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Sent by email

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Reform of domestic EPC rating metrics to support delivery of Net Zero

Dear Patrick,

Energy Performance Certificates (EPCs) are a critically important policy tool for delivering Net Zero homes, but the present arrangements are not fit for purpose. The ratings on EPCs are used to define standards and targets for a range of policies aimed at reducing household emissions. However, the current rating metrics are poorly suited to this role and do not provide the clear information people need to understand the energy efficiency of their homes.

We understand that the Scottish Government is developing options for reforming the rating metrics used on EPCs. The CCC welcomes this process, having recommended reform for several years. Improving the rating metrics presents an opportunity to ensure that EPCs are fit for delivering Net Zero by incentivising changes to homes that reduce emissions.

We have analysed the current metrics and developed recommendations for change, with input from a panel of experts in this area (see the Annex to this letter). We suggest improvements to the metrics used, to make them better for both informing consumers and delivering policy. We are sharing these recommendations with you to support your efforts to improve EPCs.

Current EPC rating metrics

EPCs currently include two ratings - the 'Energy Efficiency Rating' (EER) and the 'Environmental Impact Rating' (EIR). Of these, the EER is commonly used to deliver policy and as a focus when selling or letting homes. However, this metric is actually a measure of energy costs, not energy efficiency: it does not accurately incentivise the energy efficiency and heating solutions required to reduce emissions. The ratings are split into bands (labelled A to G), which support simple comparisons between properties. The ratings themselves use a 1 to 100 scale, rather than real-world units, and only include certain aspects of energy consumption: this can make them difficult to understand and impossible to compare against actual energy consumption.

Our recommendations to improve EPC rating metrics

EPC ratings should provide clear information to consumers about energy use in homes. The metrics should incentivise homeowners to make their properties more energy efficient and adopt low-carbon heating. They should be designed to support policy mechanisms aiming to deliver zero-emission homes.

The metrics should have simple names which make their meaning obvious and allow them to be targeted by policies. The rating scales should use real-world units so they can be easily understood and compared against actual performance. The ratings should continue to be split into bands to allow simple comparisons between properties.

Key assumptions underlying the ratings, including factors such as occupancy levels, should be made clear on the EPC. These factors impact real-world performance, so tables or interactive digital formats should be provided to allow homeowners to adjust assumptions to reflect actual conditions and better predict actual energy consumption.

EPC ratings should provide a wider range of useful information to consumers while allowing polices to be better targeted. We propose four primary metrics, including a renamed EER ('cost'):

- **'Energy'**: Total energy use intensity ($kWh/m^2/yr$). This should be the headline metric for consumer information. It provides consumers with clear information about the overall energy use of a home. A better indicator of energy use will support policies which incentivise consumers to improve fabric efficiency and install more efficient low-carbon heating systems. This metric can be easily compared to actual energy consumption.

- **'Fabric'**: Space heating demand intensity ($kWh/m^2/yr$). This metric provides a clear indication of the underlying fabric efficiency of a home (excluding the impact of heating system choice). It accurately incentivises improvements to fabric efficiency when targeted by policy, and can be used to assess actual performance of existing building fabric and any improvements made.

- **'Heating'**: Heating system type (categories of heating system, ranked from 1 to 6). This provides consumers with a clear hierarchy of heating system types, giving clarity on the merits of different heating technologies. It enables policies mandating the use of certain types of heating system.

- **'Cost'**: Energy cost intensity ($£/m^2/yr$). An identical or similar metric to the current EER, enabling continuing use in relation to fuel poverty policy. This could include all home energy use (unlike the current EER) to give a clearer indication of energy costs for a home.

EPCs should include further information to supplement the primary ratings. This should include the floor area of the property and indicators of on-site generation, demand flexibility, total energy costs, and carbon emissions.

Other recommendations

Reforms to EPC rating metrics should be applied alongside wider improvements to the EPC system, some of which are already underway. These should include:

- Measures to improve the quality and consistency of EPC assessments including better training and oversight of EPC assessors.

- An overhaul of the SAP methodology used to calculate the ratings.

- Improvements to the digital presentation of EPC data, such as the provisions of interactive features to adjust assumptions and convey the impacts of potential improvements.

- Storage of the input data used for generating EPC ratings, allowing inputs to be checked for accuracy and reused when updating certificates.

Homeowners also need more information on risks posed by increasing changes to the UK's climate and advice on adapting to these. EPCs could be expanded into an instrument for providing homeowners with advice on risks such as overheating, flooding and water scarcity, and ways to reduce these risks.

It is essential that the Scottish Government takes this opportunity to get EPCs right, and we hope that our advice can be of help in this regard. More detailed analysis and explanations of our recommendations are provided in the attached annex to this letter.

Yours,

Lord Deben
Chair, Climate Change Committee

Annex

Reform of domestic EPC rating metrics to support delivery of Net Zero

Climate
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Contents

Introduction

Homes account for around 20% of UK GHG emissions. Eliminating these emissions is essential to reaching Net Zero. Domestic Energy Performance Certificates (EPCs) have become a critically important policy tool for delivering Net Zero homes. Many Government policies rely on EPC ratings as a means to drive and measure the delivery of energy efficiency improvements and low-carbon heating in existing homes.

However, the metrics currently used for domestic EPC ratings are not well suited to this task. In their current form they can incentivise sub-optimal outcomes and create a misleading picture of the progress being made.

The CCC has previously expressed concerns about the suitability of current EPC metrics as a mechanism for decarbonising homes, and has repeatedly recommended that they should be reviewed.[1,2,3,4] The UK and Scottish Governments have each acknowledged these concerns and both are currently reviewing options for revising the metrics used.

To help address these concerns, and assist with these reviews, we have developed recommendations for reforming EPC metrics, to better align with their use in delivering climate policy targets. We obtained input from a panel of experts and practitioners, who considered the current and future uses of EPCs and the suitability of different metrics to these uses.

This annex outlines the case for change, presents our recommendations, and sets out the reasoning behind them.

(a) Scope of this annex

This annex focuses on the metrics used to define the EPC ratings of domestic properties. Improving EPCs to be fit for purpose also requires other reforms to the EPC system such as: better training for assessors, greater consistency in measurement, and easier ways to update the assessed performance of individual properties. We have not covered these issues in detail in this annex.

Context

EPCs provide information about the energy use and greenhouse gas emissions of individual homes, and measures which may be taken to reduce these. EPCs include two ratings which are intended to indicate a home's energy efficiency and CO_2 emissions. The ratings are generated using a defined calculation methodology called the Standard Assessment Procedure (SAP) which uses information about the characteristics of the home and its heating systems.[*]

A valid EPC is required to sell or let a home. The original intention of EPC ratings was to provide a simple means for prospective buyers or renters to compare the energy use and environmental impact of homes, and to support advice on how these could be improved. Over time, the Government has increasingly used EPC ratings as a means to drive and monitor the delivery of policies relating to home energy use and emissions.

(a) Current EPC metrics

EPCs currently include two ratings: the Energy Efficiency Rating (EER) and the Environmental Impact Rating (EIR). The EER is the main metric used for policy delivery.

- **Energy Efficiency Rating.** The EER is a measure of energy costs per square metre per year (it is not a direct measure of energy efficiency).

- **Environmental Impact Rating.** The EIR is a measure of greenhouse gas emissions per square metre per year.

Neither rating is a direct measure of energy efficiency. The values of both ratings are influenced by fuel type as well as energy consumption. Both ratings relate to 'regulated' energy use – they include the expected use of energy for heating, hot water and lighting, but exclude appliances – and are not a true indicator of the fabric efficiency of the building.

The ratings use a numeric scale from 1 to 100, which is converted to a band ranging from G to A. The bands are not equally sized and the way the ratings are calculated means they do not relate linearly to the attributes they represent. The rating scales are also slightly weighted, and so are not fully independent of dwelling size. Consumers cannot easily equate these ratings with measurable units of energy costs or emissions per square metre, and it is impossible to convert them to energy consumption per square metre.

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[*] Existing homes are usually assessed using Reduced Data SAP (RdSAP) which requires fewer inputs.

(b) Current use of EPC metrics

A range of Government policies relating to home energy use – primarily around decarbonising homes and tackling fuel poverty – rely on EPC ratings, both as a means of driving change (through targets, funding allocation, and regulations) and measuring progress. EPC ratings are also used by other organisations such as financial institutions, housing associations, and local authorities to analyse their portfolios, target improvements, and assess eligibility for products and financial support. Policies are usually based around achieving a certain EPC band, and typically use the EER rating.

Improvements in EPC ratings can be delivered by funding and regulations.

- Funding schemes, (grants, loans, preferential interest rates, and tax discounts and exemptions) can be targeted at improving properties which fall below a certain EPC rating, or at increasing the EPC rating of homes to a specific level.

- Regulations can be used to require properties to achieve specific EPC ratings. Regulations can target homeowners, landlords, and lenders. These obligations may be required by a specific date, or by triggers such as the sale of a home, renewal of a tenancy, or certain works to a property.

Table 1 lists the key policy and monitoring frameworks which use EPC ratings, and the related targets, delivery mechanisms and indicators.

Table 1
Existing policy and monitoring frameworks which use EPC ratings

Policy scope	Target, delivery mechanism or indicator	Policy or monitoring framework
Fuel-poor homes	Ensure that as many homes as possible reach Band C (after adjustments for schemes which affect energy costs)	Sustainable Warmth[5] (fuel poverty strategy for England)
All homes	Reach EPC Band C by 2035	Net Zero Strategy[6]
Fuel-poor homes	Reach EPC Band C by 2030	Net Zero Strategy
Private-rented homes	Reach EPC Band C by 2028	Net Zero Strategy
Social housing	Long term target of EPC Band C	Net Zero Strategy
Energy	As many homes to reach EPC Band C as possible by 2035	British Energy Security Strategy[7]
Private-rented homes	Homes for rent must achieve EPC Band E	Domestic private rented property: minimum energy efficiency standard[8]
Low-income and low-EPC rated homes	Improvement of homes currently in Bands D, E, F and G	Local Authority Delivery Scheme and Home Upgrade Grant[9]
Low-income homes	Improvement of homes in Bands D,E, F and G, with a certain proportion at E, F and G. Post-project Bands must be determined	ECO4[10]
Mortgaged homes	Requirement to disclose EPC profile of portfolios, voluntary target of portfolio average EPC Band C by 2030	Improving home energy performance through lenders[11]
All homes in Scotland	Reach EPC Band C by 2033	Scottish Government Heat in Buildings Strategy[12]
Fuel-poor homes in Scotland	Maximise number of fuel poor homes reaching EPC Band C by 2030 and EPC Band B by 2040	Tackling Fuel Poverty in Scotland[13]
Social housing in Wales	Minimum SAP rating of 65 (EPC Band D)	The Welsh Housing Quality Standard 2008[14]
Social housing in Wales	Reach EPC Band A by 2033	Draft Welsh Housing Quality Standard 2023[15]

(c) Problems with EPC metrics

EPC ratings, specifically the EER metric, play an important role in Government policies aimed at decarbonising homes and delivering Net Zero. The current EPC rating metrics are poorly suited to this role: they do not incentivise the optimum changes to homes and are opaque and difficult to compare against measured performance.

(i) Incentives

The EER metric. The EER is based on the cost of energy required for heating and lighting. It is affected by the prices of the fuels used in a dwelling as well as measures to reduce energy demand. It is therefore well suited to reducing energy costs, but less suited to delivering energy efficiency and low-carbon heating.

- **Energy efficiency.** Currently the EER metric does not adequately incentivise homeowners to install fabric efficiency measures. The cheapest and easiest way to improve a home's EER is often to fit a more efficient fossil fuel boiler (which reduces fuel consumption) or install solar PV (which reduces or offsets electricity consumption). These measures will reduce energy bills but will not deliver the improved fabric efficiency needed to enable low-carbon heating over the longer term.

- **Low-carbon heat.** Under the current SAP methodology and present fuel prices, a better EER will tend to be achieved by selecting fossil fuel heating rather than low-carbon heating (such as heat pumps). This is an active disincentive to decarbonise heat. It does not meet the Government's policy aims and ignores the potential benefits of electrified heating over the longer term.

The EIR metric. The EIR is based on greenhouse gas emissions. This means that it is affected by relative emissions intensities of fuels, as well as energy consumption. The EIR does not tend to be targeted by policy interventions but would also pose difficulties if used to incentivise decarbonisation of homes.

- The carbon-intensity of electricity generation should continue to fall this decade, to well below 100 g/kWh by 2030 and close to zero by 2035. This future decarbonisation of electricity would need to be incorporated for the EIR to be a sensible guide to the longer-term emissions impact of homes.

- As electricity generation decarbonises, the impacts of energy efficiency measures and variation in impact of different electric heating systems on the EIR will become insignificant. Targeting the EIR could incentivise switching to direct electric heating rather than heat pumps and would tend not to incentivise improvements to fabric efficiency (particularly in rented accommodation where landlords do not pay energy costs). This would increase household bills and energy system costs.

(ii) Clarity and measurability

The current rating metrics provide a simple and seemingly clear means of understanding the energy efficiency and environmental impact of homes and comparing between homes. However, this clarity is superficial.

- The EER is misleadingly named. Consumers may assume that it is a measure of the fabric energy efficiency of a dwelling, when in fact it is measure of energy costs. As a measure of cost it is confusing, due to the calculation methodology and the exclusion of some energy use.

- The 1 to 100 scale is opaque and does not relate linearly to actual units. Actual energy costs and emissions per square metre are not provided, and energy use per square metre cannot be determined. Differences in energy costs and emissions between different points on the scale cannot be established, making meaningful comparisons between dwellings difficult.

- Ratings are not based solely on space heat demand, so are not an accurate indicator of fabric efficiency.

- Ratings do not include all energy use in a dwelling, which may confuse consumers and means that EPC ratings cannot be used with meter readings to evaluate real-world performance.

Current EPC ratings cannot be easily compared with real-world measurements of energy use. This makes it difficult for homeowners to judge whether their property is meeting the performance expected and whether improvements deliver the expected savings.

Objectives

EPC ratings should continue to have a role in policies for reaching Net Zero. To reach Net Zero, by 2050 all the UK's existing homes must be zero-carbon, with a good level of energy efficiency and low-carbon heating.

For the Government to achieve this it will need to deliver the following changes to all homes:

- **Energy efficiency.** All homes need sufficient improvements to their fabric efficiency to enable cost-effective use of low-carbon heating, and ideally reduce heating costs significantly. The energy demand for hot water, lighting and appliances also needs to be reduced substantially.

- **Low-carbon heating.** Homes need to be heated by on-site or communal heating systems which produce zero direct emissions and, ultimately, zero indirect emissions.

Cost-effectively decarbonising homes for Net Zero means that a significant proportion of homes will also need the following changes, where practical and cost effective:

- **On-site generation.** Homeowners should install on-site renewables (such as solar PV or solar thermal) and energy storage to support decarbonisation of the grid and reduce household energy costs.

- **Demand flexibility.** Households should adopt other measures such as pre-heating, heat storage, batteries and demand-responsive appliances, to reduce peaks in energy demands.

EPC ratings can help the Government drive and monitor delivery of these aims. To do so successfully the metrics need to be aligned with the required policy outcomes and priorities.

(a) Use of EPCs for decarbonising homes

(i) Driving policy delivery

EPC ratings can help meet the objectives above. But this requires rating metrics which align with these outcomes, incentivising homeowners to make appropriate changes and supporting policies which target improvements in those ratings. EPC ratings should be used alongside a range of other policy levers to deliver the required outcomes. They should be designed to support other policy mechanisms such as fabric efficiency targets, regulations on heating technologies, and financial incentives.

(ii) Monitoring policy delivery

Statistics on EPC ratings of the housing stock can be used to monitor progress in delivering energy efficiency and low-carbon heat. For these statistics to be useful the ratings need to be valid measures of the desired outcomes.

(b) Enabling other objectives

EPC metrics should also support other objectives and policy aims:

- **Providing clear information.** The ratings should be clear and simple, to help consumers properly understand the energy performance of their homes and ways they could improve it.

- **Supporting consumer decisions.** The ratings should provide sufficient and appropriate information to help consumers to choose between properties and make decisions about improvements to their homes.

- **Reducing energy costs.** The ratings should continue to help consumers to understand and compare the costs of energy use in their homes, and enable policies aiming to reduce fuel poverty.

- **Tracking actual performance.** The ratings should allow homeowners to draw comparisons between the actual and expected performance of their homes.

Recommendations

(a) Aims

EPC ratings should be clear indicators of the energy efficiency of homes and the presence of low-carbon heating in homes.

EPC rating metrics should be suited to use in driving and monitoring uptake of energy efficiency and low-carbon heating. They should be used alongside other policy mechanisms, and designed to support these.

The primary EPC ratings should provide clear, valid indicators of the following:

- Total energy use

- Fabric energy efficiency

- Heating type

In addition, an indicator of energy costs should continue to be included, to support delivery of fuel poverty targets.

Other information should be provided on EPCs to supplement the primary ratings. These should include indicators of on-site generation, demand flexibility, total energy costs and carbon emissions.

The baseline assumptions (such as occupancy levels and heating times) behind all indicators should be made clear on the EPC. These factors impact real-world performance, so tables or interactive digital formats should be provided to allow homeowners to adjust the assumptions used in the assessment to match the actual conditions of their property. This will allow them to better predict their actual energy consumption.

Ratings should be given simple, one-word names (rather than acronyms), which make their meaning obvious, and allow them to be easily distinguished and individually targeted by policy.

(b) Scales and bands

Rating scales (1 to 100) should be replaced by actual units (such as kWh/m^2 and $£/m^2$). This would make the ratings easier to understand and compare with in-use measurements.

Rating bands (G to A) should continue to be used, based on ranges of actual units, to allow simple comparisons between properties.

(c) Metrics

EPCs should provide four primary metrics. These should consist of a new headline 'energy' metric, two further new metrics, and a renamed EER (the EIR should be omitted).

The primary ratings would thus be the following:

- **'Energy'**: Total energy use intensity (kWh/m^2/yr). This should be the headline metric for consumer information. It provides consumers with clear information about the overall energy use of a home. A better indicator of energy use will support policies which incentivise consumers to improve fabric efficiency and install more efficient low-carbon heating systems. This metric can be easily compared to actual energy consumption.

- **'Fabric'**: Space heating demand intensity (kWh/m^2/yr). This metric provides a clear indication of the underlying fabric efficiency of a home (excluding the impact of heating system choice). It accurately incentivises improvements to fabric efficiency when targeted by policy, and can be used to assess actual performance of existing building fabric and any improvements made.

- **'Heating'**: Heating system type (categories of heating system, ranked from 1 to 6). This provides consumers with a clear hierarchy of heating system types, giving clarity on the merits of different heating technologies. It enables policies mandating the use of certain types of heating system.

- **'Cost'**: Energy cost intensity (£/m^2/yr). An identical or similar metric to the current EER, enabling continuing use in relation to fuel poverty policy. This could include all home energy use (unlike the current EER) to give a clearer indication of energy costs for a home.

Further details of the proposed metrics are given in Table 2 below.

Table 2	
Proposed EPC rating metrics	
Energy	
Description	Total energy use intensity (excluding on-site generation – this might be included in brackets)
Units	kWh/m^2/yr
Bands	A to G
Notes	• Excluding on-site generation provides a transparent indication of underlying efficiency • Energy use including on-site generation could be shown in brackets, and explained elsewhere on certificate
Use	• Provides clear information on total energy use • Incentivises improving fabric efficiency and installing efficient heating systems • Can easily be compared to actual energy consumption
Fabric	
Description	Space heating demand intensity (excluding heating system efficiency)
Units	kWh/m^2/yr
Bands	A to G
Notes	• Excluding heating system efficiency provides transparent indication of fabric efficiency
Use	• Provides clear information on fabric efficiency • Incentivises improving fabric efficiency • Use with policies setting target dates for minimum ratings, by housing sector • Use with policies setting trigger points (such as sale of a home) for improving ratings
Heating	
Description	• Heating system type
Units	• Ordinal (ranked categories)

Bands	Band	Name	Technologies
	1	Low emissions (high efficiency)	Heat pump Hybrid heat pump (connected to biomass or green hydrogen supply)
	2	Low emissions	Direct electric Hydrogen (connected to a green hydrogen supply) Heat network (connected to a low emissions heat source)
	3	Hybrid	Hybrid heat pump (connected to fossil fuel supply)
	4	Heat network	Heat network (connected to fossil fuel heat source)
	5	Biomass	Biomass boiler
	6	Fossil fuel	Fossil fuel boiler

Notes	• Provides clarity to consumers on merits of different heating systems • Distinguishing between differing efficiencies of low emissions heating enables regulations requiring high efficiency systems in homes with lower fabric efficiencies

Use	• Use with policies prohibiting worsening of rating, to address perverse incentives created by other ratings • Use with policies setting dates for prohibition of certain categories, by sector and current fuel type. • Use with policies requiring minimum fabric efficiency ratings for certain heating categories
Cost	
Description	• Energy cost intensity
Units	• £/m^2/yr
Bands	• A to G
Notes	• Could include only 'regulated' energy consumption (as current EER), or expand to all energy consumption to improve clarity for consumers • Supports continuation of existing fuel poverty policies
Use	• Incentivises measures which reduce energy bills • Use with policies prohibiting worsening of rating, to eliminate perverse incentives created by other ratings

(d) Delivering policy

Multiple ratings would allow policies to be targeted better, and to target combinations of ratings. This should help the Government to deliver its intended outcomes, such as reducing emissions in homes or addressing fuel poverty.

- **Energy efficiency.** Targeting the 'fabric' rating would incentivise fabric efficiency, and avoid the perverse incentives created by the current cost rating (EER).

- **Low-carbon heating.** The 'heating' rating could be used to mandate the types of heating which can be installed. Moving to a worse rating could be prohibited in all cases (removing perverse incentives under other policies). Allowable heating types could be linked to the 'fabric' rating to limit running costs of direct electric and hydrogen systems.

- **Fuel poverty.** Targeting both the 'cost' and 'fabric' rating would incentivise landlords to improve fabric efficiency rather than just changing heating systems and installing photovoltaics.

(e) Measuring policy

The new ratings would enable better monitoring of policy progress, by providing more valid measures of the targeted outcomes, and enabling delivery of energy efficiency and low-carbon heating to be tracked separately. Reliable, comprehensive data on the types of energy efficiency measures and heating systems installed in home is not currently available. Rating metrics which capture this information would greatly assist in tracking changes to the housing stock.

(f) Other recommendations

Reforms to EPC rating metrics need to be applied alongside other improvements to the EPC system. These should include:

- Measures to improve the quality and consistency of EPC assessments including better training and oversight of EPC assessors.

- An overhaul of the SAP methodology which is used to calculate the ratings.

- Improvements to the digital presentation of EPC data, such as the provisions of interactive features to adjust assumptions and convey the impacts of potential improvements.

- Storage and display of the input data used for generating EPC ratings, allowing inputs to be checked for accuracy and reused when updating certificates.

Homeowners also need more information on risks posed by changes to the UK's climate and advice on adapting to these. EPCs could be given an expanded role to provide advice on risks such as overheating, flooding and water scarcity; including explaining the severity of risk and advising on steps that can be taken to mitigate risks.

Next steps

The Department for Levelling Up Homes and Communities (DLUHC) and the Scottish Government are currently considering options for modifying the rating metrics used on EPCs. This is an important opportunity to reform the ratings and ensure that they are optimised for delivering Net Zero policies, as well as making the ratings clearer and more useful to consumers. We hope that the analysis and recommendations in this annex prove helpful in these processes.

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Acknowledgements

In developing the advice given in this annex the CCC obtained input from an expert panel, convened to consider the uses of EPC ratings and the suitability of different metrics to these uses.

The inputs from the expert panel were considered in producing this annex. However, the views expressed in this annex and the advice provided are solely those of the CCC and should not be assumed to represent the views of the panel members.

The Committee would like to thank the panel members for providing their time and expertise.

The panel consisted of the following people:

- Julie Godefroy: Head of Sustainability, CIBSE.

- Tessa Hurstwyn: Technical Adviser, Future Homes Hub.

- Thomas Lefevre: Director, Etude.

- Patrick Mason: Head of Heat in Buildings Assessment, Scottish Government.

- Clare Murray: Head of Sustainability, Levitt Bernstein.

- Tadj Oreszczyn: Professor of Energy and Environment, UCL Energy Institute.

- Jack Ostrofsky: Head of Sustainability and Design, Southern Housing Group.

- James Parker: Senior Sustainability Manager, Clarion Housing Group.

- Joe Jack Williams: Head of Environmental Research, Feilden Clegg Bradley Studios.

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