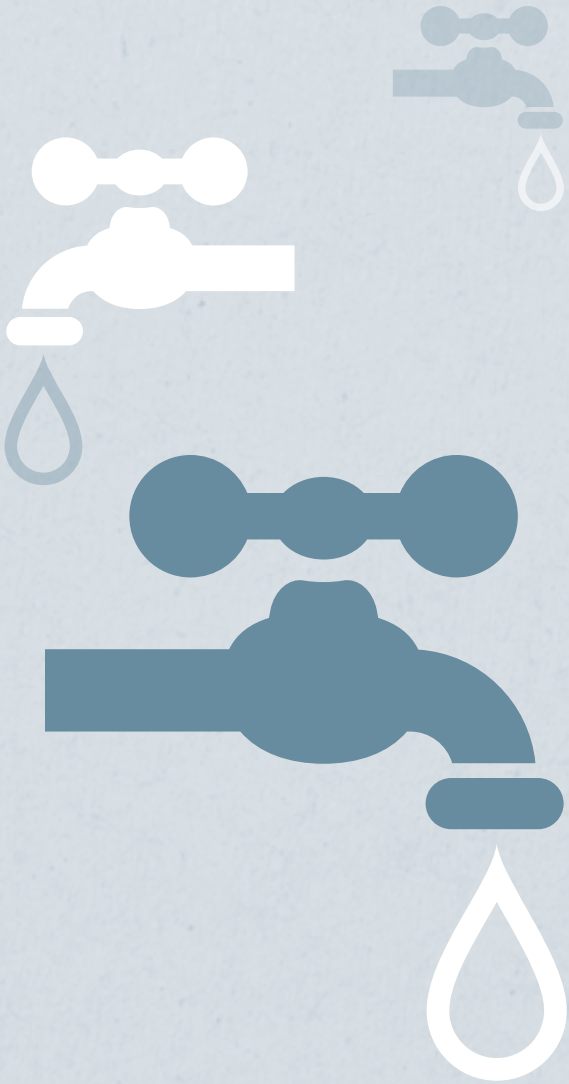
- Does the building receive the power that the wind turbine generates?
- What cost / saving does the wind turbine create for the occupier?
- Was the turbine registered for the Feed-in Tariff and if so, who gets the income generated?
- Who is responsible for the cost of maintenance of the turbine?

More information

DECC

Renewable UK

Planning Portal



Water

Water is a scarce resource, increasingly expensive and its consumption often reported in annual corporate statements. The processing and pumping of water is highly energy intensive, making it a significant source of CO_2 emissions.

Occupiers should expect building owners to have installed water efficient fittings, to maintain these so as to prevent leakage, and to be able to show records of consumption and cost. Good water management is particularly important where there is extensive landscaping which requires irrigation. Where a water intensive user or users occupies space in a building it is important to understand how the water costs are attributed.

Key issues to consider:

- Typical annual water consumption costs of the building.
- The water conservation features installed in a building e.g. efficient fittings, rain water harvesting, grey water recycling, water metering.
- The ability for the building's water efficiency to be improved.
- Major water consumers in the building, for example coffee shops.

Water Metering

What is it?

Water metering includes the main utility meter and any sub-metering. The meters measure the amount of water passing through them. Some meters will incorporate memory storage capacity to record half-hourly water consumption. Other meters will only have the capacity to produce half-hourly 'pulses' related to the units of consumption and communicate this information to the building management system (BMS).

Sub-metering is particularly beneficial if there are large water consuming areas in the building (e.g. shower blocks, canteens) or equipment present (e.g. swimming pool).

An Automatic Meter Reading (AMR) water metering system actively monitors water consumption and identifies normal and abnormal flow rates. An AMR system can also be used for improved water management and occupier billing.

Advantages / Disadvantages

A mains utility meter will result in more precise billing which may either increase or reduce monthly charges. Sub-metering will provide greater transparency for service charge purposes.	✓
Enables the monitoring and management of water consumption and can demonstrate when water savings are being achieved.	✓
May indicate the presence of a leak or other unexpected water consumption.	✓

Water efficiency

Metering is essential if an occupier wants to plan effectively to reduce their water usage and monitor the success of their activities.

Running costs

Maintenance costs of any sub-metering will be minimal, however, there will be a cost associated with monitoring the meter readings which might be part of the building management team or outsourced to a third party organisation.

Retrofit / improvement opportunities

Metering is easy to retrofit and low cost to install.

Applicable buildings

All buildings should have a main utility water meter to enable the basic monitoring of consumption. Sub-metering is typically only installed in buildings with large water consuming items of equipment or areas (e.g. catering facilities, swimming pool). However, the reduction in the cost of installing sub-metering means it is now being installed more commonly.

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

The water utility company will carry out all necessary maintenance on the main water meter. Periodic checking and servicing of any sub-metering will need to be undertaken by the owner who typically installs it.

How to identify it

The main utility meter is typically located in a plant room in the basement or on the ground floor on the incoming water main. Sub-metering will be located on the water supply pipework to the area or equipment served.

What to ask for

- Is a main utility water meter installed?
- How many water sub-meters are in place and what areas or equipment do they serve?
- How is water consumption charged back to the occupiers?
- Who takes responsibility for monitoring and is there an associated cost?

More information

BBP Better Metering Toolkit

Efficient Fittings

What is it?

Water efficient fittings include:

- Dual-flush toilets (minimum efficiency 6/4l, better is 4.5/3l).
- Spray, push or sensor activated taps.
- Low-flow showers.
- Presence detection sensors on urinals or waterless urinals.

Most modern and recently refurbished buildings will include at least some of these fittings.

Advantages / Disadvantages

Significant water savings can be achieved.	✓
Only marginally more expensive to install compared to standard fittings and the value of water saved can often pay back the installation cost within 2 years.	✓
Low-flow showers are not as effective as standard showers when the water pressure is low.	✗

Water efficiency

Efficient fittings can significantly reduce water consumption in a building.

Running costs

Water efficient fittings reduce water supply and waste water bills, which will offset any additional maintenance costs associated with presence detection sensors (if present).

Retrofit / improvement opportunities

Water efficient fittings are easy to retrofit. They are a low cost measure to install compared with standard fittings and the value of water saved can often pay back the installation cost within 2 years.

Applicable buildings

All building types.

Floor plate implications

None.

Occupier comfort

Low-flow showers might be an issue for users when there is a low water pressure.

Maintenance implications

Presence detection sensors will require maintenance to ensure that they are kept in full working order.

How to identify it

Dual-flush toilets will have two push buttons. Sensor operated taps and urinals will have the sensor in a prominent location. Spray taps, push taps and low-flow showers can be identified upon operation.

Questions to ask

- What water efficient sanitary fittings are present in the building?

More information

Water Efficient Buildings – a developers guide

Envirowise WRAP guidance
Urinals / WCs / Taps / Showers

Waterless Urinals

What is it?

Waterless urinals do not use water to maintain cleanliness and freshness. There are various types of urinal that work in different ways.

Advantages / Disadvantages

Significant water savings can be achieved.	✓
Sometimes unpopular with occupiers but perceptions are changing.	✗

Water efficiency

There can be a significant reduction in water consumption if all urinals in a building are waterless.

Running costs

Waterless urinals reduce water supply and waste water bills which will offset any additional maintenance costs.

Retrofit / improvement opportunities

Waterless urinals are straightforward to retrofit.

Applicable buildings

All building types.

Floor plate implications

None.

Occupier comfort

Occupier perceptions can be negative, although these are usually based on an incorrect belief that waterless urinals are unhygienic or result in increased odours.

Maintenance implications

Some versions have a small fan, to prevent odours from being a nuisance, which requires maintenance. Weekly dosing with compatible chemicals may be required with some systems.

How to identify it

Typically depicted with a marketing sticker on the urinal given the innovative nature of these fittings, and featuring a larger than usual drain hole.

Questions to ask

Are waterless urinals fitted in the building?

More information

Environment Agency

Envirowise WRAP guidance Urinals

Rainwater Harvesting

What is it?

The capture of rainwater on-site and storing it for the use of flushing toilets and irrigation of external planting and green roofs/walls. Rainwater is typically captured from the roof, filtered and stored in a tank at ground or basement level, or buried underground. The water is not of a potable standard and therefore is not used to serve sinks.

Rainwater harvesting and grey water recycling systems can be combined to reduce even further the amount of potable water consumed for flushing and irrigation.

Advantages / Disadvantages

Reduces the amount of potable water used for the purposes of flushing toilets and irrigation which saves CO_2 as cleansing water to potable standard and pumping it are highly energy intensive.	✓
Strong sustainability message.	✓
Only effective where the roof of the building and annual rainfall can provide enough water to meet the building's flushing / irrigation demand.	✗

Water efficiency

The volume of water saved depends on the size of the roof available for collection, the ability to store it hygienically until it is needed and a high demand for non-drinking water.

Running costs

Rainwater harvesting reduces water supply and waste water bills which will offset additional maintenance costs providing water collection and flushing / irrigation demand is high.

Retrofit / improvement opportunities

Rainwater harvesting is difficult to retrofit unless installed during a major refurbishment. The additional pipework from roof collection points to a central water store and space required to accommodate the storage tank are key considerations for retrofitting rainwater harvesting.

Applicable buildings

Not typically suited for office buildings unless there is substantial landscaping because there is usually a low WC flushing demand and limited space for collecting rainwater. Shopping centres are appropriate if there is a high number of toilets and the roof of the building and annual rainfall is sufficient to provide enough water to meet flushing demand.

Floor plate implications

None.

Occupier comfort

Occupier perceptions can be negative although these are usually based on an incorrect belief that discoloured water in a toilet pan is unhygienic.

Maintenance implications

Periodic cleaning and replacement of water filters is required.

How to identify it

A large tank is situated at ground or basement level and possibly off-coloured water in the toilet pan.

Questions to ask

- Is there a rainwater harvesting system in place?

More information

UK Rain Water Harvesting Association

Envirowise WRAP Reducing mains water through rain water harvesting

The Renewable Energy Centre

Grey Water Recycling

What is it?

The capture of water previously used in sinks and showers and storing it for flushing toilets and irrigation of external planting and green roofs / walls. Grey water is filtered and stored in a tank at ground or basement level, or buried underground. The water is not of a potable standard and therefore is not used to serve sinks.

Grey water recycling and rainwater harvesting systems can be combined to reduce even further the amount of potable water consumed for flushing and irrigation.

Advantages / Disadvantages

Reduces the amount of potable water used for the purposes of flushing toilets and irrigation which saves CO_2 as cleansing water to potable standard and pumping it are highly energy intensive.	✓
Strong sustainability message.	✓
Only effective if installed in a building where large quantities of grey water are produced and where there is a significant flushing / irrigation demand.	✗

Water efficiency

The volume of water saved depends on the number of appliances water is being collected from, the ability to store it hygienically until it is needed and a high demand for non-potable water.

Running costs

Grey water recycling reduces water supply and waste water bills which will offset any additional maintenance costs providing water collection and flushing / irrigation demand is high.

Retrofit / improvement opportunities

Retrofit is expensive and disruptive because a dual run of pipework is required to collect the grey water from sinks and showers throughout the building. A large tank and filtering equipment also needs to be accommodated.

Grey water recycling is difficult to retrofit unless installed during a major refurbishment. The additional pipework required and space required to accommodate the storage tank are key considerations for retrofitting a grey water system.

Applicable buildings

Not typically suited for commercial buildings because the amount of available grey water produced is low.

Floor plate implications

None.

Occupier comfort

Occupier perceptions can be negative although these are usually based on an incorrect belief that discoloured water in a toilet pan is unhygienic.

Maintenance implications

Periodic cleaning and replacement of water filters is required. These are more onerous when compared to a rainwater harvesting system.

How to identify it

A large tank is situated at ground or basement level and possibly off-coloured water in the toilet pan.

Questions to ask

- Is there a grey water harvesting system in place?

Waste

Responsible waste management is becoming increasingly important to owners and occupiers due to continuing taxation rises. It is also a standard reporting item for many companies.

From 1st April 2012, the landfill tax rate for active waste will be £64 per tonne, rising to £80 per tonne by 2014, which is paid in addition to waste management costs for any waste that is sent to landfill. Facilities to help occupiers to maximise the recycling / recovery of their waste will help them to reduce these costs. Occupiers need to be confident that a building has waste management practices in place that will be appropriate for their business.

Key issues to consider:

- What is the current waste management system for the building and associated costs e.g. on-site recycling or compactors & balers?
- Does the current system meet your client's requirements?
- If not, can changes be made to the current system to meet your client's requirements?

On-site Recycling

What is it?

Provision of collection and storage facilities for recycling waste produced by the building occupier. Requires recycling bins, on-site storage facilities and provisions for the waste contractor to collect and process waste.

Advantages / Disadvantages

Strong sustainability and CSR message.	✓
Low cost to implement.	✓

Resource efficiency

Increased recycling will reduce the amount of waste sent to landfill and conserve resources. The effectiveness of a recycling strategy will be maximised when there is a recycling policy in place which is disseminated to occupiers so they fully utilise the facilities.

Running costs

There is, potentially, a financial saving because less commercial waste is being sent to landfill and segregated waste bins are typically cheaper to dispose of than mixed waste bins. It might be the case that the existing waste management contract requires amendment to realise this saving.

Retrofit / improvement opportunities

Straightforward to retrofit into any building.

Applicable buildings

All building types providing there is sufficient space to store several recycling bins in a central location. BREEAM recommends, for example, an area of 10m^2 for a 5,000m^2 office building or 20m^2 if there is catering waste being generated.

Floor plate implications

A very small area of space will be required to accommodate the bins at each floor level or in the occupier's demise.

Occupier comfort

No issues.

Maintenance implications

Additional cleaning will be required for the bins stored centrally and on each floor or space.

How to identify it

Separate bins will be provided throughout the building for different waste materials to be used by the occupier and other building users. This will typically include paper, plastic bottles, cans, etc. It will also include organic waste if there is food preparation taking place and other specific waste bins depending on the use of the building. For example, retail buildings will have bins for packaging waste.

Individual bins are taken to a central refuse point for collection by the recycling waste contractor with bins clearly marked to identify specific waste streams.

Questions to ask

- Which waste streams are segregated?
- Who is responsible for collecting waste from the occupier and storing it in the central recycling storage area?

More information

WRAP

Business Link

Compactors and Balers

What is it?

A machine that is designed to compress waste streams to maximise storage space and reduce vehicle journeys associated with waste disposal.

Advantages / Disadvantages

Maximises the use of waste storage areas where large quantities are being produced or space is constrained.	✓
Reduces waste disposal costs and transport emissions.	✓
Compacting dry waste significantly reduces the volume of waste sent to landfill.	✓
Increased maintenance requirements.	✗

Resource savings

Reduces the volume of waste sent to landfill and the number of vehicle trips required for the collection and delivery of the waste.

Running costs

Waste disposal costs will be lower and in turn the service charge reduced, however, there will be an ongoing maintenance cost that will offset a proportion of the savings achieved.

Retrofit / improvement opportunities

Straightforward to retrofit in an existing building providing there is adequate space to accommodate it either internally or externally.

Applicable buildings

Suited to all buildings with significant quantities of waste (e.g. retail, large offices) and with adequate space to accommodate it.

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

The compactor / baler will require regular servicing.

How to identify it

A large piece of machinery located typically in the waste storage area or adjacent to it.

What to ask for

- Is there a compactor / baler on-site?
- What charges are recouped through the service charge?
- Is the occupier entitled to use the baler if owned by the building owner?

Transport

Transport is key to the accessibility of a building and has always been a significant issue for owners and occupiers. However the range of issues associated with transport is becoming more complex.

Staff commuting and business travel are a significant source of CO_2 emissions and a drain on staff time and productivity for businesses. This trend will continue as pressure on infrastructure increases and as more organisations take action to reduce their environmental impact. Understanding and articulating all the transport options available for a building is critical and has extended beyond the proximity of a station and the amount of parking available. Options such as teleconferencing and home working can significantly save time, cut costs and reduce CO_2 emissions, but this requires both investment in IT infrastructure and in the working culture of the occupiers.

Key issues to consider:

- All the transport options available to a building.
- Do facilities exist which support more sustainable modes of transport e.g. cycle facilities, electric charging points?
- Is there a Green Travel Plan in place for the building?

Cyclist Facilities

What is it?

The provision of secure cycle storage racks, showers, changing facilities, lockers and drying space for clothes for use by staff and visitors to the building. These are often installed in new buildings or following major refurbishment to meet planning and BREEAM requirements. A modern office building will increasingly be expected to have these facilities.

Advantages / Disadvantages

Reduces CO_2 emissions associated with staff and visitor travel.	✓
Increasingly demanded by staff and employers, particularly in city centre offices.	✓
Requires a significant amount of space either at ground or basement level.	✗
The provision of showers will increase the building's water and energy consumption.	✗

Resource savings

Commuting by bicycle instead of by car reduces CO_2 emissions and congestion. Supporting staff who want to cycle to work can be a useful demonstration of a company's commitment to sustainability and staff engagement.

Running costs

Showers will increase the building's water and energy consumption.

Retrofit / improvement opportunities

Cycle racks are straightforward to retrofit providing there is sufficient space to accommodate them and to access them safely. The installation of showers and changing facilities can be limited by internal space constraints.

Applicable buildings

Applicable to all buildings providing there is sufficient space to accommodate the facilities.

Maintenance implications

Cycle racks require no maintenance apart from two-tier racking systems which are manually operated and need to be kept in working order.

Shower facilities will need to be maintained and changing areas / drying spaces cleaned frequently.

How to identify it

Cycle racks come in a variety of forms and are normally either located externally or in ground floor or basement level common parts. Cycle racks require significant space and clear access, however, vertical and two-tier racking systems are available which are more space efficient.

Showers and changing facilities are typically provided close to internal cycle racks but can be anywhere convenient within the building.

Questions to ask

- How many cycle racks and showers are present in the building?
- Are they in a safe and secure location?
- How many lockers are available for cyclists and is there a drying space for clothes?

More information

Department for Transport

Transport for London Workplace Cycling Parking Guide

Electric Charging Points

What is it?

An on-site charging point for electric vehicles. This comprises a secure pillar and socket accessed by an electronic tag in its most basic form. Variations exist, including two car charging posts, quick charging and electronic displays. The building owner can either offer the electricity from a charging point for free, reclaim it through the service charge or charge consumers using a metering and payment system. A third party organisation may also install, own, maintain and receive revenue from the charging point(s).

Electric vehicles make up a very small proportion of all vehicles in the UK, however it is expected numbers will increase significantly in the next few years. In London, the Mayor has an ambition to boost the number of electric vehicles on the roads by rapidly increasing the network of charging points and setting an obligation in the London Plan for new developments to provide 1 in 5 parking spaces with a charging point.

Advantages / Disadvantages

Supports sustainable modes of transport for staff and visitors and thereby helps to reduce CO_2 emissions associated with travel.	✓
Demonstrable commitment to sustainability.	✓
Increased electricity usage on-site and associated CO_2 emissions.	✗

Running costs

The electricity consumed at the charging point will be a cost to the building owner if the use of the facility is not recouped through the service charge or individually charged to occupiers. The owner may charge for the electricity but this will require a metering and payment system to be set-up and administered. The cost to charge an electric car will depend on the efficiency of the vehicle, tariff paid and time of day but is typically in the region of £1 to £3 for a full charge.

Retrofit/improvement opportunities

The design life of charging points is approximately 10 years.

The installation of a charging point is relatively straightforward. Simple charging points are low cost compared to more complex charging points with metering and payment facilities. However, charging for electricity does raise revenue to offset some of the initial installation cost. A metering mechanism will be required for charging points installed for the benefit of a building occupier to recover the cost of the electricity used.

Wall mounted charging points are less obtrusive than pillar mounted points which require an additional 'feeder' pillar to be installed.

It is necessary to contact the electricity company for advice and assistance when installing a charging point.

Applicable buildings

All buildings, in particular business parks and shopping centres where cars are the predominant transport mode.

Maintenance implications

Charging points require frequent testing (as often as four times a year) to ensure that they function correctly. Maintenance agreements are usually in place to cover testing and repair. Either the building owner or a third party will be responsible for maintenance, depending on how the charging point is owned.

How to identify it

Charging points are either pillar or wall mounted with a socket and instructions for use.

Questions to ask

- Are there any charging points on-site or in close proximity to the building?
- Is the electricity provided free or charged to the user?
- Who owns the charging point and has responsibility for maintenance and administrating payment (if applicable)?
- Are the points part of a network or scheme e.g. Source London or Charge your Car?

More information

Department for Transport

EV Network UK

Travel Plans

What is it?

A travel plan is a strategy that aims to reduce an organisation's environmental impact through the promotion of sustainable transport methods, including walking, cycling, public transport and car sharing. A travel plan is specific to each building and is often developed in response to a BREEAM assessment or a planning requirement.

Advantages / Disadvantages

Potentially reduces CO_2 emissions associated with staff and visitor travel if its recommendations are implemented.	✓
Particularly helpful where the building is located in an area known to have problems with congestion.	✓
Low cost to develop a plan.	✓
Complying with recommendations can be costly and time consuming.	✗

Applicable buildings

All buildings types.

How to identify it

The plan will be developed specifically for the building and will be held by the owner / building management team. All building users should be aware of the plan.

Questions to ask

- Is there a travel plan for the building and what does it include?

More information

Business Link

Department for Transport

Biodiversity

Commercial property agents often find it difficult to see why the features of a building which increase the variety of natural species in an area is a relevant issue for them, however it is becoming increasingly important to both owners and occupiers.

Commercial buildings are often in urban locations, seem to offer little chance to contribute positively to biodiversity and any benefits to occupiers are seen to be 'soft' and hard to quantify. The reality is that new and refurbished buildings are increasingly expected to make a positive contribution to biodiversity. This takes the form of, for example, green and brown roofs, bat boxes and, more recently, bee hives. Agents need to be aware of the issues and opportunities these raise.

Key issues to consider:

- Does the building have features which improve the biodiversity of the surrounding area e.g. ecological space, wildlife habitats, green roofs?
- What are the maintenance implications and costs of these features?

Ecological Amenity Space

What is it?

An amenity space for staff can comprise planting, or other ecological features such as a pond, together with seating and benches. Space can be within an internal courtyard, terracing or as part of the external landscaping.

Advantages / Disadvantages

Increases biodiversity on the building / site making a positive sustainability statement.	✓
Seen as improving occupier satisfaction and wellbeing. Studies have indicated that green or amenity space can lead to an increase in occupier productivity.	✓
Potentially high maintenance, depending on the planting strategy and the features included.	✗
Irrigation is a key consideration, particularly if there is no rainwater harvesting in place or there is planting present that has a high water dependency. Drought resistant planting is now increasingly common to avoid this.	✗

Running costs

The ongoing cost of an amenity space will depend on its maintenance requirements. Replacement plants and shrubs can be avoided if appropriate management is followed.

Retrofit / improvement opportunities

Retrofitting an internal or external amenity space requires space either internally (such as in an atrium or light-well), on the roof or within the site boundary.

Applicable buildings

Internal or external space is required for an amenity space but even a relatively small dedicated area can bring benefits.

Floor plate implications

None.

Occupier comfort

The amenity space should be attractive to occupiers which in turn can help improve staff wellbeing and morale. Studies have indicated that green or amenity space can lead to an increase in occupier productivity.

Maintenance implications

Maintenance for an amenity space will depend on features present. Certain species of plants, shrubs and trees and features such as ponds will require regular upkeep to maintain appearance. Internal plants will require regular watering.

How to identify it

Designated internal or external space featuring planting, seating and other recreational features.

Questions to ask

- Does the building have a dedicated amenity space for staff?
- How is the space managed?
- Who has access to the space? If there is no dedicated amenity space on-site, where is the nearest open space for staff to use?

More information

RIBA

Wildlife Habitats

What is it?

A wildlife habitat is a generic term covering features such as bird and bat boxes and insect habitats.

Advantages / Disadvantages

Increases biodiversity on the building / site.	✓
Demonstrates to staff and visitors a strong commitment to sustainability.	✓
On-going advice required from an ecologist or other specialist.	✗
Strict regulations are in place preventing bat and bird habitats being tampered with or removed.	✗

Running costs

Ad hoc specialist advice will be required depending on the type of wildlife habitat.

Retrofit / improvement opportunities

Straightforward to retrofit providing there is accessible roof space. Specialist advice is required to determine the best position to site the wildlife habitat.

Applicable buildings

All building types can host wildlife habitats, however, specialist advice should be sought and a survey undertaken.

Floor plate implications

None.

Occupier comfort

No issues.

Maintenance implications

Wildlife habitats typically require no maintenance except for beehives which will be undertaken by an external specialist or trained members of the building management. All maintenance implications should be detailed in a biodiversity management plan prepared by an ecologist or other specialist.

The advice of an ecologist or other specialist will be required if bat and bird boxes need to be moved because there are strict regulations that need to be complied with.

How to identify it

A wildlife habitat typically comprises a timber box or other wooden structure housing bats, birds, insects or bees at roof level either mounted vertically or horizontally. Habitats vary in size depending on the fauna being accommodated.

Questions to ask

- Are there any bird and / or bat boxes, beehives or other insect habitats on the building?
- Is there a biodiversity management plan detailing any specific maintenance requirements?
- Who is responsible for maintaining any installed wildlife habitat (if required)?

More information

Bat Conservation Trust

RSPB

Green Roofs and Living Walls

What is it?

Green roofs (also known as a living or sedum roofs) are a specifically designed planting system to provide a habitat for wildlife, enhance ecological value and aesthetic appeal and reduce heat gain / loss from the building. Green roofs take a variety of forms and can be categorised as either 'extensive', 'intensive' or 'semi-intensive'. An extensive green roof is characterised by moss, herbs and grasses and is primarily used as an ecological landscape. An intensive roof is more managed and can be used as a garden with a lawn and perennials, shrubs and trees and can be incorporated with amenity space for occupiers. A semi-intensive roof is a mixture of the two.

'Brown' roofs are similar to green roofs. The main difference is the choice of growing medium (usually locally sourced rubble, gravel, etc) to meet a specific biodiversity objective. They are generally less attractive than green roofs but equally valuable in terms of biodiversity.

A living wall is a living and self-regenerating, cladding system using climbing plants.

Advantages / Disadvantages

Increases biodiversity on the building / site making a positive sustainability statement.	✓
Can have effective insulation properties to prevent heat loss in winter and provide passive cooling in summer.	✓
Intensive roofs can be used as an amenity space.	✓
Potentially high maintenance depending on the planting strategy adopted.	✗
Irrigation is a key consideration, particularly if there is no rain or grey water recycling in place or there is planting present that has as a high water dependency.	✗
An existing roof may not be able to support the additional structural load of a green roof without strengthening works being undertaken, which may be impractical.	✗

Running costs

Intensive green roofs and living walls will have higher running costs compared to extensive green roofs or brown roofs due to higher maintenance requirements and water consumption. A rainwater harvesting or grey water recycling system for irrigation purposes will reduce mains water consumption.

Green roofs can also reduce a building's energy demand by preventing solar gain and providing insulation thereby saving both energy and running costs.

Retrofit / improvement opportunities

Straightforward to retrofit providing there is adequate free roof space with easy access, no shading and the existing roof can accommodate the additional load. If the existing roof structure cannot take the additional load of a green roof then strengthening works will be required.

Retrofitting a green roof should take into consideration the future space required for the occupier to install additional plant and equipment on the roof (e.g. air conditioning units and air handling units).

Applicable buildings

All building types can benefit from green or brown roofs or living walls. However, there are a range of design issues, such as drainage, irrigation, access for maintenance, additional structural load, shading and aesthetic appeal, to consider.

Floor plate implications

None.

Occupier comfort

Intensive green roofs in the form of terraces can provide good views and an amenity space for occupiers providing appropriate maintenance and irrigation is applied to avoid deterioration in appearance. Planting can include edible plants such as herbs that occupiers can use.

Continue

Green Roofs and Living Walls continued

Maintenance implications

Extensive green and brown roofs will require annual maintenance whereas intensive roofs and living walls will require regular attendance and management. Typically, a biodiversity management plan will be in place which will set out specific maintenance actions and frequency.

How to identify it

Green roofs will feature a range of planting types of various sizes and become established over time. Brown roofs may have rubble or other hard materials on them to encourage colonisation by fauna as well as flora.

Living walls comprise an area of the building façade featuring climbing plants set on a dedicated frame and with an irrigation system.

Questions to ask

- Is there a green roof, brown roof or living wall on the building?
- Is the green roof extensive or intensive?
- Is there a biodiversity management plan for the feature?
- What is the maintenance cost and does it add to the service charge?

More information

The Green Roof Centre

UK-Green Building Council

Design for Biodiversity

CSR

It is becoming increasingly common for companies, particularly major corporates, to publish Corporate Social Responsibility (CSR) statements and policies. These set out their approach to environmental and social issues that are material to their business.

While there is currently no legal requirement for CSR reporting, the trend is upwards, with 45% of S&P 500 companies publishing annual reports. Companies with CSR policies will normally have targets for reducing their negative environmental and social impacts and will collect data on, for example, their consumption of energy and water and their generation of waste. Companies that have CSR policies and report on their performance are likely to be interested in the environmental credentials of the building(s) they own and/or occupy. A building's ability to support an organisation's CSR policies can give it an advantage over a similar but less sustainable building for this type of occupier.

Key issues to consider:

- Does your client have a CSR policy and could it impact on building choice?
- Can the building support your client's CSR policy?
- Is the building owner willing to engage and work together on environmental matters e.g. through a Green lease, Green MoU or Green Building Group?

Corporate Social Responsibility (CSR) Policies

What is it?

A statement setting out a company's approach to managing the negative environmental and social impacts of its operations and to generate positive social and environmental outcomes. It will normally include data on energy and water use, CO_2 emissions, waste generation and key supply chain issues. Organisations may have specific requirements within their CSR policy relating to the purchase or letting of a building e.g. Energy Performance Certificate rating or BREEAM rating.

Why is it useful?

A CSR policy statement establishes a company's position on sustainability issues and enables agents and other suppliers to understand what its priorities in this area are. Demonstrating awareness of a company's CSR policy, and how their expertise may support this, provides an agent with an important advantage.

Issues to be aware of

Occupiers with strong CSR policies might have difficulty finding space that suits all their requirements from an environmental / sustainability perspective. This issue can be overcome if agents and owners understand how a building can be upgraded or retrofitted to higher standards and how it can be operated efficiently by or for the occupier.

Applicable buildings

All building types.

Questions to ask

- Does the owner / occupier have a CSR policy and / or sustainability and environmental targets that will impact upon building selection and its operational performance?

More information

Department of Business Innovation and Skills

Business Links

Green Leases

What is it?

A green lease is a standard form lease with additional clauses included which provide for the management and improvement of the environmental aspects of a building by both owner and occupier. These clauses often relate to the sharing of utilities consumption data, protecting the energy performance rating of the building and general cooperation on environmental matters.

Why is it useful?

A green lease demonstrates a strong environmental commitment and enables cooperation between owner and occupier, which will in turn support the CSR obligations and corporate reporting requirements of each party.

A growing amount of environmental regulation is likely to require transparent data reporting. Having clearly articulated obligations for both owner and occupier in a lease document will be of benefit to both parties.

Obligations can protect the energy performance rating of a building by restricting alterations that might be detrimental.

Issues to be aware of

Owners, occupiers and their legal advisors can be reluctant to agree to the inclusion of environmental clauses in a lease, even though such provisions are normally of benefit to both owner and occupiers.

Occupiers may be concerned that the building owner will be able to use the environmental clauses as a way of improving a building at their expense, but appropriately worded clauses should allay any fears.

Owners, occupiers and their legal advisors may see the introduction of environmental clauses in a lease as slowing down the negotiation process, but they should be seen as a clear benefit rather than a burden.

It is important to ensure that any occupier affected by the Carbon Reduction Commitment Energy Efficiency Scheme is provided with energy consumption data and green lease provisions can facilitate this.

Applicable buildings

All building types.

Questions to ask

- Is either the owner or occupier offering / expecting to include environmental clauses in the lease?
- If not, how will the owner be working with the occupier to ensure the environmental performance of the building is satisfactory?

More information

BBP Green Lease Toolkit

Green Memorandums of Understanding

What is it?

A green Memorandum of Understanding (MoU) is a document which sets out how the owner and occupiers of a building, together with the building management, will cooperate on environmental issues. It is not legally binding and can be negotiated at any point during a lease.

Why is it useful?

A green MoU can be seen as a less contentious option to a green lease as it demonstrates a commitment to environmental matters but without any contractual obligation. It can be introduced alongside an existing lease at any point. It also establishes a basis for how environmental issues within a building will be addressed which will support both owner and occupier's CSR obligations and corporate reporting requirements.

Issues to be aware of

A green MoU is not legally binding and therefore effective action requires a commitment from the owner, occupier and building manager. It can be time consuming to negotiate and obligations cannot be enforced, but can be a very valuable tool when well drafted.

Applicable buildings

All building types.

Questions to ask

- Is either the owner or occupier offering or expecting a green MoU?
- If not, how will the owner be working with the occupier to ensure the energy efficiency of the building is satisfactory?

More information

BBP Green Lease Toolkit

Green Building Management Groups

What is it?

A Green Building Management Group (GBMG) is a forum that comprises the building owner, occupiers and building management specifically established to review and improve the environmental and operational performance of a building. It is an effective way of addressing obligations agreed within a green lease or green Memorandum of Understanding (MoU).

Why is it useful?

A GBMG can lead to improved communication between the owner and occupiers on a range of issues beyond those which are environmental and sustainability related. Likely to highlight building inefficiencies, improve performance and result in significant financial savings for both parties.

Issues to be aware of

Occupier engagement can be difficult, depending on their level of interest in environmental matters, but benefits can be significant.

Applicable buildings

All building types but particularly useful for multi-let offices.

Questions to ask

- Is there a GBMG in place or planned and if so what are the details?
- If there isn't, has one been considered?
- What arrangements are in place to enable the owner and occupier to communicate on environmental issues such as policy, regulation and data sharing?

More information

BBP Green Building Management Toolkit

Ratings

A variety of indicators are available which rate the environmental performance of a building. Many of these are having an increasing influence on the decision making process for both owners and occupiers.

They can be helpful in understanding a building's sustainability/environmental credentials, but they are not sufficient on their own to give an accurate indication of a building's performance. The date of any rating should be checked to establish its current relevance and whether any recommendations for improvement were provided with it. If there are, enquiries should be made to establish whether or not these have been implemented.

Key rating systems to be aware of include: BREEAM; Display Energy Certificates (DECs); Energy Performance Certificates (EPCs); LEED; Ska Rating and Environmental Management Systems.

Key issues to consider:

- Does your client have any requirements relating to building environmental ratings?
- Does the building have any certified environmental ratings e.g. EPC, BREEAM?
- Are there opportunities to improve the rating level and at what cost?

Energy Performance Certificates

A+

What is it?

Energy Performance Certificates (EPCs) advise owners and occupiers of the potential energy efficiency of a building and are required by law to be displayed in marketing literature when a building is built, sold or let. The EPC displays a grade from A (best) to G (worst) and allows owners and occupiers to compare the potential energy efficiency of different buildings.

EPCs come with a recommendation report which includes advice on energy efficiency improvements and a potential rating that could be achieved if improvement work is undertaken. An EPC for a commercial building is valid for 10 years or until replaced with a newer one.

Why is it useful?

An EPC provides a rating of the theoretical energy efficiency performance of a building which can be used as a standard measure of comparison for all commercial buildings that are traded or newly let. The EPC is also useful in the absence of actual consumption data.

Issues to be aware of

Within the Energy Act lie powers to make it unlawful to let properties which lie below a certain energy performance certificate rating (with government officials suggesting that minimum standards will commence with F & G rated buildings). The Energy Act leaves the Government scope to introduce such minimum standards at the very latest by 2018, meaning that minimum standards could be introduced sooner. Precise details of the measures and any exemptions will develop over the coming months and agents should be aware of these.

EPCs only provide a rating based on theoretical performance and do not reflect the actual level of energy use during occupation (for ratings based on actual energy performance see Display Energy Certificates). A good EPC rating does not necessarily mean that an occupier will have lower energy costs, simply that there is the potential for low energy costs if the building is run efficiently.

Applicable buildings

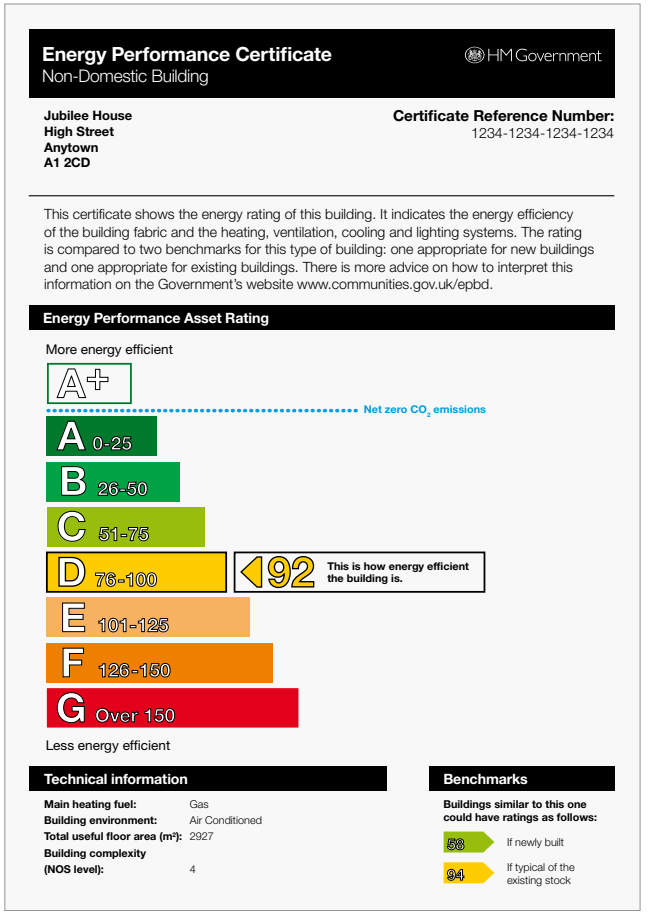
Mandatory for all commercial buildings above 50m².

Questions to ask

- Is there an EPC for the building and if so what is the rating and CO_2 index score?
- When was the EPC issued?
- Have any improvements been undertaken since the EPC and improvement report was issued? If so, what did these include?

More information

Department of Communities and Local Government



Energy Performance Certificate
Non-Domestic Building

HM Government

Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25
B 26-50
C 51-75
D 76-100
E 101-125
F 126-150
G Over 150

92 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Gas
Building environment:	Air Conditioned
Total useful floor area (m²):	2927
Building complexity (NOS level):	4

Benchmarks

Buildings similar to this one could have ratings as follows:

58 If newly built
94 If typical of the existing stock

Display Energy Certificates

A+

What is it?

Display Energy Certificates (DECs) advise owners and occupiers of the actual energy performance of a building over a 12 month period i.e. how much energy it used in a year. All public authorities and institutions providing public services in a building with a total floor area over 1,000m^2 must produce and prominently display a DEC for that building every year. DECs are currently not a legal requirement for buildings with private sector occupiers. The DEC displays a grade from A (best) to G (worst) and allows owners and occupiers to compare the actual energy performance of different buildings or tenanted space and how performance has changed over a three-year period. DECs also come with a recommendation report which includes advice on energy efficiency improvements.

Why is it useful?

A DEC is able influence the behaviour of owners and occupiers by making energy performance data accessible and simple to understand and by showing performance in preceding years.

A DEC can be more useful than an Energy Performance Certificate since it details performance based on actual energy consumption rather than theoretical performance and therefore provides information on how efficiently a building is currently being run.

Issues to be aware of

DECs are currently mandatory for public authorities and institutions providing public services in a building with a total floor area over 1,000m^2. However the floor space threshold is likely to reduce over time so that more buildings will require a DEC.

Some large property company owners are now committing to providing DECs on a voluntary basis for all their buildings.

Applicable buildings

All public buildings and those occupied by public authorities which have a total useful area greater than 1,000m^2 and provide a public service to a large number of people and are therefore frequently visited by those people.

Questions to ask

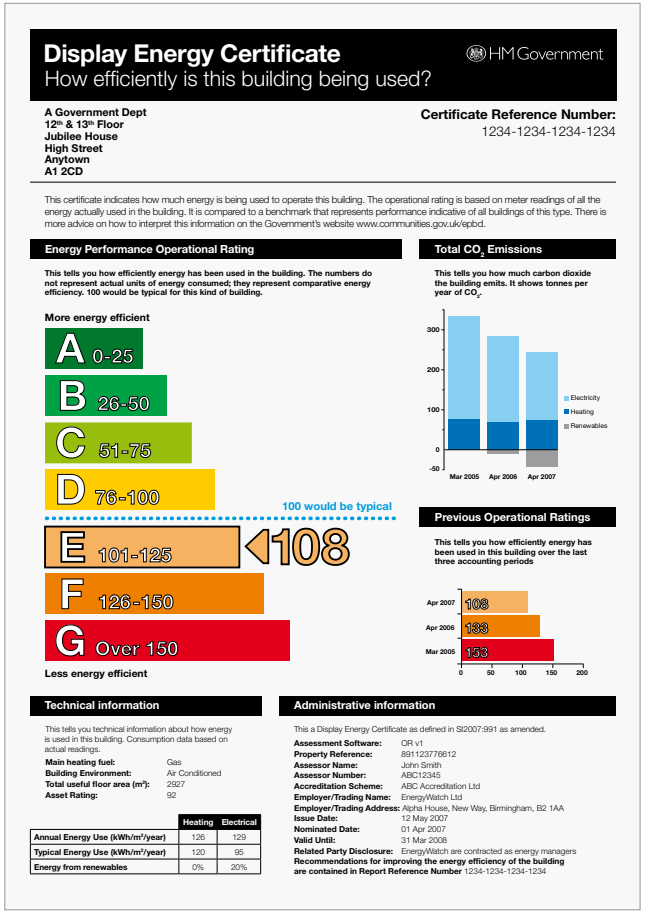
- Is there a DEC for the whole building or part only (i.e. the area occupied by a public authority)?
- What is the rating and CO_2 index score?
- When was the DEC issued?
- Have any improvements been undertaken since the DEC was issued? If so, what did this include?
- Is there a data sharing arrangement – e.g. a green lease or green Memorandum of Understanding – in place between owner and occupier in order to produce a DEC?

More information

Department of Communities and Local Government

Better Buildings Partnership

UK Green Building Council



Display Energy Certificate
How efficiently is this building being used?

HM Government

A Government Dept
12th & 13th Floor
Jubilee House
High Street
Anytown
A1 2CD

Certificate Reference Number:
1234-1234-1234-1234

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient
A 0-25
B 26-50
C 51-75
D 76-100
100 would be typical
E 101-125 108
F 126-150
G Over 150
Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Electricity
Heating
Renewables
Mar 2005 Apr 2006 Apr 2007

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

Apr 2007 108
Apr 2006 138
Mar 2005 153

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual readings.

Main heating fuel:	Gas
Building Environment:	Air Conditioned
Total useful floor area (m²):	2927
Asset Rating:	92

	Heating	Electrical
Annual Energy Use (kWh/m²/year)	126	129
Typical Energy Use (kWh/m²/year)	120	95
Energy from renewables	0%	20%

Administrative information

This a Display Energy Certificate as defined in SI2007:991 as amended.

Assessment Software:	OR v1
Property Reference:	891123776612
Assessor Name:	John Smith
Assessor Number:	ABC12345
Accreditation Scheme:	ABC Accreditation Ltd
Employer/Trading Name:	EnergyWatch Ltd
Employer/Trading Address:	Alpha House, New Way, Birmingham, B2 1AA
Issue Date:	12 May 2007
Nominated Date:	01 Apr 2007
Valid Until:	31 Mar 2008
Related Party Disclosure:	EnergyWatch are contracted as energy managers
Recommendations for improving the energy efficiency of the building are contained in Report Reference Number	1234-1234-1234-1234

BREEAM

A+

What is it?

BREEAM is the Building Research Establishment Environmental Assessment Method which is used for measuring a building's environmental performance in terms of sustainable design. It is the most frequently used method in the UK compared to other assessment methods. A similar, US developed alternative, is LEED.

The assessment covers new buildings, refurbished buildings and fit-outs for a range of building types against set criteria and best practice. The BREEAM assessment covers nine categories: management, health & wellbeing, energy, transport, water, materials, waste, land use & ecology, pollution. An overall environmental rating is then provided.

Once an assessment is complete, the Building Research Establishment issue a certificate identifying the awarded BREEAM rating. Current BREEAM ratings are: 'Outstanding', 'Excellent', 'Very Good', 'Good' and 'Pass'.

Why is it useful?

A BREEAM rating provides some evidence of the sustainability profile of a building. This can be useful for marketing purposes and some occupiers will have a minimum BREEAM rating requirement for new space, normally either 'Excellent' or 'Very Good'. Some large corporates are aiming for 'Outstanding', but this rating is challenging and expensive to achieve.

Issues to be aware of

A high BREEAM rating does not necessarily mean a building is operated efficiently, just that it has environmental / sustainability features and has the potential to be run efficiently. A 'BREEAM In-Use' assessment can identify how efficiently a building is being operated.

It is important to note that BREEAM is updated relatively frequently to take account of current best practice, raise standards and encourage exemplar design. The latest version is 2011 which superseded versions including 2008, 2006 and 2005. Ratings awarded under later versions of the scheme will indicate a higher standard of sustainability has been met compared to the same rating awarded under earlier versions. For example, an 'Excellent' rating awarded under the 2008 version represents a lower standard of sustainability compared to 'Excellent' awarded under the 2011 version. The BREEAM 2008 scheme was the first to include minimum requirements for energy performance. Therefore, buildings with certificates from earlier schemes may have achieved little or no improvement in energy performance over the basic requirements of building regulations.

Applicable building types

All building types can be assessed using BREEAM. Retail property often struggles, however, to achieve a high BREEAM rating because it tends to be built to shell and core and the occupier controls the 'high impact' systems such as lighting and air conditioning and also fit-out within the units.

Questions to ask

- Does the building have a BREEAM rating and if so, what is it and under what version of the scheme was it awarded?
- Does the BREEAM rating impose specific fit-out standards (e.g. efficiencies or technology types) on occupiers?

More information

BREEAM

LEED

A+

What is it?

Leadership in Energy and Environmental Design (LEED) is an international green building certification system that measures a building's design against a set of performance categories. Developed in the US, LEED is becoming more frequently used in the UK as an alternative to BREEAM.

The performance categories assessed by LEED cover six categories: sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality and innovation in design.

When an assessment is complete, the US Green Building Council will issue a certificate identifying the awarded LEED rating. Current LEED ratings are: 'Platinum', 'Gold', 'Silver' and 'Certified'.

Other international certification systems include:

- BEAM (Building Environmental Assessment Method) – Hong Kong.
- CASBEE (Comprehensive Assessment System for Built Environment Efficiency) – Japan.
- DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) – Germany.
- Green Star – Australia.
- HQE (Haute Qualité Environnementale) – France.
- Passivhaus – International.

Why is it useful?

LEED provides some evidence of the sustainability of a building. This can be useful for marketing purposes and some occupiers will have a minimum LEED rating for new space. The system is widely adopted in North America and can be adopted globally. For this reason, LEED is often the preferred assessment method for US organisations owning or occupying buildings in the UK.

Issues to be aware of

A high LEED rating does not necessarily mean a building is operated efficiently. All LEED rated buildings have some environmental / sustainability features and the potential to be run efficiently.

It is important to note that LEED is updated relatively frequently to take account of current best practice, raise standards and encourage exemplar design. Ratings awarded under later versions of the scheme will indicate a higher standard of sustainability has been met compared to the same rating awarded under earlier versions. For example, a 'Gold' rating awarded under the 2009 version represents a higher standard of sustainability compared to 'Gold' awarded under the 2005 version.

The process of obtaining a BREEAM and LEED rating is similar in that it requires an appointment of a qualified assessor to review the project at design stage and then again once construction is complete to obtain formal certification. However, BREEAM and LEED ratings are not directly comparable because the assessment criteria are different although the categories assessed are broadly the same. A high BREEAM rating is likely to achieve a high LEED rating and vice versa but there is no direct comparison between the scores achieved. A building with a BREEAM rating will need to be reassessed if the owner or occupier requires a LEED rating.

Notable differences between BREEAM and LEED include:

- LEED uses a points system compared to a percentage system under BREEAM.
- LEED is generally less prescriptive than BREEAM which gives the design team more flexibility to meet the assessment criteria. The prescriptive credits in LEED are generally less challenging than BREEAM.
- BREEAM is based on UK and EU legislation whilst LEED is based on US standards.

Applicable buildings

All building types can be assessed using LEED.

Questions to ask

- Does the building have a LEED rating and if so, what is it and under what version of the scheme was it awarded?
- Does the LEED rating impose specific fit-out standards (e.g. efficiencies or technology types) on occupiers?

More information

US Green Building Council

Ska Rating

A+

What is it?

A UK labelling system, developed by the Royal Institution of Chartered Surveyors (RICS), which is designed to rate and compare the environmental performance of fit-outs in office and retail buildings. The Ska system consists of good practice measures covering energy and CO_2 emissions, waste, water, materials, pollution, wellbeing and transport. The Ska tool assesses at three stages – Design, Handover and Post Occupancy.

Once an assessment is complete, the RICS issue a certificate identifying the awarded Ska rating. Current Ska ratings are: 'Gold', 'Silver' and 'Bronze'.

Why is it useful?

The Ska assessment tool is free to use and can be useful to inform the fit-out design process. Formal certification can then be undertaken by a qualified assessor for an additional fee. The post occupancy assessment will indicate the operational efficiency of the building.

Issues to be aware of

This is a relatively new system and isn't yet widely used. Market awareness is, however, growing.

A high Ska rating does not necessarily mean a building is operated efficiently. All Ska rated buildings have some environmental / sustainability features and the potential to be run efficiently.

The process of obtaining a Ska rating differs to BREEAM. An ongoing Ska review can be undertaken free of charge without need to register the scheme with RICS or appoint a licensed Ska assessor. The Ska assessor is only essential if formal Ska certification is sought.

Ska and BREEAM are similar in that the project is reviewed at design stage and then again once construction is complete to obtain formal certification. However, BREEAM and Ska ratings are not directly comparable because the assessment criteria are different although the categories assessed are broadly the same. A high BREEAM rating is likely to achieve a high Ska rating and vice versa but there is no direct comparison between the scores achieved. A building with a BREEAM rating will need to be reassessed if the owner or occupier requires a Ska rating.

Notable differences between BREEAM and Ska include:

- The Ska assessment can be tailored to suit the scope of the fit-out by 'filtering out' credits that don't apply. This provides greater flexibility to the scope of assessment.
- Ska is a free tool which can be used to inform the design process.
- A Ska assessment places greater emphasis on the environmental properties of the materials used in the fit-out.

Applicable buildings

The tool has only been developed for office and retail building fit-outs.

Questions to ask

- Does the building or part of the building have a Ska rating?
- Does the occupier have a Ska rating target for their fit-out?

More information

RICS

Environmental Management Systems

A+

What is it?

An Environmental Management System (EMS) formally defines the procedures and processes for an organisation to follow when setting, managing and implementing environmental objectives. The EMS will be developed by the organisation to ensure that their environmental policy is implemented across all areas of the organisation. The EMS sets out the procedures to be followed in order to meet the organisation's environmental objectives and can be used as a tool to improve environmental performance. For example, the EMS for a portfolio owner will include separate environmental procedures for acquiring, refurbishing and leasing buildings. These procedures are likely to set specific targets relating to energy, water, waste, BREEAM etc.

The EMS will also set out how the environmental objectives and / or targets should be monitored, reviewed and continuously improved.

ISO 14001 is a voluntary international standard for organisations operating an Environmental Management System (EMS). A certificate is issued when the EMS formally meets the standards of ISO 14001 and thereafter the organisation is continually audited every six months to ensure it is fully compliant with the procedures set out in the EMS.

Why is it useful?

An owner or occupier who operates an EMS and / or ISO 14001 certification is likely to have specific environmental targets or corporate obligations that need to be achieved as well as being a good indicator of their commitment to environmental / sustainability related matters. For an owner, these may include, for example, establishing a Green Building Management Group for each building, agreeing a green Memorandum of Understanding with each occupier or setting a BREEAM fit-out target for each occupier.

An occupier with an EMS/ISO 14001 accreditation is likely to demand space in a building with high environmental credentials. This will include either a BREEAM, LEED or Ska rating or a specific Energy Performance Certificate rating. The occupier may also be more willing to share data and work with an owner to ensure the building performs well.

Issues to be aware of

None.

Applicable buildings

All building types.

Questions to ask

- Does the owner or occupier have an EMS accreditation?
- Are there any specific environmental objectives or targets which will affect a potential occupier or owner?

More information

Business Links

ISO 14001 Environmental Management System Guide

Regulations

A range of penalties and incentives have been introduced by the Government in order to reduce CO_2 emissions from both new and existing commercial buildings. These will continue to be developed and increase over time.

The focus of the Government's policies tends to be on encouraging building owners to invest in improvements to their buildings which reduce carbon emissions. Some are more straightforward than others and range in the level of impact they are currently having. It's clear that the Government is committed to reducing CO_2 emissions from commercial buildings and legislation will increase over time. An agent needs to be aware of how a building is affected by such legislation and what the potential impacts are.

Key regulations to be aware of include: Carbon Reduction Commitment Energy Efficiency Scheme (CRC); Green Deal; Feed-in-Tariffs and the Renewable Heat Incentive.

Key issues to consider:

- Are there any features of the building which result in any potential regulatory environmental penalties or incentives?
- What arrangements are in place to address any potential environmental penalties or incentives?
- What is the CRC reporting status of the client?

Carbon Reduction Commitment Energy Efficiency Scheme (CRC)

What is it?

The CRC is a UK-based CO_2 emissions trading scheme for large public and private sector organisations. It is a mandatory scheme which aims to both improve energy efficiency and regulate the amount of greenhouse gases that are released from the burning of fossil fuels by an organisation. Participants are required to report on the total CO_2 emissions for their business over the course of a year and pay a specified amount for each tonne (currently £12 but likely to increase over time). The scheme includes the publication of a league table showing the performance of all the participants within the scheme.

Why is it useful?

The CRC aims to encourage large consumers of electricity and gas to undertake energy efficiency improvements instead of paying an amount per tonne of CO_2 produced to the Government. The published league table aims to impact upon the reputation of participating organisations and encourage action as a result.

Issues to be aware of

The CRC is viewed as an environmental tax because the Government benefits from the revenue raised. The scheme applies to organisations whose half-hourly electricity consumption totals more than 6,000MWh per year which equates to approximately £500,000 annual spend. An organisation that meets the criteria will be required to report and buy allowances for all electricity, gas and oil consumed (excluding transport fuels).

The CRC is assessed at the corporate level and includes all buildings / occupied space. CRC liability attaches to the party that has the energy supply contract for the building. This is particularly relevant in multi-let buildings where the owner has the energy supply contract and therefore CRC liability for the energy consumed by the occupiers. Liability for the cost of CRC compliance between owner and occupiers will require specialist legal advice in relation to new and existing leases.

Applicable buildings

The scheme applies to all commercial building types.

Questions to ask

- Is the owner or occupier a participant in the CRC?
- Are the owner's costs of compliance being passed on through the service charge? If so, for the whole building or part?
- Is the prospective occupier a CRC participant or expecting to be?

More information

Department of Energy and Climate Change

Environment Agency

British Property Federation

Feed-in Tariff

What is it?

The Feed-in Tariff (FiT) is a subsidy payable over 20 or 25 years (depending on the technology) to the owner of specific renewable energy technologies for each kWh of electricity generated. In addition, energy suppliers are required to purchase each unit of electricity generated from the owner if exported to the national grid. The FiT applies only to electricity generating equipment: wind power, solar photovoltaic (PV), hydro, anaerobic digestion and domestic scale micro CHP.

The FiT is fixed at the time the technology is commissioned and index linked for the entire 20 to 25 year period providing it is still generating electricity during this time.

Why is it useful?

The purpose of the initiative is to encourage the uptake of technologies supplying renewable electricity. The FiT is also a potential long-term income stream for a building owner. Electricity generated by the equipment can be used to reduce the electricity demand for the building, thereby reducing building running costs and CO_2 emissions.

The tariff is payable to the owner of the equipment which might be a third party, separate from the building owner. If a building owner installs and pays for PV panels (for example) and then sells the building, they can continue to receive the FiT. This will be subject to negotiations with the building purchaser. Where a lease is being taken on a building, the renewable energy technology may enable the owner to provide low cost electricity to the building, thereby reducing the service charge.

Issues to be aware of

The FiT is less generous now compared to when the scheme was first introduced, but nonetheless remains a potential long-term income stream for an owner. The tariff set when the technology was installed applies throughout the tariff period subject to index linking. Electricity generated by the equipment can be sold to occupiers for close to grid price, which is likely to rise.

The potential exists for the Government to change the scheme further.

Applicable buildings

From 1 April 2012, to be eligible for the standard PV tariff rates, the building to which the solar PV installation is attached or wired to provide electricity must have an Energy Performance Certificate rating of 'D' or above.

Questions to ask

- Is there a renewable energy technology installed on the building registered for the FiT?
- Is the FiT claimed by the owner, occupier or a third party?
- Is the electricity generated consumed in the building or exported back to the grid?
- Is the electricity generated being provided to the occupiers as low cost electricity?

More information

Department of Energy and Climate Change

Renewable Heat Incentive

What is it?

The Renewable Heat Incentive (RHI) is a subsidy payable over 18 to 20 years to the owner of specific renewable energy technologies for each kWh of renewable heat generated. The RHI applies only to heat generating equipment: solar thermal panels, biomass boilers, ground source heat pumps and water source heat pumps. Air source heat pumps are currently not eligible to claim the RHI.

The RHI is fixed at the time the technology is commissioned and index linked for the entire period providing it is still generating heat during this time.

Why is it useful?

The purpose of the initiative is to encourage the uptake of technologies supplying renewable heat. The RHI is also a potential long-term income stream for a building owner. Heat generated by the equipment can be used to reduce the gas required to generate hot water or heating, thereby reducing building running costs and CO_2 emissions.

The tariff is payable to the owner of the equipment, so where a building is purchased outright, including the renewable energy equipment, the tariff will pass to the new owner. Where a lease is being taken on a building the renewable energy technology may enable the owner to provide low cost heat to the building, thereby reducing the service charge.

Issues to be aware of

The tariff set when the technology was installed applies throughout the tariff period subject to index linking. Heat generated by the equipment can be sold to occupiers for close to the cost of generating their own heat, which is likely to rise.

To claim the RHI tariff and charge occupiers for using the heat generated, a comprehensive metering strategy needs to be in place.

The potential exists for the Government to change the scheme, as has happened with the Feed-in Tariff. However, once the installation is locked into a specific tariff level this is index linked for the duration of the incentive period.

Applicable buildings

The RHI can be claimed for systems installed on all buildings, however the amount available will depend on the heat generated. Technologies should only be installed where it is appropriate and viable to do so (see 'On-site generation' section).

Questions to ask

- Is there a renewable heat technology installed on the building registered for the RHI?
- Is the RHI claimed by the owner, occupier or a third party?
- Is the heat generated being provided to the occupiers as low cost heat?

More information

Department of Energy and Climate Change

Green Deal

What is it?

The Government's Green Deal initiative is due to be implemented in October 2012. The scheme allows owners and occupiers to borrow money to carry out energy efficiency improvement works to their building(s). Money is borrowed from non-government 'Green Deal Providers' to finance improvement works providing it can be paid back from the energy saved over the lifetime of the improvement. This is known as the 'Golden Rule'. For example, the energy saved from installing a new boiler must be sufficient to pay back the loan within 20 years as this is the expected life span of the boiler.

The loan will be attached to the electricity meter and not the party who took out the Green Deal loan and commissioned the improvement work. For example, an owner is able to sell the building together with its obligation to repay the loan.

Why is it useful?

The Green Deal allows an owner or occupier to access low cost finance to improve the energy efficiency of their buildings and save energy. The exact details of the scheme are yet to be finalised, however it is likely to cover a broad range of improvement works providing the 'Golden Rule' is met.

Issues to be aware of

The Green Deal has not yet been implemented and there is currently a lack of clarity as to how it will be operated. It is unlikely to be attractive to owners and / or occupiers where leases are shorter than the repayment term of the loan.

The building owner may be liable for repayments should the building become vacant unless the Green Deal is taken out by the occupier(s).

Applicable buildings

All building types.

Questions to ask

- Has the owner or the previous occupier obtained finance through the Green Deal?
- If so, what improvement work was undertaken and what are the relevant details regarding estimated energy savings and financial payback of the loan?

More information

Department of Energy and Climate Change

Useful Links

General

BBP

Better Buildings Partnership
www.betterbuildingspartnership.co.uk

BPF

The British Property Federation a membership organisation representing the interests of all those involved in property ownership and investment
www.bpf.org.uk

Business Link

A free business advice and support service
www.businesslink.gov.uk

Carbon Trust

A not-for-profit company with the mission to accelerate the move to a low carbon economy
www.carbontrust.co.uk

CIBSE

Chartered Institute of Building Services Engineers
www.cibse.org

Environment Agency

UK Government public body for the environment
www.environment-agency.gov.uk

UK-GBC

The UK Green Building Council is a membership organisation campaigning for a sustainable built environment
www.ukgbc.org

Envirowise WRAP

Provides free and independent support to improve resource efficiency in organisations
http://envirowise.wrap.org.uk/uk.html

Energy

BBP

Better Metering Toolkit
www.betterbuildingspartnership.co.uk/working-groups/sustainability-benchmarks/better-metering-toolkit

Business Link

Energy and carbon emissions
www.businesslink.gov.uk/bdotg/action/layer?topicId=1079432186

Carbon Trust

A not-for-profit company with the mission to accelerate the move to a low carbon economy
www.carbontrust.co.uk

CIBSE

Chartered Institute of Building Services Engineers
www.cibse.org

Department of Energy and Climate Change (DECC)

Practical guidance on low carbon buildings
www.decc.gov.uk/en/content/cms/meeting_energy/microgen/prac_guidance/prac_guidance.aspx

Water

Business Link

Water Management
www.businesslink.gov.uk/bdotg/action/layer?r.l1=1079068363&r.l2=1086029826&r.l3=1082900505&r.s=m&topicId=1086029826

Environment Agency

Guidance on water regulations and how to reduce water use
www.environment-agency.gov.uk/business/topics/water/default.aspx

Waste

Business Link

Waste Management
www.businesslink.gov.uk/bdotg/action/layer?r.l1=1079068363&r.s=tl&topicId=1086048456

Chartered Institution of Wastes Management

The professional body for the wastes management sector
www.ciwm.co.uk

ESA

Environmental Services Association
www.esauk.org

WRAP

Waste Resources Action Programme: A government body which helps businesses and individuals reduce waste, develop sustainable products and to use resources in an efficient way
www.wrap.org.uk

Continue

Useful Links continued

Transport

Department for Transport

Guidance on cycling, electric vehicles and travel plans
www.dft.gov.uk

Biodiversity

Bat Conservation Trust

www.bats.org.uk/pages/bats_and_the_law.html

Design for Biodiversity

www.d4b.org.uk

RIBA

www.architecture.com/SustainabilityHub/Designstrategies/Life/1-5-1-3-Siteplanting.aspx

RSPB

www.rspb.org.uk

The Green Roof Centre

www.thegreenroofcentre.co.uk/green_roofs

UK Green Building Council

www.ukgbc.org/content/biodiversity-guidance

CSR

BBP

Better Building Partnership: Green Building Management Toolkit
www.betterbuildingspartnership.co.uk/working-groups/owner-occupier-partnerships/green-building-management-toolkit/

BBP

Better Building Partnership: Green Lease Toolkit
www.betterbuildingspartnership.co.uk/working-groups/green-leases/green-lease-toolkit

Business Link

Guidance on corporate social responsibility
www.businesslink.gov.uk/bdotg/action/layer?topicId=1075408468

Department for Business Innovation & Skills (BIS)

Guidance on corporate social responsibility
www.bis.gov.uk/policies/business-sectors/low-carbon-business-opportunities/sustainable-development/corporate-responsibility

Ratings

BREEAM

BRE Environmental Assessment Method
www.breeam.org

Department for Communities and Local Government

Guidance on EPCs and DECs
www.communities.gov.uk/planningandbuilding/sustainability/energyperformance

Environmental Management Systems

www.businesslink.gov.uk/bdotg/action/layer?topicId=1079422683

LEED

The US Green Building Councils green building certification system
www.usgbc.org/DisplayPage.aspx?CategoryID=19

Ska Rating

The environmental assessment tool for sustainable fit-outs
www.rics.org/ska

Regulations

Department for Energy and Climate Change

Guidance on the Carbon Reduction Commitment Energy Efficiency Scheme, Feed-in Tariffs, Renewable Heat Incentives, Green Deal
www.decc.gov.uk

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