

# Energy efficiency of housing in England and Wales QMI

Quality and Methodology Information for energy efficiency of housing estimates for England and Wales, detailing the strengths and limitations of the data, methods used, and data uses and users.

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# 1 . Output information

- National Statistic: No
- Data sources: Energy Performance Certificates (EPC) downloaded from Open Communities website and Valuation Office Agency (VOA) Property Attributes
- Frequency: Annual
- How compiled: Administrative
- Geographic coverage: Country, region, local authority and Middle Layer Super Output Area (MSOA) level in England and Wales
- Related publications: [Energy efficiency of housing in England and Wales](#)
- Last revised: October 2022

## 2 . About this Quality and Methodology Information

This quality and methodology information report contains information on the quality characteristics of the data, as well as the methods used to create it.

The information in this report will help you to:

- understand the strengths and limitations of the data
- learn about existing uses and users of the data
- understand the methods used to create the data
- help you to decide suitable uses for the data
- reduce the risk of misusing data

## 3 . Important points

- The Energy Efficiency of Housing publication and datasets are derived from Energy Performance Certificates (EPCs); since 2007 these have been required when a dwelling is sold, rented, constructed, or converted.
- As EPCs are only required for specific reasons, our statistics do not cover all dwellings in England and Wales.
- We quality assure property attributes on the EPC data with Valuation Office Agency (VOA) Property Attributes data at the address level and exclude records which are not consistent across sources.
- EPCs represent a snapshot of the energy efficiency features of a dwelling at the time of the assessment and do not necessarily reflect energy efficiency improvements that have been made since an EPC assessment was conducted.
- Dwellings can have more than one EPC, but we only keep the latest record for our analysis in any time period, so dwellings are not double counted.

## 4 . Quality summary

In this publication, we produce statistics that provide insight on the energy efficiency, estimated carbon dioxide emissions and the main type of fuel used in the central heating system. We explore these in relation to housing variables such as new (newly constructed or converted) and existing dwellings, by property type, property age band and tenure.

Since legislation was introduced in 2007, an Energy Performance Certificate (EPC) is required when dwellings are bought or sold, rented, constructed, or converted, if the dwelling had no EPC or this was expired. They are issued by trained energy efficiency assessors using the [Standard Assessment Procedure](#) (SAP) for new dwellings and Reduced data Standard Assessment Procedure (RdSAP) for existing dwellings. EPCs are valid for 10 years, so in our analysis we exclude “expired” records, except for in our five year overlapping time series data.

To increase confidence in the statistics we produce, we apply quality assurance checks and filtering to the EPCs that are available on the [Open Communities website](#) provided by the Department for Levelling Up, Housing and Communities (DLUHC).

We link the EPC data to Property Attributes data provided by the Valuation Office Agency (VOA) at the dwelling level, to verify each EPC record using several variables. These include the Unique Property Reference Number (UPRN) to check if the dwelling still exists, property type (for example, detached, semi-detached and so on) and property age band. We exclude records that have contrasting information across the datasets. If an EPC has missing information on property type or property age, we impute this information from the VOA data for the dwelling.

We provide these statistics for a range of geographies for England and Wales, including country, region, local authority and Middle Layer Super Output Areas (MSOA) where possible. Typically, median scores or percentage breakdowns are provided, but more detailed breakdowns are not available for all small geographic areas. Areas which have less than five records for any category are suppressed.

This annual publication provides detailed statistics at a local level to provide evidence to central government, local authorities, housing groups and communities to gain an overall picture of energy efficiency in their area. These data can be used to inform policy and highlight the types of dwellings that require improvements to gain a good standard of energy efficiency.

### Uses and users

The main users of our energy efficiency of housing statistics have been identified as:

- central government: monitoring housing trends, to understand the patterns associated with energy efficiency of housing at national, regional, and local level
- local government: monitoring trends and highlighting patterns in energy efficiency in their local authorities, which can inform housing policies being set in each area
- academia: monitoring trends and highlighting patterns in energy efficiency for international comparisons
- energy industry specialists: these include organisations that are involved in activities to do with improving energy efficiency in domestic properties
- housing industry specialists: these include organisations such as large estate agents seeking information on subnational housing trends
- housing bodies: these include organisations such as the Home Builders Federation and charities that carry out secondary analyses of official housing statistics

## **Strengths and limitations**

### **The main strengths of the energy efficiency of housing statistics**

These estimates provide users with a valuable insight into energy efficiency trends, as they provide a high level of detail at various geographies and by various housing variables. This allows a variety of users to gain a substantial understanding of the EPC data for England and Wales.

Our data make use of VOA Property Attributes, which we link to EPC data at the dwelling level, to provide quality assurance steps to our method. Although the quality assurance results in a smaller dataset (as EPC records are removed when inconsistencies between sources are found) it means that we can have a higher degree of confidence about the trends identified by analysis of these records.

### **The main limitations of the energy efficiency of housing statistics**

The underlying EPC data do not cover all dwellings in England and Wales because not every dwelling has had an energy efficiency assessment (these are only required when a dwelling is constructed, converted, sold or let). As such, we do not have a complete picture of the energy efficiency of the entire dwelling stock in England and Wales, and so the patterns we can identify may not be wholly representative.

Although EPCs are a rich source of data detailing how energy efficient dwellings are, a disadvantage is that they only represent a snapshot of the energy efficiency features of a dwelling at that moment in time. As such, they do not necessarily reflect energy efficiency improvements that may have been made since an EPC assessment was conducted. This also extends to tenure, as some properties may have changed tenure since the EPC assessment, such as moving from social rented to owner occupied.

## **5 . Quality characteristics of the energy efficiency of housing statistics**

This section provides a range of information that describes the quality of the data and details any points that should be noted when using these statistics.

## Relevance

Energy efficiency of housing statistics are produced in response to demand for aggregated energy efficiency data at various levels of granularity and across different housing variables.

We produce these statistics to provide more information on energy efficiency trends at a range of geographies and broken down by various housing variables. When using these data, it is important to consider what the data reflect. EPC data are based on the energy efficiency features of a dwelling such as double glazing. If the user is interested in actual domestic energy usage, then there are other sources available such as the [domestic consumption data published as part of the National Energy Efficiency Data Framework](#) by the Department for Business, Energy and Industrial Strategy (BEIS).

## Accuracy and reliability

It is important to note that Energy Performance Certificate (EPC) (Standard Assessment Procedure (SAP) scores) are calculated using a standardised methodology based on the features of a dwelling that influence its energy efficiency and do not reflect actual energy usage. The accuracy of information provided on an EPC is reliant on the assessor carrying out the assessment.

EPCs provide a snapshot of the energy efficiency features of that dwelling at the point of assessment. There is no obligation for a new EPC to be obtained if the dwelling has had energy efficiency improvements, so EPCs may not necessarily accurately portray the current energy efficiency of any given dwelling.

EPC records which are no longer valid are excluded, for example, the inspection date was more than ten years before our latest data point. We analyse all other lodgements over the last ten years, to analyse a large representation of the dwelling stock. Data are also produced for five year periods. This allows a time series to be created, but also has a large enough sample to avoid biases in the types of properties that have transacted in an area for a smaller time period.

## Coherence and comparability

Our statistics are published with the intention of complementing the Department for Levelling Up, Housing and Communities' (DLUHC's) [quarterly statistics on EPCs](#) as these releases focus on the EPCs themselves rather than analysing the results of the EPCs.

[Raw data on EPC certificates](#) are made publicly available on the EPC register for England and Wales since 2008. Management [information from the Scottish EPC Register](#) are made publicly available for EPC certificates from 2012 onwards, but only includes one record per dwellings. No information on EPC certificates is published for Northern Ireland currently.

## Housing conditions surveys

Each of the four UK countries runs a household survey that collects data on the energy efficiency (among other aspects) of their housing stock.

The [English Housing Survey](#) (EHS) is commissioned by the Department for Levelling Up, Housing and Communities (DLUHC). The EHS is based off a randomised sample of dwellings and so is well placed for tracking trends over time.

The [Welsh Housing Conditions Survey](#) (WHCS) is run by the Welsh Government. The latest survey year for Wales is 2017 to 2018.

The [Scottish house condition survey](#) is managed by Scottish Government. This is the primary source of data at a national level on the energy efficiency of the Scottish housing stock.

The [Northern Ireland House Condition Survey](#) (NIHCS) is run by the Northern Ireland Housing Executive. The latest survey year for Northern Ireland is 2016.

## Accessibility and clarity

Our recommended format for accessible content is a combination of HTML web pages for narrative, charts and graphs, with data being provided in usable formats such as Excel. Our website also offers users the option to download the narrative in PDF format. In some instances, other software may be used, or may be available on request. Available formats for content published on our website but not produced by us, or referenced on our website but stored elsewhere, may vary. For further information, please contact us by email at: [better.info@ons.gov.uk](mailto:better.info@ons.gov.uk).

For information regarding conditions of access to data, please refer to [our terms and conditions \(for data on the website\)](#) and [accessibility webpage](#).

In addition to this quality and methodology information report, basic quality information relevant to each release is available in the Data sources and quality section of the relevant article.

## Timeliness and punctuality

The Energy Performance of Buildings Data published by DLUHC on the Open Communities website is downloaded around two to four times per year. Once data for the latest full financial year are available, we attempt to release these statistics as soon as possible.

For more details on related releases, the [GOV.UK release calendar](#) provides 12 months advance notice of release dates. In the unlikely event of a change to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the [Code of Practice for Statistics](#).

## Why you can trust our data

The Office for National Statistics (ONS) is the UK's largest independent producer of statistics and its national statistics institute. The [Data Policies and Information Charter](#), available on the ONS website, details how data are collected, secured and used in the publication of statistics. We treat the data that we hold with respect, keeping it secure and confidential, and we use statistical methods that are professional, ethical, and transparent.

# 6 . Methods used to produce the energy efficiency of housing estimates

## Main data sources

The data used to produce the Energy Efficiency of Housing estimates are provided by the Department for Levelling Up, Housing and Communities (DLUHC) and the Valuation Office Agency (VOA).

## Energy Performance Certificate (EPC) data

Our [Energy efficiency of housing article](#) contains analysis of important variables in the EPC data downloaded from the [Department for Levelling up, Housing and Communities \(DLUHC\) Open Data Communities website](#), for England and Wales. To produce our statistics, we download a copy of all EPCs in the register, which is then run through the Office for National Statistics (ONS) Address Index Matching Service (AIMS), which assigns a Unique Property Reference Number (UPRN) to properties using the address string in the raw data. Quality assurance and deduplication techniques are then applied to ensure the records we include in our analysis are high quality.

## Property Attributes data

To quality check the EPC records used for analysis, EPC data were linked to VOA Property Attributes data at the address level using UPRNs which have been applied through AIMS. This enabled cross-reference checks that could guarantee that the dwelling with an EPC record still existed, and that there was consistent property information (property type and age of property band) across both data sources.

We excluded records that had a direct contradiction between data sources on these property variables from the analysis. Where information in the EPC record was missing (property age or property type) we inputted the information from the VOA dataset.

## How we produce the estimates

First the EPC and VOA Property Attributes data are run through the ONS AIMS, by using address strings to apply a UPRN. The UPRN is used to link property variables from the VOA data onto the EPC data at the address level.

All EPC records that cannot have a UPRN applied are excluded. Also excluded are those that do not have a match to VOA data, which flags the dwelling no longer exists, for example, it has been demolished or converted. Data are checked to ensure we do not include any records with implausible values on important variables, such as having a negative or extremely high energy efficiency score which would not fit into an energy efficiency rating band.

Information on property type and property age band are available in both EPC and VOA datasets but are recoded to be consistent response categories. These are detached, semi-detached, terraces and flats and maisonettes for property type, and pre 1930, 1930 to 1982, 1983 to 2011 and 2012 onwards for property age band. To improve the confidence in the estimates we produce, we quality check these variables by comparing across sources. EPC records which have direct contradictions to VOA data on these two variables are excluded.

There are a small number of records which are duplicated on a number of variables including UPRN, inspection date and energy efficiency score, so we only retain one of these records. There are also records where there are more than one EPC record for a UPRN on the same inspection date, but differing energy efficiency scores. This can happen when the dwelling goes through energy efficiency improvements through a scheme such as Energy Company Obligation (ECO). We retain the record with the highest energy efficiency score, as an EPC assessment is needed before and after the improvements.

The EPC data are presented in two ways for the publication, with each having slightly different filtering methods after this point.

1. Analysis of the stock of dwellings with a valid EPC up to the latest financial year available in the data. For this, we exclude any EPC records that are no longer valid and only retain records inspected in the latest ten years. Deduplication occurs by UPRN to only keep the latest lodgement available for each dwelling.
2. Five year overlapping time series data. For this we group the EPC records into overlapping five-year time periods starting from April 2008 to March 2012. Only the latest record for each dwelling is included in each five-year group, but that dwelling could appear in more than one five-year group.

## How we analyse and interpret the data

Analysis in the energy efficiency of housing article largely focuses on national and regional level trends across different tenure and property types, with some subnational estimates included alongside an interactive map. We aggregate these records to produce median values for energy efficiency, carbon dioxide (CO<sub>2</sub>) emissions (tonnes per year), and a percentage breakdown of the main fuel type used or method of central heating. These are also broken down for new and existing dwellings, property type, tenure and property age band where possible.

The percentage of dwellings with an energy efficiency score in each Band from A to G, as well as the percentage of dwellings that have a score in Band C or above, are also available in the statistics. The UK government has set a goal for fuel-poor homes (households where the cost of heating is high relative to income) in England to reach a rating of C or higher by 2030 (where reasonable). This contributes to the UK-wide [net zero 2050 target](#). [The Welsh Government are currently consulting on plans for the Warm Homes Programme](#) to bring homes rated F or G to Band D, and homes in Band D or E to Band C.

Data on “valid EPCs up to the latest financial year ending” data can be used to get analysis that covers a larger representation of the dwelling stock, and see how the current picture is based on the latest EPC records for each property. Data on “five rolling year periods” have a lower representation of the entire dwelling stock, but can be used as time series data.

## How we quality assure and validate the data

Rigorous quality assurance is carried out at all stages of the data production process. Specific procedures include:

- the input data sources have quality assurance processes in place before being published
- code that filters and processes the raw EPC certificates is quality assured
- output tables are checked to ensure there are no errors or inaccuracies by comparing them to the raw data
- thoroughly checking the data input into charts, tables and in the text of the article are consistent with the data in the main datasets

## How we disseminate the data

Energy efficiency of housing data can be downloaded free of charge in Microsoft Excel format. An article accompanies each publication. The underlying data for the charts and tables in the article can be downloaded. The [GOV.UK release calendar](#) clearly provides the release date and location of each new set of subnational tenure housing affordability publications.

Any additional enquiries regarding these energy efficiency of housing statistics can be made by emailing [better.info@ons.gov.uk](mailto:better.info@ons.gov.uk).

## 7 . Useful links

### [Energy Performance of Buildings Certificates](#)

Collection | Last updated 28 July 2022

The Department of Levelling Up, Housing and Communities (DLUHC) publish quarterly Energy Performance Certificate (EPC) statistical releases. These focus EPCs themselves, presenting timely information for domestic and non-domestic buildings in England and Wales.

### [Welsh Housing Conditions Survey \(energy efficiency of dwellings\)](#)

Statistics | Released 23 October 2021

The Welsh Government also provides analysis on the energy efficiency of dwellings in Wales, based on data from the [Welsh Housing Conditions Survey](#).

### [Scottish house condition survey](#)

Statistics | Released 1 December 2020

The Scottish house condition survey contains statistics on energy efficiency, based on an annual survey sample of around 3,000 dwellings. This is the primary source of data at a national level on the energy efficiency of the Scottish housing stock.

### [Northern Ireland Housing Statistics](#)

Report | Last updated 9 December 2021

The Northern Ireland Housing Statistics report contains information and statistics relating to domestic energy and energy efficiency of homes in Northern Ireland.

### [Energy Efficiency of Housing, England and Wales: 2022](#)

Article | Released 25 October 2022

Analysis of the energy efficiency estimated carbon dioxide emissions of dwellings in England and Wales with an Energy Performance Certificate.

### [UK Climate Change Statistics Portal](#)

Statistics Dashboard | Updated regularly

A prototype portal for data and insights on climate change.



## 8 . Cite this QMI

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