

Research Briefing

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Housing and net zero



Summary

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Summary

Residential buildings are a significant source of carbon emissions in the UK. Reducing carbon emissions from new and existing homes is therefore part of strategies to meet the UK's net zero target.

Carbon emissions from homes

The government has set a legally binding [target to reduce the UK's net emissions by 100% by 2050](#) compared with 1990 levels. This is known as the 'net zero target'.

In 2022, emissions from residential buildings accounted for [a fifth \(20%\) of greenhouse gas emissions in the UK](#). The Climate Change Committee (CCC), the government's advisory body, said [the UK will not meet its emissions targets "without near complete decarbonisation of the housing stock"](#).

Emissions from residential buildings come mainly from fuel combustion (the burning of oil and gas for heating and hot water) and electricity use. Homes can be decarbonised by installing low-carbon heating systems (such as heat pumps), fitting insulation to improve their energy efficiency and installing renewable energy systems (such as solar panels).

Assessing the energy performance of homes

Energy performance certificates (EPCs) are commonly used to assess and compare the energy performance of homes. EPCs for homes include two ratings: an energy efficiency rating and an environmental impact rating. Both are rated on a scale of 1 to 100 and split into bands (A to G).

When EPCs are discussed, the focus is usually on the energy efficiency rating. It is based on the cost of energy requirements per square metre per year of a building to supply its fixed building services (such as heating and lighting).

To determine the energy efficiency rating of a home, EPC assessors use the [standard assessment procedure](#) (SAP). For existing homes, where information may not be available, EPC assessors will make assumptions. This is called the reduced SAP (RdSAP).

Concerns about EPCs and proposed reforms

The CCC has argued that [EPCs are not “fit for purpose”](#) to assess the energy efficiency of homes and to set retrofitting targets. For example, the CCC has noted that, because the energy efficiency rating is based on cost and gas is relatively cheaper than electricity, homes with a gas boiler may be rated as more energy efficient than homes with a heat pump.

The UK Government (for England and Wales) and the Scottish Government have proposed reforms to EPCs. The UK Government has proposed [replacing the SAP with a new methodology: the home energy model \(HEM\)](#). The Scottish Government has proposed renaming the energy efficiency rating ‘cost rating’ and [adding information to EPCs \(for example, on the heating system\)](#).

Targets and policies to decarbonise homes

Targets and strategies to decarbonise existing and new homes differ across the UK. The UK Government set out its policies for decarbonising homes in the [Heat and Buildings Strategy](#) (October 2021). It has set a target for “as many homes [in England and Wales] as possible to achieve EPC band C by 2035”.

The Scottish Government set out its plans for decarbonising homes in its [Heat in Buildings Strategy](#) (October 2021). It said all homes in Scotland should meet at least EPC band C by 2033 “where feasible and cost-effective”. The Scottish Government has proposed a new [Heat in Buildings Bill](#) to require homeowners in Scotland to meet a minimum energy efficiency standard by 2033.

Although the Welsh Government and the Northern Ireland Executive have not published specific strategies on their plans for decarbonising homes, they have included commitments in other strategies: the Welsh Government in its [emissions reduction plan for its second \(2021 to 2025\) carbon budget](#), and the Northern Ireland Executive in its [Energy Strategy](#) (December 2021).

Decarbonising existing homes

There is currently no legal requirement for existing homes to be retrofitted or for low-carbon heating technologies (such as heat pumps) to be installed in existing homes. Exceptions apply to privately rented homes and homes owned by local authorities and housing associations in some parts of the UK:

- [Privately rented homes in England and Wales must have at least an EPC rating of E](#) (since 2020). The Scottish Government has also proposed [a minimum energy efficiency standard for privately rented homes](#).
- The Welsh Government and Scottish Government set [minimum energy efficiency standards for socially rented homes](#). The UK Government said

it would [consult on setting “a long-term regulatory standard”](#) for socially rented homes in England.

To incentivise homeowners to retrofit their properties and install low-carbon heating technologies, the UK Government and the devolved administrations have various schemes that provide homeowners with financial support. These schemes and their eligibility criteria differ across the UK.

Concerns about progress

The CCC has expressed concern that [the “current pace” of energy efficiency upgrades was “too slow”](#) and that, although the rate of installations of heat pumps has increased, it remained “very low”.

House of Commons Select Committee have highlighted the installation and running [costs of heat pumps usually exceeded those of gas boilers](#) and that [funding for retrofitting homes was “piecemeal”](#). They have also highlighted a lack of awareness of heat pumps.

Decarbonising new homes

The UK Government and the devolved administrations updated requirements for new homes in 2021/22. They also plan to further update requirements for new homes in the coming years: England and Wales in 2025, Scotland in 2024 and Northern Ireland in 2026 or 2027.

For example, in England, [under the 2021 uplift, an average semi-detached home must have 30% lower emissions](#) than a comparable home built under 2013 standards. The UK Government has proposed further changes to these requirements under the [Future Homes Standard](#) from 2025. It said that, under the Future Homes Standard, an average semi-detached home will have 75% lower emissions than under 2013 standards and heat pumps will become “the primary heating technology”.

In Scotland, [as of April 2024, new homes cannot have oil or gas boilers](#). They must instead have a low-carbon heating system, such as a heat pump. By the end of 2024, the [Scottish Government also intends to introduce a ‘Passivhaus’ standard](#). A Passivhaus building is designed to retain heat from the sun and their occupants, so it requires very little additional heating or cooling.

Response to the Future Homes Standard

Although the Future Homes Standard was welcomed by environmental groups and built environment professionals, they expressed concern that it did not go far enough. For example, the [Royal Institution of British Architects](#) said it was “insufficient to significantly improve the performance of new homes”, and the [Good Homes Alliance](#) said that there would need to be “a further iteration [...] to ensure new buildings are of a higher specification by 2028”.

The Commons Environmental Audit Committee also expressed concern about the [lack of targets for embodied emissions](#) (which are the emissions involved in manufacturing and transporting the materials used to build or refurbish a building and in the construction process). The CCC has recommended that [the whole-life carbon impact of new homes should be reduced](#).

1 Targets for decarbonising homes

This briefing focuses on the targets and policies of the UK Government and the devolved administrations to reduce emissions from existing and new homes. It does not cover efforts to make homes more resilient to the impacts of climate change (for example, to overheating) and to reduce water use from homes.

1 UK net zero targets

The UK Government has set a legally binding target to reduce greenhouse gas emissions by 100% compared to 1990 levels by 2050.¹ This is referred to as the ‘net zero target’. The devolved administrations have also set legally binding targets to reduce their greenhouse gas emissions to net zero compared with 1990 levels: Wales and Northern Ireland by 2050,² and Scotland by 2045.³

For further information about the UK net zero targets, see the Library briefing on [the UK’s plans and progress to reach net zero by 2050](#).

1.1 Why do homes need to be decarbonised?

A report by the Climate Change Committee (CCC), the government’s advisory body on climate change, said the UK “will not meet our targets for emissions reduction without near complete decarbonisation of the housing stock”.⁴ Decarbonisation is the process of reducing carbon emissions from a system.

In 2022, domestic properties accounted for a quarter (26%) of energy use in the UK, and emissions from residential buildings accounted for a fifth (20%) of greenhouse gas emissions in the UK.⁵

¹ [Climate Change Act 2008; The Climate Change Act 2008 \(2050 Target Amendment\) Order 2019](#)

² Welsh Government, [Climate change targets and carbon budgets](#), last updated November 2022; [Climate Change Act \(Northern Ireland\) 2022](#)

³ [Climate Change \(Scotland\) Act 2009](#), as amended by the [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Act 2019](#); Scottish Government, [Reducing greenhouse gas emissions](#), undated

⁴ Climate Change Committee (CCC), [UK housing: Fit for the future?](#), February 2019

⁵ Department for Energy Security and Net Zero (DESNZ), [Energy consumption in the UK 2023: ECUK 2023: Consumption data tables \(Excel\)](#): Table C5, last updated 15 December 2023 [accessed 24 May 2024]; DESNZ, [Final UK greenhouse gas emissions national statistics: 1990 to 2022](#): Annex 1, last updated 28 March 2024 [accessed 24 May 2024]

Emissions from residential buildings come mainly from fossil fuel combustion (that is, the burning of oil or gas for heating and hot water) and electricity use. In its [2022 progress report to Parliament](#), the CCC said “heat accounts for the largest single share of emissions from buildings”.⁶

Home heating can be decarbonised by installing low-carbon heating (such as heat pumps). Emissions from homes can also be reduced by improving their energy efficiency (for example, by installing insulation or ensuring appliances are energy efficient) and installing renewable energy systems (such as solar panels).⁷ The Environmental Audit Committee said that “energy efficiency is an important precursor to low carbon heating”.⁸

2 Differing views on a ‘fabric first’ approach

Some organisations, such as the National Insulation Association, have called for a ‘fabric first’ approach. A building’s fabric includes its structural elements (for example, its external walls, roof and floors) and its doors and windows. A ‘fabric first’ approach involves reducing heat loss through fabric elements (for example, by fitting insulation) before installing renewable energy systems and low-carbon heating technologies (such as heat pumps).⁹

The Royal Institute of British Architects (RIBA) has also argued that “we should not rely on low carbon heating technology alone to decarbonise” new homes. It said that the government should raise standards for the fabric efficiency of new homes “as a priority”.¹⁰

Other organisations, such as the charity Nesta, have argued that “it is not cost effective to insulate every home to a high standard”. Nesta has argued that households should be encouraged to fit heat pumps even “if their home is poorly insulated”.¹¹ Researchers from the University of Oxford have also said that “for many homes the solution will be to put in a heat pump first”.¹²

How are UK homes heated?

The Office for National Statistics (ONS) collected data on the types of central heating used in homes in [England and Wales as part of the 2021 census](#). The

⁶ CCC, [2022 Progress Report to Parliament](#), June 2022

⁷ CCC, [UK housing: Fit for the future?](#), February 2019

⁸ Environmental Audit Committee (EAC), [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁹ National Insulation Association, [Call for Evidence: Decarbonising home heating - National Insulation Association response](#), April 2024

¹⁰ Royal Institute of British Architects, [The proposed Future Homes and Buildings Standards – A positive step or lacking in ambition?](#), March 2024

¹¹ Nesta, [Insulation impact: How much do UK houses really need?](#), January 2024

¹² University of Oxford Environmental Change Institute, [Think first before fabric first](#), January 2024; Nick Eyre and others, [Fabric first: Is it still the right approach?](#), Building & Cities, Vol 4(1), 2023

census data showed that three quarters (74%) of households in England and Wales used gas as their only source of heating. 3% of households used oil as their only source of heating.

Only 9% of households in England and Wales said they used electric heating (such as storage heaters) as their only source of heating. Homes that only used electric heating were mainly located in major cities such as Manchester, Birmingham and London. Less than 1% of households used renewable energy sources (such as geothermal heating, a heat pump or solar heating) on their own or with other source of heating. Similarly, less than 1% of households said they were on heat networks.¹³

Similarly, the 2021 Scottish House Condition Survey found that 80% of homes in Scotland (around 2 million) use mains gas for heating and 6% used oil. 11% of households in Scotland used electricity to heat their homes in 2021.¹⁴

In contrast, most homes in Northern Ireland are not connected to the gas grid. The 2021 census showed that 33% of households in Northern Ireland used gas to heat their homes, while 63% used oil to heat their homes.¹⁵

3 Low-carbon heating technologies

The government said that heat pumps and heat networks will be the main low-carbon technologies for decarbonising home heating:

- **Heat pumps** use electricity to extract heat from the air, ground or nearby water sources and transfer it into a building. Because heat pumps usually transfer rather than generate heat, they are more energy efficient than conventional heating technologies, such as boilers.
 - Air-source heat pumps are more commonly used in homes in the UK because they are smaller, cheaper and easier to install than ground-source heat pumps.¹⁶
- **Heat networks** distribute heating and hot water from a central source to blocks of flats (communal heat network) or to a whole neighbourhood of buildings (district heat network) through a network of pipes. They are a more efficient way of delivering heat because they use large-scale heat generation, and they can use waste sources of heat (for example, from power stations or data centres).¹⁷

¹³ Office for National Statistics, [Census 2021: how homes are heated in your area](#), 5 January 2023; ONS, [Census 2021: Central heating](#), last updated 28 March 2023 [accessed 24 May 2024]

¹⁴ Scottish Government, [Scottish House Condition Survey: 2021 Key Findings](#), May 2023

¹⁵ Northern Ireland Statistics and Research Agency, [Census 2021: Household spaces and accommodation](#) (PDF), 15 December 2022 [accessed 24 May 2024], p22

¹⁶ Energy Saving Trust, [In-depth guide to heat pumps](#), March 2024; International Energy Agency, [How a heat pump works](#), November 2022

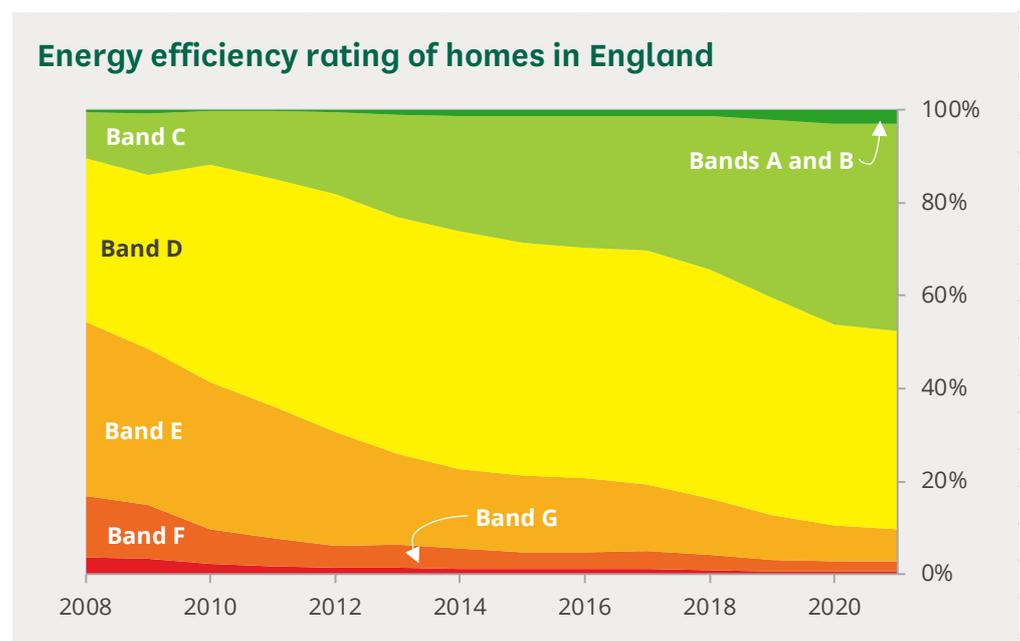
¹⁷ DESNZ and BEIS, [What is a heat network?](#), March 2018; National Audit Office, [Decarbonising home heating](#), March 2024

Hydrogen boilers are another low-carbon heating method. Hydrogen boilers use hydrogen gas rather than natural gas as fuel. Unlike natural gas, hydrogen does not release carbon dioxide when burned. The government said it would decide on the role of hydrogen by 2026.¹⁸ For further information, see a briefing by the Parliamentary Office for Science and Technology (POST) on [Low-carbon hydrogen supply](#) (June 2021).

How energy efficient are UK homes?

Data on the energy efficiency of homes in England is collected as part of the [English Housing Survey](#), an annual survey administered by the Department for Levelling Up, Housing and Communities. It provides estimates of the condition of the housing stock in England. The most recent data was collected in 2021.

The English Housing Survey uses the standard assessment procedure (SAP) to monitor the energy efficiency of homes. It rates the energy efficiency of homes on a scale of 1 to 100, which is then split into bands (A to G). This rating is also displayed on energy performance certificates (EPCs). For further information about the SAP and EPCs, see section 2 of this briefing.



Source: Department for Levelling Up, Housing and Communities (DLUHC) and Ministry for Housing, Communities and Local Government (MHCLG), [English Housing Survey data on energy performance: Table DA7101: energy performance - dwellings](#) (ODS file, opens in Excel), last updated 13 July 2023

In 2021, the average energy efficiency of homes in England was 66 (on the 1 to 100 scale) and 48% of homes were in EPC band C or above. In comparison, in

¹⁸ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023; NAO, [Decarbonising home heating](#), March 2024

2008, the average energy efficiency of homes in England was 51 and 10% of homes were in EPC band C or above.¹⁹

As shown in the chart above, the increase in the number of homes in EPC band C or above in the past decade has been driven by the increase in the number of homes in band C. Only 3% of homes in 2021 were in band A or B (compared with less than 1% in 2008).

Devolved administrations

Similar data on the energy efficiency of homes is also available for Wales (latest data from 2017/18), Scotland (latest data from 2021) and Northern Ireland (latest data from 2016):

- In Wales, the average energy efficiency rating of homes was 61 in 2017/18, and 28% of homes were in EPC band C or above.²⁰
- In Scotland, the average energy efficiency rating of homes was 68 in 2021, and 52% of homes were in EPC band C or above.²¹
- In Northern Ireland, the average energy efficiency rating of homes was 66 in 2016, and 49% of homes were in EPC band C or above.²²

For further information on how ratings vary across the UK, see the Library briefing, [Energy efficiency of UK homes](#) (February 2024).

1.2 Heat and Buildings Strategy (October 2021)

In October 2021, the government published the [Heat and Buildings Strategy](#), which sets out its policies for decarbonising homes. The Heat and Buildings Strategy was published alongside the [Net Zero Strategy: Build Back Greener](#), which sets out policies to decarbonise all sectors of the UK economy.

The Heat and Buildings Strategy built upon previous strategies including:

- [The clean growth strategy](#) (October 2017)
- [The ten-point plan for a green industrial revolution](#) (November 2020)

¹⁹ Department for Levelling Up, Housing and Communities (DLUHC) and Ministry for Housing, Communities and Local Government (MHCLG), [English Housing Survey data on energy performance: Table DA7101: energy performance - dwellings](#) (ODS file, opens in Excel), last updated 13 July 2023 [accessed 24 May 2024]

²⁰ Welsh Government, [Welsh Housing Conditions Survey: Results viewer](#), last updated 31 October 2019 [accessed 24 May 2024]

²¹ Scottish Government, [Scottish House Condition Survey: 2021 Key Findings](#), published 30 May 2023 [accessed 24 May 2024]

²² Northern Ireland Housing Executive, [Northern Ireland House Condition Survey 2016: Main Report](#) (Table 7.2), 2016 [accessed 24 May 2024]

- [Energy white paper: Powering our net zero future](#) (December 2020)

Since publishing the Heat and Buildings Strategy in 2021, the government has published the [Powering up Britain](#) policy paper (March 2023). In Powering up Britain, the government set out the steps it intends to take to improve the UK's energy security and how it intends to achieve its net zero commitments.²³

In the Heat and Buildings Strategy, the government said, to meet its net zero target, “almost all buildings [will need] to fully decarbonise”. To this end, it said it would:

- Lower the cost of heat pumps between 25% and 50% by 2025 and deploy at least 600,000 heat pump systems a year by 2028.
- Phase out the installation of new and replacement natural gas boilers in England by 2035 and ensure that all heating systems used in 2050 are “compatible with net zero”.
- Aim for “as many homes as possible” to have an EPC band C by 2035 and “as many fuel-poor homes as possible” in England to be band C by 2030.²⁴ For further information about EPCs, see section 2 of this briefing.

The government also said it would consider setting a “net zero minimum energy performance standard” for all homes by 2050 “where cost-effective, practical and affordable”.²⁵ It has not set out at what level this minimum energy performance standard will be set.

In the strategy, the government also said it would introduce a ‘Future Homes Standard’ by 2025 to “ensure that new-build homes are future-proofed with low-carbon heating and high levels of energy efficiency”.²⁶ The government [initially consulted on the Future Homes Standard](#) between October 2019 and February 2020 and on its [detailed specification between November 2023 and March 2024](#).²⁷ For further information about the Future Homes Standard, see section 4 of this briefing.

A ‘new approach’ to net zero (September 2023)

In a speech in September 2023, then Prime Minister, Rishi Sunak, announced [the government would take a “new approach to achieving net zero”](#). He said the government’s recent approach did not account for additional costs to households and disruption to people’s lives and risked losing their support.

²³ DESNZ, [Powering up Britain](#), last updated April 2023

²⁴ DESNZ and BEIS (Department for Business, Energy and Industrial Strategy), [Heat and buildings strategy](#), last updated March 2023

²⁵ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

²⁶ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

²⁷ MHCLG, [Future Homes Standard: Changes to Part L and Part F of the Building Regulations for new dwellings](#), last updated January 2021; DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

Rishi Sunak said the government remained committed to meeting its net zero target. He announced, however, that the government would adopt a “more pragmatic, proportionate, and realistic approach [...] that eases the burdens on working people”.²⁸

In the speech, and in accompanying press releases, the government said it would make the following changes to its approach to decarbonising homes:

- Delaying the ban on installing oil and gas boilers and new coal heating for off-gas-grid homes from 2026 to 2035.
- Exempting some homes, such as off-gas-grid homes, from the requirement to phase out fossil fuel boilers (previously set for 2035).
- Scrapping proposals to require landlords to meet EPC C from 2025 in privately rented homes.²⁹

For further information about the changes announced in the speech, see the [accompanying press release for the speech](#) and section 4 of the Lords Library briefing [King’s Speech 2023: Energy security and net zero](#).

1.3 Strategies in the devolved administrations

The UK Government’s [Heat and Buildings Strategy](#) sets out policies for decarbonising homes across the UK, focusing on England and Wales. Although energy policy is only devolved to Northern Ireland, other policy areas (such as building control and housing) are devolved to Wales and Scotland as well.

The devolved administrations also set out plans on how they intend to decarbonise homes in their respective parts of the UK.

Wales

The Welsh Government’s [emissions reduction plan for the second carbon budget](#) (2021 to 2025) sets out its plans for decarbonising homes. It states:

- Around 148,000 houses across Wales should receive retrofit measures to reduce heat loss between 2021 and 2025. The proportion of homes that use electrified heat should increase to 3% by 2025.

²⁸ Prime Minister’s Office (PMO), [PM speech on Net Zero: 20 September 2023](#), September 2023

²⁹ PMO, [PM speech on Net Zero: 20 September 2023](#), September 2023; PMO, [PM re-commits pledges a “fairer” path to achieving target](#), September 2023; DLUHC, [Reforming the Private Rented Sector: Government response](#) (PDF), 20 October 2023, HC 1935 2022-23

- By 2025, all new affordable homes in Wales should be built to net zero carbon. Developers of other new homes, regardless of tenure, should also adopt net zero standards by 2025.³⁰

Scotland

The Scottish Government has outlined its plans for decarbonising homes in its [Heat in Buildings Strategy](#) (October 2021). It said to meet its net zero targets:

- All homes in Scotland should meet EPC band C by 2033 “where feasible and cost-effective”.
- The 1 million homes that are connected to the gas grid and the “vast majority” of the 170,000 off-gas-grid homes that currently use oil, liquefied petroleum gas or solid fuels in Scotland must move to zero-emissions heating by 2030.
- From 2024, new homes should have heating systems that produce zero direct emissions (such as heat pumps) and “high levels of fabric energy efficiency” so that they do not need to be retrofitted in the future.³¹

Northern Ireland

The Northern Ireland Department for the Economy (DfE) set out its plans for decarbonising homes in its [Energy Strategy](#) (December 2021). It said it would:

- Introduce minimum energy efficiency standards for existing homes “as soon as possible”.
- Change building regulations requirements for new homes to ensure they are “net zero ready by 2026/27”.³²

³⁰ Welsh Government, [Net Zero Wales Carbon Budget 2 \(2021 to 2025\)](#), October 2021

³¹ Scottish Government, [Heat in Buildings Strategy - Achieving net zero emissions in Scotland's buildings](#), October 2021

³² Northern Ireland Department for the Economy, [Energy Strategy - Path to Net Zero Energy](#), December 2021

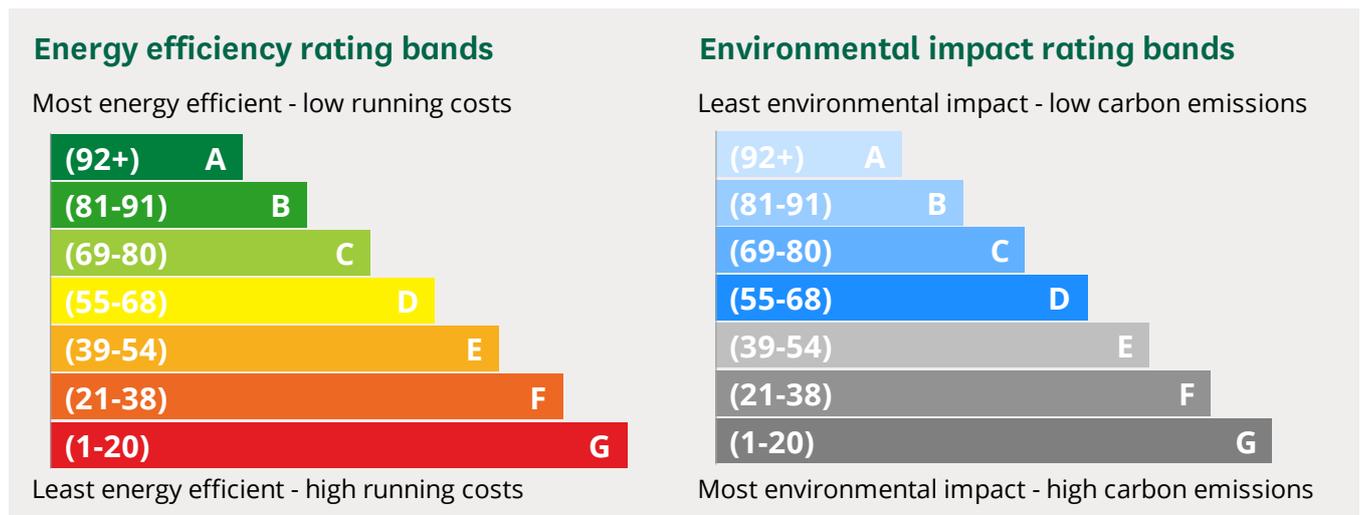
2 Measuring energy efficiency and environmental impact

This section of the briefing discusses energy performance certificates (EPCs), which are commonly used to assess and compare the energy performance of homes. It discusses their limitations and proposals to reform the methodology underlying them.

2.1 Energy performance certificates (EPCs)

EPCs provide information about the energy efficiency and environmental impact of buildings. EPCs for domestic buildings include two ratings, which are both rated on a scale of 1 to 100 and then split into bands (A to G):

1. The **energy efficiency rating** is based on the cost of energy per square metre per year of a building and its fixed services (such as heating and lighting). Band A buildings are the most energy efficient, whereas band G the least energy efficient.
2. The **environmental impact rating** is based on the greenhouse gas emissions per square metre per year of a building and its fixed services. Band A buildings have the least environmental impact, whereas band G have the most environmental impact.³³



³³ CCC, [Reform of domestic EPC rating metrics to Lee Rowley MP](#), February 2023; Building Research Establishment (BRE), [Standard Assessment Procedure SAP 10: SAP 10.2 specification \(11/04/2023\)](#) (PDF), April 2024

The chart above shows how the 1 to 100 scores map onto A to G ratings for energy efficiency and environmental impact.

EPCs provide both the current energy efficiency and environmental impact rating of a building. However, when EPC ratings are discussed, the focus is usually on the energy efficiency rating.

EPCs also include information on how the energy efficiency of a building can be improved or its environmental impact can be reduced, for example, by fitting insulation or installing a heat pump.

How are EPC ratings calculated?

An accredited assessor will determine both ratings displayed on an EPC based on a building's construction, insulation, heating, ventilation and expected use.

The methodology used to assess the energy performance and environmental impact are developed by the Building Research Establishment (BRE), an independent organisation that provides advice, research and information on the built environment, on behalf of the UK Government.³⁴ The methodology the BRE developed is also approved for use in Scotland and Northern Ireland.³⁵

New homes

For new homes, EPC assessors will use the [standard assessment procedure](#) (SAP) to determine the energy efficiency of a home. The SAP considers several factors to determine the energy efficiency of a home, including:

- the materials used in the construction of a home
- the levels of insulation and draught-proofing
- the types of heating, hot water systems and energy sources³⁶

For new homes, a lot of information is usually readily available to calculate the SAP. Therefore, the EPC assessments can be carried out off-site using a home's floor plans and specifications.³⁷

The environmental impact rating is based on the carbon dioxide emissions of a home's space heating, water heating, ventilation and lighting, minus any emissions saved by energy generation technologies (such as solar panels). It is adjusted for floor area.³⁸

³⁴ DESNZ and BEIS, [Standard Assessment Procedure](#), last updated December 2023

³⁵ Scottish Government, [Energy Performance Certificates: Guide](#), November 2023; Northern Ireland Department of Finance, [Standard Assessment Procedure](#), undated [accessed 24 May 2024]

³⁶ BRE, [Standard Assessment Procedure SAP 10: SAP 10.2 specification \(11/04/2023\)](#) (PDF), April 2024

³⁷ DLUHC, [Energy Performance of Buildings Certificates: Notes and definitions](#), last updated May 2021

³⁸ BRE, [Standard Assessment Procedure SAP 10: SAP 10.2 specification \(11/04/2023\)](#) (PDF), April 2024

Existing homes

For existing homes, EPC assessors will usually need to carry out an on-site survey. Because the data needed for the SAP is often not available for existing homes, EPC assessors will usually rely on a set of assumptions about a home. This is called the reduced SAP (RdSAP).³⁹

For further information about SAP and RdSAP, including the full specifications, see [guidance published by the BRE](#). The current version of the SAP in place in England and Wales is the SAP 10.2; it came into force in 2022. The government consulted replacing the SAP with a new methodology between December 2023 and March 2024; for further information, see section 2.3 of this briefing.

When are EPCs required?

The Energy Performance of Buildings Regulations require UK homes to have an EPC when they are built, sold or rented. The EPC must be displayed when a property is marketed to give potential tenants or buyers an idea of how much they will pay for heating, lighting and hot water as well as how much carbon dioxide a home will emit.⁴⁰

The regulations do not require UK homes to have certain minimum EPC ratings. However, there are minimum ratings for privately rented homes in England and Wales. Under the [Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#), privately rented homes must meet EPC band E since April 2018 (for new tenancies) or April 2020 (for existing tenancies). For further information about the requirements for privately and socially rented homes, see section 3.2 of this briefing.

2.2

Concerns about EPCs

The Climate Change Committee (CCC), the government's advisory body on climate change, has expressed concern about the use of EPCs to assess the energy efficiency of homes and to set targets for retrofitting. In letters to the UK Government and the Scottish Government, the CCC argued that EPCs were not "fit for purpose".

The [government commissioned a study of SAP calculations from Etude](#), an independent organisation which specialises in low-energy building design and environmental assessments, which was published in June 2021. The study and the CCC highlighted the following issues:

- Both the energy efficiency rating and the environmental impact rating only consider the energy used for heating, hot water and lighting, but not

³⁹ BRE, [Standard Assessment Procedure SAP 10: RdSAP10 specification \(13/02/24\)](#) (PDF), February 2024

⁴⁰ [Energy Performance of Buildings \(England and Wales\) Regulations 2012](#); [Energy Performance of Buildings \(Scotland\) Regulations 2008](#); [Energy Performance of Buildings \(Certificates and Inspections\) \(Amendment\) Regulations \(Northern Ireland\) 2014](#)

the energy used for other appliances. They are also not “a true indicator” of the fabric efficiency of buildings (for example, the extent to which they lose heat through their external walls, roof and floors).

- The energy efficiency rating can be misleading because it is a measure of energy cost, not energy efficiency. It therefore does not “incentivise the energy efficiency and heating solutions required to reduce emissions”.
 - For example, fuel type influences the energy efficiency rating because it is based on energy cost. Because gas is cheaper than electricity, a home with a gas boiler could have a higher energy efficiency rating than a home with a more efficient heat pump.⁴¹
- The environmental impact rating is affected by the emissions of fuels. As the electricity system in Great Britain decarbonises, it could incentivise switching to direct electric heating instead of incentivising improving insulation or the installation of heat pumps.
- Differences between points of the 1 to 100 scales do not directly relate to differences in energy costs and emissions. This can make it difficult for consumers to make comparisons between homes.⁴²
- EPC ratings can be subject to error. Researchers from University College London found that ratings can deviate by up to 8 points, particularly in poorer performing properties. This can result in some buildings ending up in the wrong band.⁴³ The CCC also expressed concern that EPCs are “less reliable” for older and rural homes.⁴⁴

Proposed recommendations to improve EPCs

The CCC said EPCs should provide “clear information” about the energy use of homes to incentivise homeowners to make their homes more energy efficient and adopt low-carbon heating. It also said EPC metrics should have “simple names which make their meanings obvious” and the rating scales should use “real-world units so they can be easily understood and compared”.

The CCC recommended that the energy efficiency rating should be renamed “cost” and that other metrics should be included on EPCs, including metrics on energy use, a home’s fabric efficiency and heating system. It also called for “an overhaul” of the SAP.⁴⁵

⁴¹ CCC, [UK housing: Fit for the future?](#), February 2019

⁴² CCC, [Letter: Reform of domestic EPC rating metrics to Lee Rowley MP](#), February 2023; CCC, [Letter: Reform of domestic EPC rating metrics to Patrick Harvie MSP](#), February 2023; Etude, [The future of SAP calculations: Making SAP and RdSAP 11 fit for Net Zero](#), June 2021

⁴³ Jenny Crawley and others, [Quantifying the Measurement Error on England and Wales EPC Ratings](#), Energies, Vol 12 (18), 2019

⁴⁴ CCC, [UK housing: Fit for the future?](#), February 2019

⁴⁵ CCC, [Letter: Reform of domestic EPC rating metrics to Lee Rowley MP](#), February 2023; CCC, [Letter: Reform of domestic EPC rating metrics to Patrick Harvie MSP](#), February 2023

In a [report on energy efficiency of existing homes](#) (March 2021), the House of Commons Environmental Audit Select Committee also called for EPCs to be “overhauled” to include not just fuel cost, but energy and carbon metrics. It said EPCs should eventually be replaced by “building renovation passports” that provide “more accurate data on energy usage and provide homeowners with long term renovation strategies”.⁴⁶

2.3 Proposed reforms to EPCs

The Energy Performance of Buildings Regulations, which govern when EPC assessments are required for buildings, are derived from EU law but were retained and remain in place following the UK’s exit from the EU in 2020.

The [Energy Act 2023](#) gives the UK Government the power to change or replace these regulations in England and Wales; it gives the same powers to the Scottish Government and the Northern Ireland Department for Finance for Scotland and Northern Ireland.⁴⁷

The UK Government said it would consult on changes to the regulations. A consultation has not yet been published.⁴⁸ The Scottish Government said it also intended to introduce revised regulations in winter of 2023/24.⁴⁹ But it has not yet made any changes.

The UK Government (for England and Wales) and the Scottish Government have said that they intend to reform EPCs, including the methodology that they use and the metrics displayed on them.

England and Wales

Between July and October 2018, the government held a consultation seeking views on the performance of EPCs and how EPCs could be improved. In 2020, in response to the consultation, the government published an [action plan](#), which said that the government would investigate how it could improve the reliability and accuracy of EPCs. It also said that it would update the SAP by the end of 2021.⁵⁰ The government published a [progress report on the action plan](#) in November 2021.⁵¹

⁴⁶ Environmental Audit Committee (EAC), [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁴⁷ [Part 10 of the Energy Act 2023](#); BEIS and DESNZ, [Energy Security Bill factsheet: Power to make or change energy performance of buildings regulations](#), last updated September 2023

⁴⁸ BEIS and DESNZ, [Energy Security Bill factsheet: Power to make or change energy performance of buildings regulations](#), last updated September 2023

⁴⁹ Scottish Government, [Energy Performance Certificate \(EPC\) reform: Consultation](#), July 2023

⁵⁰ BEIS and MHCLG, [Energy Performance Certificates in buildings: Call for evidence](#), last updated September 2020

⁵¹ DESNZ, DLUHC and BEIS, [Improving Energy Performance Certificates: Action plan - progress report](#), November 2021

The BRE updated the SAP, which had been in use since 2012, to its most recent version (SAP 10.2) in August 2021. The updated SAP came into force in England in June 2022 and Wales in November 2022. For information about the updates to the SAP, see [a summary of the changes to the SAP 10](#) published by LABC (an organisation which represents local authority building control surveyors).

The BRE is also updating the RdSAP, which has been in use since 2012. The government said the updated RdSAP would come into force in spring 2024.⁵²

Home Energy Model (HEM) to replace the SAP

In line with [recommendations made by the CCC](#), and a [study commissioned by the government](#), the government has proposed replacing the SAP with a new methodology: the home energy model (HEM). The government [consulted on the HEM](#) between December 2023 and March 2024.⁵³

The government said the HEM would be used to assess whether new homes meet the energy performance standards set by the Future Homes Standard. The government said it intends to implement the HEM for new homes alongside the Future Homes Standard in 2025 (see section 4 of this briefing). It also said it would decide on whether it would use the HEM (rather than the RdSAP) for existing homes by the end of 2024.⁵⁴

In May 2024, the government said it was working on proposals for improving EPC metrics, including to ensure that the new metrics would account for low-carbon heating. The government said it would consult on these proposals “in the coming months”.⁵⁵ A consultation has not yet been published.

Scotland

In its [Heat in Buildings Strategy](#) (October 2021), the Scottish Government said it would “reform the assessment process and metrics” underpinning EPCs.⁵⁶ In an [initial consultation in 2021](#), the Scottish Government proposed including a new metric (energy use) in EPCs for homes and renaming existing metrics.⁵⁷

In 2023, the Scottish Government [held a further consultation on EPCs](#) to “ensure they are fit for purposes to support future heat”. It proposed:

- renaming the energy efficiency rating ‘cost rating’ and the environmental impact rating ‘emissions rating’.

⁵² BRE, [Standard Assessment Procedure SAP 10](#), undated [accessed 28 May 2024]; DESNZ and BEIS, [Standard Assessment Procedure](#), last updated December 2023

⁵³ DESNZ, [Home Energy Model: Future Homes Standard assessment](#), last updated March 2024

⁵⁴ DESNZ, [Home Energy Model: Future Homes Standard assessment](#), last updated March 2024;

⁵⁵ PQ 23540 [[Energy Performance Certificates](#)] 24 April 2024

⁵⁶ Scottish Government, [Heat in Buildings Strategy - Achieving net zero emissions in Scotland's buildings](#), October 2021

⁵⁷ Scottish Government, [Domestic Energy Performance Certificates reform: Consultation](#), July 2021

- including information on the fabric performance of a home, heating system type and energy use of homes in EPCs.
- displaying information on the fabric energy efficiency of homes (such as whether the building has cavity wall insulation or loft insulation) more prominently on the EPC.⁵⁸

The Scottish Government said it would introduce the reformed EPCs “shortly” after amending the Energy Performance of Buildings Regulations in winter of 2023/24 and before introducing its proposed Heat in Buildings Bill.⁵⁹

⁵⁸ Scottish Government, [Energy Performance Certificate \(EPC\) reform: Consultation](#), July 2023

⁵⁹ Scottish Government, [Energy Performance Certificate \(EPC\) reform: Consultation](#), July 2023

3

Decarbonising existing homes

In a [report on the UK's housing stock](#) (2019), the Climate Change Committee (CCC) estimated that “four out of five homes [80%] that will be occupied by 2050 have already been built”. In a [report on energy efficiency of existing homes](#) (March 2021), the Environmental Audit Committee reached the same conclusion.⁶⁰

In the [Heat and Buildings Strategy](#) (October 2021), the government estimated that around 15 million UK homes (60% of UK homes) had an EPC rating below band C in 2019 and would need to be retrofitted by 2050.⁶¹ The CCC estimated that 29 million homes would need to be made “low-carbon, low-energy and resilient to a changing climate”, and the Environmental Audit Committee said “over ten million occupied homes and over three million private rented sector [homes]” would need to be upgraded to meet EPC band C by 2035.⁶²

3.1

Government targets and strategies

In its [Heat and Buildings Strategy](#) (October 2021), the government set a target for “as many homes [in England and Wales] as possible to achieve EPC band C by 2035”.⁶³ The government said it would meet this target by incentivising homeowners to move to low-carbon heating technologies and to retrofit their homes. There is no requirement for existing homes (except privately rented homes, see section 3.2 of this briefing) to be retrofitted to meet a certain EPC rating.

In its [Heat in Buildings Strategy](#), the Scottish Government set a target for “a large majority” of buildings to meet EPC band C by 2030 and for all homes to meet EPC band C by 2033 “where feasible and cost-effective”.⁶⁴ The Scottish Government has proposed a new law (the [Heat in Buildings Bill](#)) which will require homeowners to meet a certain minimum energy efficiency standard by 2033. It consulted on the bill between November 2023 and March 2024, and it intends to pass the bill by the end of the current parliament (in May 2026).⁶⁵

⁶⁰ CCC, [UK housing: Fit for the future?](#), February 2019; EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁶¹ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

⁶² CCC, [UK housing: Fit for the future?](#), February 2019; EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁶³ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

⁶⁴ Scottish Government, [Heat in Buildings Strategy - Achieving net zero emissions in Scotland's buildings](#), October 2021

⁶⁵ Scottish Government, [Delivering net zero for Scotland's buildings - Heat in Buildings Bill: Consultation](#), November 2023

For further information about plans to decarbonise homes in Scotland and the Heat in Buildings Bill, see a [briefing by the Scottish Parliament's Information Centre](#) (February 2024).

Table 1 provides a summary of the targets for decarbonising existing owner-occupied and privately and socially rented homes in England, Wales and Scotland. The Northern Ireland Executive has not yet set out its plans and targets for decarbonising existing homes.

Table 1: Targets to decarbonise existing homes		
Targets	Where?	By when?
No new natural gas boilers	England	2035
All heating systems “compatible with net zero”	England	2050
All fuel-poor households at least EPC band C	England	2030
New privately rented homes at least EPC band E	England and Wales	2020
Privately rented homes at least EPC band C ⁶⁶	England and Wales	2025 for new tenancies; 2028 for all tenancies
As many homes as possible to achieve at least EPC band C	England and Wales	2035
All homes to meet a “minimum energy efficiency standard”	England and Wales	2050
Voluntary target for mortgage lenders to have average of at least EPC band C rated homes in their portfolio	England and Wales	2030
All homes to meet at least EPC band C	Scotland	2033
New homes to have zero-carbon heating	Scotland	April 2024
Privately and socially rented homes to meet “minimum energy efficiency standard”		2028 for privately rented; 2033 for socially rented
Clean heating systems to replace oil and gas boilers in all existing homes	Scotland	2028 (earliest), or 2045 (backstop date)

Source: DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023; Scottish Government, [Heat in Buildings Strategy - Achieving net zero emissions in Scotland's buildings](#), October 2021; Scottish Government, [Delivering net zero for Scotland's buildings - Heat in Buildings Bill: Consultation](#), November 2023

⁶⁶ In the September 2023 ‘new approach to net zero’ speech, the then Prime Minister Rishi Sunak announced that this target would be scrapped.

3.2 Requirements for privately and socially rented homes

There are minimum energy efficiency standards in some parts of the UK for privately and socially rented homes. Energy efficiency and fuel poverty are devolved matters, meaning the devolved administrations in Wales, Scotland and Northern Ireland can set different standards and targets. A summary of the energy efficiency standards across the UK is provided in table 2.

There are also minimum energy efficiency standards for non-domestic rental properties. For further information about the requirements in England and Wales, see government guidance on [minimum energy efficiency standards for non-domestic private rented properties](#).

Table 2: Requirements for privately and socially rented homes		
	Privately rented homes	Socially rented homes
England	Minimum energy efficiency standards (MEES): minimum EPC band E for new tenancies since April 2018 and existing tenancies since April 2020	Decent homes standard, but no minimum EPC rating
Wales		Housing quality standard: minimum EPC band C by 2030
Scotland	No minimum energy efficiency standard for privately rented homes. Proposed minimum standards from 2028	Energy efficiency standard for social housing (ESSH): minimum EPC band C or D by 2020. Proposed upgrade to band B by 2032
Northern Ireland	No minimum energy efficiency standard for privately rented homes	Decent homes standard, but no minimum EPC rating

England and Wales

As of April 2018, the [Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#) (also called Minimum Energy Efficiency Standards or MEES Regulations) require newly leased domestic private rented properties in England and Wales to meet at least EPC band E. The government amended the MEES Regulations in 2019 to extend them to existing leases (which came into force on 1 April 2020).⁶⁷

This means that, as of April 2020, landlords in England and Wales cannot grant new leases or continue existing leases for properties that have an EPC rating of F or G, unless their home meets certain exemptions (for example, if

⁶⁷ [Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015; Energy Efficiency \(Private Rented Property\) \(England and Wales\) \(Amendment\) Regulations 2019](#)

retrofitting a home will cause damage to it or devalue it). If landlords do not comply, then they may have to pay a fine of up to £5,000.⁶⁸

Landlords can either self-fund improvements or apply for government funding to improve the energy efficiency of their properties. They do not have to spend more than £3,500 to improve the energy efficiency of a property. If the cost of improvements exceeds £3,500, landlords only have to make improvements up to that amount.⁶⁹

[Part 2 of the Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#) gives tenants the right to install energy efficiency measures in their rented properties. Tenants must obtain the landlord's consent, but the landlord cannot withhold consent "unreasonably". Landlords are not required to contribute funding for any measures requested by tenants.⁷⁰

Between September 2020 and January 2021, the government [consulted on whether to amend the MEES Regulations](#) to require new leases to meet EPC band C by April 2025 and existing leases to meet EPC band C by 2028.⁷¹ In his ['new approach to net zero' speech](#) in September 2023, the Prime Minister, Rishi Sunak, announced that the government no longer intended to amend the MEES Regulations to uplift the requirement.⁷²

England

The MEES Regulations only apply to privately rented homes, not to socially rented homes. While standards for privately rented homes are a reserved matter, standards for socially rented homes are devolved to Wales.

In England, social housing providers must ensure that their properties meet the [decent homes standard](#). It requires that socially rented homes provide "a reasonable degree of thermal comfort", including "effective insulation and efficient heating".⁷³ However, the government has not set a minimum energy efficiency rating for socially rented homes in England.

The decent homes standard has not been updated since 2006. In its [Social Housing White Paper](#) (November 2020), the government said it would review the decent homes standard to consider whether it would need to be updated. As part of the review, the government said it would consider how the decent

⁶⁸ DESNZ and BEIS, [Domestic private rented property: minimum energy efficiency standard - landlord guidance](#), last updated April 2023

⁶⁹ DESNZ and BEIS, [Domestic private rented property: minimum energy efficiency standard - landlord guidance](#), last updated April 2023

⁷⁰ [Part 2 of the Energy Efficiency \(Private Rented Property\) \(England and Wales\) Regulations 2015](#); DESNZ and BEIS, [Tenants' energy efficiency improvements provisions - Guidance for domestic landlords and tenants](#), March 2016

⁷¹ DESNZ and BEIS, [Improving the energy performance of privately rented homes](#), last updated December 2020

⁷² PMO, [PM speech on Net Zero: 20 September 2023](#), September 2023; PMO, [PM recommits UK to Net Zero by 2050 and pledges a "fairer" path to achieving target to ease the financial burden on British families](#), September 2023

⁷³ DLUHC and MHCLG, [A decent home: Definition and guidance](#), June 2006

homes standard could “support the decarbonisation and energy efficiency of social homes”.⁷⁴ In its [Heat and Buildings Strategy](#) (October 2021), the government said it would consider setting “a long-term regulatory standard” to require socially rented homes to meet EPC band C.⁷⁵

In an [update on its work to improve the quality of social housing](#) in February 2024, the government said that its review of the decent homes standard was ongoing. It also said it would consult on minimum energy efficiency standards for socially rented homes “shortly”.⁷⁶ It has not yet published a consultation.

Wales

In Wales, the [housing quality standard](#) (last updated October 2023) requires social housing providers to ensure that their properties meet EPC band C by March 2030.⁷⁷

Scotland

There are currently no minimum energy efficiency standards for privately rented homes in Scotland. Between November 2023 and March 2024, the Scottish Government [consulted on whether to require privately rented homes to meet a minimum energy efficiency standard](#) by 2028. The requirement will form part of the new [Heat in Buildings Bill](#) which the Scottish Government also consulted on between November 2023 and March 2024.⁷⁸

However, there are minimum energy efficiency standards for socially rented homes in Scotland. In 2014, the Scottish Government introduced an energy efficiency standard for social housing (EESH), which required social housing providers to ensure their properties achieved EPC band C or D (depending on dwelling and fuel type) by December 2020.

In June 2019, the Scottish Government announced that socially rented homes would have to meet EPC band B or “become as energy efficient as practically possible” by December 2032. However, the Scottish Government subsequently expressed concern that “the 2032 milestone was not aligned with net zero targets”. Between November 2023 and March 2024, the Scottish Government [consulted on whether to introduce a new social housing net zero standard](#) to replace the EESH.⁷⁹ It has not yet responded to the consultation.

⁷⁴ MHCLG, [The charter for social housing residents: Social housing white paper](#), last updated January 2021

⁷⁵ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

⁷⁶ DLUHC, [Update on the government’s work to improve the quality of social housing](#), February 2024

⁷⁷ Welsh Government, [Welsh Housing Quality Standard 2023](#), last updated April 2024

⁷⁸ Scottish Government, [Energy efficiency in homes](#), undated [accessed 27 May 2024]; [Delivering net zero for Scotland’s buildings - Heat in Buildings Bill: Consultation](#), November 2023

⁷⁹ Scottish Government, [Energy efficiency in homes](#), undated [accessed 27 May 2024]; Scottish Government, [Social housing net zero standard: Consultation](#), November 2023

Northern Ireland

There are currently no minimum energy efficiency standards for privately or socially rented homes in Northern Ireland. However, social housing providers must ensure that their properties meet the [decent homes standard](#) (adopted in 2004). It requires socially rented homes provide “a reasonable degree of thermal comfort”, including “effective insulation and efficient heating”.⁸⁰

3.3

Other measures to incentivise retrofitting and move to low-carbon heating systems

To incentivise homeowners to retrofit their properties to improve their energy efficiency and to install low-carbon heating systems, the UK Government and the devolved administrations have relaxed planning rules. They have also introduced grants and loans to fund improvements.

Planning rules

Changes that affect the external appearance of a building usually require planning permission from the local planning authority. However, the UK Government and the devolved administrations have introduced ‘permitted development rights’, such that planning permission is not usually required to install heat pumps or solar panels (subject to restrictions and conditions).⁸¹

As planning is a devolved matter, the rules differ across the UK. For example, in England, permitted development rights allow for the installation of solar panels with a capacity up to 50 kilowatts and for the installation of ground-source and water-source heat pumps. Air-source heat pumps are only covered by permitted development rights if they are at least one metre from the property boundary.⁸²

The UK Government extended permitted development rights in November 2023 to allow the installation of solar panels on flat roofs in England and consulted on extending permitted development rights for air-source heat pumps between February and April 2024.⁸³ It has not yet responded to the consultation.

⁸⁰ Northern Ireland Executive, [Decent homes standard](#), last updated June 2024

⁸¹ Welsh Government, [Planning permission: Solar panels](#) and [Planning permission: Heat pumps](#), undated [accessed 28 May 2024]; Scottish Government, [Householder permitted development rights: Guidance - updated 2021](#), April 2021; [Part 2 of the Schedule of the Planning \(General Permitted Development\) Order \(Northern Ireland\) 2015](#)

⁸² [Part 14 of Schedule 2 of the Town and Country Planning \(General Permitted Development\) \(England\) Order 2015](#)

⁸³ DLUHC, [New planning rules to boost solar rollout and slash energy bills](#), November 2023; DLUHC, [Changes to various permitted development rights: Consultation](#), February 2024

Other energy efficiency improvements, such as installing insulation or double glazing, generally do not need planning permission unless a building is listed or in a conservation area.⁸⁴

Funding schemes

The UK Government and the devolved administrations have also introduced various schemes to help households improve the energy efficiency of their homes and install low-carbon heating systems or renewable energy systems.

Table 3 provides an overview of the schemes. For further information about the schemes, see the Library briefing, [Help with energy efficiency, heating and renewable energy in homes](#).

Some of the schemes (for example, the Smart Export Guarantee scheme and the Energy Company Obligation scheme) are not delivered by the government but require energy suppliers to provide support to homeowners.

Table 3: Schemes to incentivise retrofitting and move to low-carbon heating systems and installations renewable energy systems		
Funding scheme	Who is eligible?	Where?
Smart Export Guarantee (SEG)	All households (with a renewable energy system)	Great Britain (England, Wales and Scotland)
Energy Company Obligation (ECO)	Households that receive certain benefits	Great Britain
ECO4 Flex	Households that are living in fuel poverty or have low incomes and are vulnerable to the effects of living in a cold home	Great Britain
Great British Insulation Scheme (GBIS)	Homes with an EPC rating between D and G which are in council tax bands A to D in England or A to E in Scotland and Wales	Great Britain
Boiler Upgrade Scheme (BUS)	All households (except new builds and social housing)	England and Wales
Green Deal loans	All households	Great Britain
Social Housing Decarbonisation Fund	Social housing providers for properties with an EPC rating between D and G	England
Home Upgrade Grant (HUG) and Local Authority Delivery	Eligibility criteria decided by local authorities	Some local authorities in England
Optimised RetroFit Programme	Social landlords	Wales

⁸⁴ Planning Portal, [Planning permission - Insulation](#) and [Planning Permission - Doors and windows](#), accessed May 2024

Warm Homes Nest	Households that receive certain benefits or have low incomes. Homes must have an EPC rating of below E (D, if a member of the household has a chronic health condition)	Wales
Home Energy Scotland grants and loans	Homeowners	Scotland
Home Energy Scotland landlord loans	Private landlords	Scotland
Social Housing Net Zero Heat Fund	Social landlords	Scotland
Affordable Warmth Scheme	Low-income households who are owner-occupiers or private tenants	Northern Ireland
Schemes that are part of the Northern Ireland Sustainable Energy Programme	Eligibility criteria differ by scheme	Northern Ireland

Cost of low-carbon heating systems

In its [Heat and Buildings Strategy](#) (October 2021), the government said that it would work “with industry to reduce the costs of heat pumps by at least 25-50% by 2025 and towards parity with boilers by 2030”.⁸⁵ It highlighted that “air source heat pumps [...] cost off gas grid households £12,000 on average to install, which is £8000 more than equivalent fossil fuel systems”.⁸⁶

Between October 2021 and January 2022, the government sought views on [proposals to introduce a ‘market-based mechanism for low-carbon heat’](#).

It further [consulted on the ‘clean heat market mechanism’](#) between March and June 2023.⁸⁷

The [Energy Act 2023](#) gives the government the power to introduce regulations for ‘low-carbon heat schemes’ to encourage the supply and installation of low-carbon heating appliances, such as heat pumps. The government said it would use these powers to require “manufacturers of fossil fuel heating appliances to meet a rising standard for low-carbon heat pump sales as a proportion of their total appliance sales”.⁸⁸

⁸⁵ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

⁸⁶ BEIS, [Decarbonising heat in homes: Government Response to the Committee’s Seventh Report of 2021–22](#) (PDF), HC 203 2022–23, May 2022

⁸⁷ BEIS, [Market-based mechanism for low carbon heat](#), last updated January 2023; DESNZ, [Clean heat market mechanism](#), last updated March 2024

⁸⁸ [Section 143 of the Energy Act 2023](#); BEIS and DESNZ, [Energy Security Bill factsheet: Low-carbon heat scheme](#), last updated September 2023

The government has not yet introduced regulations to that effect. In March 2024, the government proposed [delaying the introduction of the clean heat market mechanism to April 2025](#). It published a consultation seeking views on the delay.⁸⁹

3.4 Concerns about progress

The CCC, the National Audit Office, and parliamentary select committees have expressed concern that energy efficiency upgrades and the uptake of low-carbon heating, such as heat pumps, are not progressing quickly enough to meet the government’s ambitions. They have argued that, at the current pace, the UK is unlikely to meet its net zero targets.⁹⁰

The CCC also said the plans the government set out in its Heat and Buildings Strategy were “not yet fully comprehensive or complete”.⁹¹ The Environmental Audit Committee called on the government to “set long-term targets [...] and not change the goalposts along the way”.⁹²

Energy efficiency upgrades

In its [2022 progress report to Parliament](#), the CCC expressed concern that the “current pace” of energy efficiency upgrades was “too slow”. It estimated that, in 2021, government schemes supported energy efficiency upgrades in over 150,000 homes. To achieve the government’s target for all homes to meet EPC band C by 2035, the CCC said that “the number of homes receiving energy efficiency upgrades needs to scale up substantially”. It said that the number of homes receiving upgrades would have to increase to 500,000 a year by 2025 and 1 million a year by 2030.⁹³

The Environmental Audit Committee also expressed concern that “overall policy is piecemeal and not delivering at the scale or pace required” in a [report on energy efficiency of existing homes](#) (March 2021).⁹⁴

In a [report on home energy improvements](#) (2021), Citizens Advice, a charity which provides advice on benefits, housing employment and consumer rights, argued that the number of schemes, codes and bodies confused consumers. Citizens Advice said it was “difficult for people to know who to trust or how to be confident about choosing providers and installers”. It said the government should establish one accreditation body for energy efficiency measures.⁹⁵

⁸⁹ DESNZ, [Clean Heat Market Mechanism: Adjustment to scheme introduction date](#), March 2024

⁹⁰ CCC, [UK housing: Fit for the future?](#), February 2019; National Audit Office, [Decarbonising home heating](#), March 2024; EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁹¹ CCC, [2022 Progress Report to Parliament](#), June 2022

⁹² EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁹³ CCC, [2022 Progress Report to Parliament](#), June 2022

⁹⁴ EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

⁹⁵ Citizens Advice, [Helping people piece together home energy improvements](#), October 2021

Heat pump installations

In its [Heat and Buildings Strategy](#) (October 2021), the government said it was aiming for at least 600,000 heat pump systems to be installed a year by 2028. It also set an ambition to reduce the cost of heat pumps by between 25% and 50% by 2025 and to ensure heat pumps are not more expensive to buy and run than gas boilers by 2030.⁹⁶

However, the CCC said that, although heat pump installations had increased, they remained “very low”. The CCC said installations would have to increase “more than tenfold over the next six years to meet government targets”.⁹⁷

Data from the Heat Pump Association, a membership organisation for heat pump installers and manufacturers, showed that around 58,000 heat pumps were sold in the UK in 2022.⁹⁸ The National Audit Office found that, between May 2022 and December 2023, around 18,900 heat pumps were installed in England and Wales using the Boiler Upgrade Scheme. The government had budgeted for up to 50,000 installations in that period.⁹⁹

The CCC, the National Audit Office and select committees have highlighted the following factors that have led to a low uptake of heat pumps:

- **Lack of awareness:** The Public Accounts Committee said consumers faced “too much complexity and confusion to make informed decisions about installing a heat pump”.¹⁰⁰ The CCC said that low uptake of heat pumps was the result of “low awareness, ... concerns around disruption and difficulty in finding trusted installers with the right skills”.¹⁰¹
- **Installation costs:** The Public Accounts Committee highlighted that “an average heat pump was four times more expensive than a gas boiler”.¹⁰² The National Audit Office said installation costs had fallen “more slowly” than the government had hoped. They would “need to fall around three times faster over the next two years” to meet the government’s target.¹⁰³
- **Running costs:** Because electricity is more expensive per unit than gas, heat pumps can be more expensive to run than gas boilers. The National Audit Office said the government had not made “the progress it planned” on reducing the running costs of heat pumps.¹⁰⁴ The Environmental Audit Committee also highlighted that policy costs, for example for retrofitting schemes, were usually added to electricity, rather than gas, bills.¹⁰⁵

⁹⁶ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

⁹⁷ CCC, [2022 Progress Report to Parliament](#), June 2022

⁹⁸ Heat Pump Association, [Statistics: Heat pump sales in the UK](#), undated [accessed 30 May 2024]

⁹⁹ National Audit Office, [Decarbonising home heating](#), March 2024

¹⁰⁰ Public Accounts Committee, [Decarbonising home heating](#) (PDF), HC 653 2023-24, May 2024

¹⁰¹ CCC, [UK housing: Fit for the future?](#), February 2019

¹⁰² Public Accounts Committee, [Decarbonising home heating](#) (PDF), HC 653 2023-24, May 2024

¹⁰³ National Audit Office, [Decarbonising home heating](#), March 2024

¹⁰⁴ National Audit Office, [Decarbonising home heating](#), March 2024

¹⁰⁵ EAC, [Energy efficiency of existing homes](#) (PDF), HC 346 2019-21, March 2021

- **Shortage of installers:** The government is on track to meet its target of 12,000 heat pump installers by 2025. However, “there will need to be 33,700 trained heat pump installers by 2028” to meet the government’s installation targets.¹⁰⁶

Role of hydrogen

In the [Heat and Buildings Strategy](#) (October 2021), the government said that it would decide on the role of hydrogen for domestic energy by 2026.¹⁰⁷

4 Proposed hydrogen trials

In the [Heat and Buildings Strategy](#) (October 2021), the government said that it would trial the use of hydrogen heating on neighbourhood and village scales by 2023 and 2025 to decide whether hydrogen had “a role in decarbonising heat”. However, all trials in England have since been cancelled or paused:

- A proposed village trial in Whitby in Cheshire would have replaced natural gas in up to 2,000 homes with hydrogen for two years. The government cancelled the trial in July 2023 following objections from residents.¹⁰⁸
- Another proposed village trial in Redcar, on Teesside, was cancelled in December 2023 due to a lack of low-carbon hydrogen supply.¹⁰⁹
- The government had also proposed a larger trial for 10,000 homes but paused the trial in May 2024. It said it would review the trial in 2026 after it decided on the role of hydrogen.¹¹⁰

There is one domestic hydrogen heating trial under development in Fife, Scotland. The government said this is expected to supply 300 homes with hydrogen “in the second half of 2024”.¹¹¹

The National Infrastructure Commission, which advises the government on infrastructure challenges, recommended that hydrogen should be “ruled out as an option” to heat homes. It highlighted that “using electricity to produce hydrogen [...] requires five to six times more electricity than using the same electricity directly in a heat pump”. The National Infrastructure Commission

¹⁰⁶ Public Accounts Committee, [Decarbonising home heating](#) (PDF), HC 653 2023-24, May 2024

¹⁰⁷ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

¹⁰⁸ [UK hydrogen heating trial ditched over residents’ concerns](#), Financial Times, 11 July 2023 [accessed 30 May 2024]

¹⁰⁹ [UK scraps hydrogen home-heating trial in Redcar](#), Financial Times, 14 December 2023 [accessed 30 May 2024]

¹¹⁰ [UK shelves plan for country’s biggest hydrogen home heating trial](#), Financial Times, 9 May 2024 [accessed 30 May 2024]

¹¹¹ DESNZ, [UK hydrogen strategy](#), last updated December 2023

recommended that the government should instead focus on heat pumps and heat networks.¹¹²

The National Audit Office expressed concern that the government's plans to test the feasibility of hydrogen had been delayed or cancelled, "meaning it will have less evidence to make decisions in 2026 on the role of hydrogen". It expressed concern "ongoing uncertainty over the role of hydrogen could slow the progress of decarbonising home heating".

The National Audit Office said that some households may be put off installing a heat pump because of uncertainty on whether hydrogen might be available in future.¹¹³ The Public Accounts Committee said that "indecision over the role of hydrogen for heating is creating uncertainty for investors".¹¹⁴

¹¹² National Infrastructure Commission, [National Infrastructure Assessment](#), October 2023

¹¹³ National Audit Office, [Decarbonising home heating](#), March 2024

¹¹⁴ Public Accounts Committee, [Decarbonising home heating](#) (PDF), HC 653 2023-24, May 2024

4 Decarbonising new homes

In a [report on the UK's housing stock](#) (2019), the Climate Change Committee (CCC) said, from 2025, “no new homes should be connected to the gas grid” and instead should have low-carbon heating systems, such as heat pumps. It also said new homes should have “ultra-high levels of energy efficiency”.¹¹⁵

The government has also said that “it is significantly cheaper and easier to install energy efficiency and low-carbon heating measures as buildings are constructed” than to retrofit them later.¹¹⁶

4.1 Requirements for new homes

Energy performance requirements for new homes are set out in building regulations. Building regulations are a devolved matter, and different requirements apply in different parts of the UK.

Across the UK, building regulations apply only at the time when a new home is built or when certain changes are made to existing homes (for example, as part of a refurbishment). This means that standards for existing homes will usually depend on when they were built. There is no requirement for existing homes to be retrofitted to comply with updated building regulations.

Generally, building regulations set standards that need to be met (such as energy performance standards) rather than how they need to be achieved (for example, by using a particular type of insulation). They do not generally prescribe which materials, technologies and methods should be used.¹¹⁷

The UK Government and the devolved administrations publish guidance to help developers and builders comply with building regulations requirements. The guidance is called [Approved Documents in England](#) and [Wales, Technical Handbook in Scotland](#) and [Technical Booklet in Northern Ireland](#). There may be other ways to meet the building regulations requirements, however, than following the examples and solutions set out in the guidance.¹¹⁸

¹¹⁵ CCC, [UK housing: Fit for the future?](#), February 2019

¹¹⁶ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

¹¹⁷ DLUHC, [Manual to the Building Regulations](#), July 2020

¹¹⁸ DLUHC and MHCLG, [Approved Documents](#), last updated May 2024; Welsh Government, [Building regulations: Approved documents](#), last updated May 2024; Scottish Government, [Building standards](#), last updated April 2024; Northern Ireland Department of Finance, [Building Regulations Technical Booklets](#), last updated June 2022

For further information about building regulations and how they are enforced, see the Library briefing, [Building regulations and safety](#) (June 2023).

England and Wales

Energy efficiency requirements for new homes in England and Wales are set out in [part 6](#) and [part L of schedule 1 of the Building Regulations 2010](#). In 2011, building regulations were devolved to the Welsh Government, and they have diverged since.¹¹⁹

Part L requires new homes to be designed and built to limit heat losses and gains through their fabric elements (such as their external walls, roof, floor, windows and doors). It also requires new homes to have energy efficient fixed building services (which include heating and hot water systems).

Part 6 sets that the energy performance of new homes should be assessed according to target rates for carbon emissions and fabric energy efficiency, as well as a primary energy rate since June 2022:

- New homes must meet a target carbon emissions rate and a target fabric energy efficiency rate. The standard assessment procedure (SAP) methodology is used to calculate these rates (for further information about the SAP, see section 2.1 of this briefing). To assess whether a new home meets its target rate, the building is compared with a ‘notional’ building which has the same size, shape and orientation as the proposed building.
- Since June 2022, new homes must also meet a target primary energy rate. It measures the energy efficiency of a property’s heating system and the energy required to produce the fuel used by a property’s heating system and to deliver it to the property.¹²⁰

5 Past policy: Zero carbon homes

In 2006, the then Labour government said that it would amend the Building Regulations to require all new homes to have net zero carbon emissions by 2016.¹²¹ This policy was called ‘zero carbon homes’. The policy was cancelled in 2015 by the then Conservative government.¹²²

For further information, see a Library briefing on [proposals for zero carbon homes and the government's decision not to proceed](#) with the scheme (May 2016).

¹¹⁹ [Welsh Ministers \(Transfer of Functions\) \(No. 2\) Order 2009](#)

¹²⁰ [Part 6](#) and [Part L of Schedule 1 of the Building Regulations 2010](#)

¹²¹ Department for Communities and Local Government (DCLG), [Building a Greener Future](#) [accessed via The National Archives], July 2007

¹²² HM Treasury and Department for Business, Innovation and Skills, [Fixing the foundations: creating a more prosperous nation](#), 10 July 2015

Scotland

Energy efficiency requirements for new homes in Scotland are set out in [section 6 of schedule 5 of the Building \(Scotland\) Regulations 2004](#).¹²³ It requires that new homes have an ‘insulation envelope’ which reduces heat loss and energy efficient heating, hot water, cooling and lighting systems.

Since April 2024, new homes in Scotland cannot be built with heating systems that cause direct emissions, such as oil and gas boilers. Instead, they must be fitted with heat pumps or connected to a heat network.¹²⁴

Northern Ireland

Energy efficiency requirements for new homes in Northern Ireland are set out in [part F of the Building Regulations \(Northern Ireland\) 2012](#). Similar to part L in England and Wales, part F requires new homes to be designed and built to limit heat gains and losses through their fabric elements and to have energy-efficient fixed building services.¹²⁵

4.2 Updates to energy efficiency requirements

The UK Government and the devolved administrations updated their building regulations in 2021 and 2022 to reduce carbon emissions from new homes and tighten fabric efficiency standards for new homes. They also intend to further update in the coming years: England and Wales in 2025, Scotland in 2024 and Northern Ireland in 2026 or 2027.

A summary of the changes made to building regulations in 2021/22 and further planned updates across the UK is provided in Table 4.

Table 4: Recent updates to energy efficiency requirements for new homes and planned further updates

	Recent updates to requirements	Planned further updates
England	Since June 2022: 31% reduction in carbon emissions compared with 2013 standards (based on an average semi-detached house).	Future Homes Standard from 2025: 75% reduction in carbon emissions compared with 2013 standards.
Wales	Since November 2022: 37% reduction in carbon emissions compared with	From 2025: 75% reduction in carbon emissions.

¹²³ [Section 6 of Schedule 5 of the Building \(Scotland\) Regulations 2004](#)

¹²⁴ [Building \(Scotland\) Amendment Regulations 2023](#); Scottish Government, [New Build Heat Standard: Factsheet](#), last updated May 2024

¹²⁵ [Part F of the Building Regulations \(Northern Ireland\) 2012](#)

	2014 standards (based on an average semi-detached house)	
Scotland	<p>Since November 2023: 32% reduction in carbon emissions compared with 2015 standards (based on an average of different houses and flats).</p> <p>Since April 2024: Oil or gas boilers that cause direct emissions are not allowed. Instead, heat pumps or heat networks.</p>	<p>By the end of 2024: Scottish equivalent to the Passivhaus standard.</p> <p>Passivhaus buildings are designed to retain heat from the sun and their occupants, so that they require very little additional heating or cooling.¹²⁶</p>
Northern Ireland	<p>Since June 2022: 40% reduction in carbon emissions compared with 2012 standards (for an average house).</p>	<p>From 2024: Install low-carbon heating in new homes and make coal and oil unviable for most new homes. Further uplift in 2026/27.</p>

England

Following a consultation, the government updated the Building Regulations 2010 in December 2021 to reduce the carbon emissions from new homes and improve their energy efficiency. The changes took effect in June 2022.¹²⁷

The government said, under the updated regulations, carbon emissions from new homes “must be around 30% lower than current [2013] standards”. This target is based on an average semi-detached house.¹²⁸

The government also tightened standards for homes’ thermal elements (such as their external walls and roof). New homes in England must now also meet a target ‘primary energy rate’. The primary energy rate measures the energy efficiency of a home’s heating system and the energy required to produce the fuel used by the heating system and deliver it to the home.

Future Homes Standard from 2025

In the [Heat and Buildings Strategy](#) (October 2021), the government said that it would introduce a ‘Future Homes Standard’ by 2025 to ensure that “new-build homes are future-proofed with low-carbon heating and high levels of energy efficiency”.¹²⁹ It [consulted on the Future Homes Standard](#) in 2019 and 2020,

¹²⁶ Energy Savings Trust, [What is Passivhaus? The gold standard in energy efficiency](#), July 2022

¹²⁷ [Building Regulations etc. \(Amendment\) \(England\) Regulations 2021](#); DLUHC, [Building \(Amendment\) Regulations 2021: Circular 01/2021](#), December 2021

¹²⁸ DLUHC, [New homes to produce nearly a third less carbon](#), December 2021; MHCLG, [The Future Homes Standard consultation impact assessment](#), October 2019

¹²⁹ DESNZ and BEIS, [Heat and buildings strategy](#), last updated March 2023

and on [its detailed specification from November 2023 to March 2024](#).¹³⁰ The changes the government proposed include:

- New homes built under the Future Homes Standard will have to deliver “significant carbon savings”. They will have carbon emissions that are 75% lower than those of homes built under 2013 standards.
- The government intends to tighten energy efficiency standards for fixed building services (which include a home’s heating and hot water system), but not its fabric elements. The government said the changes it made in 2021 were “sufficient” and that further tightening fabric energy efficiency standards would “not deliver significant gains”.
- New homes built under the Future Homes Standard will have to be ‘zero-carbon ready’, such that they will need no further retrofitting to produce zero emissions as the electricity grid decarbonises.¹³¹

The government said it would not introduce new metrics to assess the energy performance of new homes. Instead, it will continue to set target emissions rates, target fabric energy efficiency rates and target primary energy rates for new homes. However, it proposed replacing the SAP methodology with a new methodology: the [home energy model](#) (HEM).¹³² For further information about the SAP and the HEM, see section 2.3 of this briefing.

The government also said that the [Building Regulations 2010](#) will remain neutral on how energy performance standards are met, that is, they will not prescribe which materials or technologies should be used. However, the government said it expected heat pumps to become “the primary heating technology” for new homes and heat networks to become “the preferred way” to provide heating and hot water to blocks of flats:

All performance requirements are based on notional [reference] buildings with an efficient air source heat pump or a 4th generation heat network that uses air source heat pumps.

[...] we do not expect fossil fuel heating, such as gas, hybrid heat pumps and hydrogen-ready boilers, will meet these standards. The standards proposed are also unlikely to allow the installation of biofuel systems, including wood and manufactured solid fuels. New low carbon communal and district heat networks will likely be the preferred way of providing heating and hot water to blocks of flats [...].¹³³

In its consultation, the government also sought views on whether to add solar panels to the ‘notional’ building. On the one hand, the government said solar

¹³⁰ MHCLG, [Future Homes Standard: Changes to Part L and Part F of the Building Regulations for new dwellings](#), last updated January 2021; DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹³¹ MHCLG, [Future Homes Standard: Changes to Part L and Part F of the Building Regulations for new dwellings](#), last updated January 2021; DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹³² DESNZ, [Home Energy Model: Future Homes Standard assessment](#), last updated March 2024

¹³³ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

panels could decrease the energy bills and emissions from new homes. On the other hand, solar panels had high upfront costs and may not be as important to reducing emissions once the electricity grid decarbonises:

Adding solar PV [photovoltaic] panels to the notional [reference] building decreases the target emission rate and delivers higher bill savings for households. [...] However, [...], the pace of electricity grid decarbonisation means that solar PV panels make a relatively small contribution to the carbon savings of individual homes compared with the switch to low-carbon heating. [...]

As with some other low-carbon technologies, the installation of solar PV panels represents a trade-off between upfront capital costs and longer-term benefit of reduced carbon emissions and bills to occupants.¹³⁴

The government said it intended to publish the updated regulations in 2024 and that they will come into force in 2025. The government said there would be a transition period of between six and 12 months between the regulations being announced (in 2024) and coming into force (in 2025). Once the updated regulations have come into force, there would be another 12-month transition period.¹³⁵

6 Local energy efficiency standards

The [Planning and Energy Act 2008](#) gives local planning authorities in England the power to set higher energy efficiency standards for new buildings in their area than those set by building regulations. Local planning authorities can also require “a proportion of energy used in development in their area to be [...] from renewable sources”. Local planning authorities can set and enforce local energy efficiency standards through the planning system.¹³⁶

Under the [Deregulation Act 2015](#), the government can remove the power of local planning authorities to set higher energy performance standards. The government has not yet used that power.¹³⁷

In 2015, the government said local policies should not go beyond level 4 of the [Code for Sustainable Homes](#) (PDF).¹³⁸ In 2023, the government said its 2021 uplift to national energy efficiency standards and the Future Homes Standard rendered any local policies “effectively moot”. It therefore said local planning authorities should not set “local energy efficiency standards for buildings that go beyond current or planned buildings regulations”.¹³⁹

¹³⁴ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹³⁵ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹³⁶ [Planning and Energy Act 2008](#); DLUHC and MHCLG, [Climate change](#), last updated March 2019, para 12

¹³⁷ [Section 43 of the Deregulation Act 2015](#)

¹³⁸ HCWS488 [[Planning Update](#)] 25 March 2015; Department for Communities and Local Government (DLCG), [Code for Sustainable Homes: Technical Guide](#) (PDF), November 2010

¹³⁹ HCWS123 [[Planning: Local Energy Efficiency Standards](#)] 13 December 2023

In its consultation on the Future Homes Standard, the government proposed allowing local authorities to relax energy efficiency standards set out in the building regulations “where they judge that being required to fully meet the standards would be unreasonable”.¹⁴⁰

Wales

In 2022, the Welsh Government also amended the [Building Regulations 2010](#) to require new homes in Wales to have carbon emissions that are 37% lower than those of homes built under 2014 standards (based on a semi-detached home). The Welsh Government also tightened standards for the thermal elements of new homes and introduced a new target ‘primary energy rate’ for new homes. The changes came into force in November 2022.¹⁴¹

The Welsh Government intends to again update the Building Regulations 2010 in 2025. Under the update, new homes in Wales would have carbon emissions that are at least 75% lower than those of homes built under 2014 standards. The Welsh Government also said, under the update, heat pumps would “play a major role in delivering low carbon heat for homes”.¹⁴²

Scotland

Following a consultation, the Scottish Government updated the [Building \(Scotland\) Regulations 2004](#) in 2022. Under the updated regulations, new homes in Scotland must have carbon emissions that are around 32% lower than those of homes built under 2015 standards (an average across a mix of different buildings, including detached houses, terraced houses and flats). The changes took effect in November 2023.¹⁴³

In 2022, the Scottish Government also tightened energy efficiency standards for new homes’ fabric and fixed building services and introduced a ‘delivered energy target’ for new homes.¹⁴⁴

New Build Heat Standard since April 2024

Following two consultations, the Scottish Government further amended the [Building \(Scotland\) Regulations 2004](#). As of April 2024, under the [New Build Heat Standard](#), new homes cannot be built with heating systems that cause

¹⁴⁰ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹⁴¹ [Building \(Amendment\) \(Wales\) Regulations 2022](#); Welsh Government, [All new homes in Wales to be heated and powered from clean energy sources from 2025](#), January 2020; Welsh Government, [Written Statement: Energy efficiency measures for all new homes](#), March 2021

¹⁴² Welsh Government, [Building regulations Part L review](#), last updated May 2022; Welsh Government, [Building Regulations Part L and F Review: Stage 2B](#), September 2022

¹⁴³ Scottish Government, [Building regulations - new domestic buildings - modelling of proposed energy improvements: Research report](#), July 2021

¹⁴⁴ [Building \(Scotland\) Amendment Regulations 2022](#); Scottish Government, [Building Scotland \(Amendment\) Regulations 2022 - energy: Presentation](#), February 2023

direct emissions, such as oil and gas boilers. Instead, they must be fitted with heat pumps or connected to a heat network.¹⁴⁵

For further information about the New Build Heat Standard, see a [briefing by the Scottish Parliament's Information Centre](#) (October 2023).

Passivhaus standard from 2025

The Scottish Government intends to further amend the [Building \(Scotland\) Regulations 2004](#) by the end of 2024 to require new homes to be built to “a Scottish equivalent to the Passivhaus standard”. A Passivhaus is a building that is “effectively sealed against the elements” and uses as little energy as possible:

Passivhaus [...] refers to buildings created to rigorous energy efficient design standards so that they maintain an almost constant temperature.

Passivhaus buildings are so well constructed, insulated and ventilated that they retain heat from the sun and the activities of their occupants, requiring very little additional heating or cooling.¹⁴⁶

The Scottish Government has set up a working group in 2023 to “help define how an equivalent to the Passivhaus standard will look in Scotland”. The Scottish Government intends to consult on the Scottish Passivhaus standard in 2024 and publish the updated building regulations by the end of 2024.¹⁴⁷

Northern Ireland

Following a consultation in 2021, the Northern Ireland Department of Finance updated [the Building Regulations \(Northern Ireland\) 2012](#) in 2022. Under the updated regulations, new homes must now produce 40% less emissions than homes built under past (2012) standards and new flats must produce 25% less emissions. The department also raised fabric efficiency standards “to reduce heat losses and limit excessive gains”.

The Department of Finance also said, under the updated regulations, it was “likely that renewables will be used in most situations”. However, it said there was no explicit requirement for renewables. The changes took effect in June 2022.¹⁴⁸

Between July and December 2023, the Department of Finance consulted on further uplifts to the energy efficiency requirements for new homes set out in the [Building Regulations \(Northern Ireland\) 2012](#). It said it expected to make

¹⁴⁵ [Building \(Scotland\) Amendment Regulations 2023](#); Scottish Government, [New Build Heat Standard: Factsheet](#), last updated May 2024

¹⁴⁶ Energy Savings Trust, [What is Passivhaus? The gold standard in energy efficiency](#), July 2022

¹⁴⁷ Scottish Government, [Energy Standards Review – Scottish Passivhaus Equivalent: Working Group](#), undated [accessed 30 May 2024]; Scottish Government, [Energy Standards Review – Scottish Passivhaus Equivalent: Working Group - Terms of reference](#), May 2024

¹⁴⁸ NI Department of Finance, [Technical Booklet F1: Frequently asked questions](#) (PDF), May 2022; NI Department of Finance, [Awareness Briefing on 2022 Amendments to Technical Booklets Part F Conservation of fuel and power](#), 5 May 2022 [accessed 31 May 2024]

changes to the regulations in 2024 “to ensure buildings are at least future-proofed in relation to low-carbon heating” and “to make the highest carbon fuels (such as coal and oil) unviable for most new buildings”.

The Department of Finance said it planned a further uplift in 2026 or 2027. It said, under the updated regulations, it would be “unlikely that mains gas or oil connections will be viable for new buildings”.¹⁴⁹

4.3 Concerns about the Future Homes Standard

This section discusses the response to the UK Government’s proposed [Future Homes Standard](#). Although environmental groups and built environment professionals welcomed efforts to reduce carbon emissions from new homes, they expressed concern that the proposed Future Homes Standard does not go far enough.

Response to the Future Homes Standard

In its [2022 progress report to Parliament](#), the CCC expressed concern that the interim uplift to building regulations in 2021 would not “drive sufficient change in the new build sector prior to 2025”. It highlighted that new homes could still be built without low-carbon heating under the 2021 uplift, “adding to the stock of boilers which will need to be retrofitted in coming years”.¹⁵⁰

In a [report on decarbonising home heating](#) (February 2022), the Business, Energy and Industrial Strategy (BEIS) Committee also expressed concern that “homes built between now and 2025 [would have] to be upgraded to low carbon heating systems with additional and unnecessary associated costs”. It said that the Future Homes Standard should be implemented in 2023.¹⁵¹

The government said the Future Homes Standard would not come into force until 2025 because “the industry will need to develop necessary supply chains, skills and construction practices”.¹⁵²

Does the standard go far enough?

Responding to the government’s consultation on the Future Homes Standard, the Good Homes Alliance (a membership organisation for built environment

¹⁴⁹ NI Department of Finance, [Consultation on a review of energy efficiency requirements and related areas of Building Regulations](#), last updated December 2023

¹⁵⁰ CCC, [2022 Progress Report to Parliament](#), June 2022; CCC, [Letter: Future Homes Standard and proposals for tightening Part L in 2020](#), February 2020

¹⁵¹ BEIS Committee, [Decarbonising heat in homes](#) (PDF), HC 1038 2021-22, February 2022

¹⁵² BEIS, [Decarbonising heat in homes: Government Response to the Committee’s Seventh Report of 2021-22](#) (PDF), May 2022, HC 208 2022-23

professionals) said it was “a positive step” but that there should be “a further iteration [...] to ensure new buildings are of a higher specification by 2028”.¹⁵³

An industry network, UK Green Building Council (UKGBC), also said the Future Homes Standard was “a missed opportunity”. The Royal Institution of British Architects (RIBA) argued that the Future Homes Standard was “insufficient to significantly improve the performance of new homes”.

The UKGBC welcomed that low-carbon heating systems would become the default under Future Homes Standard. RIBA said the government should not rely on low-carbon heating to decarbonise the built environment and should further tighten fabric energy efficiency standards.¹⁵⁴

Concerns about lack of compliance

In a [report on the UK's housing stock](#) (2019), the CCC also expressed concern about a lack of compliance with building regulations. It said that “many new homes lose more [heat] than they should, some as much as twice the amount they are designed to”.¹⁵⁵

In its consultation on the Future Homes Standard, the government sought views on whether to encourage developers to voluntarily “collect more data about the extent to which new homes are underperforming because of poor build quality and what the most common issues are”.¹⁵⁶ The Good Homes Alliance, RIBA and the charity Centre for Sustainable Energy called for data collection on the performance of new homes to be made mandatory.¹⁵⁷

Heat pump manufacturing capacity

in its [2022 progress report to Parliament](#), the CCC said there was “a risk [that] the heat pump market does not grow fast enough to deliver around 200,000 heat pumps in new builds annually from 2028”.¹⁵⁸

In a [report commissioned by the Independent Networks Association](#) (PDF, June 2021), the consultancy EY also found that heat pump manufacturing capacity in the UK was “limited”. It said “there will have to be a significant increase in [manufacturing] capacity” in the UK to meet the demand for heat pumps “to avoid relying on global manufacturing capacity”.¹⁵⁹

¹⁵³ Good Homes Alliance, [Future Homes Standard: Consultation response](#), April 2024

¹⁵⁴ UK Green Building Council (UKGBC), [Future Homes Standard draft sets energy efficiency standards lower than many homes built today](#), December 2023; Royal Institution of British Architects (RIBA), [The proposed Future Homes and Buildings Standards: A positive step or lacking in ambition?](#), March 2024

¹⁵⁵ CCC, [UK housing: Fit for the future?](#), February 2019

¹⁵⁶ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

¹⁵⁷ Good Homes Alliance, [Future Homes Standard: Consultation response](#), April 2024; Centre for Sustainable Energy [Response to the Future Homes Standard consultation](#), March 2024

¹⁵⁸ CCC, [2022 Progress Report to Parliament](#), June 2022

¹⁵⁹ EY and Independent Networks Association, [Review of the Future Homes Standard](#) (PDF), June 2021

Operational versus embodied emissions

In a [report on the sustainability of the built environment](#) (May 2022), the Environmental Audit Committee expressed concern that “policy has focused entirely on operational emissions” and that it does not require the embodied carbon cost of construction to be assessed or controlled.¹⁶⁰

- Embodied carbon emissions are associated with the manufacture and transport of the materials used to build or refurbish a building. They also include emissions resulting from the installation and maintenance of buildings and from their demolition and disposal.
- Operational carbon emissions arise from the energy required to run a building, such as the energy used to provide heating, hot water and lighting.¹⁶¹ Building regulations set targets for operational emissions.

The Environmental Audit Committee expressed concern that “no progress has been made in reducing these [embodied] emissions”. It said the government should require “whole-life carbon assessments for buildings” and set “carbon targets” for buildings.¹⁶² In a [report on the UK’s housing stock](#) (2019), the CCC also said the government should aim to reduce “the whole-life carbon impact of new homes, including embodied [...] carbon”.¹⁶³

In response to the Environmental Audit Committee’s report, the government recognised that “embodied carbon can account for a significant proportion of a building’s whole life carbon emissions”. It also agreed that “a standardised method” was required “to consistently assess embodied carbon at a building-level”. The government said it would consult on embodied carbon in 2023.¹⁶⁴

In its consultation on the Future Homes Standard (November 2023 to March 2024), the government said it would consult on how to measure and reduce embodied carbon “in due course”.¹⁶⁵ It has not yet published a consultation.

¹⁶⁰ EAC, [Building to net zero: Costing carbon in construction](#) (PDF), HC 103 2022-23, May 2022

¹⁶¹ UKGBC, [Operational & Embodied Carbon: Explainer Guide](#) (PDF), February 2023; Institution of Structural Engineers, [Carbon: embodied and operational emissions](#), undated [accessed 30 May 2024]

¹⁶² EAC, [Building to net zero: Costing carbon in construction](#) (PDF), HC 103 2022-23, May 2022

¹⁶³ CCC, [UK housing: Fit for the future?](#), February 2019

¹⁶⁴ BEIS, DfT, DLUHC, DfE, Defra, HMT and IPA, [Building to net zero: costing carbon in construction: Government Response to the Committee’s First Report](#) (PDF), HC 643 2022-23, September 2022

¹⁶⁵ DLUHC, [Future Homes and Buildings Standards: 2023 consultation](#), last updated March 2024

5 Further reading

5.1 Library briefings and POST notes

- Commons Library, [Help with energy efficiency, heating and renewable energy in homes](#), January 2024
- Commons Library, [Households off the gas-grid and prices for alternative fuels](#), January 2024
- Commons Library, [The UK's plans and progress to reach net zero by 2050](#), November 2023
- Commons Library, [Heat networks and energy prices](#), April 2022

Parliamentary Office of Science and Technology (POST)

- Parliamentary Office of Science and Technology (POST), [Heat pumps](#), July 2023
- POST, [Reducing the whole life carbon impact of buildings](#), November 2021
- POST, [Environmental housing standards](#), September 2021
- POST, [Low-carbon hydrogen supply](#), June 2021
- POST, [Heat networks](#), September 2020

5.2 Committee reports

- Public Accounts Committee, [Decarbonising home heating](#), May 2024
- Environmental Audit Committee, [Sustainability of the built environment](#), May 2022
- Environmental Audit Committee, [Energy Efficiency of Existing Homes](#), March 2021

5.3

Other reports

- National Audit Office, [Decarbonising home heating](#), March 2024
- Climate Change Committee (CCC), [2023 Progress Report to Parliament](#), June 2023
- CCC, [2022 Progress Report to Parliament](#), June 2022
- CCC, [Independent Assessment: The UK's Heat and Buildings Strategy](#), March 2022
- CCC, [UK housing: Fit for the future?](#), February 2019

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