

About CSE and the TCPA

CSE is an independent national charity, established in 1979 to tackle climate change and end the misery of cold homes. We undertake practical work to support households and communities to take action on energy, alongside original research and analysis to inform local and national policy.

CSE has particular research expertise in: the alleviation of fuel poverty and modelling the social and distributional impacts of energy policy; complex data modelling and software engineering; low carbon planning; and community engagement in sustainable energy. In 2014 CSE was awarded the prestigious national Ashden Award for Alleviation of Fuel Poverty.

CSE provides consultancy services to local authorities across England, with a particular focus on developing effective planning policies to address the climate crisis, that builds upon our expertise on how decarbonisation, energy and fuel poverty issues intersect.

CSE has strong working relationships with national policy makers and influencers, including as a specialist technical advisor to the Department for Business Energy & Industrial Strategy (BEIS) and the energy regulator Ofgem.

The TCPA works to support all communities to be just, healthy and sustainable. This was the aim of the Garden City principles when they were developed and they are as relevant today as ever. Founded in 1899 on a platform of social transformation, the TCPA is the UK's leading charity focused on planning, housing and sustainable development.

Through their work over the last century they have improved both the art and science of planning in the UK and abroad. The TCPA puts social justice and the environment at the heart of policy debate and seeks to inspire Government, industry, communities and the wider public to take a fresh perspective on major issues like housing, regeneration and climate change. The TCPA work to achieve transformational change through practical solutions which enhance everyone's health, safety, wellbeing and life chances.

Summary of Key Messages

There is a need for systemic change in how we regulate the built environment: Both CSE and the TCPA welcome the Government desire to improve Building Regulations but there is a case for a more fundamental review of the regulatory regime. The regulation needs to be focused not only on sustainable development and health & wellbeing, but also on the enforcement and oversight of regulations. This is particularly important in a house building industry with a culture of noncompliance and systemic problems of quality assurance. We are also concerned at the large amount of new homes being delivered through Permitted Development conversions where full planning permission is not required. It is vital that Building Regulations on energy efficiency are fully applied to this form of development.

Further and Faster. There is an overwhelming imperative to seek radical reductions in carbon emissions across our economy. This consultation offers a gradualist approach to setting building standards on energy efficiency instead of offering the fundamental change of approach which is implied by the evidence of the climate crisis. While we understand the value of responding to the detail of this consultation, what is required is for Government to draw together the key sectors in the development process and forge a much more ambitious consensus for change. Given that there is no technological barrier to deployment of solutions in areas like building efficiency; Government needs to focus on the other key barriers for change such as skills and our current highly speculative housing development model which the Government itself has described as 'broken'.

Designing in innovation and accountability. While clarity between the role of building regulations and town planning in setting standards is useful, this should not under any circumstances remove the power of local planning authorities to set standards above building regulations where this can be justified by the evidence and has been tested through the viability test in the local plan examination. With fast moving innovation in energy and construction technologies and much greater ambition by local communities to take action on climate change it is essential that local authorities retain flexibility to set local policy standards. It is worth noting that the majority of policy innovation on renewable energy systems and building standards has been set by local government. Building Regulations should act as a policy floor rather than a ceiling at local level.

Shifting the focus to operational performance. We appreciate the inclusion of suggested measures to improve as-built performance through Building Regulations, however the proposals do not go far enough. Many studies have shown that there can be a significant difference between modelled and operational performance and, if homes are to have a lower impact on the environment and be affordable to heat, then it is essential that this gap be properly addressed. We would strongly encourage the government to consider alternative approaches to promote high standards in operational performance. For example, this could include extending the scope of the Future Homes Standard to require disclosure of metered data or other post-occupation monitoring to improve accountability across the house building industry. Such measures would be likely to encourage rapid and ongoing development of the skills necessary to meet our carbon targets in this sector and to more effectively respond to the threat of climate change.

Maintaining fabric performance. We are concerned by the suggested removal of the Fabric Energy Efficiency Standard (FEES). In our view, good fabric performance is a necessity and should always be the very first step in reducing carbon emissions. More energy efficient dwellings place a lower burden on energy supply, are less likely to require extensive retrofit to meet higher standards in the future, and are more effective than the alternative technology-based options at keeping down consumer energy bills in the long term. It is therefore very worrying that modelling carried out by the London Energy Transformation Initiative (LETI) suggests that under the new regulations it would be possible to construct a new home that is less well insulated in 2020 than under Building Regulations 2013.

In addition, we welcome that Parts L and F of the building regulations are being considered together and that additional regulation will be consulted on separately for over-heating. Regarding the mitigation of over-heating, we encourage government to take an integrated approach, setting baseline standards through building regulations, and also using the planning system to tackle overheating through measures including site layout, orientation, the provision of shade and transpiration cooling from green infrastructure. The specification of the building can reduce the risk of internal overheating, but these measures can also reduce outside temperatures.

Responses to consultation questions

Response to consultation question 1

“Do you agree with our expectation that a home built to the Future Homes Standard should produce 75-80% less CO2 emissions than one built to current requirements?”

- a. Yes
 - b. No – 75-80% is too high a reduction in CO2
 - c. No – 75-80% is too low a reduction in CO2
- If no, please explain your reasoning and provide evidence to support this”**

Option c. No, 75-80% is too low a reduction in CO2. The Committee on Climate Change (CCC) Net Zero report requires “full decarbonisation of buildings by 2050”¹ and the CCC Fit For the Future report calls for ultra-high levels of energy efficiency by 2025 at the latest². Therefore, we consider that the proposed 75 – 80% reduction is short sighted and is likely to result in the need for costly retrofitting of buildings at a later date if the UK is to meet required emissions reductions targets.

Response to consultation question 2

“We think heat pumps and heat networks should typically be used to deliver the low carbon heating requirement of the Future Homes Standard. What are your views on this and in what circumstances should other low carbon technologies, such as direct electric heating, be used?”

We strongly support the appropriate use of low carbon heating systems such as heat pumps and heat networks in new development, but we believe that there should be some flexibility in how new developments meet energy performance standards and that Building Regulations should avoid being overly prescriptive on technology options in order to allow room for innovation.

CSE considers that there are some inherent tensions between addressing fuel poverty and the decarbonisation of heat. In this context, any use of direct electric systems will be likely to significantly increase the cost of heating for home owners when compared with either heat pumps or district heating. Direct electric heating also adds to costs all the way up the electricity system, from LV cabling, through secondary and primary substations, up to the generation tier when compared to the use of heat pump systems.

While we understand that the government is putting in place affordability safeguarding to ensure homes are affordable to heat, we have concerns that the use of direct electric heating could have significant unforeseen impacts on the affordability of heat for occupants. The risks of this are particularly high given the well evidenced performance gap between designed and built energy

¹ The CCC (2019) Net Zero – The UK’s contribution to stopping global warming, available at <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>, p.200

²The CCC (2019) UK Housing: Fit for the future?, available at <https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf>

performance of new development, and the weak enforcement of building regulations highlighted in the 2018 Hackett Review.

Direct electric heating is likely always to be the lowest up-front capital cost solution; developers will therefore tend to have a strong financial incentive to use this solution, and very strong national regulation or policies are required to enable Local Planning Authorities to resist the tendency to install direct electric heating in buildings which are not appropriate.

Furthermore, the widespread use of direct electric heating could further intensify pressures on the electricity distribution grid, particularly when combined with the electrification of transport.

Given the greater efficiency of heat pumps and district heating, these heating technologies should be given strong preference. We consider that direct electric heating should *only* be allowed in dwellings certified with exceptionally high levels of fabric energy efficiency (e.g. Passivhaus) and where the running cost to occupiers is not demonstrably higher than heat pump or district heat alternatives.

Response to consultation question 4

“When, if at all, should the government commence the amendment to the Planning and Energy Act 2008 to restrict local planning authorities from setting higher energy efficiency standard for dwellings?”

- a. In 2020 alongside the introduction of any option to uplift the energy efficiency standards of Part L**
- b. In 2020 but only in the event of the introduction of a 31% uplift (option 2) to the energy efficiency standards of Part L**
- c. In 2025 alongside the introduction of the Future Homes Standard**
- d. The government should not commence the amendment to the Planning and Energy Act Please explain your reasoning.”**

Option d. The government should not commence the amendment to the Planning and Energy Act, and local planning authorities should be allowed to set higher energy efficiency standard for dwellings. Following on from confirmation that local planning authorities are able to set higher energy efficiency standards than the building regulations³, we are aware of at least 32 authorities (all the London boroughs) with adopted zero carbon policies and at least 16 authorities (including 4 authorities within the west of England, all 10 authorities within Greater Manchester, plus Oxford and Reading) in the process of developing zero carbon planning policies, plus numerous authorities with policies requiring development to achieve higher emissions reductions than current building regulations.

Removing the powers of local planning authorities to set higher standards than building regulations would supercede and downgrade all of these policies, resulting in higher carbon emissions in all of

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/728498/180724_NPPF_Gov_response.pdf

these local authority areas. This is precisely the opposite of the message that should be sent by policymakers.

More than half the UK's principal local authorities have now declared a climate emergency, and have committed to achieving net zero carbon emissions prior to the UK wide 2050 deadline. Many are now reviewing their planning policies so as to contribute to the delivery of their declaration commitment. Removing the ability of local authorities to set higher energy efficiency standards would take away a key tool and would hamper their ability to deliver on these commitments, again slowing the pace of carbon reduction.

As noted by CCC, the UK is not on target to meet its existing emission reduction commitments⁴. Policy approaches by local planning authorities which allow areas to decarbonise at a faster pace (steepening the UK's overall emission reduction trajectory) should therefore be welcomed.

Additionally, relying solely on building regulations without substantial improvements in enforcing compliance is unlikely to produce the carbon emission reductions needed. The 2018 Hackett Review of Building Regulations and Fire Safety identified that compliance with current building regulations is weak. A recent government funded study by Innovate UK⁵ found that carbon emissions were 3.8 times higher than design estimates across a range of non-domestic buildings and only 1 of the 49 buildings had actual carbon emissions that matched the design estimate

The consultation makes no provision for the assessment and regulation of embodied carbon, and it is unclear whether local planning authorities would be able to regulate this through planning mechanisms, as some are starting to do. We agree with LETI that requirements for whole life carbon assessment and regulation should be phased in, starting with larger developments in the 2020 review.

⁴ <https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/>

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/497706/Non_Domestic_Building_performance_Summary_2016.pdf

Chapter 3 Part L Standards for New Homes in 2020

Response to consultation question 6

“What level of uplift to the energy efficiency standards in the Building Regulations should be introduced in 2020?

- a. No change**
- b. Option 1 – 20% CO2 reduction**
- c. Option 2 – 31% CO2 reduction (the government’s preferred option)**
- d. Other”**

Option d. It has already been demonstrated that it is economically and technically viable for developers to achieve carbon savings of more than 31%⁶. The London Plan requires a 35% improvement on current building regulations. Bath and North East Somerset Council (BANES), Bristol, South Gloucestershire and North Somerset Councils are also considering similarly high standards. Their shared evidence base⁷ suggests that it is possible to achieve net zero regulated carbon emissions from a combination of energy efficiency (10% improvement beyond building regulations) on site renewable energy and allowable solutions for an additional capital cost of between 5-7% for homes and non-domestic buildings. Achieving net zero regulated and unregulated emission is likely to result in a cost impact of 7-11% for homes in these areas at the time of the report.

Given that supply chains and skills will develop rapidly in the scenario where national building regulations have been put in place, and that higher standards have already been proven viable in England, for example Greater London, we consider that 31% reduction is too low and that the Government should consider higher standards.

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https://www.london.gov.uk/sites/default/files/driving_energy_efficiency_savings_through_the_london_plan_-_data_analysis_report_-_buro_happold.pdf

⁷ www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/LP20162036/cost_of_carbon_reduction_in_new_buildings_report_publication_version.pdf.

Response to consultation question 7

“Do you agree with using primary energy as the principal performance metric?”

- a. Yes – primary energy should be the principal performance metric**
 - b. No – CO2 should remain the principal performance metric**
 - c. No – another measure should be the principal performance metric**
- Please explain your reasoning and provide evidence to support this.**
- C. another measure should be the principal performance metric”**

C. Another measure should be the principal performance metric. In principle we agree that primary energy and carbon are sensible metrics to apply, as long as a building must achieve targets on both metrics to meet the standard. In addition we believe that a thermal fabric efficiency standard should also be applied. This is because the heating system has a far shorter lifetime than the building. A building which met the standard by utilising low carbon / low primary energy factor (PEF) fuels could become non-compliant in future, e.g. if the heating system were replaced with direct resistive heating, a change for which planning permission would not be required. Put another way, thermal fabric efficiency standards are an integral part of a least-regrets approach to setting standards for new development.

While we agree that (PEF) are in principle a good metric, we have significant concerns regarding the current methods for defining PEF for different fuels (as set out in <https://www.bregroup.com/sap/sap10/> and referred to in the consultation document). These are as follows:

As a general point, it is not explained (either in the consultation document, or in the SAP 10.1 documentation it references) how the PEF for the various fuels have been derived or how and when they will be updated: it is necessary to read a third document (CONSP:07⁸) to get any further detail. Since the proposed changes to Parts L and F refer directly to these PEF, they form the basis of the new standards. It is therefore essential that their derivation be transparent and part of the consultation.

We also have some specific issues to raise with the PEF values in the SAP 10.1 document referred to by the consultation document. Grid-connected renewable energy sources such as wind and solar are assigned a PEF of 1, despite requiring no fuel inputs⁹. This means that the PEF of wind energy (= 1) is more or less equivalent to that of house coal (= 1.064). This is inappropriate: the factor for renewables should be the lifetime kWh required to create the plant, divided by the lifetime energy yield. This is equivalent to the energy return on investment (EROI). For wind this would be

⁸https://www.bre.co.uk/filelibrary/SAP/2016/CONSP-07---CO2-and-PE-factors---V1_0.pdf

⁹“A significant portion of UK electricity is now generated using renewable sources, like wind and solar energy. Due to these sources being abundant, a statistical convention of assigning these renewables a primary energy factor of 1 at the point of generation has been adopted for the calculation of the electricity primary energy factor.” - Briefing Note – Derivation and use of Primary Energy factors in SAP. BRE. Version 1.3 – 01/10/2019

somewhere around 0.02^{10} , whereas the current method results in a value of 1. In fact the proposed method for renewables in general is akin to treating the environmental heat gathered by a heat pump as a primary fuel input. The latter is not proposed, but would be also wrong.

The above issue applies to other fuels:

- Waste vegetable oil
- Wood, biomass and waste
- Wood logs
- Wood chips and pellets
- Straw bales

Furthermore:

- Refuse Derived Fuel (RDF) is inexplicably treated differently (and in our view, correctly)
- Any electricity sold to the grid has a factor of 0.501: this is not explained.

Lastly, and very importantly, the PEF for heat networks risk introducing a systematic bias against that solution. For example, where the heat is supplied by electric heat pumps, the heat from the network is assigned a PEF of 1.501: this treats the network as though its heat source were a resistive electric heater. This is wrong, and inconsistent with the examples given by BRE in the SAP 10.1 documentation. As an illustration, the following example is taken from Appendix B of the BRE briefing note:

- *Dwelling B with a 300% efficient electric heat pump has a heating demand of 10,000 kWh. The PE factor for electricity is 1.501 kWh/kWh. The associated primary energy would be $(10,000 \text{ kWh} / 3.00) \times 1.501 = 5,003 \text{ kWh}$.*

Now if an identical dwelling were supplied from a heat network which was itself supplied by a heat pump, the currently proposed factor would lead to the following result:

- *Dwelling B' with a connection to a heat network, itself supplied from a 300% efficient electric heat pump, has a heating demand of 10,000 kWh. The PE factor for heat from such a network is 1.501 kWh/kWh. The associated primary energy would be $10,000 \text{ kWh} \times 1.501 = 15,010 \text{ kWh}$.*

Despite the fact that these two examples have identical primary energy inputs, the dwelling-level heat pump is strongly preferred. In practice the situation is even worse, since larger scale network-connected heat pumps tend to be both more cost effective, and more efficient than their building-

¹⁰For example see EROI of different fuels and the implications for society, Hall et al, 2013 [available at <https://www.sciencedirect.com/science/article/pii/S0301421513003856>]

level counterparts. This problem affects the PEF values for heat networks supplied from a range of renewable inputs in addition to the example above.

Response to consultation question 8

“Do you agree with using CO2 as the secondary performance metric?”

- a. Yes**
- b. No”**

Yes. PEFs should be used as the primary metric because they encourage efficiency, and conservation of finite resources. This is related to but distinct from the question of climate impacts. The latter is a fundamental problem in its own right, and must be addressed directly. CO2 targets are the way to do this and therefore should be the secondary performance metric.

Response to consultation question 9

“Do you agree with the proposal to set a minimum target to ensure that homes are affordable to run?”

- a. Yes**
- b.No**

Please explain your reasoning”

Yes, we agree that this would be an acceptable backstop to ensure that properties are affordable to run. However we think that a far more effective mechanism would be to retain and upgrade minimum fabric energy efficiency standards (FEES) so as to minimise the heating inputs needed in the first place. This obviates the risk we highlighted in section 7, where heating systems could be downgraded in future without requiring planning permission.

Response to consultation question 13

“In the context of the proposed move to a primary energy metric and improved minimum fabric standards, do you agree with the proposal to remove the fabric energy efficiency target?

a. Yes

b. No

If no, please explain your reasoning.”

B. No. The FEES must not be removed. It must be retained with notional fabric U-values and airtightness further improved. A balanced low energy solution is needed with high energy efficiency levels directed regulated by the Fabric Energy Efficiency Standard and the incorporation of renewable energy.

The FFEE relates to the space heating and cooling demands of dwellings and therefore the removal of this may result in dwellings with a high electricity demand and lower thermal comfort for residents.

We refer to modelling by Bath and North East Somerset and LETI which shows that the inclusion of renewable energy can be used under the 2020 proposals to mask a poor building fabric, with resultant health risks from cold and damp. The use of heat pumps further reinforces the need for good fabric performance. The low temperature heat from heat pump systems is not suited to poorly insulated buildings and without good insulation levels, heat pumps will increase heating costs markedly.

The U-values set out in the minimum standards for fabric performance are not onerous enough to justify the removal of FEES. As it stands homes can be built with less insulation in 2020 than they needed under Part L 2013. Retrofitting our existing housing stock to address climate change and fuel poverty is extremely challenging. New homes should not add to the retrofit burden due to being built with poor building fabric in 2020. The opportunity should be taken now to address fuel poverty and climate change objectives at the same time, by adopting high FEES which “design out” fuel poverty and carbon emissions.

It is also imperative that the energy efficiency of our building stock is maximised to help deliver the decarbonisation of the energy system as a whole. The CCC predict that the decarbonisation (and electrification) of our energy, heat and transport systems could result in the need to quadruple the supply of low-carbon electricity by 2050¹¹.

Quadrupling our supply of renewable electricity will be extremely challenging, requiring us to accept renewable energy installations in locations and landscapes where to date they have been resisted and requiring the substantial upgrade of the electrical distribution network. Maximising the energy efficiency of new buildings reduces the scale of this challenge. The more we insulate our homes and buildings, the less renewable electricity we will need to generate, the less we will need to reinforce

¹¹Committee on Climate Change (May 2019) - Net Zero - The UK's contribution to stopping global warming - www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf

the distribution grid to meet peak electrical demands and the less we will need to compromise on the protection of our landscapes.

Further discussion on our response

CSE and the TCPA would be happy to discuss any sections of this response in further detail. Please contact us at the email addresses to continue this discussion:

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We are an independent national charity that shares our knowledge and experience to help people change the way they think and act about energy. Switched on since 1979.

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