

# Why our energy performance system is broken

New research uncovers the staggering inaccuracy of the certificates used to rate homes' efficiency. By *Martina Lees*

Taxpayers, homeowners and landlords face paying billions of pounds to upgrade the energy efficiency of their homes — but the “staggering inaccuracy” of energy certificates means the upgrades will make little difference to either climate change or energy bills.

Experts say the energy performance certificates (EPCs) at the heart of the government's net-zero plan overestimate energy use by up to 344 per cent.

EPCs rate homes on energy efficiency from A (best) to G (worst). They estimate a property's likely fuel cost, energy use and carbon dioxide emissions. Based on unscientific box ticking, these certificates have long been known to be a blunt instrument — and research for *The Sunday Times* shows just how far from reality they are.

## Misleading baselines

On average the certificates overstate energy use by almost double. CarbonLaces, a climate fintech company, compared the EPCs of more than 17,000 homes with their actual use, as logged by smart meters every half hour for at least 300 days, to calculate



John and Harriet Kennett and their converted properties  
VICKI COUCHMAN FOR THE SUNDAY TIMES

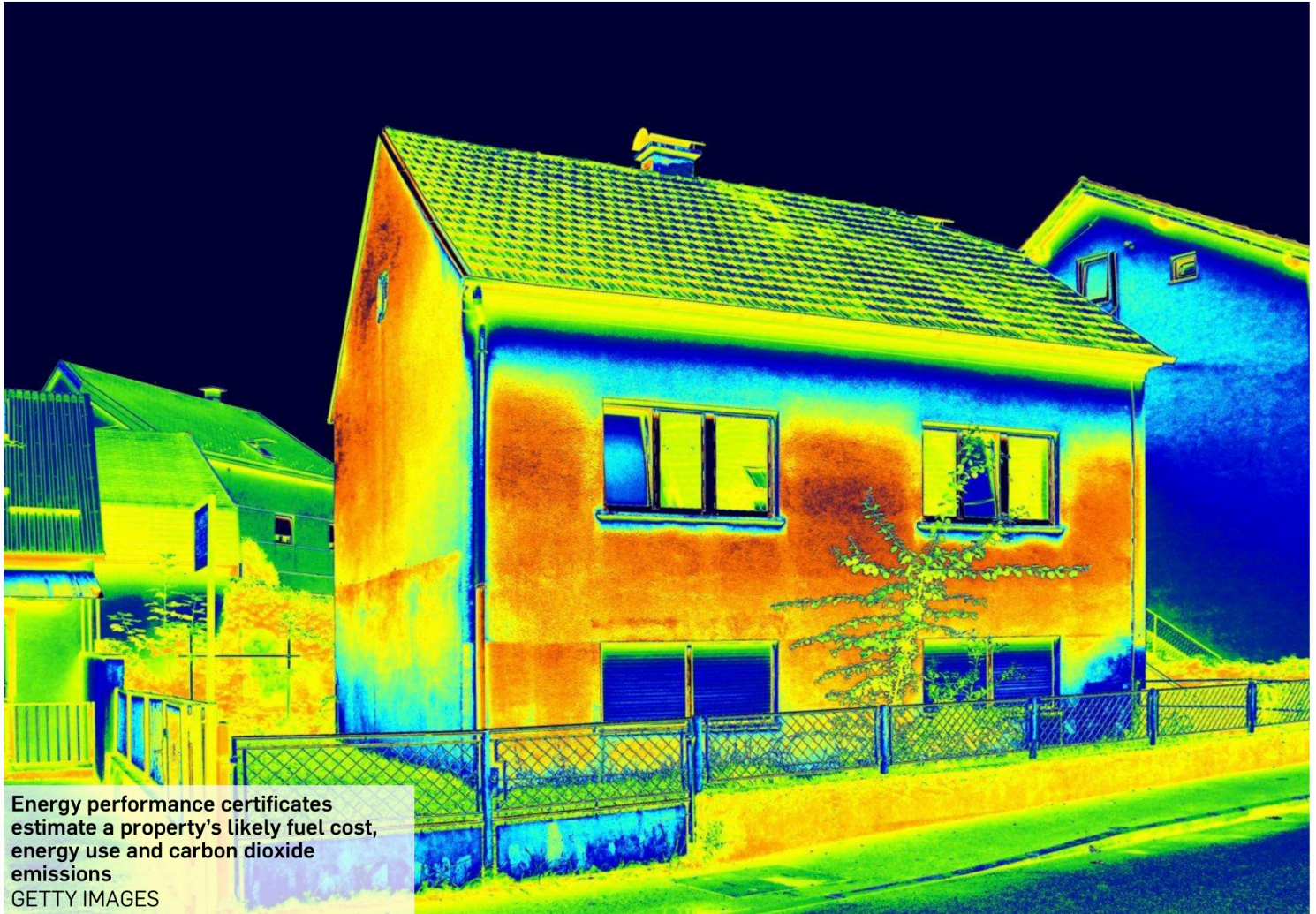
their energy bills. The average metered gas and electricity use for all the properties studied was 125kWh per square metre a year — 91 per cent lower than what their EPCs claim (239kWh/m<sup>2</sup>/yr).

The lower the EPC rating, the bigger the overestimation. For properties with the worst rating of G, EPCs estimate they use 656kWh/m<sup>2</sup>/yr. Yet their smart meters show they use only 151kWh/m<sup>2</sup>/yr — a 344 per cent gap.

This inaccuracy is “quite staggering”, says Madhuban Kumar, the founder of

CarbonLaces. “The inaccuracy increases exponentially for energy-inefficient homes.” It shows the government may be overallocating taxpayers' money to upgrade homes with the worst ratings, she adds.

D-rated homes, the most common grade across Britain, have a 52 per cent overestimation. The reality gap is 161 per cent for homes rated F, 90 per cent for E and 23 per cent for C. The most accurate EPC ratings are A and B, although these still slightly underestimate true energy use.



Energy performance certificates estimate a property's likely fuel cost, energy use and carbon dioxide emissions  
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EPCs overestimate not only energy use but also carbon emissions, by between 20 per cent (C) and 308 per cent (G). The certificates are “misleading, creating misleading baselines”, the CarbonLaces report says.

In a retrofitted Queen Anne townhouse in Westminster, I explain the findings to Lord Deben, chairman of the independent Climate Change Committee that advises the government. Earlier this month he wrote to the housing minister that EPCs are “not fit for purpose” and should be

improved.

Deben says there is a “double whammy” of issues. First, the EPC regime is not accurate. “That’s what your research has shown . . . It is obviously not sensible to use, as part of the way in which you give subsidy, a measurement that doesn’t actually work.”

Second, “even if it were accurate, it doesn’t actually do the job”. It fails to tell people accurately how they can improve their home’s energy efficiency, he says. Usually, it tells you “to replace your present fossil fuel boiler with a

better one or to have solar PV . . . But it doesn’t do anything about the nature of the house. People would be better off putting a flap over the inside of their letterbox or more insulation in the roof.”

**Net-zero linchpin**

Why does it matter? EPCs were introduced in 2007 to help buyers and renters choose a property. Every home listed for rent or sale needs the certificate, which is valid for 10 years. To get one nothing in your home is tested. Nothing is measured. It takes just a 15-



minute visit in which an assessor asks a few questions, ticks a few boxes and feeds that into a computer model that kicks out a rating.

Yet EPCs have become the linchpin of Britain's legal commitment to reach net zero emissions by 2050. The government has targets to upgrade "as many homes as possible" to grade C by 2035, and all fuel-poor homes to C by 2030. All rental homes would have to be C or better from 2025 under proposals for landlords, who are already banned from letting properties rated F or G.

It is becoming harder to get a mortgage on homes with poor ratings. Some banks already offer better terms on homes with high EPC ratings. By 2030 lenders would have to average a C rating across their portfolio, under plans the government is considering.

Despite such inaccuracy, a poor EPC can affect your house price. The EPC rating is now more important to buyers than access to local green space or public transport, according to a quarterly survey of 4,500 people for NatWest. One in five buyers deemed an EPC rating of C or above "essential".

"[The EPC system] was never meant for what is currently being thrown at it, which is where a lot of the discrepancies start from," Kumar says. "The key thing is, if you don't have accurate data, what are you measuring against? And what are you

delivering into?" She adds that Britain is "comparing apples to oranges and expecting remarkable results. That's not going to happen."

### Arbitrary algorithm

For John Kennett, 79, the study findings were no surprise. EPCs are "well meaning but in reality incoherent", he says. In 2009 Kennett and his wife, Harriet, converted stables next to their house in South Warnborough, Hampshire, into rental homes. One was rated C, based on building regulations inspections that confirmed insulation in the floor, walls and roof.

After a tenancy change in 2020, however, its EPC was "arbitrarily" downgraded to E because the new assessor assumed there was no insulation, Kennett says. Neither the insulation nor anything else in the property had changed — only the lightbulbs, to low-energy ones.

If the proposals to ban rental homes below C become law, Kennett says his tenants would be homeless, "because I would not be able to let to them any more [unless upgrades exceed £10,000]. Given that we've got a monumental housing shortage, it just seems ridiculous."

In Wimbledon a landlord letting his one-bedroom flat through Swift property lettings replaced a defunct gas boiler with an electric boiler that emits less carbon and takes up

less space. The change meant the flat, which achieved an EPC rating of C with the old boiler, had to be reassessed before it could go back on the market. Despite the greener boiler, its rating dropped to D. Like Kennett, the owner would be banned from letting the flat after 2025.

James Ranson of Mill Energy, who issued the new EPC, demonstrates why. Over a Zoom call, he shares his screen with the software that calculates the flat's EPC rating. As I watch he selects a new, more efficient gas boiler. The system factors in the performance of the exact boiler model and the score improves. But when he toggles to an electric boiler, it drops. The software does not allow him to distinguish between different types of electric boilers. "Whether you spent £500 on an electric boiler or £5,000, it wouldn't make a difference," Ranson says.

Likewise, triple glazing can get the same score as a thin sheet of Perspex stuck on to a single-glazed window. In some cases even a heat pump — seen as the future of low-carbon heating — harms the EPC score, an inquiry by the House of Lords environment and climate change committee found on Wednesday.

"EPC methodology must be corrected so that certificates properly reward households for making the switch," the committee's report says. It also highlights how "flawed" recommendations on the

certificates stop some homeowners from getting £5,000 grants to swap gas boilers for heat pumps.

The problem is that the EPC method is based on the cost of energy. It favours gas, which is three times cheaper than electricity — even though electricity emits less carbon as 40 per cent of it is generated from the wind or sun.

### ‘Bodged’ new-build tests

When it comes to new-build homes, the certificates are open to abuse. Deben, who as John Gummer was a Tory environment secretary, has previously accused Britain’s biggest developers of “building houses which cheat the public”.

For new homes, EPCs can be issued on design data alone. The software assumes everything is perfectly fitted, which may be far from true. The “only physical test” is for airtightness in one house, which is applied to EPCs across the development, says Paul Buckingham, an assessor who witnessed builders “blatantly bodging” the tests.

If a house fell short of its specified airtightness, Buckingham often had to wait while workers sealed gaps. “They’d spend half an hour going around the skirting boards, sealing it all with mastic and foam.” He then had to rerun tests until the home passed — only for carpet fitters to cut out all the sealant again.

“All they do is make the

plaster wall box airtight, while the building itself is very leaky. Give me a garden shed and enough mastic, foam and plaster board and I can make it airtight . . . It’s nothing to do with making sure that they’re energy efficient. It’s to do with ticking a box,” says Buckingham, who specialises in [thermal imaging surveys](#) to detect faults in new homes.

About 85 per cent of new homes had an A or B rating, compared with less than 4 per cent of existing homes, according to a new report by the Home Builders Federation, an industry group.

“The standards, in any case, are far too low,” Deben says. He lambasted the government for “disgracefully” scrapping plans that would have required zero carbon new homes from 2016. “We built about 1.5 million houses since then that are not fit for the future. They all have to be retrofitted,” he says.

“Housebuilders have handed on to the purchasers a cost that they should have carried themselves,” Deben says. Since 2016 developers raked in billions of pounds in profits, he adds. “That money came from building crap houses, which meant that the people who bought them would have to retrofit them . . . it’s a scandal.”

### Britain’s retrofit reality

The CarbonLaces study is the first of its kind. Smart meter data is “very hard to access”, with multiple regulatory

requirements, says Kumar, whose start-up combines the anonymised data with artificial intelligence to build financial tools for decarbonisation.

The research had one anomaly. Homes certified as F and G used less metered energy than those graded E, when you would expect the opposite. This could be because the people living in those homes may sacrifice comfort to avoid high bills, or may be on prepaid meters, the researchers say. The study could include some bias, as homes with smart meters “may overrepresent energy-conscious households”, they add. More analysis is needed.

The company created [an app](#) where you can look up your home’s postcode to compare its EPC rating with what it should be, based on modelled smart meter data. It calls this “real” rating CLEVR, which stands for CarbonLaces energy verified record.

So how bad is Britain’s retrofit problem really? Across the 17,000 homes analysed for the study, 87 per cent have an EPC rating below C — meaning they fail the government’s 2035 target — and 13 per cent are graded F or G, so cannot be let.

The picture looks less dire if we take their CLEVR rating: only 2 per cent would be banned as rental homes. Two thirds fall short of C. That still requires a lot of retrofitting, but nowhere near as much as EPCs say. ■