



INSIGHT

Energy Performance Certificates: enabling the home energy transition



Introduction

Energy Performance Certificates have become central to the way we demonstrate and discuss the energy efficiency of our homes. The EPC system now needs to evolve to effectively support the transition of our homes to net zero.

Energy Performance Certificates (EPCs) were first introduced to inform home purchase or renting decisions and to provide simple energy efficiency recommendations. But EPCs now have much wider applications – as well as providing consumer advice and information, they are used in delivering retrofit programmes, regulations, and financing.

EPCs need to evolve to meet the multiple applications they are now put to, and to be able to provide the advice and information for the net zero transformation in home energy technologies. Consumer trust in the certificates is key.

The core purposes of EPCs are well established. UK government aims for EPCs to provide a trusted, accurate and reliable measure of a building's energy performance; engage consumers and support action to reduce energy use in buildings; and enable consumers and third parties to access the data they need to make decisions. (*Improving Energy Performance Certificates for Buildings Action Plan*, BEIS/MHCLG 2020).¹

At the heart of the EPC system is the official Standard Assessment Procedure (SAP) methodology which is used to generate the energy and carbon performance data on the certificate, based on information collected about the home.

Government plans here are clear: a wholly revised and updated national Home Energy Model, designed to be ready for net zero, is under development. The government is due to consult later this year on how the Home Energy Model will be used for EPCs.

This report summarises the plans for the Home Energy Model. It also gives BRE's view on policy directions for the wider components of the EPC system for existing homes – the information provided to homeowners and other users, the processes of producing certificates and the data produced from the certificates.

A major transition in home energy is required for the UK to meet the legally binding target of net zero emissions by 2050, and a 78% reduction in carbon emissions (against 1990 levels) by 2035. In homes, installation of heat pumps, smart and flexible energy technologies and higher levels of insulation will all play a key part in meeting this target. With some policy reforms, EPCs can be a powerful, trusted tool to enable homeowners, government and a rapidly growing retrofit industry to deliver the low carbon transformation of our homes.

Components of the EPC system

- The official SAP (Standard Assessment Procedure) methodology which is used to generate the energy performance data on the certificate, based on information about the home. For existing homes, the Reduced Data SAP (RdSAP) version of the methodology is used.
- The processes to generate an EPC certificate for existing homes, involving an assessor visiting a home, conducting a survey, and lodging the data with the EPC Register. Private EPC accreditation scheme companies mainly manage these processes.
- The required format – the regulated, and largely automated, design and presentation of the Certificate.
- The energy performance ratings and list of recommended improvements that are presented on the certificate. These are generated through the SAP model using data collected by the assessor about the home.
- The data from the certificates that sits in an official EPC register.
- The management and oversight of the EPC system by government.

1. [Improving Energy Performance Certificates for Buildings Action Plan, BEIS/MHCLG 2020](#)

“EPCs will evolve to reflect new net zero-ready energy technologies in our homes.”



Summary of recommendations

A net zero ready EPC will work better for a wide range of users and consider the full range of home energy technologies needed to meet net zero. The EPC system can be improved to build value and trust.

Recommendations

Metrics and Applications

- Around 30% of the public know, or “have a sense of,” the EPC rating of their home. Five percent of people have acted on the recommendations of the EPC. ² The EPC needs to become a more widely recognised and highly trusted part of the journey to net zero for all households, providing a comparative measure of homes’ energy performance and a first assessment of potential improvements.
- Reform the headline metrics provided by the Energy Performance Certificate. Currently, the headline rating is based on the cost to heat and light a home. This remains important, and there are different options for additional metrics - a stable measure of energy efficiency is key. Discussion on possible metrics for the EPC have focused on the policy needs and technical considerations. The next step is to consider user – particularly homeowner - perspectives.
- Maximise the value of EPC data to plan interventions, programmes, and policies. Local authorities will play a key role in the transition of their communities to net zero. Government should work with councils to enable full use of EPC data.

Improving quality, trust and reach

- Unlock the full power of data collected in the EPC assessment. Policy reform could enable access to more of the data on the EPC register, which can inform more detailed advice to households and understanding of English and Welsh homes.

- EPCs need to be up to date. With the pace of change in our homes, and planned switch to renewable heating systems over the next decade, the current ten-year lifespan is too long for the certificates: a five-year validity should be considered.
- All households need access to EPCs. Currently, 40% of homes do not have EPCs.³ These homes are likely to be more energy inefficient. To unlock the advice and support that a net zero-ready EPC can provide, consideration could be given to a provisional EPC for all homes.
- Using the latest digital technology, there is potential for the data on the certificates to be used in a more dynamic way to provide the information that homeowners and other users will need for them to take action to improve homes’ energy performance. Advanced analysis of patterns in EPC data can be used to identify areas for EPC process improvements.

Skills and training

- Domestic Energy Assessors are the face and frontline of the EPC system and play a key role in ensuring accurate, high quality EPCs. Strengthened qualification, training and continuous professional development requirements for DEAs should be considered. A foundation course to enter DEA training could be required for people without prior knowledge or experience of housing/building construction.

2. [Public Attitudes Tracker: Heat and Energy in the Home](#) BEIS, Winter 2022

3. [Energy Performance of Buildings Certificates Statistical Release: January to March 2023](#) England and Wales, UK Government, 2023

Metrics and applications

Reform of metrics on the EPC

Currently, the headline EPC rating is the Energy Efficiency Rating (EER). This is an energy cost rating - an indicator of the comparative cost to heat and light the home relative to other homes of the same floor area. The EPC recommends improvements that can deliver a better EER. An Environmental Impact Rating (EIR) is also provided on the certificate as a secondary rating based on a calculation of carbon emissions associated with energy use in the home.

While a cost-based metric must remain on the EPC given the importance of reducing energy bills and tackling fuel poverty, the use of the EER as the headline rating now poses challenges.

Both the current EER (cost) and EIR (carbon) ratings depend on cost and carbon factors which can vary significantly over time and are not in the control of the homeowner.

A focus of an EPC headline metric needs to be on reducing demand, through a stable energy efficiency metric. As part of its extensive research and development work in this area, BRE has carried out an assessment of different potential energy efficiency metrics for Scottish Government.⁴ This considered options including a Fabric Energy Efficiency Standard (as used in new build building regulations) and metrics based on a Heat Loss Parameter, Useful Energy or Delivered Energy. Whichever metrics are chosen, a policy aim needs to be to encourage householders to take action on insulation alongside heat decarbonisation.

Smart & flexible energy use

Beyond energy efficiency, a consideration for the future EPC will be to report on flexibility as the grid is increasingly decarbonised and consumer outcomes and peak load management become more important. An evolution of the EPC could see a smart energy metric that would reflect the home's capacity to use energy flexibly. This metric would report on the combined performance of installed home technologies such as energy storage, controls and PV panels. The European Commission has supported extensive research into a Smart Readiness Indicator and stakeholders in the UK have also promoted this idea.⁵

The user perspective

Currently, discussion on possible metrics for the EPC have focused on the policy needs and technical considerations. The vital next step is to consider user – particularly homeowner - perspectives. Extensive qualitative and quantitative research is needed to identify how consumers understand and respond to different indicators and what supporting information and advice consumers will need.

4. BRE Report: Development work relating to a potential new metric for Scottish Energy Performance Certificates, Scottish Government 2023

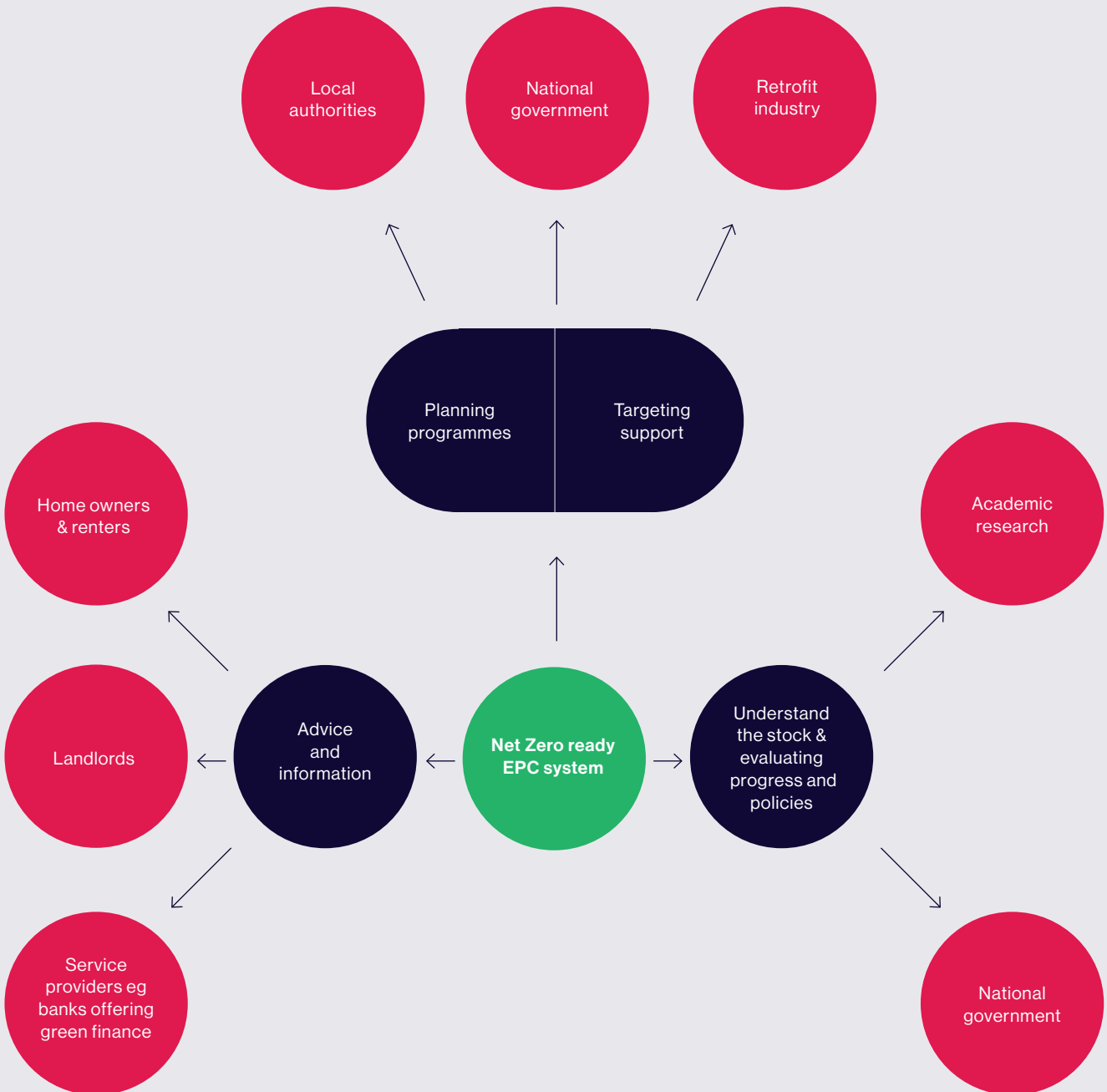
5. The 'Smart Building Rating': A Digital Tool To Scale Demand Flexibility Centre for Net Zero, Energy System Catapult, 2023

Allowing stakeholders to maximise the value of EPC data

Since the EPC was introduced, a wide range of users have benefited from the data on the certificates. For government, the use of EPCs has increased steadily and the certificates or ratings are now a component of nearly all policies for energy efficiency. EPCs already play a vital role in policy evaluation, and this will be strengthened using new metrics on the certificates – allowing tracking of progress to key policy objectives.

Local authorities are central to the low carbon transition, and make multiple uses of the EPC system, in monitoring the stock in their community and in targeting action on homes to support energy efficiency upgrades. A priority for the government should be to work with councils to maximise and share best practice in using EPC data.

Data and Insight from the EPC system supports multiple users to act on the energy performance of homes



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Improving quality, trust, and reach

Validity of the certificates – making sure certificates are up to date

Energy Performance Certificates are currently valid for ten years, meaning someone renting or buying a home may be supplied a certificate that was originally issued (usually in the context of an earlier sale or rental) up to a decade ago. There is a compelling argument for more regular updates of the certificates to ensure that homeowners, occupiers, and other EPC users have up-to-date information on the current condition of the home. Homes are changing rapidly: in 10 years the percentage of homes banded EPC “C” and above has gone from 16% to 48%.⁶ The rate of change is likely to increase over the next decade: for example, DESNZ plans for 600,000 home heat pump installations per year by 2028. Scotland has consulted on an EPC validity of five years,⁷ and this should be considered for England and Wales. Such consideration will need to factor in the availability of assessors to complete a higher number of assessments and may require a focus on building capacity in the market.

An EPC for every home: ensuring EPCs reach the homes that need them most

Around 40% of homes do not have an EPC⁸ and these properties are more likely to be energy inefficient. EPCs have been required at point of sale and rental of homes since 2008.

English Housing Survey data from 2019-20 shows that homeowners who have lived in their homes for over twenty years - and are therefore unlikely to have an EPC - are a third more likely to have a property that would be rated below EPC “C” than people who have lived in homes for a shorter period.⁹ Given the urgency of retrofit action to meet net zero, a provisional EPC could potentially be officially generated for all homes in England and Wales. In the Netherlands, from 2015 to 2020, “simplified energy labels” used information from official databases to provide provisional energy ratings, which the homeowner could then review and update.¹⁰ Provisional EPCs would not substitute for full certificates based on in-home assessments but could be a tool for engaging homeowners, and to help unlock access to some EPC-based advice, services, and support.

40%

Homes currently do not have EPC

1/3rd

More likely to have property rated below ‘C’ if lived in for 20 years

6. [English Housing Survey, 2021-2022](#)

7. [Energy Performance Certificate reform consultation, Scottish Government, 2023](#)

8. [Energy Performance of Buildings Certificates Statistical Release: January to March 2023 England and Wales, UK Government, 2023](#)

EPCs cover around 60% of the housing stock in England and just less than 60% in Wales

9. The problem is particularly acute for the very least efficient homes. Owner occupier homes that have not to have not changed resident for over twenty years are three times more likely to be in the lowest EPC F&G bands than other owner-occupied homes [Annex Table 4.8 English Housing Survey, Home Ownership Report, 2019-20](#)

10. In one awareness campaign, 4.5 million home owners that did not have an EPC received a letter with a temporary energy label for their home.

[Implementation of the EPBD in The Netherlands, CA-EPBD, 2018](#)

The home owner interface for EPCs

Just 5% of people report taking action on energy efficiency based on the information provided by EPCs. To increase the value of the EPC for householder and homeowner users, an integrated online service could enable an easier customer journey from the EPC information to advice and support on taking action.

A strengthened online service can provide both the official certificate data, with a set of metrics of performance, based on the asset-rating, standardised, assessment of the home. Accompanying, clear information should explain and illustrate what each of the metrics mean. The web-based interface can then link seamlessly to advice on how homeowners can act on recommended measures, with tools and services that enable households to personalise their information and recommendations based on their profile, behaviour, and energy use. This can build from, and link to, recent government action to strengthen home energy advice both centrally, online and via local advice services.

The EPC Register

EPCs and their underlying data are lodged on the Energy Performance of Buildings Register. All the input data into the SAP software are retained on the register. Partial public access to the data has been made available via the EPC OpenData service.¹¹

Homeowners can opt out of their EPC data being made publicly available from the register.

With regulatory reform, there could be potential for more of the data in the EPC register to be made available with appropriate privacy protections.

Survey data for EPC is costly to collect and making full use of the data in the register could enable a wide range of services, for example pinpointing the best energy efficiency improvements in hard-to-treat properties and targeting specific measures for government programmes.

Homeowners could be put in control of the data from their EPC survey in a comparable way to smart meter data. For smart meters, there is a government regulated system of data management, allowing homeowners to provide consent for third party service providers to access data.¹² Applying such an approach to detailed EPC data, homeowners could – for example – share their data with providers of more advanced retrofit planning and support tools.

Quality assurance of EPCs

Smart auditing of EPCs has been adopted in England and Wales – this uses automated reviews of EPCs to identify where lodged certificates are more at risk of being inaccurate.

There is potential for greater use of smart auditing, especially using rapidly evolving AI and machine learning. In Denmark smart auditing of the EPC register is being used to identify where EPCs seem likely to be returning erroneous values (based on wider data on the building stock) and therefore areas where assessors need more training and/or where other problems in the EPC system need to be addressed.¹³

11. [Energy Performance of Buildings Data England and Wales \(opendatacommunities.org\)](https://opendatacommunities.org/).

12. [Smart meter data access and privacy | Smart Energy GB](#)

13. [Description of Methodologies and Concepts for the Technical Implementation of Features on Improved Handling and Use of EPC Data In Selected Countries - EPC Databases Xtendo Project, 2022](#)

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Skills and Training

Domestic energy assessors

At the heart of the EPC assessment process is a trained domestic energy assessor (DEA) visiting the home, taking measurements, and collecting information on the building and the installed energy measures, such as insulation and the heating system. For the homeowner, the assessor is the face of the EPC system, and the assessor plays a central part in ensuring that EPCs are accurate through their data collection.

BRE suggests that the training, qualification and professional development requirements of domestic energy assessors could be reviewed, to build trust and confidence in the system and ensure that assessors are ready for the net zero transition of our housing stock.

There are currently no formal entry requirements to train as a Domestic Energy Assessor in England. The training requires from around 5 days of classroom or online learning, with a demonstration of practical competence in carrying out assessments. Working DEAs are required to receive ongoing continuous professional development of 10 hours structured or unstructured learning per year with accreditation schemes setting different requirements that may go beyond this minimum.

A net zero ready EPC will potentially require a more complex assessment, as low carbon and flexible energy technologies become more prevalent. The certificates will play a role in the transition of millions of homes to renewable heating. Experienced assessors themselves are keen for greater recognition of the skills needed for an effective assessment.¹⁴

In other European countries, EPC assessors are required to have a level of training before becoming qualified DEAs. For example, Portuguese EPC assessors need to be qualified engineers or architects.¹⁵ In Ireland, EPC assessors must have completed an

NVQ Level 6 in Construction (a degree equivalent qualification) or have equivalent professional experience, before training to become assessors.¹⁶

Working Irish EPC assessors should complete 20 hours of CPD each year of which 10 hours needs to be formal, structured learning.¹⁷ In Denmark a mandatory refresher course is required for working EPC assessors, with an examination, every three years.¹⁸

A review of training and professional development requirements for DEAs in England and Wales could consider:

- Entry requirements for training to become a Domestic Energy Assessor. For people without a prior relevant qualification or a period of professional experience in a related profession (as can currently be recognised in DEA training), a foundation course for DEA training could be required. A foundation course could provide key underpinning knowledge, particularly focusing on building construction. This would then lead into the DEA course which focuses more on the process of producing EPCs.
- A review and update of the National Occupational Standards for domestic energy assessors to ensure these standards provide a robust framework for a potentially more complex assessment process.
- A more advanced/additional domestic sector DEA training module. This could focus on more complex house types – e.g. historic or non-traditional house types.
- A strengthening of CPD requirements - with part of the minimum requirement to be formal learning, as in Ireland. A strengthened CPD requirement would support the roll-out of new skills and knowledge, for example covering new low carbon technologies in homes or additional training in areas where common errors or variability in EPC assessments are identified.

14. [Gledhill, T., Swan, W. and Fitton, R. \(2023\), "A practitioner study into the variability of UK domestic energy assessments", International Journal of Building Pathology and Adaptation.](#)

15. [ADENE \(Portuguese national energy agency\) Perito Qualificado I \(Level I qualified expert\)](#)

16. [Pre-Qualification Criteria, SEAI \(Irish national energy agency\)](#)

17. [BER Assessor CPD policy, SEAI](#)

18. [Energy Consultant – Refreshment, Copenhagen Business Academy](#)

A calculation methodology ready for net zero: SAP and the new Home Energy Model

The government has proposed that SAP and RdSAP will be replaced by the new, net zero ready Home Energy Model for the production of EPCs.

Current process

At the heart of the EPC process is the government's national calculation methodology for home energy - SAP, the Standard Assessment Procedure. The Reduced data SAP (RdSAP) version of the model is used to generate EPCs for existing homes.¹⁹

Using information collected about the home by an assessor, a software version of the RdSAP model generates the headline, energy-cost-based Energy Efficiency Rating (often called the SAP rating) as well as other data presented on the certificate. Recommended improvement measures are generated based on modelling of the potential for different measures to achieve a higher EPC rating, i.e. measures that are modelled to deliver a saving in running costs.

SAP and RdSAP are updated periodically. New versions of RdSAP software are rolled out for use by EPC assessors through a process of regulated testing and approval of accreditation bodies' software implementing the updated official model.

Update of RdSAP – RdSAP 10

SAP and RdSAP have been updated many times since the model's introduction in the 1990s, as regulations have changed, and as new technologies and evidence have become available. The next update to RdSAP – RdSAP10 - is being delivered this year and will bring improvements in several areas of the methodology. Detail has been added to allow **improved accuracy of assessment of building fabric performance** – for example, the new RdSAP will require measurements for all windows in the homes and will improve the assessment of homes with rooms in roof. **New technologies** have been added such as PV batteries and PV diverters for hot water heating. Heat pump modelling has been enhanced to align with the latest, full version of SAP.

The Home Energy Model

The government plans for SAP and RdSAP to be replaced by the new Home Energy Model (HEM) for the production of EPCs.

The HEM is a complete redesign and update of SAP and RdSAP – it is a powerful new home energy assessment methodology designed to be ready for net zero buildings. It is planned to be used in regulation for both EPCs (for existing and new buildings) and building regulations compliance.

The HEM brings major improvements in its capacity to reflect modern home energy technologies. It is also much more flexible in its operation and software.

The first version of the HEM was released for consultation in December 2023.²⁰ This current consultation focuses on explaining the new methodology and its planned use in building regulations. The government has said it aims to consult later in 2024 on the application of the Home Energy Model methodology for producing EPCs.²¹

The Home Energy Model incorporates multiple technical improvements. Most importantly, where SAP undertakes calculations at a monthly timestep, HEM can consider home energy use in half-hourly time steps. This major increase in granularity enables the model to better reflect smart technologies, energy storage, and load-shifting technologies whose benefits derive from using energy flexibly at different times of the day. Heat pumps are simulated in a home's specific context, rather than as a generic test simulation.²²

For the operational delivery of the HEM, the government has proposed that companies will no longer set up their own calculation engines. Instead, there will be a centralised, cloud-based version of the Home Energy Model to which different companies can build their own interface. To replace RdSAP, a dedicated EPC *wrapper* is proposed: "A separate software package, which will wrap around the Home Energy Model core engine... For existing buildings, this will take on the function that Reduced data SAP has performed in the past ... specifying the inputs and outputs that the model needs to provide for the production of EPCs."²³

This new delivery approach should allow much more rapid updating of both the core HEM model, and the specific requirements, assumptions and processes for the production of EPCs.

19. "Reduced Data" refers to the fact that a smaller range of inputs are used, reflecting the fact that it can be more difficult to collect data on existing homes than new homes.

20. [The Home Energy Model Making the Standard Assessment Procedure fit for a net zero future](#), Department for Energy Security and Net Zero, December 2023

21. *ibid.* Page 9

22. *ibid.* Page 26

23. *ibid.* Page 24-25



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