

Environmentally Sustainable Design & Construction

Technical Advice Note

DRAFT

November 2025

Introduction

Huntingdonshire District Council have recognised a Climate Crisis and Ecological emergency in the District and have adopted a [Climate Strategy](#) (22nd February 2023) that sets out the priorities to achieve the commitment of being a net zero carbon Council for its own operations by 2040 in response to a global issue. In addition, the Council's Corporate Plan 2023-2028, recognises the importance of the climate agenda in creating a better Huntingdonshire for future generations (see below).

The [Huntingdonshire Place Strategy 2050](#) articulates Huntingdonshire's aspirations and ambitions and maps out plans for place, people, economy, and the environment. Journey 4 Environmental Innovation, seeks to transition towards zero carbon development, utilising natural assets, being self-sufficient with our energy production and accelerate climate action.

The UK is committed to achieving 'net zero' by 2050, which is enshrined in law through the [Climate Change Act \(2008\)](#) making the UK the first major economy to legally bind itself to a net zero target.



Improving housing

We want everyone to live in a safe, high-quality home regardless of health, stage of life, family structure, income and tenure type. Homes should be energy efficient and allow people to live healthy and prosperous lives. New homes should be zero carbon ready and encourage sustainable travel.



Forward-thinking economic growth

We want our local economy to attract businesses that prioritise reducing their carbon footprint. A place where businesses choose to start-up, grow and invest in high-value jobs so they and our residents and high streets, can flourish and thrive. Local people should be able to develop their skills to take advantage of these opportunities, with businesses and education providers working more closely together to deliver an inclusive economy.



Lowering carbon emissions

We will take positive action to reduce carbon emissions and become a net zero carbon Council by 2040. We will enable and encourage local people and businesses to reduce carbon emissions and increase biodiversity across Huntingdonshire.

Huntingdonshire Corporate Plan 2023-2028 - Priority 2: Creating a better Huntingdonshire for future generations

Purpose

Huntingdonshire District Council recognises the urgency of addressing climate change and biodiversity loss. Environmentally sustainable planning not only mitigates negative impacts but actively contributes to climate resilience and the enhancement of the natural environment. As a local planning authority, the Council is committed to using its influence to drive design and construction practices that are fit for the future.

This Technical Advice Note (TAN) has been prepared to support and complement the implementation of the Council's Climate Strategy, guiding individuals, developers, businesses and communities on the pathway to Net Zero. It provides practical guidance for all scales of development on site-specific design and sustainable construction, and is intended to complement the [Huntingdonshire Design Guide Supplementary Planning Document \(2017\)](#), which sets out principles for good urban design and includes approaches to achieving more sustainable development.

Recent updates to the National Planning Policy Framework (NPPF) have broadened the environmental objectives for planning, shifting the goal from simply achieving a "low carbon future" to enabling a "net-zero future". This places new emphasis on a wider range of climate impacts, including overheating, water scarcity, nature recovery, flood and drought resilience, and protection against extreme weather. Environmentally sustainable development must therefore go beyond energy efficiency and carbon reduction to respond holistically to environmental challenges.

Buildings contribute around 25% of the UK's total carbon emissions, according to the [UK Green Building Council](#). In Huntingdonshire, carbon emissions stand at 5.3 tonnes per person per year, marginally above the UK average of 5.2. Overall, the district's emissions are 88% higher than the national average, primarily due to the scale of road traffic (Source: Huntingdonshire BEIS Emission Data 2020, Huntingdonshire District Council Climate Strategy).

Development proposals in the district must play an active role in tackling the Climate Crisis, contributing to the transition to a low carbon future and reducing emissions wherever possible.

The starting point is to maximise energy efficiency - both in new development and through the retrofitting of existing buildings. This reduces energy use, supports affordability by lowering running costs, and helps to address fuel poverty. However, preparing Huntingdonshire for a changing climate requires a broader shift in how we design and construct buildings. Everyone, including the construction industry, must use less energy, fewer materials, and fewer natural resources.

Exemplary development will take an integrated approach, embedding multifunctional solutions that support both people and planet. For example, it might use repurposed materials to deliver thermal efficiency, or deliver biodiversity enhancements alongside natural flood management and surface water filtration.

Truly environmentally sustainable design reflects not only our duty to future generations, but also the Council's Corporate

Plan priority to keep residents out of crisis. While the scale and pace of change required may be daunting, it also presents many local benefits:

- New opportunities for skills and employment in low-carbon and green construction industries;
- Healthier homes, better able to protect residents from overheating in summer and cold conditions in winter - especially for vulnerable people;
- Lower energy bills, supporting financial resilience and reducing household running costs;
- Cleaner air, with benefits for public health and wellbeing;
- Support for nature recovery, helping to stem the loss of local species and habitats.

This guidance is intended to be read as a whole document so that the interrelationship of all aspects of environmentally sustainable design and construction can be understood to enable a whole building approach to be taken.

Using this document, alongside adopted planning policies, applicants and developers can take responsibility for delivering climate-conscious, future-proof development. Together, we can create sustainable places for the people of Huntingdonshire - now and for generations to come.

Energy Efficiency Measures

This document sets out the recommended energy efficiency measures and practical guidance to be considered in the design of new development proposals. It includes the following:

- Planning and Building Regulations
- The Energy Hierarchy
- Passive Design
- Building Insulation and Airtightness
- Mechanical Ventilation and Heat Recovery
- Decentralised Energy Systems including district heating
- Photovoltaic (PV) / Solar Thermal Panels
- Heat pumps

Further considerations:

- Construction Materials
- Modern Methods of Construction
- Waste
- Water Management and Air Quality
- Nature Conservation and Biodiversity
- EV Charging
- Retrofitting and Home Efficiency Grants
- Traditional and Historic Buildings



Planning and Building Regulations

National Planning Policy Framework 2024

The [National Planning Policy Framework 2024](#) (NPPF) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced, with section 14 of the Framework giving consideration to the role of planning in responding to our changing climate.

This sets out a clear role for planning in supporting **'...the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure'** (NPPF 2024, Paragraph 161).

The NPPF retains the key link between planning policy and the provisions of the Climate Change Act 2008 and means Local Plans will have a duty to reduce the carbon emissions associated with new development, contributing to the UK's commitment to achieving net zero by 2050.

Huntingdonshire Local Plan to 2036

The [Huntingdonshire Local Plan to 2036](#) (adopted 2019) sets out the Council's approach to securing sustainable development from 2011 to 2036 in order to meet identified needs. Policy LP 12 – Design Implementation, encourages sustainable design and construction methods amongst other considerations to ensure that proposals makes efficient use of energy, water and other resources. The optional standards as set out in Building Regulations Part G (Sanitation, hot water safety and water efficiency) are required for all new residential development in Huntingdonshire.

The Building Research Establishment Environmental Assessment Method (BREEAM) standards are widely accepted as the best way to improve standards for non-residential buildings moving towards a zero carbon target. LP12 part j requires all new non-residential development to meet the BREEAM 'Good' standard, which is considered to be an achievable standard. The Council would support proposals that seek to achieve the higher 'Excellent' standard.

In addition to promoting environmental efficiency measures LP12 requires that new developments should be designed and built such that they will be durable and facilitate flexible usage for their anticipated lifetime. Design should reflect the desirability of minimising maintenance costs both of buildings and landscaping.

On 24 January 2023 Huntingdonshire District Council's Cabinet agreed to the preparation of a full update to the adopted Local Plan

which will set out a plan for how the district will grow over future decades. This provides the opportunity for future policies in relation to sustainable design and renewable technologies in supporting the UK's 2050 Net Zero target.



Local Plan Engagement 2024

We're updating the Local Plan, which sets the vision and strategy for future development in Huntingdonshire.

This is your chance to have a say on key issues like housing, climate change, infrastructure, and jobs. You can also view the sites put forward for development

Provide your feedback on important planning documents that will guide Huntingdonshire's future.

SCAN ME

To find out more information scan the QR code.

See the reverse for event dates.

local.plan@huntingdonshire.gov.uk

Huntingdonshire DISTRICT COUNCIL

Building Regulations

Building Regulations play a crucial role in reducing carbon emissions from new and existing buildings, helping the UK meet its net-zero target by 2050. They set minimum energy efficiency standards for homes and commercial buildings, ensuring that developments are more sustainable.

Building regulations parts F, L, O and S seek to improve the energy efficiency of buildings to help the country move towards its targets for Net Zero by 2050.

- **Part F – Ventilation.** This looks at ventilation in buildings to increase ventilation rates to compensate for airtight buildings.
- **Part L – Conservation of fuel and power.** This looks at the energy efficiency of properties and makes it mandatory to cut carbon emissions of fossil fuel heating systems in new homes by 30% and in non-domestic buildings by 27% though better insulation or renewable energy sources.
- **Part O - Overheating.** This looks at design strategies to prevent overheating in buildings.
- **Part S – Infrastructure for charging in electric vehicles.** This includes a mandate for EV charging points for new homes, offices and major renovations.

These reductions are a step towards the Governments anticipated Future Homes and Buildings Standards to be introduced in 2025 which will require all new homes to produce

75-80% less carbon emissions. These introduce further requirements for energy efficiency and heating for homes and non-domestic buildings. Once implemented, no further work will be needed for new buildings to produce zero carbon emissions as the electricity grid decarbonises (source: [Future Homes and Building Standards Consultation](#))

The key Government goal is for all new Homes to be 'Zero Carbon Ready' meaning they will be built to such high efficiency standards that they won't require retrofitting later to meet the UK's net zero 2050 target.

The Future Homes Standards will phase out fossil fuel heating (such as gas boilers) and prioritises low-carbon systems like Air Source or Ground Source Heat Pumps, Heat Networks (district heating systems) and Hydrogen-ready boilers (if hydrogen infrastructure is developed) and focuses on the fabric efficiency by improving insulation and minimising heat loss by using airtight construction.

All proposals for new buildings should therefore seek to promote energy efficiency by adopting best practice in all aspects of design including but not limited to site layout, building orientation, the layout of rooms and uses within buildings and the use of landscaping for shelter and shade.

Building Regulations acknowledge, energy efficiency improvements will be sought for historic buildings where they do not harm the special architectural and historic interest of those buildings

Such measures can be incorporated through the design process without adding to costs.

Applicants and developers must consider the most up to date building regulations at the time of their development proposals to ensure that they comply.

Further information:

[Building Regulations Approved Documents](#)

[3C Building Control](#)



The Energy Hierarchy

The Energy Hierarchy offers a framework and a common sense approach to designing and constructing buildings to reduce carbon emissions. It is strongly encouraged that the Energy Hierarchy is considered at the early stages of the design process to enable development proposals to be effective and cost-efficient.

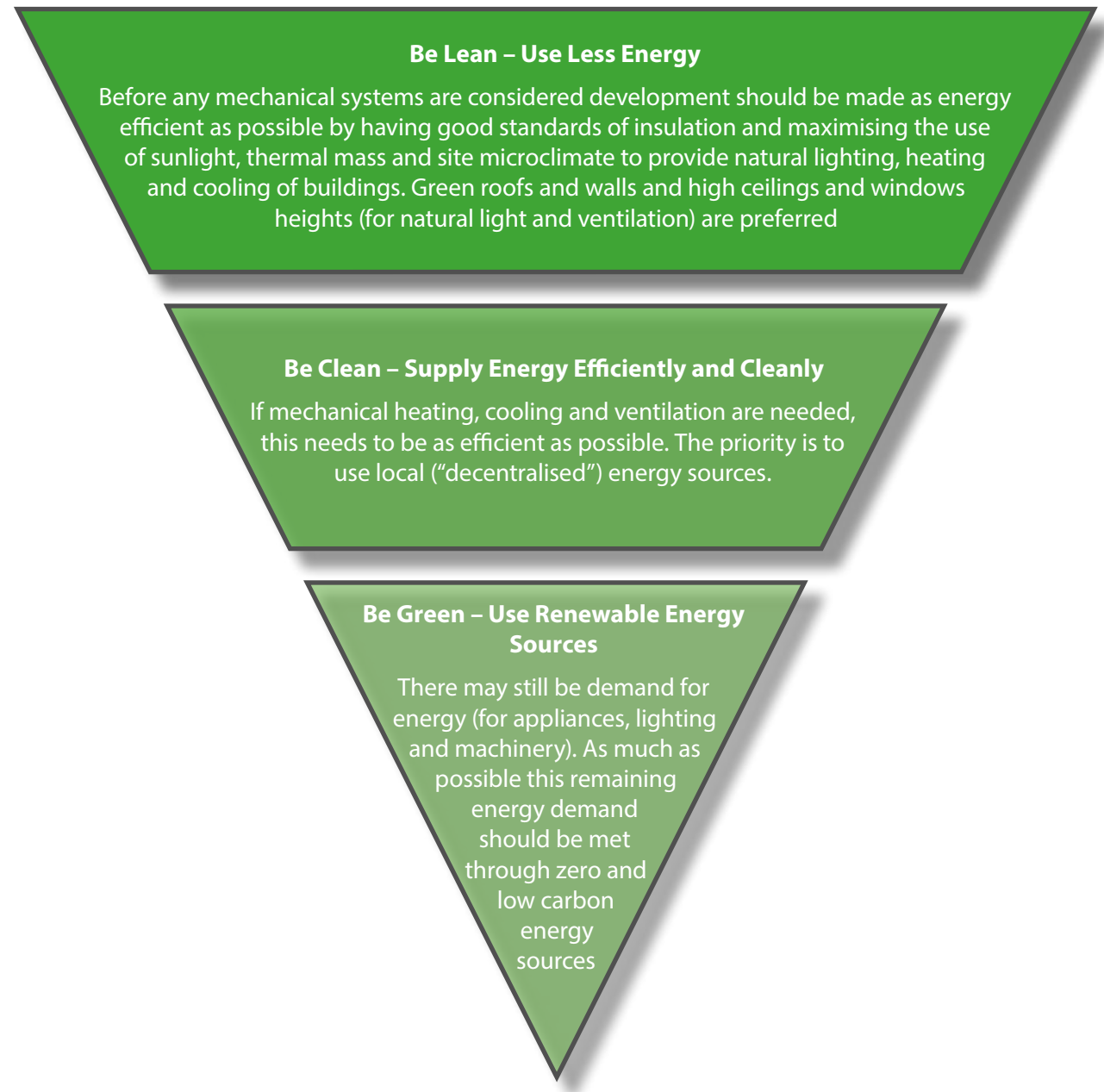
The Energy Hierarchy follows a three-step approach prioritising energy efficiency and sustainability.

What development does it apply to?

The energy hierarchy principles can apply to all types of land uses such as housing, offices, industrial development, retail, community and leisure facilities, including:

- New buildings
- Refurbishment or retrofitting to existing buildings
- Extensions to existing buildings
- Public areas such as landscaped areas around the buildings and new or improved open spaces.

Applications for Large Scale Major Development as defined within the Huntingdonshire Local Plan to 2036 are encouraged to submit an energy statement showing how this hierarchy has been applied.



Building Orientation and Passive Solar Heating

The orientation and massing of the building should be optimised where possible to allow useful solar gains and prevent significant overshadowing in winter. New buildings should ideally be orientated with the longer building elevation within ± 30 degrees of south and site layouts should seek to maximise the number of buildings with the main habitable spaces that has at least one window on a wall facing 90 degrees of due south.

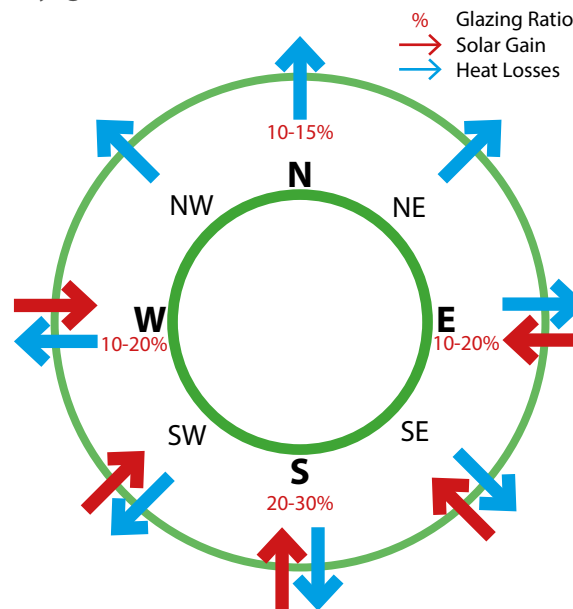
Ensuring the right glazing-to-wall ratio on each façade is a key feature of energy efficient design. Minimising heat loss to the north (smaller windows) while providing sufficient solar heat gain from the south (larger windows). The glazing ratio illustration below gives an overview of the advised ratio of the window area compared to the overall wall area in a building based on the orientation.

To maximise useful solar gains in winter, rooms that are occupied more frequently should be positioned along the south side of the building ideally:

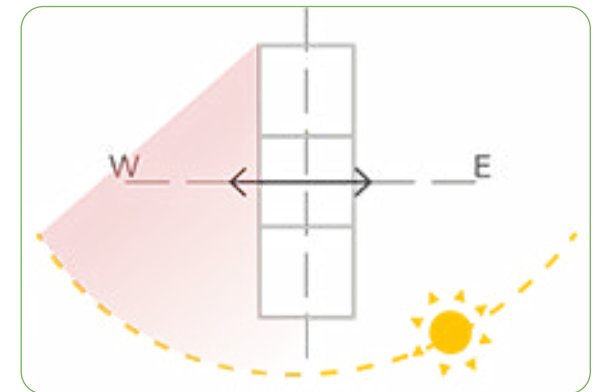
- Living rooms face south or west
- Kitchen north or east
- Consider north facing home offices to avoid glare

- Bedrooms should be avoided on the west elevations, because these receive solar gains at the end of the day just before they are occupied, so are more prone to overheating.

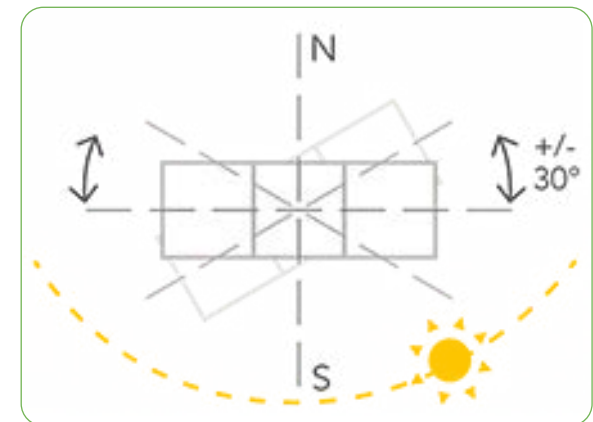
The size and shape of windows can have significant impacts on the levels of daylight and solar gain. Horizontal windows are more efficient than vertical windows in terms of daylight distribution and increasing the amount of openable areas for ventilation. They are typically easier to shade, lowering the risk of overheating. Horizontal windows in bedrooms also provide privacy and space for furniture. Glazing below 800mm of finished floor level provides little benefit to internal daylight levels.



Recommend glazing ratios based on facard orientation



Inefficient Design – Avoid large areas of elevation facing east west as this can mean the building is harder to protect from overheating (the lower sun angles restricts solar shading options) and less of the building will be able to benefit from solar gains (Source: Essex Design Guide)



Optimised Design - Ideally south facing allows for solar winter gain. Elevations facing $\pm 30^\circ$ south will benefit from useful solar gains in the winter (Source: Essex Design Guide)

Preventing overheating

When orientating buildings south there is an elevated risk of overheating in summer. However, this can be counteracted with solar shading, applied to south, east and west elevations.

- This can include horizontal Brise soleil. In summer, when the sun is at a higher angle in the sky, they shade from unwanted solar gain, but in the winter, when sun angles are lower, useful solar gain still enters the space. For the depth of horizontal brise soleil, a useful rule of thumb is half the window height. In practice though, any amount of shading will be beneficial.
- Balconies offer a similar opportunity to shade south facing windows. Stacked balconies rather than staggered balconies provide shade to lower floor levels. Fully inset balconies are encouraged to provide shade and improved privacy, but can create dimly lit rooms depending upon the balcony depth and orientation.
- East and west facades are harder to shade effectively. Horizontal brise soleil are not generally recommended as they can reduce useful solar gain in winter and cannot shade sun early or late in the day, however vertical brise soleil allows light to penetrate.
- Overhangs, pergolas and deciduous

trees can also block summer sun while allowing winter sunlight.



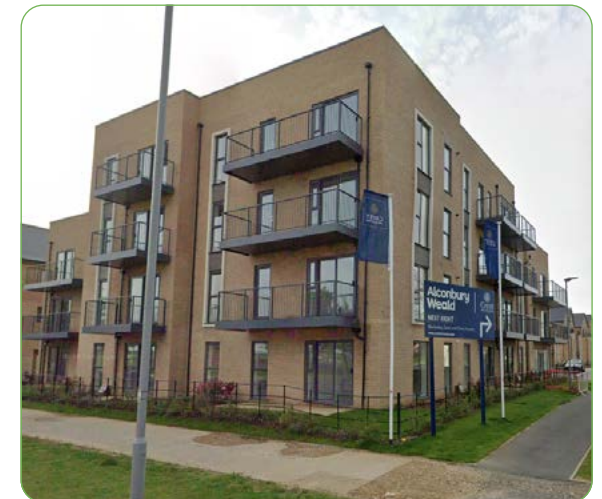
South facing facade incorporating horizontal Brise Soleil



East facing facade incorporating vertical Brise Soleil - New Shire Hall, Alconbury Weald



Inset balconies at Alconbury Weald provide shade and improved privacy



Stacked balconies at Alconbury Weald provide shading to the balcony below

Thermal Mass

Thermal mass refers to materials that can absorb, store and release heat over time. It helps stabilise indoor temperatures by reducing temperature fluctuations between day and night.

Common high thermal mass materials include dense materials like concrete, brick, tiles and rammed earth. During the day the materials absorb excess heat from sunlight and internal sources. At night, when temperatures drop, it slowly releases stored heat keeping indoor spaces warmer.

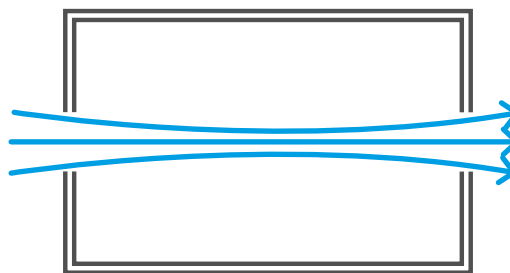
Passive Cooling and Ventilation

To improve thermal comfort in summer, it is important to maximise natural ventilation. Where possible buildings should be dual aspect, with fully openable windows that are placed strategically to allow for cross ventilation. Adjacent wall ventilation is less effective but better than single aspect buildings.

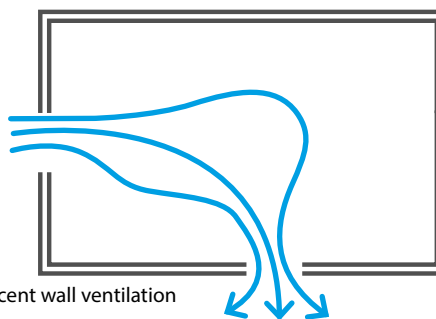
Stack ventilation (hot air rising and escaping through high vents or clerestory (high level) windows) can also remove heat naturally. This could be achieved through incorporating a chimney style feature on the roof of a building that would allow ventilation of a landing / stairs, and would also provide visual interest to the roof.

To maximise natural ventilation, room heights

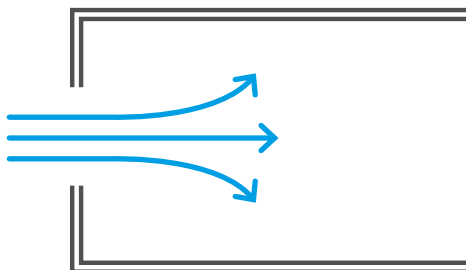
of at least 2.5m and preferably 2.7m or more are recommended, provided that the resulting building is of a sympathetic scale and mass to its immediate context. For single sided ventilation the room depth should not exceed 2.5 times the room height. For cross ventilation the room depth should not exceed 5 times the room height.



Cross ventilation



Adjacent wall ventilation

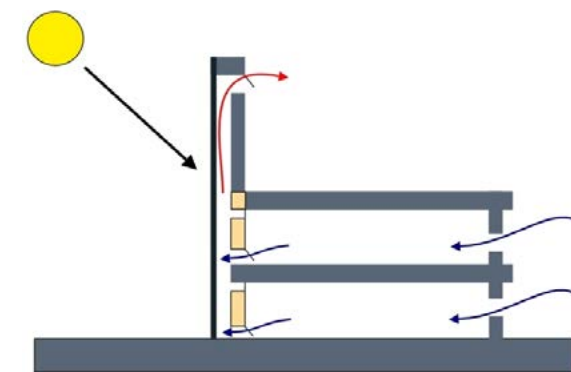


Single aspect buildings reduce opportunities for passive cooling

When designing for ventilation, special consideration should be given to the requirements of [Building Regulations Part O](#), particularly around noise, pollution, security and protection from falling and entrapment.

Where noise, security or pollution reduces the ability to fully open windows, alternative means of ventilation should be considered:

- **Acoustic restrictions** – reduced opening, boosted mechanical ventilation, summer bypass, MVHR air tempering module, mechanical cooling. Mechanical cooling should only be used once all other methods of ventilation have been considered.
- **Security risks** - mesh, bars, louvres, grills, lockable shutters
- **Pollution** – mechanical ventilation and plants/trees



Passive solar chimney (source: www.designingbuildings.co.uk)

Building Insulation and Airtightness

Building insulation is a key energy saving measure. Insulation reduces heat lost and heat gain by slowing the transfer of heat through walls, roofs and floors. It also lowers energy consumption by maintaining a more stable indoor temperature, and reduces the workload on heating, ventilation and air conditioning. This means less energy is consumed in the day to day running of the building which is essential for reducing a buildings carbon footprint.

Building Regulations Part L sets out minimum insulation levels. The type of insulation selected is an important factor in minimising any environmental impact. There are ecological and carbon impacts associated with conventional insulation materials such as foamed glass; glass wool; mineral/rock wool; expanded and extruded polystyrene; Rigid Urethane Foams; Vermiculite; and Woodwool Slabs, from their manufacture through to their disposal.

Natural insulation products are encouraged (e.g. sheep's wool, hemp or wood fibre) because they have a lot less impact on the environment than conventional insulation products; are made from renewable plant or animal sources; produced with low energy use; use only natural additives; are biodegradable; and have an ability to 'breathe' so can absorb airborne moisture.



Glass wool insulation batts being installed in a full-fill cavity wall (source: www.selfbuildanddesign.com)



Baumit wall insulation being applied to a multi-residential building. External wall insulation is well suited to old single-brick buildings, being an effective way of treating condensation when insulation is required on one or two walls (source: www.selfbuildanddesign.com)



Natural Sheep's Wool insulation (source: <https://havelockwool.com>)



Wood Fibre insulation in timber frame building (source: www.carpenteroak.com)



Compressed thermal insulated hemp fibre panels

Mechanical Ventilation and Heat Recovery (MVHR)

Mechanical Ventilation with Heat Recovery (MVHR) is a whole house ventilation system that both supplies and extracts air throughout a property. Heat recovery is an option used in domestic dwellings and helps to reduce the heating and cooling demands of buildings. Not only does this unit supply air into living spaces, and extract air from kitchen and bathroom spaces, it does this using very little energy.

Heat recovery systems typically recover about 73–95% of the heat in exhaust air and have significantly improved the energy efficiency of buildings (Source: www.envirovent.com)

MVHR is the ideal choice for:

- A full renovation or building a new house rather than a retrofit.
- A whole house ventilation solution is required.
- Making your home energy efficient.

It is important that the MVHR unit is positioned as close as possible to an external wall to prevent heat loss from the ductwork that connects to the outside. It is important that ducts are accurately fitted with adequate insulation to prevent heat loss, and generally ductwork should avoid having sharp bends which could affect pressure loss and flow. MVHR units include filters that should be changed regularly (usually at least once per year but check the manufacturer's instructions).

There is a myth that 'sealing up' a building means you can no longer open the windows. This is not true. The benefit of an MVHR is that you do not have to open windows in winter for fresh air, letting the heat escape. Occupants can open windows and use the building / dwelling normally.

When using the unit it is important that the user understands how to operate it to maintain optimum performance.



Typical domestic MVHR system fitted in the roof space (source: <https://sgs-energy.co.uk>).

How does the MVHR system work?

3. Replacement outside air is continuously supplied into the property. It is passed through a filter and the heat exchanger (where it picks up the recovered heat) and is then supplied to living and bedrooms

1. From bathroom, wc's and the kitchen, the MVHR system is extracting air containing moisture, odours and pollutants

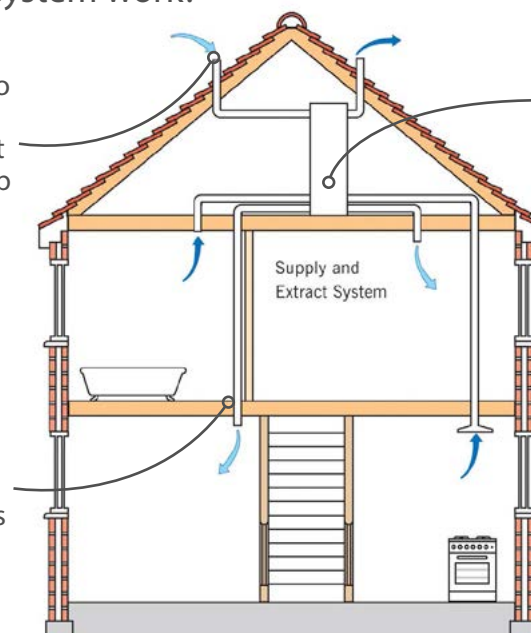


Illustration shows MVHR in house mounted in loft. In apartment unit usually located in cupboard

2. As air is extracted it passes through a heat exchanger recovering up to 95%* of heat inside the heat recovery unit.

*Heat recovery % varies based on brand make and model

4. When outside air temperature increases, the heat recovery mode is switched off to avoid overheating and increasing the internal temperature (temp point is pre-set on the unit) - this is called the Summer By Pass Mode

(Source: www.hvr-group.com)

Decentralised Energy Systems

Decentralised Energy Schemes (also known as distributed energy systems) use a series of local systems generating heat and / or power (for space or water) at or near the point of use and uses local distribution networks to minimise energy that is lost in transmitting energy.

Examples of decentralised energy systems include heat networks, solar panel arrays, community wind farms, battery storage systems (such as a Tesla Powerwall paired with solar) and Electric Vehicle (EV) charging networks that integrate with local renewable energy sources.

Larger developments in Huntingdonshire have the opportunity to use energy more efficiently though Heat Networks (also known as District Heating), Combined Heat and Power (CHP) or Combined Cooling, Heating and Power (CCHP) systems. These systems are more efficient than individual heating systems because it centralises heat and / or energy generation, reducing heat loss and enabling the use of more efficient technologies and renewable energy sources.

The CHP systems require a relatively even and constant demand for energy. Area-wide schemes that cover mixed use development are therefore most likely to be viable.

When considering CHP systems the following order of preferences should be followed:

- Connect to an existing energy network, CHP or CCHP systems, including those

on nearby housing estates.

- If the above is not possible, use a site-wide CHP/ CCHP system that connects different uses and / or groups of buildings, preferably powered by renewables.
- Assess the feasibility of extending the system to adjacent sites.
- If the above is not possible, communal heating or cooling systems should be used, preferably powered by renewables.
- If none of the above alternatives are feasible, other efficient systems should be considered, such as heat pumps or heat recovery ventilation. These systems should be powered by low or zero emission fuels.
- It is important that occupants understand how to use the energy features of a building efficiently.



Insulated underground district heating pipes. (source: www.pipefix.co.uk)



Swaffham Prior became the first UK village to retrofit a renewable heating network into an existing community (image source: tp-heatnetworks.org). For more information about the project visit www.cambridgeshire.gov.uk/swaffham-prior-heat-network

Photovoltaic / Solar Thermal Panels

Photovoltaics (PV) convert sunlight directly into electricity. Solar thermal panels, also known as solar thermal collectors, are designed to absorb sunlight and convert it into heat. The following table illustrates the characteristics and differences between the two types of solar panels:

Feature	Solar Thermal	Photovoltaic
What it produces	Hot Water	Electricity
Made from	Metals like Copper and Glass	Silicon, Glass, Metals
Cost to start	Medium	Medium to High
How well it works (Efficiency*)	Very Good (about 80% effective)	Good (about 17-22% effective)

* defined as the amount of sun energy converted in useful energy

Photovoltaic (PV)

Photovoltaics (PV), capture the sun's energy and convert it into electricity to use in your development. Installing solar panels lets you use free, renewable, clean electricity to power your appliances. You can sell extra electricity to the grid or store it for later use.

How do solar panels work?

1. When the sun shines on a solar panel, solar energy is absorbed by individual PV cells. These cells are made from layers of semi-conducting material, most commonly silicon.



Solar Thermal Panels



Photovoltaic Panels

2. The PV cells produce an electrical charge as they become energised by the sunlight. The stronger the sunshine, the more electricity generated. But cells don't need direct sunlight to work and can even work on cloudy days.
3. This electrical charge creates a direct current (DC) of electricity.
4. The direct current passes through a solar inverter to turn it into alternating current (AC) electricity. You need AC electricity to run your household appliances.

Where can solar panels be installed?

The ideal place to install solar panels is on a sloping roof, as the panels work best when angled towards the sun. Solar panels may be unsuitable on some roofs, but there are a few other options available to you:

- Flat roof
- Outbuildings
- Garden

What are the benefits of solar panels?

- Cut your electricity bills
- Sunlight is free, so once you've paid for the initial installation, your electricity costs will be reduced.
- Cut your carbon dioxide emissions
- Solar electricity is a clean, renewable energy source. A typical home solar panel system could save around one tonne of carbon per year. That's the equivalent of driving 3,600 miles, or from London to Bristol 30 times.
- Sell extra energy to the grid
- Export the electricity you can't use yourself and get paid for it. The [Smart Export Guarantee](#) lets you sell extra electricity to the grid.

Source: [The Energy Savings Trust](#)

Solar Thermal Panels

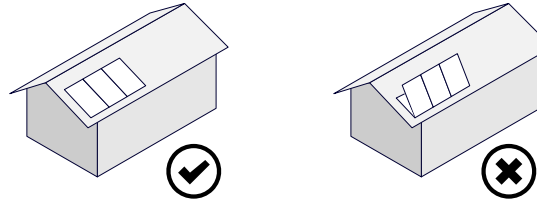
Solar Thermal Panels capture sunlight to generate heat, which is then used for heating water in residential, commercial, or industrial applications. Unlike solar photovoltaic (PV) panels that convert sunlight into electricity, solar thermal panels focus on harnessing solar energy for thermal (heat) purposes. Solar Thermal Panels have a similar design and appearance to PV panels.

Integration of Photovoltaics, solar thermal panels and battery storage

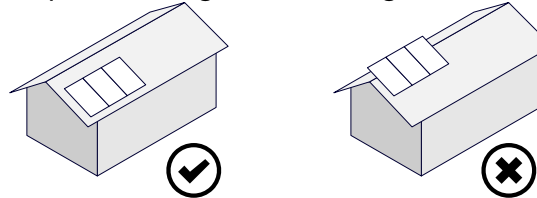
The integration of photovoltaics, solar thermal panels, and battery storage is strongly encouraged as part of sustainable design. Where proposed on buildings or dwellings, where practicable, these technologies should be sensitively designed to complement the visual character of the building and surrounding street scene. In particular, installations are encouraged to:

- Be located to maximise efficiency.
- Be sized, grouped, aligned, positioned in the same way along any terrace or group of buildings and with even distances to the roof margins where possible.
- Be laid in a regular pattern and fitted discretely and safely to roofs, either in line with the tiles or fitted snugly on top.
- Be located where flues, chimneys, skylights and dormers do not prohibit the installation of photovoltaics and solar thermal panels at a later stage, and consider potential overshadowing from these features if retrofitting.
- Be concealed behind a parapet on a flat roof, to reduce the prominence from the public realm (where it does not create shading of the panels, or create any other design or amenity impacts).
- Be installed by certified professionals and include simple, accessible controls with clear user guidance.

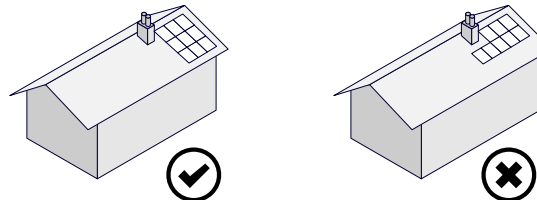
In line with roof slope:



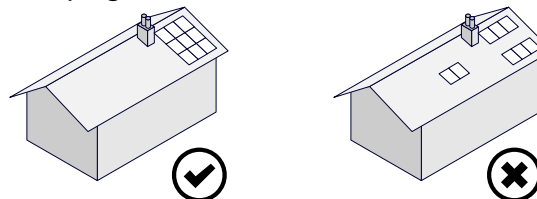
Respect roof ridge lines and edges:



Shape:



Grouping:



Solar Car Barns used at One Leisure St Ives



PV panels fitted flush with the roof tiles, Alconbury Weald



PV panels that have been retrofitted to the dwelling and sit proud of the roof tiles

Battery Storage

A battery storage system is encouraged to be used with photovoltaic (PV) solar panels to store excess electricity generated during daylight hours. Batteries allow developments to use the stored energy when the sun isn't shining (e.g. at night) and therefore maximize the usage of solar power and reduce reliance on the grid, which also helps to reduce electricity bills.

In addition to energy efficiency benefits, battery storage can enhance resilience in the event of a power cut by providing a backup source of electricity to users of the building (this can be particularly important for disabled occupants). Ensuring continuity of power can help maintain safety, comfort, and independence during outages.

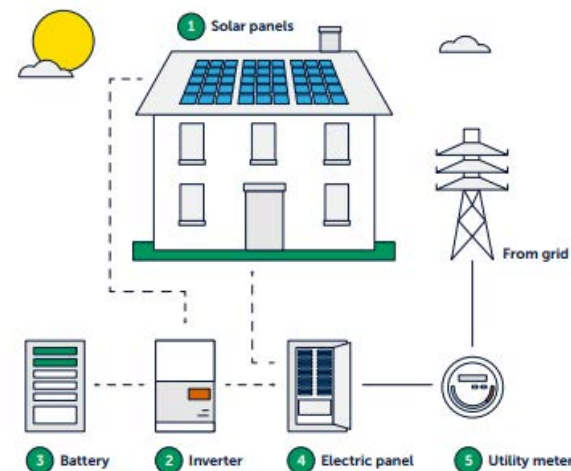


Tesla Powerwall battery system (source: www.ecoaffect.org)

The installation of battery storage should not affect the overall appearance of the building or the street scene and should not be detrimental to the host building or any other adjacent buildings.

Any fire risks of proposed solar and (battery) energy storage systems should be considered and appropriately managed to minimise those risks.

How battery storage works with a Solar Array



When photovoltaic panels (1) are exposed to solar radiation, they produce Direct Current (DC) which is subsequently converted into Alternating Current (AC) by the inverter (2). This transformation is needed as most appliances can only use AC. The electricity can also be used to charge the battery (3). Surplus electricity can be exported to the grid.

Source: City Of Westminster: How to Retrofit Solar Panels March 2024



PV panels centred on the roof, The Boulevard, Alconbury Weald

Heat pumps

Although there are different kinds of heat pumps, they all work in the same way. Heat pumps transfer heat from the outside environment into a building through a four-step process:

1. Evaporation
2. Compression
3. Condensation
4. Expansion

This is known as a refrigeration cycle. This heat pump diagram illustrates the process:

1. **Evaporation:** Heat pumps take in heat from the air or ground or sometimes water, transferring it to a heat exchanger that contains a liquid refrigerant. This refrigerant absorbs heat from the outside and evaporates, turning it into a low-pressure, low-temperature gas.
2. **Compression:** The gas is transferred to an electrically powered compressor that compresses the refrigerant. This compression increases the pressure of the gas, which raises the gas temperature.
3. **Condensation:** The hot gas reaches the heat exchanger, where it's circulated and transfers its heat to a cold water circuit. This causes the water to heat up as it absorbs heat from the gas. Once the water has reached the desired temperature, usually around 55 degrees, it's sent to radiators and underfloor heating to warm the building. By transferring heat to the

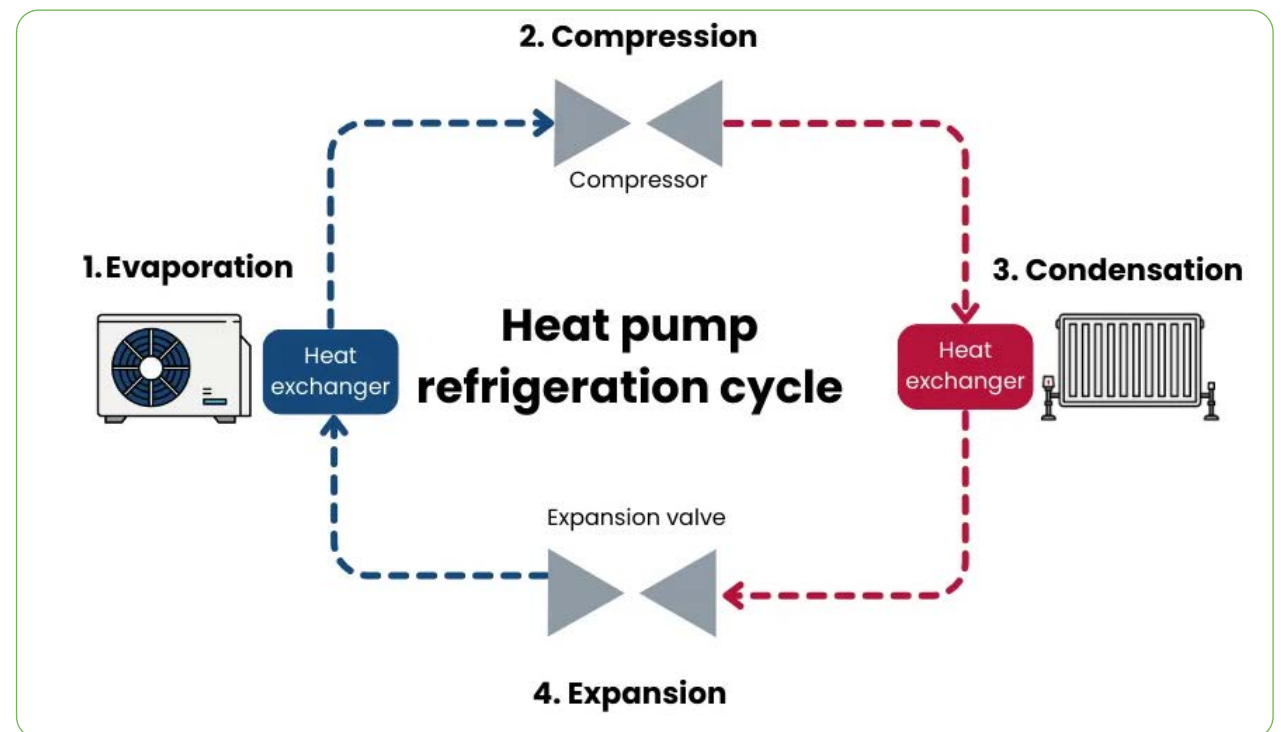
water circuit, the refrigerant cools down enough to turn it back into a liquid.

4. **Expansion:** The cooled refrigerant moves through an expansion valve, which lowers the pressure and allows it to absorb more heat energy. From there it's pumped back into the heat exchanger to repeat the cycle.

There are some differences in how heat pumps work, depending on what type of heat pump you have.



Air Source Heat Pump



Four step process showing the function of heat pumps

Air Source Heat Pumps

How do air source heat pumps work?

Air source heat pumps are a low-carbon heating technology that extracts warmth from the air outside and uses it to keep things warm inside. They are the most common type of domestic heat pump in the UK and are suitable for many types of buildings. They work differently to gas boilers. The heat pump is normally provided as a 'monoblock' that sits outside the size of two domestic wheelie bins side by side.

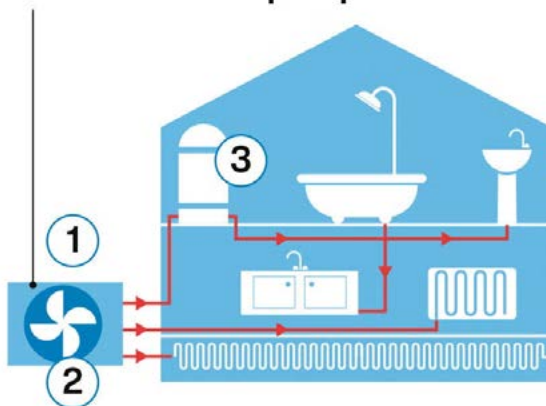
Air source heat pumps use the same kind of technology that keeps a fridge or freezer cool – but in reverse.

The whole process only uses electricity and has an energy efficiency of over 350% – compared to an A-rated gas boiler, which is about 90% efficient (Source: British Gas). They are:

- Much better for the environment – cutting the buildings CO2 emissions and improving local air quality
- Able to be used with solar panels for a more self-sufficient system

To get the best efficiency from heat pumps, the building will need to retain a lot of its heat through good insulation.

Air source heat pump



1. Pump absorbs heat from outside air into a liquid refrigerant.
2. Pump compresses liquid to increase temperature, then condenses liquid to release heat.
3. Heat sent to radiators and hot water cylinder.

(Source: www.independent.co.uk)

It is essential that an air source heat pump has access and the right space surrounding it:

- Be easily accessible for servicing or maintenance
- Be as close to the building as possible to reduce length of pipework and associated heat loss
- On the ground (not wall-mounted)
- Consider noise impact on the room it is attached to as well as on neighbouring

dwellings / buildings

- Be installed to the rear of the building, away from the public realm
- Be concealed behind a solid boundary between private amenity space and public realm, if positioned to the side of the building, if the rear is not an option
- Be enclosed (on all sides except the front) within a robust, structure that is well-integrated within the design of the building it serves, if positioned to the front of the dwelling and only if all other options are demonstrably not feasible.
- Listed Building Consent may be required for any internal or external works to a Listed Building



ASHP enclosure (source: <https://airsourcecovers.co.uk>)

Ground Source Heat Pumps

A ground source heat pump (also called a ground-to-water heat pump) transfers heat from the ground outside to heat the building. It can also heat water stored in a hot water cylinder, ready to use for your hot taps and showers. Ground source heat pumps are better suited to those who have a large garden or outdoor space to run a loop of underground pipes or sink boreholes. They tend to be more efficient than air source heat pumps but are currently more expensive to install.

It starts with a loop of pipe that's buried in your garden or outdoor space. This loop could either be a long or coiled pipe buried in trenches, or a long loop (called a 'probe') inserted into a borehole.

Inside this pipe is a mixture of water and antifreeze called a thermal transfer fluid (TTF), sometimes known as 'brine'.

The brine absorbs heat from the ground, which then passes through a heat exchanger into a refrigerant. The refrigerant is compressed, raising its temperature, and this heat is transferred again to your central heating system.

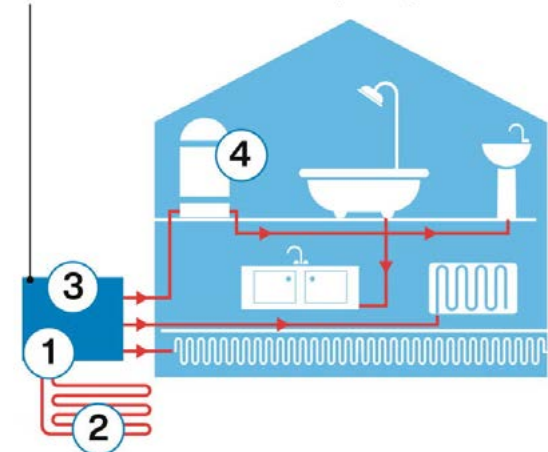
The benefits of ground source heat pumps include:

- **Lower energy bills:** switching to a heat pump could save you money compared to other ways of heating your home.
- **Reduce your energy use:** for every unit of electricity they use, heat pumps generate three units of heat. Having a heating system this efficient means you cut down how much energy you're using.
- **Improve your carbon footprint:** heat pumps are a low carbon heating system, emitting less CO₂ emissions than other fuel sources.



Pipe loop serving a Ground Source Heat Pump

Ground source heat pump



1. Loop of water pipes is buried underground
2. Mixture of water and antifreeze is pumped around loop to absorb naturally-occurring heat stored in the ground
3. Mixture is compressed inside heat exchanger, which extracts heat and transfers it to pump
4. Heat sent to radiators and hot water cylinder.

(Source: www.independent.co.uk)

Construction Materials

The production and use of building materials in development consumes large quantities of energy and resources and generates waste. The choice of materials used in a building therefore has important implications for its sustainability and the environment; wherever possible they should be selected to minimise negative environmental impacts and the consumption of non-renewable resources.

There are many different construction methods that could be utilised for building low energy buildings: brick and block, timber frame, steel frame, structurally insulated panels, insulated concrete formwork, to name a few.

Some methods of construction lend themselves better to the aims of ultra low energy buildings than others. For example, closed panel timber framing may deliver a better quality and more thermally efficient structure than an open panel timber frame. Similarly, a solid, insulated masonry wall may be easier to control for airtightness than a cavity wall.

Huge amounts of materials are used to build new homes, offices, commercial and industrial buildings every year. Some materials have more of a negative effect on the environment than others. For example, producing polyvinyl chloride or PVC, which is often used to make window frames, causes pollution in the atmosphere.

For these reason we encourage developments to:

- Use materials from local suppliers to reduce the need for transport;
- Use reused and recycled materials (this will mean that fewer materials are thrown away);
- Use materials which do not damage the environment unnecessarily when mined, made and transported;
- Use timber from well-managed forests (this will help stop the unnecessary destruction of the world's forests); and
- Not use peat or weathered limestone because the supply of these materials destroys the special living places for plants and wildlife.



Modern Methods of Construction

Modern Methods of Construction (MMC) include a range of processes and technologies which involve prefabrication, off-site assembly and various forms of supply chain specifications.

Off-site construction is a form of modern method of construction and involves the manufacture and fit out of building modules within a factory controlled environment, whilst ground works and foundations are prepared on site. The modular units are then delivered to site and craned into position to form the building. This process reduces the build time on site compared to traditional construction methods. Off-site construction generates less waste as a result of the factory environment which gives greater control of materials and affords greater opportunity to reduce, re-use or recycle waste, compared to site-based building methods. Modern Methods of Construction can be better for the environment, creating around 30 percent less pollution compared to on-site manufacturing

(Source: <https://buildingbetter.org.uk/wp-content/uploads/2022/10/Environmental-benefits-of-MMC.pdf>)



Aerated concrete blocks



Composite wooden sip panels erected in a factory



A range of insulated cladding used on commercial applications



Construction of new and modern modular house. Walls made from composite wooden sip panels with styrofoam insulation inside



Modular homes being lifted into place on site
(source: www.constructionnews.co.uk)



California Meadows, Huntingdon - development used timber framed panels manufactured in factory conditions before being transported to site and craned into place
(source: www.longhurst-group.org.uk)

Waste

The construction sector accounts for 62% of the UK's total waste (Source: [Environment Agency](#)). We must reduce the amount of waste we produce, recycle more and extract energy from waste.

Developers are encouraged to follow the Waste Hierarchy Framework that priorities waste management options based on their environmental impact and gives top priority to preventing waste in the first place. When waste is created it gives priority to preparing it for re-use then recycling, then recovery, and last of all disposal (e.g. landfill).

By adhering to the waste hierarchy, developments can help reduce the carbon footprint of new buildings; lower construction costs; support a circular economy and encourage innovation in the re-use of materials.

Developers may be required to produce a Construction and Environmental Management Plan (CEMP) to show how they will reduce and recycle waste when building new homes or workplaces and avoid, minimise or mitigate any construction effects on the environment.



Prevention: The most desirable option, focusing on reducing the amount of waste generated in the first place. This can involve changes in product design, production processes, or consumption patterns.

Preparing for Re-Use: This involves ensuring products are suitable for further use, potentially through cleaning, repairing, or refurbishment.

Recycling: Transforming waste materials into new products, which can be a valuable resource for various industries.

Other Recovery (including energy recovery): This includes processes like incineration with energy recovery or anaerobic digestion, which can convert waste into usable energy or other resources.

Disposal: The least preferred option, involving landfilling or incineration without energy recovery. This option should be generally avoided as it can lead to environmental pollution and resource depletion.



Water Management and Air Quality

Water Management

The east of England is facing a water shortage with hosepipe bans becoming a regular event during the summer months. Water shortages will become more frequent as our climate gets hotter and an increase in sudden storms may lead to more flooding. Site wide flood risk and water management considerations are detailed on pages 116-118 within the [HDC Design Guide](#) and in the [Cambridgeshire Flooding and Water SPD](#).

The Huntingdonshire Water Cycle Study 2024 notes that Huntingdonshire is in an area of serious water stress. As such there is sufficient justification for the tighter water efficiency target currently allowed for under building regulations of 110 litres per day, which is also referenced within Local Plan Policy LP12. Development proposals are therefore encouraged to incorporate water saving features.

Development proposals are encouraged to integrate rainwater harvesting and gray water recycling to help offset the potable water demand. Rainwater harvesting is where rainwater is collected and stored to provide the water demand for fittings that do not require water to be drinking safe, e.g. WC flushing. This would require an internal store, e.g. within roof space, which is then fed to the relevant fitting. Appliances such as taps, shower heads and toilets should be specified so as to not waste water (for example, install dual-flush toilets).

Grey water recycling is where wastewater from fittings such as showers is collected and used to flush WCs. This requires specific systems to be installed to connect the two fittings which would need to be considered within the bathroom design.

As water demand for external uses (such as watering plants and car washing) is not required to be 'potable', it can be met via rainwater harvesting. Water butts are commonly used as a method to reduce potable water demand for external uses and are connected to building / dwelling gutters to collect rainwater to store until needed. The sizing of the butt should be considered to maximise storage capacity.

Landscaping design can also consider potable water free systems, such as gully's and pipes which are fed from the rainwater store to irrigate areas of land and controlled via a tap or other shut off valve. Landscape design is also encouraged to include natural drainage systems such as gravel or grass to allow rainwater to seep into the ground, rather than impermeable paving.

Permeable paving is encouraged for areas of hard standing including driveways and parking areas.



Water butts are commonly used as a method to reduce water demand



Permeable driveway

Air Quality

Air quality has a direct impact on human health, ecosystem integrity, and quality of life. Poor air quality is associated with increased rates of respiratory illness, cardiovascular disease, and premature death. It can also damage vegetation, reduce biodiversity, and contribute to climate change. Within Huntingdonshire, the principal sources of air pollution are road traffic emissions (notably nitrogen dioxide and fine particulate matter, PM2.5), construction activity, and in some locations, domestic heating systems.

Development proposals should take proactive steps to minimise both the generation of air pollutants and exposure to them, particularly for vulnerable groups such as children, older adults, and those with pre-existing health conditions.

To help improve and protect air quality, developments are encouraged to:

- Minimise traffic generation by prioritising walkable neighbourhoods, cycling infrastructure and accessible public transport links to reduce reliance on private cars;
- Include Electric Vehicle (EV) charging points in accordance with Building Regulations Part S, enabling the transition to low-emission transport;

- Promote modal shift by integrating secure cycle parking, car clubs, and shared mobility hubs, especially for larger developments;
- Avoid siting residential units, schools or healthcare facilities immediately adjacent to heavily trafficked roads unless mitigation is in place;
- Incorporate green infrastructure such as street trees, hedgerows, green roofs and walls, which can help intercept airborne pollutants, lower ambient temperatures, and improve micro-climate;
- Consider building orientation, ventilation strategy, and internal air quality in areas with known pollution issues, including mechanical ventilation with filtration where necessary;
- Apply clean construction techniques, including dust suppression, use of non-diesel plant where feasible, and adherence to best practice as outlined in Construction and Environmental Management Plans (CEMPs);
- Select low-emission building materials, paints, sealants and finishes to reduce the release of Volatile Organic Compounds (VOCs) within indoor environments;
- Design in buffer zones, planting, or screening in sensitive edge locations to reduce the impact of localised emissions from roads or industrial uses.

In areas with existing air quality concerns or those identified as Air Quality Management Areas (AQMAs), applicants may be required to submit an Air Quality Assessment and demonstrate how mitigation has been integrated into the design from the outset. Early engagement with environmental health and planning officers is encouraged.

By embedding these considerations into the design and operation of new development, proposals can make a positive contribution to both local health outcomes and climate resilience.

Nature Conservation and Biodiversity

New development can disturb or destroy existing habitats and wildlife, and many species have become endangered or extinct due to pressures from housing, food production and resource extraction. Development in Huntingdonshire must therefore contribute positively to nature recovery by following a clear mitigation hierarchy:

- Do everything possible to first avoid, then minimise impacts on biodiversity, and, only as a last resort, compensate for losses that cannot be avoided including impacts not adequately addressed by Biodiversity Net Gain (BNG) calculations.
- Protect and enhance on-site priority habitats and priority species populations, ensuring their long-term management and resilience.
- Integrate biodiversity enhancements into building design, including the provision of bat and swift bricks and the creation of hedgehog highways through boundary treatments.
- Create green infrastructure and corridors throughout the development using native species to deliver a wide range of ecosystem services, enhance biodiversity, and establish landscape-scale connectivity for nature. Development boundaries and such corridors should be retained as unlit dark zones to support nocturnal species.
- Use only native species planting appropriate to the development's location. Non-native species should only be used where their inclusion is ecologically justified.
- Prioritise larger, longer-lived tree species to maximise carbon sequestration, contribute to canopy cover, and deliver wider environmental benefits.
- Provide undeveloped riparian buffer zones alongside watercourses to protect water quality, reduce flood risk, and support aquatic and riparian habitats.
- Support Huntingdonshire's Priority Natural Landscapes in line with the Nature Recovery Network for Huntingdonshire, ensuring development contributes to district-wide habitat connectivity and ecological restoration.
- Create sufficient on-site green space to meet the recreational needs of new residents and avoid increased visitor pressure on surrounding designated sites.
- Incorporate habitat-rich SuDS and wetland areas to provide wildlife habitat and improve surface water quality before it re-enters the natural water cycle.

These measures should be embedded from the earliest stages of site design to maximise benefits for both biodiversity and people.



Green Wall at Marks and Spencers, Norwich (Source: Wikimedia Commons)



Gaps in fences create Hedgehog 'highways'



Bat Box built into a wall



Green roof

Local Nature Recovery Strategy

Cambridgeshire and Peterborough is one of the most nature-depleted areas in England and developments should support wider environmental goals by aligning with the [Local Local Nature Recovery Strategy](#) (LNRS), which identifies local habitat priorities and opportunities for nature recovery. This can help ensure site-specific interventions contribute meaningfully to the wider ecological network.

Biodiversity Net Gain

All major developments are now legally required to deliver Biodiversity Net Gain (BNG) under the Environment Act 2021. This means that developments must leave biodiversity in a measurably better state than before, contributing to the recovery of nature. A minimum of 10% net gain must be achieved, calculated using the Government's biodiversity metric and secured for at least 30 years. Developers are encouraged to further enrich biodiversity and exceed the 10% legal minimum.

This requirement follows the BNG mitigation hierarchy, which prioritises:

1. Avoiding biodiversity harm;
2. Minimising unavoidable impacts;
3. Restoring or enhancing habitats on-site; and
4. Offsetting any remaining loss through off-site measures.

Wherever possible, biodiversity enhancements should be integrated early into site design to maximise benefits for wildlife and people.

Trees

Huntingdonshire's tree canopy cover has reduced from 8.7% to 6.5% in the last four years - a loss of approximately 1,625 acres. This is significantly below the England average of 16% and well under the 20% target recommended by Forest Research for non-

coastal areas. In some parts of the district coverage is as low as 3%, while others reach 24%. (Source - [HDC Tree Canopy Assessment](#))

Given this deficit, substantial canopy growth is needed to meet best-practice targets. Proposals should therefore:

- Prioritise retention of existing trees, designing schemes around their mature canopy and root spread, and avoiding encroachment into rooting areas except where essential.
- Favour large-canopied, long-lived native species, which store more carbon, deliver greater ecological and environmental benefits, and contribute to the district's visual character.
- Commit to tree establishment, not just planting - ensuring adequate aftercare, watering, and protection until maturity.
- Replace losses at a ratio of at least two new trees for every one removed, where on-site space and context allow.
- Integrate tree planting with wider green infrastructure to improve air quality, manage surface water, and connect habitats.
- Trees provide substantial public benefits, including carbon storage, air purification, flood mitigation, property value uplift, and enhanced wellbeing. Development should aim to expand canopy cover, contributing to climate resilience and nature recovery.

EV Charging

[Building Regulations Part S](#) introduced requirements for electric vehicle (EV) charging infrastructure in new buildings and certain types of renovations and are aimed at supporting the transition to electric vehicles and reducing carbon emissions.

This requires at least one EV charging point for all new homes (including flats) with a minimum power rating of 7kW (mode 3 charging) provided the associated parking space is not within a covered car park. The total cost of compliance (including equipment and installation) is currently capped at £3,600 per charging point. If costs exceed this, the number of charge points required may be reduced and cable routes / ducts provided to allow the future installation of EV chargers.

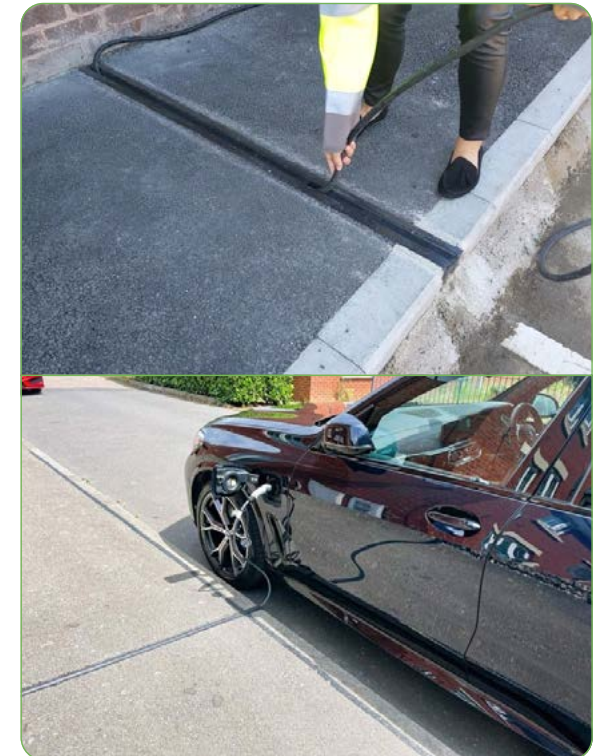
Applicants should carefully consider the placement of electric vehicle (EV) chargers from the outset, along with the required cable routes between the charger and the parked vehicle. This may present challenges for terraced houses where parking is located on the street, as trailing cables could pose a trip hazard. To mitigate this risk, channel systems may be utilized to secure the cable in place. While these systems do not require planning permission, residents must obtain approval through a Section 173 (S173) agreement with the Highway Authority to authorise their use.

Listed Building Consent may be required if the charger is to be located on a listed building. In these instances, a charging unit on a free

standing post may be more appropriate.

Further information can be obtained from Cambridgeshire County Councils [Electric Vehicle Charging Points website](#).

With smart charging technology, EVs can be charged at times when electricity demand is low, helping to balance the grid and integrate more renewable energy sources. Advanced charging infrastructure allows EVs to not only draw power from the grid but also feed electricity back into the grid during peak demand periods, acting as a distributed energy storage system.



Channels cut within the pavement allow charging cables to be routed safely to on street parking spaces

EV chargers can be installed under permitted development (Class D) provided the outlet and its casing do not:

- Exceed 0.2 cubic metres
- Face onto and be within two metres of a highway
- Be within a site designated as a scheduled monument
- Be within the curtilage of a listed building.

Retrofitting

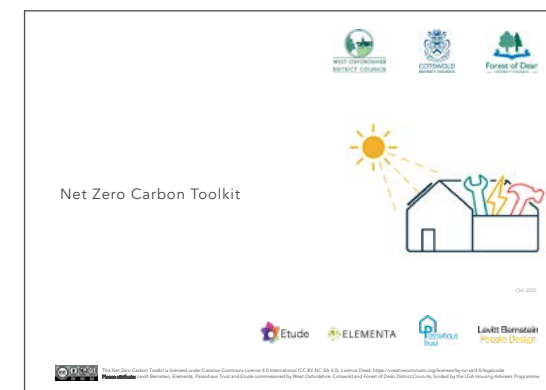
Approximately 80% of the homes that will exist in 2050 have already been built. If we are to successfully decarbonise housing, retrofitting is where the real challenge lies: we need to increase their energy efficiency, change their gas or oil heating system for low carbon heating systems and generate more renewable energy on their roofs.

There is a growing library of resources to help homeowners, landlords and renters understand what sustainable measures can be incorporated when retrofitting a property. To name a few:

- Cambridge City Council as part of the Action on Energy Partnership have commissioned a [Retrofitting Guide](#). This includes practical advice on how to retrofit 7 common types of properties and sets out a range of low and no cost measures through to a more fundamental deep retrofit.
- [The Net Zero Carbon Tool Kit](#), prepared by Levitt Bernstein, Elementa, Passivhaus Trust and Etude commissioned by West Oxfordshire, Cotswold and Forest of Dean District Councils, includes guidance for both new residential and retrofit schemes.
- The [Climate Emergency Retrofit Guide](#) by LETI (Low Energy Transformation Initiative) includes retrofit guidance for four typical house archetype examples: Semi-detached, detached, mid terrace and a flats and sets out energy use targets and practical guidance on how to achieve them.

Many energy saving initiatives can be installed on homes within permitted development rights (when full planning permission is not required) and residents are encouraged to implement such measures. There may be occasions where schemes that do require planning permission could have a potential adverse impact on the character of the area and the amenity of nearby occupants.

The [Planning Portal](#) provides further guidance on planning and building regulation requirements for detached, semi-detached, terrace, shops and flats when considering domestic adaptations and advises if these works require planning permission.



Traditional and Historic Buildings

Special regard needs to be had when considering energy efficiency improvements to historic buildings, listed buildings and those within conservation areas. Historic England (The Government's specialist advisor on historic buildings) advocates a 'whole building approach', a holistic process of understanding a building in its context to find balanced solutions that save energy, sustain heritage significance, and maintain a comfortable and healthy indoor environment. Different buildings will have different opportunities for change.

Most traditional buildings also have an innate ability to offer greater resilience to our changing climate than their modern counterparts. Even so, there are things we can do to reduce energy use and carbon emissions, increase resilience, and help them remain viable and useful into the future

There is a growing library of resources available for the responsible retrofit of traditional and historic buildings including:

- [Planning Responsible Retrofit of Traditional Buildings \(Sustainable Traditional buildings Alliance\)](#)
- [Energy Efficiency and Historic Buildings \(Historic England\)](#)
- [Adapting Historic Buildings for Energy and Carbon Efficiency \(Historic England\)](#)



An insensitive external wall insulation application which damages the beauty and character of the street (Source: [Planning Responsible Retrofit of Traditional Buildings - Sustainable Traditional buildings Alliance](#))



Solar panels on the rear extension of the Grade II listed Roman Catholic Church of the Sacred Heart, St Ives



Interior of the outhouse at Hoggerstone Hill Farm, North Yorkshire, showing the ground source heat pump mechanics, with a view towards the converted farmhouse (Source: [Adapting Historic Buildings for Energy and Carbon Efficiency - Historic England](#))

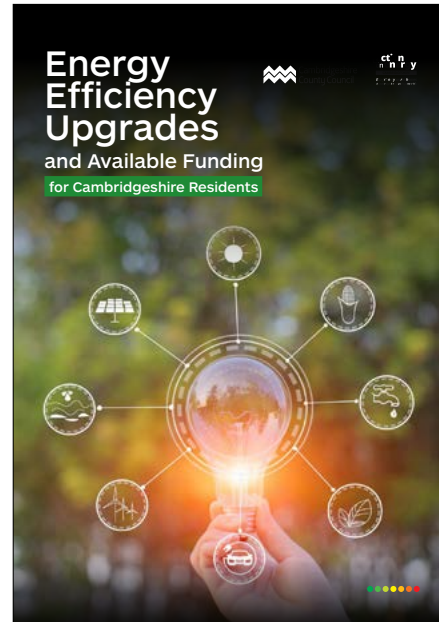


External awnings, shutters or blinds can prevent overheating in summer (Source: [Adapting Historic Buildings for Energy and Carbon Efficiency - Historic England](#))

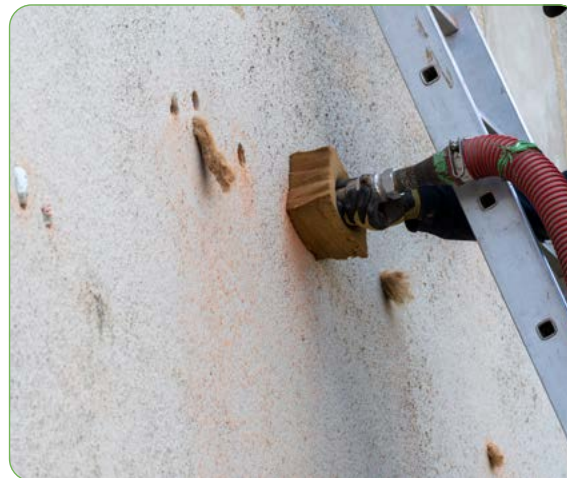
Home Efficiency Grants

Huntingdonshire District Council is part of the Action on Energy partnership between Cambridgeshire County Council and other district authorities in Cambridgeshire and provides advice on how to maximise the energy efficiency of their homes, save money on their energy bills and cut their carbon emissions. The website www.actiononenergycambs.org includes information on the energy efficiency measures available, practical guidance, funding opportunities and support to find an installer.

More information on the range of Government Grant funding available can be found from our [website](#)



Technicians installing photovoltaic solar modules on the roof of a house



House insulation by injecting insulating material into the cavity walls



Glossary

Adaptation: adjustment to actual or expected climate and its effects to moderate or avoid harm or exploit beneficial opportunities.

Air Source Heat Pump (ASHP): A low-carbon heating system that extracts warmth from the outside air and uses it to heat the interior space and water.

Airtightness: The degree to which a building prevents uncontrolled air leakage through the envelope, which is essential for energy efficiency.

Battery Storage: Technology that stores excess electricity (often from solar panels) for later use, enhancing self-sufficiency and reducing demand on the grid.

Be Lean / Be Clean / Be Green: The three stages of the Energy Hierarchy: reduce energy demand, use energy efficiently, and use renewable sources.

Biodiversity Net Gain: A principle requiring developments to leave the natural environment in a measurably better state than before.

Brise Soleil: Architectural feature that provides solar shading to reduce overheating, typically in the form of horizontal or vertical fins.

Building Fabric: The physical elements of the building envelope - walls, roof, windows, etc. - that separate the interior from the exterior.

Building Form: The three-dimensional shape and structure of a building that influences energy use, daylighting, and ventilation.

Building Orientation: The positioning of a building in relation to the sun's path, affecting natural heating, cooling, and daylighting.

Building Regulations (Parts F, L, O, S): Statutory requirements in England covering ventilation (F), energy efficiency (L), overheating (O), and EV charging (S).

BREEAM: Building Research Establishment Environmental Assessment Method—a standard for assessing the environmental performance of non-residential buildings.

Carbon / Carbon Dioxide (CO₂): A greenhouse gas contributing to climate change; often used as a shorthand for carbon emissions.

CHP / CCHP: Combined Heat and Power / Combined Cooling, Heating and Power systems that generate electricity and capture usable heat.

Circular Economy: An economic model aimed at eliminating waste and the continual use of resources through reuse, repair, refurbishment, and recycling.

Climate Change: A long-term alteration of temperature and typical weather patterns, largely due to human activities emitting greenhouse gases.

Decarbonisation: The process of reducing carbon dioxide emissions from activities like energy use, transport, and manufacturing.

Decentralised Energy: Energy generated close to the point of use, such as solar panels or district heating networks, reducing transmission losses.

Deep Retrofit: Comprehensive upgrades to existing buildings to significantly improve energy efficiency and comfort, often including insulation, air sealing, and renewable systems.

Embodied Carbon: Carbon emissions associated with building materials throughout their life cycle - from extraction and manufacture to disposal.

Energy Hierarchy: A framework guiding sustainable energy use: 1) reduce demand, 2) use efficiently, 3) use renewables.

Energy efficiency: measures to reduce the amount of energy required for products and services.

EV Charging: Infrastructure that enables the charging of electric vehicles, typically required in new developments under Building Regulations Part S.

Fabric First: Design approach that prioritises improving the building envelope before considering mechanical or renewable systems.

Form Factor: The ratio of a building's external surface area to its internal volume - lower ratios typically reduce heat loss.

Future Homes Standard: Government standard due in 2025 requiring new homes to produce 75–80% fewer carbon emissions than those built to 2013 regulations.

Glazing Ratio: The proportion of window area to wall area on each elevation, affecting heat loss and solar gain.

Greenhouse Gases (GHGs): Gases that trap heat in the atmosphere, including CO₂, CH₄, N₂O, and H₂O vapour.

Grey Water Recycling: The reuse of wastewater from baths, sinks, or showers for non-potable uses such as toilet flushing.

Heat Pumps: Devices that transfer heat from a source (air, ground, water) into a building using a refrigeration cycle.

Insulated Concrete Formwork: A construction method using hollow blocks filled with concrete and insulation, offering high airtightness and thermal performance.

Mechanical Ventilation with Heat Recovery (MVHR): A ventilation system that extracts stale air and supplies fresh air while recovering heat from the outgoing air.

Modern Methods of Construction (MMC): Innovative construction methods such as off-site manufacturing and modular building aimed at improving quality and sustainability.

Natural Ventilation: Ventilation achieved without mechanical systems, using window openings, cross-ventilation, and stack effects.

Net Zero: the reduction of greenhouse gas emissions by 90% or more compared to a set baseline year, with the remaining emissions balanced by absorbing or removing them. The UK's Net Zero baseline year is 1990. The UK is committed to a target of Net Zero by 2050

Overheating: discomfort, and possible health risks to occupants caused by the accumulation of warmth within a building.

Passive Design: Building design strategies that utilise natural sources of heating, cooling, and lighting to reduce energy demand.

Permeable Paving: Surface materials that allow water to infiltrate the ground, reducing surface runoff and aiding drainage.

Photovoltaic (PV) Panels: Panels that convert sunlight directly into electricity, commonly installed on rooftops.

Rainwater Harvesting: Collecting and storing rainwater for use in non-drinking applications such as irrigation or toilet flushing.

Retrofit: the addition of new technologies or features to an existing building to change the way it performs or functions.

Sheep's Wool / Hemp / Wood Fibre Insulation: Natural, breathable insulation materials with low embodied carbon.

Smart Export Guarantee: A government initiative that pays households for electricity exported back to the grid from renewable sources.

Solar Thermal Panels: Panels that capture sunlight to heat water rather than generate electricity.

Stack Ventilation: Ventilation driven by the natural movement of warm air rising and escaping through high vents.

SuDS (Sustainable Drainage Systems): Drainage systems that mimic natural water processes to manage rainwater and reduce flooding.

Thermal Bridging: A pathway for heat to escape through elements of a building envelope with less insulation.

Thermal Mass: The ability of a material to absorb, store, and slowly release heat, moderating indoor temperatures.

Whole Building Approach: considers a building's context to find balanced solutions that save energy, sustain heritage significance, and maintain a comfortable and healthy indoor environment. It also considers wider environmental, cultural, community and economic issues, including energy supply. It can help to manage the risks of maladaptation.

Zero Carbon Ready: A term for buildings built to such a high efficiency standard that they will not require retrofitting to achieve net zero in the future.

