

ASSESSMENT OF UK POLICY CONTRADICTIONS FOR HEAT DECARBONISATION

REPORT TO THE UNIVERSITY OF SUSSEX'S 'GOING DUTCH'
PROJECT

AUTHORS

TOM ELLIOTT, PRACTICE MANAGER – BUSINESS MODEL INNOVATION

GEORGE DAY, SENIOR ADVISER – NET ZERO POLICY

BEN SHAFRAN, HEAD OF MARKETS, POLICY & REGULATION

RESEARCH SUPPORT

MAHTA AMELI, GRADUATE ENERGY POLICY ADVISOR

15th MARCH 2023



DOCUMENT CONTROL

ESC programme name	Markets, Policy & Regulation – Zero Carbon Buildings
ESC project number	ESC00753
Version*	1.2
Status	Final
Restrictions*	None
Release date	17/03/2023
External release ID	N/A

Review and approval

	Name	Position
Author	Mahta Ameli	Graduate Energy Policy Adviser
Reviewer(s)	Tom Elliott George Day	Practice Manager Senior Adviser – Net Zero Policy
Approver	Ben Shafran	Head of Markets, Policy & Regulation

Revision history

Date	Version	Comments
24/02/2023	1.0	Working draft for Ben to review
28/02/2023	1.1	Final draft sent to client

DOCUMENT PROTECTION

Arising IP

Description	Owner	Category
N/A		

Background IP

Description	Owner	Category
N/A		

Trademarks, licenses and disclaimers

Description	Owner	Category
N/A		

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1. EXECUTIVE SUMMARY

This short report highlights how a number of policy contradictions are acting as a barrier to the decarbonisation of domestic heating in the UK. We show that without an overarching vision and framework to guide them, the disparate policies that relate to heat, buildings and energy infrastructure result in inefficient and ineffective mobilisation of resources, alignment of stakeholders, and allocation of responsibilities. We propose alternative approaches that can address the policy contradictions in question.

As the UK moves towards its 5th Carbon Budget, the average home will require a further reduction of 3.6 tonnes of CO₂. This will require a significant reduction in the reliance on natural gas for heating homes.

In this report we demonstrate through three examples how the UK policy landscape creates contradictions that undermine the imperative for rapid decarbonisation of heat and buildings. The examples discussed are not exhaustive but an attempt to highlight some of the key policy inconsistencies that require attention.

The examples we cover are:

- The Fuel Poor Network Extension Scheme highlights an inconsistency between the policy adopted to pursue the **social** goal of reducing fuel poverty for homes that are not connected to the gas network and the need to reduce the use of natural gas to heat homes.
- The methodology informing Energy Performance Certificates (EPCs) result in an inconsistency between the **technological** solutions that would improve the cost-efficiency of a home's energy use, and the solutions that would best achieve heat decarbonisation from the perspective of the individual home and the system (i.e. local area, and local energy networks).
- Different funding arrangements for local authorities, and funding processes for electricity and gas distribution companies that are not directly linked to local spatial planning, create inconsistencies between the **economic** factors that inform spatial planning and those that inform energy investment planning.

Drawing on our report *Towards an Enduring Policy Framework to Decarbonise Buildings*,¹ we describe – at a high level – the solutions to the above inconsistencies. In particular, Local Area Energy Plans (LAEPs) have an important role in overcoming the policy challenges described in this report. By bringing together the spatial planning and energy planning elements, and establishing stakeholder alignment, LAEPs form the foundation of place-based approaches that can achieve effective decarbonisation at pace and scale. LAEPs should be combined with new powers for local authorities to guide the solutions to fuel poverty that best align with the characteristics of their local areas. Lastly, EPCs must be reformed to accurately reflect the real-world emissions from buildings and to provide the right incentives for homeowners to decarbonise in the most efficient way for their circumstances.

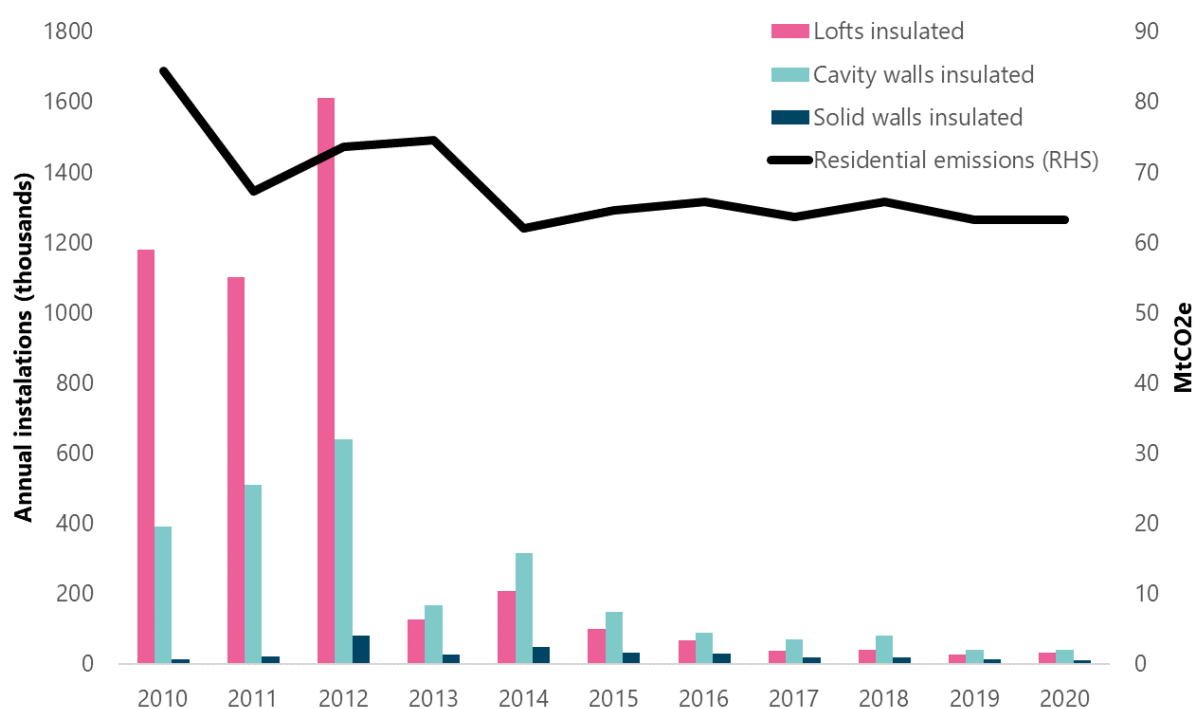
¹ [Energy Systems Catapult, Towards an enduring policy framework to decarbonise buildings, February 2020](#)

2. INTRODUCTION

The decarbonisation of buildings is an essential element of transitioning to a net zero economy – currently residential buildings account for around 16% of the UK’s greenhouse gas emissions.² However, the pace of decarbonising homes has slowed and emissions have largely flatlined since 2014 – see Figure 1. This is the result of reduced funding for measures to improve energy efficiency in homes, but is also symptomatic of the broader policy landscape.

As the UK moves towards the 5th Carbon budget, the average home will require a further reduction of 3.6 tonnes of CO₂. This will require a significant reduction in the reliance on natural gas for heating homes. Achieving the decarbonisation of buildings and of heat of this scale requires radical innovation to make the transition convenient, affordable and effective for households.

Figure 1: Emissions from residential buildings and energy efficiency improvements (2010-2020)



Sources: Climate Change Commission, *Independent Assessment: The UK’s Heat and Buildings Strategy*; BEIS, *Final UK greenhouse gas emissions national statistics*

Previous research³ has indicated that on a policy topic as complex as heat decarbonisation, there is sometimes a need for the willful introduction of inconsistencies into an existing policy mix to help induce innovation and change. At the same time, these must be guided by a shared vision that mobilises resources and stakeholders, and that responsibilities are assigned to those who are best placed to deliver the required outcomes. This shared vision is currently missing from the UK heat decarbonisation policy landscape.

In this short report we demonstrate how the lack of clarity in heat decarbonisation policy is creating conflicts that are hindering the pace and scale of the transition. Drawing on a review of the

² BEIS, *Final UK greenhouse gas emissions national statistics: 1990 to 2020*

³ L. Frank, K. Jacob and R. Quitzow (2020), *Transforming or tinkering at the margins? Assessing policy strategies for heating decarbonisation in Germany and the United Kingdom. Energy Research & Social Science, Volume 67*

literature and a series of interviews with subject matter experts, we present three examples that illustrate the policy contradictions in the following dimensions:

- **Social:** we present the contradiction between the aim of The Fuel Poor Network Extension Scheme to reduce fuel poverty for homes that are not connected to the gas network, and the need to reduce the use of natural gas to heat homes.
- **Technological:** we present the contradiction between the use of Energy Performance Certificates (EPCs) to encourage investments that would improve the cost-efficiency of a home's energy use, and the solutions that would best achieve heat decarbonisation.
- **Economic:** we present the contradiction between the different funding arrangements for local authorities that inform spatial planning, and funding mechanisms for electricity and gas distribution companies that facilitate investment in energy infrastructure.

The examples discussed in this report are not meant to be exhaustive; rather they are an attempt to highlight some of the key policy inconsistencies that require attention.

Following a short overview of the policy landscape in the next sub-section, each chapter of this report discusses a policy contradiction and its unintended impacts on heat offers a potential solution.

2.1. CONTEXT: THE POLICY LANDSCAPE FOR HEAT DECARBONISATION IN THE UK

Heat decarbonisation policy can be thought of as comprising both a national element and a local element; and they involve the interaction between spatial planning and energy planning. The current landscape consists of disparate policies that result in inconsistencies, overlaps and policy gaps between:

- Different national aims
- Local ambitions and national aims
- Plans in different local areas
- Spatial planning and energy planning within the same area

The Heat and Buildings Strategy⁴ was intended to offer a national-level roadmap of the role of building decarbonisation in achieving Net Zero. However, the Strategy is incomplete in a number of important areas – for example, a decision on the role of hydrogen in domestic heating is not expected until 2026.

At local level, different authorities have announced ambitious plans to decarbonise – often before the national target of being net zero by 2050 (2045 in Scotland). However, these stated ambitions often lack clarity on how they would be delivered. In particular, decarbonisation at the envisaged pace and scale would need to be facilitated in the local energy infrastructure (electricity distribution network; potentially transformation of the gas distribution network to carry hydrogen), but the authority to fund investment in the energy network sits with Ofgem and not with local authorities.

To address these challenges, Energy Systems Catapult developed Local Area Energy Plans (LAEP), which can help to set out the change required to transition an area's energy system to Net Zero in the relevant timeframe. This is achieved by exploring different pathways whilst considering a range of technologies and scenarios combined with stakeholder engagement to provide the most cost-effective pathway for that local area – see text box below for a brief description of LAEP. However,

⁴ [HM Government, Heat and Buildings Strategy, October 2021](#)

there is currently no requirement on local authorities to conduct LAEP.⁵ Energy network companies are also not required to comply with a LAEP (if available in a local area that they serve), and the funding provided by Ofgem to energy networks is not contingent on there being a LAEP, nor is the level of funding necessarily aligned with the investment plans set out in a LAEP.⁶

Introduction to LAEP

Local Area Energy Planning (LAEP) is a data driven and whole energy system, evidence-based approach that sets out to identify the most effective route for the local area to contribute towards meeting the national net zero target, as well as meeting its local net zero target.

LAEP is led by local government and developed collaboratively with defined stakeholders.

The results are a fully costed, spatial plan that identifies the change needed to the local energy system and built environment, detailing 'what, where and when and by whom'. LAEP sets out the total costs, changes in energy use and emissions, and sets these out over incremental time periods.

LAEP provides the level of detail for an area that is equivalent to an outline design or master plan; additional detailed design work is required for identified projects to progress to implementation. It identifies near-term actions and projects, providing stakeholders with a basis for taking forward activity and prioritising investments and action.

LAEP defines a long-term vision for an area, which should be updated approximately every 3–5 years (or when significant technological, policy or local changes occur) to ensure the long-term vision remains relevant.

The LAEP scope addresses electricity, heat, and gas networks, future potential for hydrogen, the built environment (domestic, commercial and industrial – as relevant) including its fabric and systems, flexibility and storage, energy generation, and associated vectors such as transport (e.g. electric vehicle charging infrastructure).

In Scotland, an alternative approach to local planning - Local Heat and Energy Efficiency Strategy (LHEES)⁷ – is mandatory on local authorities. LHEES sets out the long-term plan for energy efficiency and heat decarbonisation for all buildings in a local area. However, LHEES do not address the local coordination challenge since they only cover the spatial planning element and do not cover the energy infrastructure planning.

At a national level, two notable heat and decarbonisation policies are the ban on the sale of gas boilers from 2035⁸ and the target to improve the Energy Performance Certificate (EPC) rating of

⁵ The Welsh government has committed to undertaking LAEP in all local areas, scaling up to a national energy plan. [Welsh Government, Renewable energy deep dive: recommendations, 8 December 2021](#)

⁶ For its most recent review of electricity distribution investment plans (RIIO-ED2, covering 2023-2028), Ofgem drew attention to the LAEP guidance developed by Energy Systems Catapult and the Centre for Sustainable Energy, but did not mandate the use of LAEP to inform investment plans. [Ofgem, RIIO-ED2 Methodology Decision: Overview, 17 December 2020](#)

⁷ [Scottish Government, Local heat and energy efficiency strategies and delivery plans: guidance, 20 October 2022](#)

⁸ We note that the review into the net zero target carried out by Chris Skidmore MP recommended bringing the ban forward to 2033. [Rt Hon Chris Skidmore MP, Mission Zero - Independent Review of Net Zero, 13 January 2023](#)

social and private rented properties to at least Band C (where “practical, cost-effective and affordable”).⁹ But there is a lack of clarity on how these ambitions would be delivered:

- There are different policies and incentives to support alternatives to gas boilers: the Boiler Upgrade Scheme was introduced to support the uptake of heat pumps and biomass boilers, but is widely regarded as having been ineffective at driving mass scale change.¹⁰ Looking forward, the UK government is adopting technology-specific policies that risk creating a confusing landscape and result in unintended impacts:
 - heat pumps are subject to a “market-based mechanism” that requires manufacturers of boilers to increase the share of heat pumps they sale;¹¹
 - heat networks can be promoted through zoning plans by local authorities;¹²
 - and the government recently proposed to mandate that all boiler sold from 2026 be “hydrogen-ready”.¹³
- As we discuss in chapter 4 of this report, the EPC methodology creates perverse incentives that could result in the target of Band C ratings being met, without achieving a meaningful reduction in emissions from the buildings in question.

⁹ [HM Government, The Clean Growth Strategy, October 2017](#)

¹⁰ [Lords Environment and Climate Change Committee, Letter to Lord Callanan, Parliamentary Under Secretary of State at the Department for Energy Security and Net Zero regarding The Boiler Upgrade Scheme and the wider transition to low-carbon heat, 22 February 2023](#)

¹¹ [BEIS, A market-based mechanism for low-carbon heat, Summary of responses received and Government response, May 2022](#)

¹² [BEIS, Heat network zoning, 8 October 2021](#)

¹³ [BEIS, Improving Boiler Standards and Efficiency - Boiler efficiency, hydrogen-ready boilers, and the role of hybrid systems, December 2022](#)

3. FUEL POVERTY NETWORK EXTENSION SCHEME

3.1. CONTEXT

The UK (like the Netherlands) is highly reliant on natural gas to meet domestic heat demands, with around 85% of UK households connected to an extensive gas grid covering most regions of the country (with the notable exception of Northern Ireland). Major improvements in domestic heating and addressing fuel poverty over the past 50 years have been achieved across the UK through installation of central heating and gas boilers across much of the UK housing stock. During this period, gas has been seen as an efficient and low cost fuel to meet space and water heating energy demands. However, this has left four million households across the UK (or roughly 14%) beyond the reach of the gas grid – often in more rural areas. This part of the UK housing stock has had a heavier reliance on higher carbon, higher cost and frequently less efficient heating technologies.

Of these off-gas grid residential properties:

- 2.3 million homes are heated by electricity alone
- 1 million by heating oil
- and roughly 200,000 each rely on solid fuel or LPG for their primary heating.

Electric heating is often associated with high rise flats (particularly in Scotland) with poor energy performance ratings, while oil fired heating is common in rural and detached off grid properties.

Across the UK there is also an association between off gas grid properties and fuel poverty – with higher proportions of off gas grid households being fuel poor and higher severity of fuel poverty. This reflects both the higher costs of heating (the higher costs of electricity, heating oil and solid fuels as an energy source for space heating), and an association of off gas grid properties with households and regions on lower incomes (e.g. rural areas such as mid Wales or Highland Scotland).¹⁴ National Energy Action (a fuel poverty charity) estimates that the average fuel poverty gap (the amount by which energy costs would need to shrink to remove a household from fuel poverty) for off gas grid fuel poor households was triple that experienced by the on gas fuel poor.¹⁵

Historically this has led to a policy focus on extending the perceived benefits of connection to the gas grid, as a mechanism to address fuel poverty and improve energy access. However, this is in tension with the imperative to cut carbon emissions from space heating in buildings. While gas grid extension can reduce reliance on heating oil and solid fuels, and thereby cut emissions in the short term, the adoption of the Net Zero target in 2019 has strengthened the need to completely decarbonise energy use in buildings.

The CCC's sixth carbon budget analysis includes a 'balanced pathway' scenario consistent with the goal of reaching net zero emissions by 2050.¹⁶ This pathway suggests that:

- Gas boiler sales should be phased out by 2033
- Oil and coal heating is phased out by 2028, with 100% of heating systems for off gas grid properties being low carbon from 2028

¹⁴ [Citizens Advice Scotland, Off-gas consumers: Updated information on households without mains gas heating, June 2018](#)

¹⁵ [National Energy Action, Working in partnership to influence the continuation of the Fuel Poor Network Extension Scheme, July 2021](#)

¹⁶ [CCC, Sixth Carbon Budget, 9 December 2020](#)

- All new buildings must be zero carbon by 2025 – implying that no new build properties should be connected to a fossil gas grid after 2025.

3.2. OVERVIEW OF THE FUEL POOR NETWORK EXTENSION SCHEME

The Fuel Poor Network Extension Scheme was introduced by Ofgem as part of the gas distribution price control framework, initially in 2008. It has been retained into subsequent price controls – including the current ‘RIIO-GD2’ settlement for gas distribution networks, which covers the period 2021-26. As originally conceived, the scheme allowed the gas network companies to offer a discount to eligible households on the costs of connecting their property to the gas grid.

Ofgem set out its high level reasoning in its 2009 letter on the scheme:¹⁷

Throughout the Gas Distribution Price Control (GDPCR) process we consulted with relevant parties on the options available to promote extensions of the gas network to fuel poor communities. Gas is usually a cheaper source of space heating energy than its conventional alternatives (e.g. electricity, oil, etc) so *network extensions to non-gas communities could contribute to alleviating fuel poverty*. (emphasis added)

In the same 2009 letter, Ofgem also characterised its policy intent as being “that the network extension scheme should succeed in connecting the maximum number of vulnerable and fuel poor households at least cost”.

The eligibility criteria were deliberately designed to favour:

- Households in deprived areas (as measured by the Government’s Index of Multiple Deprivation)
- Households where the gas distribution company worked to secure access to separate funding to increase the affordability of ‘in house’ costs associated with a conversion to gas; or
- Households meeting other criteria relating to either their fuel poverty status or eligibility for other social assistance schemes (focused on energy efficiency or other in-property measures).

In its first period of operation, covering 2008–2013, the gas distribution networks connected 43,615 fuel poor households. Ofgem then made some changes to the scheme from April 2016, including setting connections target of 91,203 for the period 2013-21 (up from an initial target of 77,450 for the period). The gas distribution companies were set financial incentives to deliver these targets.

3.3. CONTRADICTION SIGNALS FOR BROADER HEAT DECARBONISATION

The tensions between the delivery focus of the Fuel Poor Network Extension Scheme on growing household use of gas for heating and the broader strategy for decarbonising heat has come into sharper focus since the adoption of a net zero target for 2050.

Ofgem decided to continue the scheme through to at least 2026 on the basis that it continued to provide a cost effective solution to help fuel poor households. However, it is noteworthy that Ofgem also included the possibility of revisiting this decision via a ‘price control re-opener’, which would allow Ofgem to stop the scheme if appropriate in response to changes to wider government policy on heat decarbonisation.

It is clear that continuation of the Fuel Poor Network Extension Scheme supports the continued expansion of the coverage of the gas grid. Eventually, some of the new network assets built to

¹⁷ [Ofgem, Final position on the non gas fuel poor network extension scheme, 29 January 2009](#)

serve the scheme may become stranded (i.e. not useful), and there will be a need for further in-property investment to install low carbon heating solutions.

The continuation of the scheme undermines the potential to drive demand for low carbon solutions such as heat pumps – or perhaps heat network solutions in some of the high rise properties that currently rely on inefficient electrical heating solutions. Off gas grid properties represent a particular niche of the heating decarbonisation market, one which could be used for early deployment of low carbon solutions with the right policy support.

3.4. OUR PROPOSED SOLUTION

There is a pathway, and the beginnings of a statutory framework, to move towards a more coherent approach to decision making around the inter-related facets of energy network investments, local strategies to decarbonise heat and buildings and locally tailored strategies to address fuel poverty.

It is now no longer tenable to invest in long life assets to address fuel poverty without taking account of the decarbonisation requirements around energy use which will become binding during the lifetime of those investments. There is an urgent need to strengthen the role of local stakeholders in driving the allocation of socially targeted funding across measures to ease the energy transition for particular categories of affected households, including those in fuel poverty and those who are currently reliant on expensive or inefficient forms of heating.

Local area energy planning can provide the analysis and evidence base for a more coherent, locally tailored strategy to address local energy needs, taking account of drivers relating to both decarbonisation and action on fuel or energy poverty. LAEPs provide a methodological framework for identifying a cost-effective set of measures, investments, and locally tailored policies.¹⁸ Critically this should include a locally tailored programme to transition gas networks in a way that is consistent with net zero, minimising the risk of asset stranding from further gas network investment, while providing clear drivers for the build up of supply chains offering low carbon solutions that are tailored to local needs (including alignment with heat network funding support mechanisms).

Fuel poverty has a strong local dimension reflecting the intersection of building stock, energy infrastructure assets and social and economic conditions. There is, therefore, a strong case for Local Authorities to take responsibility for the design and choice of measures.

Local authorities could be given a statutory responsibility (and funding/powers) to address fuel poverty in their local area. We understand that the beginnings of a legal framework to support that role already exists within the Home Energy Conservation Act 1995 (which requires local authorities to draw up local energy conservation reports), and could build on the responsibilities for public health that were allocated to local authorities under the Health and Social Care Act 2012.

Through this approach local authorities could gain power to shape and align funding schemes (whether funded by bill payers, as per the Fuel Poor Network Extension Scheme) or obligations and targets placed on energy network companies within their areas. More ambitiously, local authorities

¹⁸ There is the remaining question of how local plans would marry up to national infrastructure planning. One proposal, set out in a recent consultation by Ofgem on the institutions and governance of local energy, is to create local subsidiaries of the national Future System Operator (FSO), known as Regional System Planners (RSPs). The RSPs would be responsible for planning energy infrastructure at a local level, engaging closely with local authorities and spatial planning, while also coordinating across RSPs and with the FSO to achieve national alignment. See: [Ofgem, Future of local energy institutions and governance, 1 March 2023](#)

could be given power to determine the targeting and use of other taxpayer funded social schemes (e.g. winter fuel payments) within their area, and freedom to redirect this funding towards measures identified in LAEPs, which are consistent with locally determined social and decarbonisation priorities.

4. ENERGY PERFORMANCE CERTIFICATES

4.1. CONTEXT

Energy Performance Certificates (EPCs) were introduced in the UK in 2008 as a measure to comply with requirements of the European Energy Performance of Buildings Directive. Essentially, a legal requirement to have an EPC has been introduced on all domestic and commercial buildings in the UK that are being made available to buy or rent. The only exemptions are for limited specific building categories (such as temporary buildings or in conservation areas).

An EPC provides an indication of how much it will cost to heat and power a property. It also includes recommendations of energy-efficient improvements, the cost of carrying them out, and the associated potential for energy cost savings.

EPC ratings are based on a static and desk-based generalised scoring methodology known as the Standard Assessment Procedure (SAP). As a result, EPC ratings are relatively crude proxies for the real-world energy use and emissions of specific properties. We will discuss below how the specific characteristics of the rating methodology can give rise to incentives or promote the adoption of measures that may contradict broader objectives around building decarbonisation.

In addition, over time EPC ratings have been used by the UK government, devolved administrations and other bodies as a metric against which to frame policy measures and targets relating to building energy efficiency and broader decarbonisation objectives. For example, in 2018 the Department for Business, Energy and Industrial Strategy (BEIS) introduced minimum energy efficiency standards for domestic private rented properties expressed as a requirement to achieve a minimum EPC E rating. This reliance on the EPC rating system as a way to frame policy targets and potential measures (e.g. framing regulatory requirements in terms of achieving a particular EPC rating) was reinforced in the Heat and Buildings Strategy, contained proposals to:¹⁹

Continue to drive improvements to poorer performing homes throughout the 2020s, in line with the commitment we made in our Clean Growth Strategy for as many homes as possible to *achieve EPC band C by 2035* where cost-effective, practical and affordable, and our commitment to reduce fuel poverty by ensuring as many fuel poor homes in England, as reasonably practicable, *achieve a minimum energy efficiency rating of band C by the end of 2030*. (emphasis added)

Moreover, EPC and the targets articulated with reference to them influence spatial planning decisions and, to a degree, energy planning decisions as some regulated utilities use them to scenario planning.

The EPC rating methodology is not accurately aligned with real world carbon emissions performance of buildings. When this methodology is used to express regulatory requirements and policy targets, the effect is to carry those inaccuracies and distortions through to the incentives on building owners, service providers, supply chains and technology innovators. This has the effect of magnifying these distortions and contradictions into influencing market behaviour and the competitive playing field for specific technologies, depending on how they are treated through the EPC rating methodology, rather than their actual impact on carbon emissions performance.

¹⁹ [HM Government, Heat and Buildings Strategy, October 2021](#)

4.2. EPC CONTRADICTIONS WITH DECARBONISATION OBJECTIVES

The SAP methodology produces two metrics:

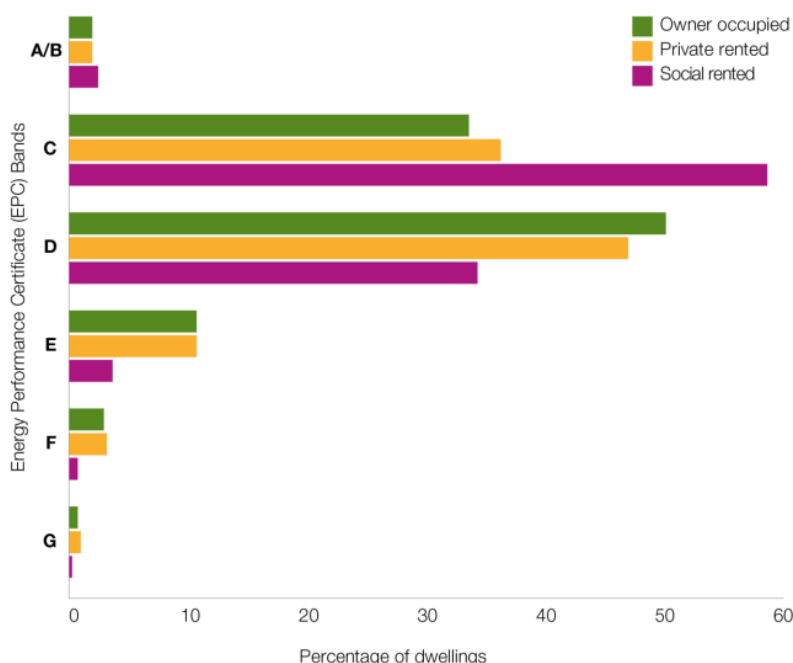
- the Energy Efficiency Rating, which reflects an assessment of the likely energy costs required by the property; and
- the Environmental Impact Rating, which reflects an assessment of the environmental performance of the property in terms of estimated carbon emissions.

The overall EPC banding is decided by the Energy Efficiency Rating and is, therefore, primarily a cost metric related to typical use of that property, not a measure of actual energy use or a measure of carbon emissions.

The primacy of cost considerations in the EPC banding means that cheaper energy vectors are favoured, regardless of their performance in terms of carbon emissions. This results in more favourable treatment of gas boilers compared to heat pumps, despite this being in clear tension with a focus on building carbon performance. It also leads to the prioritisation of solar panel installations, regardless of their broader impact on grid decarbonisation.

As illustrated in the Heat and Buildings Strategy (Figure 2 below) roughly 40% of total housing is already EPC C and above, with around 4-5% representing F-G, meaning that approximately 55% of homes are EPC D / E (mainly Owner occupied and Private rented).

Figure 2: Share of properties in each EPC band (2019)



Source: Heat and Buildings Strategy, Figure 9

The Heat and Buildings Strategy targets framed around obtaining an average of EPC C can in practice be achieved by implementing a range of measures, many of which do not align closely with action to achieve heat decarbonisation. The decision on what technology or intervention to use to achieve this will be guided by the recommendations within an EPC, the capital cost of the improvement, and the impact on the overall EER rating via the SAP methodology. The EPC is designed to tell building owners/occupants how to score SAP points, rather than how to optimise measures to manage bills, carbon emissions or the potential impacts and costs posed to the energy system (which impact on consumer bills).

For example, using typical SAP improvement points, moving from a mid E rating up to C is possible with a 3.5kWp solar PV system, costing approximately £5,000-6,000.²⁰ In comparison, a new heat pump could be more expensive even after accounting for the Boiler Upgrade Scheme grant of £5,000 (we note that a number of providers have been promoting their heat pumps as being price-competitive with a gas boiler replacement). A policy targeting EPC band C ratings across all tenures may result in incentivising building owners to install the cheaper option of solar PV. The result is likely to be less impact on the market for low carbon heating, a weaker signal for installers to develop heat pump installation skills and, ultimately, less impact on reducing carbon emissions. Domestic solar PV is a tried, tested and reliable technology for both carbon and cost reductions; but it will not by itself contribute to the ambitious low carbon heating deployment targets.

In some cases, moving from a gas boiler to a heat pump may result in a worse EPC rating. This is because the main EER metric rewards reductions in energy running costs, rather than reductions in carbon emissions. Gas boilers tend to fare well on this metric in comparison to heat pumps due to the higher unit costs of electricity, which partly reflects the imbalance in policy levies across electricity and gas pricing, and the lack of a carbon price on gas. Currently, policy levies are applied much more heavily to electricity over gas, meaning that price signals distort incentives in favour of high carbon fuels. While the Government has indicated in the Net Zero Strategy an intention to realign these levies over time,²¹ (and has temporarily moved the levies from bills onto the Treasury's balance sheet to mitigate the rising cost of energy), the detail on how this will be achieved remains to be seen. The anomaly underlines the importance of urgent EPC reform.

A further problem with EPCs is that the SAP scoring methodology fails to capture the systems benefits (and associated emissions benefits) that can be unlocked by technologies that enable smarter use of energy, such as demand shifting to time periods when the grid generation mix has lower carbon intensity. The static approach used in SAP to electricity costs and carbon content is an issue that has been raised with us at Energy Systems Catapult numerous times by smart energy technology innovators.

4.3. OUR PROPOSED SOLUTION

The continued use of EPCs to frame policy targets risks distorting decisions and market behaviour in favour of technology solutions that do not efficiently deliver heat decarbonisation.

Our preferred long-term solution to driving decarbonisation in buildings would require substantial reforms to the way in which carbon emissions are measured, requiring the SAP methodology to be reformed and replaced with a smarter, more accurate building level measure of actual carbon and energy performance.

In the short term, we favour proposals to reform the EPC rating system by targeting a dual metric, based on a combination of the existing Energy Efficiency Rating and an improved version of the Environmental Impact Rating that relies more heavily on measuring actual carbon emissions. Given the likelihood of continued reliance on EPCs to articulate policy targets, government should be looking to reform this system, making it fit for the purpose of measuring actual carbon emissions, using digital technology and placing greater overall emphasis on emissions targets.

Targeting a dual metric could be a pragmatic, immediate first step towards a more evidence-based, data-led measurement of building carbon emissions. A dual metric would importantly encourage measurement of both carbon emissions as well as energy efficiency. Three elements of building

²⁰ [Energy Saving Trust, advice on solar panel, accessed 1 February 2023](#)

²¹ [HM Government, Net Zero Strategy: Build Back Greener, October 2021](#)

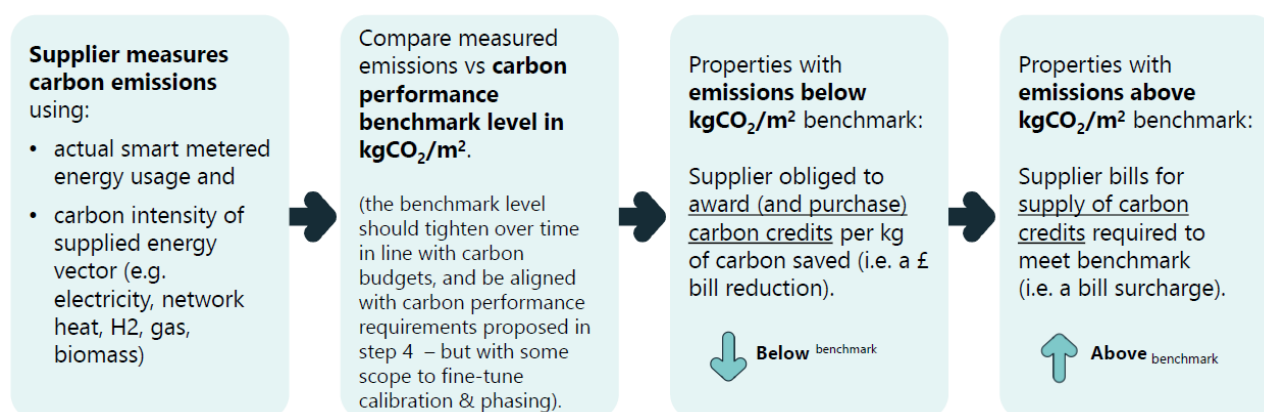
decarbonisation can be measured to a degree of accuracy if a dual metric becomes commonplace – namely financial cost, energy used, and carbon emitted.

In the longer term we believe there is scope for more ambitious reform. Our report *Towards an Enduring Policy Framework to Decarbonise Buildings*²² sets out a proposal to introduce a carbon credit scheme to incentivise the progressive rebalancing of energy demand over time in favour of low carbon energy. A new revenue neutral carbon credits scheme linked to measurement of carbon performance at property level (through smart meters) could help to achieve this. The scheme could be operated by energy suppliers and reward consumers with lower emissions. Those whose emissions remain high would need to purchase more carbon credits through their energy bills.

Consumers with lower emissions would be rewarded with carbon credits that reduce their bills, while higher carbon households would need to purchase carbon credits as well as energy in their bills. The resulting incentives could increase progressively over time, starting slowly but with a clearly signalled trend that eventually makes low carbon the obvious choice for mainstream consumers. Information on projected bills for different solutions over the next 5 to 10 years could also be provided, so consumers can start to factor this into home improvement plans. It would also strengthen the demand pull for flexibility to support zero carbon electricity.

A carbon credit scheme would need to overcome some implementation questions, such as with regard to access to households’ smart meter data. And there will also be a need to understand, and mitigate, any unintended distributional impacts on consumers.

Figure 3: How a carbon credit scheme could work



Source: ESC

We have also put forward the idea of minimum standards covering all buildings, with a heavier focus on carbon emissions. Akin to an MOT required by car owners, we argue that minimum standards based on carbon performance could be phased in to address building carbon emissions, perhaps introduced at natural trigger points, for instance at the point of sale, or in the private rental sector, at change of tenancy.

This could work in conjunction with the carbon credit scheme to reward low carbon choices through energy bills; encouraging consumers to reduce carbon emissions from their buildings.

²² [ESC, Towards an enduring policy framework to decarbonise buildings, February 2020](#)

5. CONFLICTING FUNDING MECHANISMS AND INCENTIVES

In this chapter we present examples of how the various funding streams that are available to local authorities to support building and heat decarbonisation, and the powers available to local authorities, at times misaligned with:

- Each other
- National decarbonisation objectives
- The funding and incentives that apply to energy network companies

In the rest of this section we first offer example of each of the above misalignments and then we demonstrate the compounding impact of these individual policies being misaligned with each other.

5.1. THE SOCIAL HOUSING DECARBONISATION FUND

The Social Housing Decarbonisation Fund (SHDF) was set up by BEIS in 2020 to encourage coordination between local authorities and social housing to decarbonise social housing. The fund has a substantial overall budget of £3.8 billion over 10 years. However, funding has been released incrementally in “waves” - £62 million in 2020, £160 million in 2021 and up to £800 million in 2022 – and delivery timeframes for funded projects are short.

The result has been that the fund has been ineffective at providing a sustained foundation for local projects to decarbonise social housing – with reports that more than half of councils funded under the scheme had to return their funding due to non-delivery of retrofits.²³ This, in turn, hinders the ability to develop local supply chains for retrofits and other forms of building decarbonisation.

The SHDF offers an example of a policy intervention that is not suitably structured to achieve the goals it sets out to. The short-termist structure of the fund means it has not been able to facilitate meaningful progress towards the government’s aim of social housing reaching EPC Band C by 2035. More generally, the fund has not facilitated the large-scale transformation of supply chains that to deliver the government’s building and heat decarbonisation objectives.

5.2. HEAT NETWORK ZONING

Heat networks are seen as a potentially important part of decarbonising heat in higher density local areas. Dedicated heat network zones are seen as a way of creating a “critical mass” of local demand can support investment in heat networks. With this in mind, the Heat and Buildings Strategy has committed to introduce heat network zoning in England by 2025, and the legislation to enable heat network zoning is currently going through Parliament as part of the Energy Bill (2023).

In a heat network zone, all new buildings, large public sector and large non-domestic buildings, and larger domestic premises that are communally heated would be required to connect to a heat network within a prescribed timeframe.²⁴ This means the demand from those buildings would not add (and may reduce) the demand for gas; nor would these building require electrification of heating. In the absence of jointly accepted plans, the local gas distribution company and/or electricity distribution company may base their investment plans on those properties remaining – or adding to – the demand for gas / electricity. These plans are then presented to Ofgem as the basis for requesting funding for upcoming ‘price control’ periods. Without coordinated planning,

²³ [Inside Housing, Social Housing Decarbonisation Fund: majority of councils failed to retrofit single home by deadline. Article dated 25 April 2022.](#)

²⁴ [BEIS, Heat network zoning, October 2021](#)

there is a risk that funding will be provided to meet demand that does not materialise – an inefficiency that would add to energy bills.

BEIS has launched a heat network zoning pilot in order to test the proposed zoning methodology (i.e. local plan).²⁵ Details on how the methodology is applied in practice are limited outside of the pilot participants, but the overview provided by BEIS appears to imply a planning approach that is focused on identifying heat network zones as opposed to a holistic plan of the optimal heat decarbonisation approach(es) for the local area. Again, this risks inefficiencies and potential inconsistencies between the heat network zoning and other local plans.

We also note that there appears to be a missed opportunity to link heat network zoning with mechanisms such as the SHDF, which could be a way to fund ambitious decarbonisation of local areas in a planned manner.

5.3. UNCERTAINTY MECHANISMS FOR ENERGY NETWORK COMPANIES

Electricity and gas network companies are local monopolies. They are regulated by Ofgem and funded on 5-yearly ‘price control’ cycles. At the time of granting the funding, Ofgem cannot know for certain what level of investment in the energy networks would be required to meet electricity and gas demand. Therefore, Ofgem uses a range of ‘uncertainty mechanisms’ to flex the allowances during the 5-year price controls in response to new information. Each price control typically sees the introduction or refinement of uncertainty mechanisms to address the most relevant uncertainties at the time.

The price controls for electricity distribution companies and gas distribution companies are set at different times,²⁶ and are not coordinated with each other. For example, if additional funding for an electricity distribution company is required to meet a faster than expected uptake of heat pumps in its region, there is no automatic mechanism by which Ofgem would also reduce the funding for the gas distribution company that operates in the same geography.

Moreover, the funding approved by Ofgem – either at the time of setting the price control or through uncertainty mechanism – is not directly linked to local spatial plans. To illustrate the contradiction that this creates, we link back to the two examples discussed in the preceding sub-sections: decarbonising social housing (e.g. via SHDF funding) and/or introducing heat network zones would have an impact on the demand for and need to invest in the gas and electricity networks in the local area. However, the uncertainty mechanisms that are used to adjust electricity and gas network companies’ funding during the price control periods are not designed to specifically take account of such local circumstances. This would likely result in over- or under-funding of individual energy networks, as local conditions deviate from those that inform the price control funding decisions.

5.4. OUR PROPOSED SOLUTION

Given the varying heat sources, uses, building characteristics and associated infrastructure that exist across different areas and regions, it is vital that local level plans, and wider planning system, are used to help set and deliver tailored heat decarbonisation.

²⁵ [BEIS, Heat Network Zoning Pilot, 1 November 2022](#)

²⁶ The current price control for electricity distribution (called RIIO-ED2) runs from 2023 to 2028. The current price control for gas distribution (RIIO-GD2) runs from 2021 to 2026.

Local Area Energy Plans (LAEP) have the potential to also address the complexity of spatial and energy system governance by ensuring the collective investments and strategic choices required for the decarbonisation of heat are made with a whole system view, rather than in siloes.

Energy Systems Catapult developed the LAEP concept precisely with this aim in mind, and have implemented LAEPs in a number of local areas including Greater Manchester and Bridgend.²⁷

Introducing a statutory framework to support LAEP could bring the spatial planning and energy planning frameworks together to ensure coordinated decision making and investments. For example, these plans could direct wider energy system investment decisions required for heat decarbonisation, and ensure local level policies align with the regional energy network investments and infrastructure required for low carbon heating.

²⁷ See: <https://es.catapult.org.uk/tools-and-labs/local-area-energy-planning/>

6. NEXT STEPS

In this short report we have highlighted examples of the contradictory policy landscape that relates to heat and building decarbonisation in the UK. We demonstrated how these contradictions act as barriers to the effective and speedy progress needed to meet interim aims such as targeting 600,000 installation of heat pumps by 2028 and banning the sale of gas boilers from 2035. Ultimately, if not addressed, these contradictions make it less likely that the UK would be able to achieve net zero emissions by 2050.

For each of the three examples of policy contradictions that we presented, we briefly introduced a solution that is aligned with our overall framework as per our report *Towards an Enduring Policy Framework to Decarbonise Buildings*.²⁸ This is not to say that our solutions address the entirety of the policy landscape, nor that they are immediately implementable.

In particular, to support the specific proposals made in this report there is need to address the broader policy landscape regarding heat and buildings:

- Further clarity is required on the national strategy to decarbonise heat and buildings – particularly about the potential role of hydrogen
- Local authorities would need to be funded and resourced to be able to deliver (and monitor delivery by others) LAEP and to undertake any new roles with regard to reducing fuel poverty.
- There will be a need to establish how LAEP informs energy network companies' investment plans that are submitted to Ofgem, and what discretion Ofgem should have with regard to funding plans that align with a LAEP. We note that Ofgem is currently consulting on proposed reforms of local energy institutions and governance, which have the potential to clarify the link between LAEP and the funding provided for energy network companies under price controls.²⁹
- There will also be a need to ensure the coordination of LAEPs across neighbouring local areas, as well as with national plans for investment in energy infrastructure – for which the newly established Future System Operator will be responsible. Again, Ofgem's consultation on local energy institutions and governance offers a proposal for how this could be addressed.
- Lastly, an alternative methodology for EPCs, which more accurately reflects real-world energy use and emissions will need to be developed, tested and implemented – including any implications for restating government targets that are currently defined in terms of EPC bands.

²⁸ [ESC, Towards an enduring policy framework to decarbonise buildings, February 2020](#)

²⁹ [Ofgem, Future of local energy institutions and governance, 1 March 2023](#)

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**ENERGY SYSTEMS CATAPULT
7TH FLOOR, CANNON HOUSE,
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