

A

Acoustic comfort: When the noise levels indoor are comfortable for occupants. Good sleep is essential for health and noise can be disruptive. Double (triple) glazing reduces the noise from outside. In some places, it helps to have windows open to create a cooling breeze during the summer (see *Natural ventilation*). It may however be necessary to have a cooling system in noisy locations.

Administrative data: All data that are collected by Government and NHS every day to keep things going.

Airtightness: Traditionally, houses were designed with good *natural ventilation* from when open fires were used for cooking and heating. Today, homes are getting more airtight. This saves on heating bills but makes the indoor air unhealthy unless the home has a good *ventilation system* or that residents open doors and windows from time to time (see *Natural ventilation*).

B

Boiler upgrade: Boilers heat the water needed for heating and the hot water taps. The most typical boilers use gas for heating. This is a source of greenhouse gas. New types of boilers use the gas more efficiently, are cheaper to use, and slightly better for the environment (condensing boilers). Households are notably increasingly recommended to install low carbon alternatives such as *heat pumps* and electric heating (see *Grid*) instead of gas boilers.

C

Cardiovascular conditions: High blood pressure, heart conditions, strokes, and other conditions related to the blood vessels. The most common link between poor housing and cardiovascular conditions is the fact that the blood vessels contract when we are cold. This restricts the blood flow and increases the risk of strokes and heart problems. This risk increases with age and is worse for smokers, diabetics, those overweight, and some other high-risk groups. The WHO recommends that the room temperature should be at least 18°C in general. For elderly and other vulnerable groups, the recommended temperature can be higher.

Climate resilience: Resilience is how well a person, household, community, country, ecosystem, or the planet can cope with changes. The climate is changing. Many places are getting hotter and drier. In other places the weather is getting wetter or more extreme and unpredictable. We are experiencing more hurricanes and wildfires, farming is under pressure, and livelihoods depending on fisheries and other natural resources are at risk. Housing is a source of greenhouse gases adding to climate change. We need to make housing greener (climate mitigation). At the same time, we must prepare and be ahead of the curve (climate adaptation). Climate resilience is the combination of these two things.

Community organisations: Community organisations are

formed by local residents to deal with a specific issue. These organisations play a key role in connecting people struggling with energy bills to government schemes. Different national charities also play an important role in this area.

Compliance: When people stick to the rules.

Condensation: Water forming when moisture in the air gets in contact with a cool surface, e.g. single-glazed windows or walls without insulation.

Conservation area: Some streets and neighbourhoods are protected for their historic value. The local authority needs to give planning permission for changes, especially, if visible from the street. *Energy efficiency measures* are still possible but can often be more costly.

COPD: COPD is a common lung condition related to damaged lungs; mainly from smoking. COPD stands for Chronic obstructive pulmonary disease.

D

Damp and mould: Mould are living organisms that like damp conditions and can be found on walls, ceilings, and around windows in the kitchen and the bathroom. They can also be more widespread in the home due to *condensation*, washing and drying of clothes, people showering, water seeping in due to leaking pipes or roofs, crowded homes, and a lack of ventilation. The most effective solution is a combination of repairs, double (or triple)

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glazing together with better insulation, heating systems, and ventilation. See *Energy efficiency measure*.

Daylighting: Controlled use of natural light in a home. Natural light is a free and sustainable form of lighting and heating. A home can be improved by careful use of windows, skylights, reflective surfaces, blinds, shutters, and overhangs. See *Passive measures*.

Department of Energy Security and Net Zero (DESNZ): The government department in charge of energy and the green transition towards *Net Zero*.

District heating: When a neighbourhood or town get very hot water piped to them for space heating. The energy source for heating the water in the pipes vary. The transition to a green energy source can then benefit a lot of households in one go.

Digital twins: The origin of digital twins was a computer model on the ground that used continuous data from NASA spacecraft engines to understand how they worked and when they were likely to fail. Digital twins are being tested to find out if useful for controlling things like how energy is used in a home.

E

Energy Company Obligation (ECO): A scheme for fuel poor households to make the home more energy efficient, which is set by the Government, carried out by energy suppliers, and paid for by adding a percentage to everyone's energy bills. The ECO schemes

have been running between 2013 and 2026. There have been different waves; each with a slightly different focus. ECO schemes are now being replaced by new schemes. See *Warm Homes Plan*.

Energy efficiency measure: Energy efficiency retrofits have different elements. Upgrades such as insulation stops heat escaping. Changing from gas to electric heating reduces the amount of greenhouse gasses released into the atmosphere (see *Heat pump*). Installing solar panels (see *solar energy*) are both good for the environment and reduces the electricity bill. If not everything can be done at once, stopping heat escaping is the top priority. This is the Fabric first principle. The term, 'fabric', refers to the outer shell of a house. The logic is that the electricity used for running, say, a heat pump would be wasted if the heat would immediately escape.

Energy Performance Certificate (EPC): EPC looks at how costly the property would be to heat. This is based on the size and property type, how it is heated, and how well insulated it is. The best performing properties are given an A and the worst a G. EPC lasts for 10 years and is needed whenever a property is built, sold, or rented out to someone new. If you rent from a private landlord, the property must be E or better. See *MEES*.

Evaluation: A 'warts and all' study of what a scheme achieves on the ground.

F

Freeholder: The one who owns the building and the land underneath it - in law and practice. See *Leaseholder*.

Fuel poverty: When a household can't afford the energy bills. Low-income households living in energy inefficient housing are particularly vulnerable. This is also known as energy poverty.

G

Green gentrification: Gentrification is when rents or house prices go up in an area and many of the usual residents no longer can afford living there. In London, some areas are changing rapidly and shops selling cheap goods and fast food are replaced with fancy cafes and organic grocery shops. These areas are often brick built with ornamental detail near parks or transport hubs. Green gentrification is similar in that the usual tenants could be forced out if rents go up after the upgrade. More broadly, upgrades can also lead to increased house prices and rents in an area. Green gentrification is never the direct intention of government schemes but it can be an unintended consequence.

Grid or electrical grid: The electricity supply comes from a huge national grid. Electricity has in the past been produced by burning coal or gas but is getting greener every year as coal-fired power stations are phased out and more renewable energy sources are taken up. In more detail, the electricity is typically generated in power

plants, then transmitted as high-voltage power across the National Grid. Locally, the electricity is transformed to low-voltage power and distributed to each home. The household is finally billed by a supplier. Different energy companies operate at each level: generation, transmission, distribution, and supply.

Traditionally, the power came from huge power plants. In the green transition, power is increasingly being generated in many smaller networks from wind farms to solar panels. Some households may end up producing more energy than they need. The 'grid' is therefore being upgraded to deal with these changes.

H

Health co-benefits: The additional benefits for health/wellbeing from doing something about the climate crisis such as when people's health improves as a result of energy efficiency measures.

Health inequalities: When some groups have worse health than you should expect – usually due to poorer living conditions.

Heat pump: Low-energy heating system that turns energy in the surroundings (air, ground, or water) into hot water or hot air for heating. It works a bit like a fridge in reverse and can work even at low temperatures. Commonly, the pump runs on electricity from the grid. The water in the tank of an air-to-water heat pump may not be as hot as with a gas boiler. Sometimes larger radiators are needed. When installed properly, they work well and are a lot better for the environment. There are

many new types of heat pumps on the way. In some places, huge heat pumps now power *district heating*. Other new types include some where the tank gets as hot as with a gas boiler and some that can be installed on a balcony or indoors. Companies are naturally talking up their products although lots of individual solutions may not be what is best for everyone. See *Retrofit assessor*.

Homes fit for human habitation:

Landlords must make sure that their properties are fit for people to live in. Examples of what could make a home unfit are: unsafe gas and electric installations, fire hazards, pests like mice and rats, disrepair, broken heating systems, unsanitary kitchens, bathrooms, and toilets, excessive damp and mould. If in doubt, seek advice from your local authority, Citizens Advice, or housing charities.

I

Insulation: We feel warmer when we put on a sweater because the air trapped in the fibres makes it harder for the body's heat to escape. Insulation is the same principle just applied to a building. During the 20th century houses were increasingly built with a double wall. The space between the inner and outer wall can be filled with insulation materials. This is known as cavity wall insulation. Lofts also need insulating. Before 1918, houses were built with a single solid wall. These houses need insulating from outside or inside. This requires more technical expertise for the best result.

L

Landlord: The person or company who owns and rent out a property. Sometimes a private landlord puts a letting agency in charge of the contact with tenants. Local authorities and housing associations are landlords for *social housing*.

The landlord has certain responsibilities and the property needs to be fit as a home (see *Homes fit for human habitation*). In some situations, the landlord needs a licence from the local authority to operate. This typically applies in cases where 5+ people from 2+ households share kitchen and bathroom (known as Houses of Multiple Occupation). In some parts of the country, landlords also need a licence to rent out to other types of households (known as Additional Licencing and Selective Licencing). See *Unlicensed/informal letting arrangements*.

Leaseholder: If someone buys a flat, they typically buy the right to occupy that flat for a time period, say, 99 years. They are then the leaseholder for that time period. For some decisions they have to get permission from the *freeholder*.

Local authority: Local authorities are responsible for running local services such as education, social care, transport, waste collection, and local planning. They play a role in enforcing housing standards in the rental sector and must assist anyone at risk of homelessness. Local authorities will have a big role in delivering the new *Warm Homes Plan*.

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Low carbon heating: Heating systems other than those burning gas, oil, or coal.

M

Marginalised groups: The government strives to make society fairer in different ways. An important part of this is understanding the needs and opportunities of different groups and making it easier for everyone to play a part whether at school, at work, in their neighbourhood, sitting on or voting for who sits on councils at all levels from the local parish to the Parliament in Westminster. Groups that are less connected in any of these ways are called marginalised. Some groups are marginalised due to discrimination. To address such issues many groups are now protected against discrimination in the law. See *Protected characteristics*.

Minimum Energy Efficiency Standard (MEES): The legally required minimum energy efficiency standard. For private rental properties, the minimum EPC should currently be band E. For social housing, the minimum requirements are related to EPC but measure more things. Generally, the minimum standard is close to EPC band C.

Mental health challenges: Links between poor quality housing and mental health are well-known. Essentially, mental health is affected when there is uncertainty about our basic needs such as a place to live, food to eat, and an income to pay for it. The home is also central to family and social life, access to services, and

opportunities for education, work, and leisure.

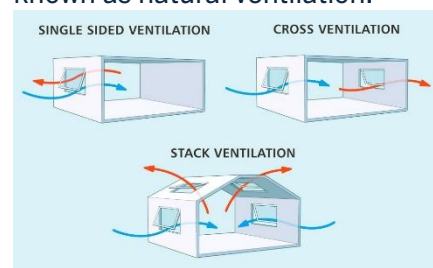
Not to over-simplify, it should be mentioned that more factors (not only housing) can lead to mental health challenges and that people with mental health challenges often end up dealing with a range of problems.

Mixed ownership: Since the 1980s, local authorities have been selling off their *social housing* homes to tenants one by one at a discounted rate (Right-to-Buy). This can make it more complicated (consensus barrier) and costly to carry out energy efficiency retrofits at scale in a block of flats or neighbourhood with this type of mixed ownership.

Mould: See *Damp and mould*.

N

Natural ventilation: Changing the air inside is easier in homes that open to more than one side (cross ventilation); and/or more than one level (stack ventilation). This is known as natural ventilation.



Natural ventilation is also important as a natural form of cooling. There are exceptions. It does not work when it gets extremely hot outside. Some locations are also very noisy and polluted. Ventilation and cooling systems may be needed in such cases. See *Acoustic comfort*.

Net Zero: The point where we have reduced the amount of greenhouse gas that is effectively released into the atmosphere to what it was in 1990. Part of the plan is to plant more trees and find other new ways to catch greenhouse gases instead of releasing them into the atmosphere. The transition towards Net Zero is also called the green or the sustainable transition.

O

Occupant: This is a general term for anyone living in a place.

Ofgem: Ofgem is the organisation that looks after gas and electricity in the UK for the government. Energy is sold by private companies that compete with each other for customers. Ofgem makes sure this market is fair for people. It does this by setting a limit on how much companies can charge for energy, which helps protect households when prices go up, for example during global events like the war in Ukraine. Ofgem also helps run and check government schemes that improve energy efficiency. Ofgem stands for the Office of Gas and Electricity Markets. They work for Department of Energy Security and Net Zero.

Owner-occupied housing: Households with a mortgage or who own the home outright. In some cases, the owner pays a mortgage for a part of the home and rent for the rest. Over time, the part rented decreases until the home is owned 100%. This is known as shared ownership.

P

Participatory: Anything that someone chooses to be part of.

Passive measures: Measures that are ‘built-in’ and working without needing machines or occupants touching anything. Examples are things like insulation, draught proofing, double (or triple) glazing, overhangs, shutters, blinds, skylights, and the orientation of the building. Passive measures use no energy once in place and likely need less maintenance than active measures.

Post-intervention: The time after something has been done - in this case the retrofitting.

Private rental housing: Households renting from private landlords (or an agency).

Protected characteristics: Some groups are recognised in the law as vulnerable to discrimination and being marginalised (see *Marginalised groups*). This is known as Protected characteristics and relate to age, sex, gender reassignment/identity, marriage/civil partnership, being pregnant or on maternity leave, disability, race (incl. colour, nationality, ethnic, and national origin), religion/belief, sexual orientation. It is illegal to discriminate against anyone because of their protected characteristics.

R

Rebound effects and Jevons Paradox: When the change is not what was expected because

people’s life changes in some way or that they start doing things differently, say, keeping the home at a higher temperature than before. The end result could be good for health but bad for the environment or make little difference to health while being bad for the environment.

Renoviction Made-up word of Renovation+Eviction: when tenants are told to leave because the landlord wants to do a major renovation of the property. Tenants do have some rights in this area. If in doubt, seek advice from your local authority, Citizens Advice, or housing charities.

Respiratory conditions: Lung conditions. Housing that is cold, damp, and mouldy increases the risk of coughs, colds, chest infections, and is particularly bad for people with asthma, COPD, and other lung conditions.

Retrofit assessor: A professional who provide households with expert advice on what needs doing to make the home more energy efficient.

Retrofitting: Improvements to an existing property. Building Regulations cover newbuilds and better reflect the current requirements for a home. Older buildings therefore typically need more improvements; that is retrofitting. The current Building Regulations are from 1991. While updated from time to time, it is not fully up to date with requirements of reducing greenhouse gasses and preparing for climate change. Unfortunately, housing surveys

have also found poor *compliance* with the Building Regulations.

S

Smart meter: Electricity, gas, water are often billed according to usage. Traditionally, the utility companies would send someone to read the meters once a year. Smart meters are doing this automatically and in real time. The data collected can be used to make usage more efficient.

Split incentives: Carrot or stick? Saving on energy bills is a benefit (‘carrot’). This is good for tenants, but landlords do not benefit while having the costs and uncertainty of the change. This problem is called split incentives. There is now regulation (‘stick’) for how low the energy efficiency rating of a rental property can be. See *MEES*.

Social housing: Housing built and run by local authorities and housing associations offering rents related to tenant income rather than ‘market rent’ (what the highest bidder can afford). Some types of housing have rents that fall in between those two categories and are unhelpfully called ‘affordable rents’.

The housing standards are better regulated than in the private sector.

There are separate energy efficiency retrofit schemes available for social housing. See *Mixed ownership*.

Solar energy: When energy from the sun is used to heat water or converted into electricity in solar cells; also known as photovoltaic (PV) cells or solar panels. The power generated can then be

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stored in batteries for when needed or sold to the grid.

Stakeholder: Persons or organisations in a given policy area. If something needs changing, it is usually important to involve stakeholders to reach solutions that are effective and fair.

Supply chain: When a government scheme provides funding for an energy efficiency upgrade many things need to happen – often in long chains. This is the supply chain. This can cover everything from digging raw materials out of the ground to the local contractors working on the upgrade. There also needs to be enough people with the right training for the supply chain to work (green jobs).

Sustainable housing: Homes that can be heated, cooled, and ventilated using no or little energy overall. Some homes may even produce more energy than they need.

T

Tenants: The people renting their home. Tenants' rights have recently improved. If in doubt, seek advice from your local authority, Citizens Advice, or housing charities. See *Homes fit for human habitation*.

Theories-of-Change: Framework for what needs to happen to bring about change, why we think this, when we know it has worked and, if not, why that might be.

Thermal comfort: When the indoor temperature is comfortable. See

Cardiovascular conditions and *Respiratory conditions*.

TrustMark: The organisation the government has put in charge of inspecting retrofitted properties. They check whether the energy efficiency measures are up to scratch in terms of safety and quality standards. This is to protect residents and to find out if schemes such as ECO are value for public money.

U

Unlicensed/informal letting arrangements: Refers to temporary and/or illegal rentals. Temporary lets include when the tenant rent out their home to someone else for a while (sub-letting).

Dodgy landlords hide their activities from the authorities to avoid inspections, licence fees, and spending on safety and repairs. Often, they use middlemen to collect the rent. If in doubt, seek advice from your local authority, Citizens Advice, or housing charities.

Occupants in those places leave fewer traces in data systems and are harder to study with administrative data.

UPRN: Stands for Unique Property Reference Number and is a different number for each address.

V

Ventilation system: Most homes need a form of ventilation system to avoid damp and stale air building up. Homes built after 1991 should have extractor fans in kitchens and bathrooms and

trickle vents around windows. Unfortunately, the regulation does not apply to the older housing stock. Surveys have also shown that even when extractor fans are in place they are very often not working. Modern ventilation systems are built with so-called heat recovery units so that the air gets changed without losing most of the heat (known as mechanical ventilation with heat recovery). Residents can also open all doors and windows briefly. This is known as purge ventilation (see *Natural ventilation*). It changes the air without cooling the walls and furniture very much.

W

Warm Homes Plan: The government's new strategy to make homes more energy efficient. It has different schemes for tenants (social and private) and for homeowners depending on the conditions of the property, the local area, and the household's situation. Local authorities will have a big role in delivering the Warm Homes Plan. A new government organisation, Warm Homes Agency, will be set up. They are expected to inform the public about how everyone can be part of the green transition.

For more information:



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