energy saving trust

Consultation response

April 2021

The Future Buildings Standard

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1. About Energy Saving Trust

Energy Saving Trust is an independent organisation dedicated to promoting energy efficiency, low carbon transport and sustainable energy use to address the climate emergency.

Our work focuses on reaching net zero targets by taking action to reduce energy consumption, installing new infrastructure and accelerating a move to sustainable, low carbon lifestyles.

A trusted, independent voice, we have over 25 years' sector experience. We provide leadership and expertise to deliver the benefits of achieving carbon reduction targets: warmer homes, cleaner air, healthier populations, a resilient economy and a stable climate.

We empower householders to make better choices, deliver transformative programmes for governments and support businesses and community groups with strategy, research and assurance – enabling everyone to play their part in building a sustainable future.

2. Consultation description

The consultation proposals applies England only and can be found here[1]

The consultation summary states:

'*This is the second stage of our 2-part consultation on proposed changes to Part L (Conservation of fuel and power) and Part F (ventilation) of the Building Regulations.*

It builds on the Future Homes Standard consultation by setting out energy and ventilation standards for non-domestic buildings, existing homes and includes proposals to mitigate against overheating in residential buildings.

It sets out proposals for a Future Buildings Standard, which provides a pathway to highly efficient non-domestic buildings which are zero carbon ready, better for the environment and fit for the future'.

The Energy Saving Trust is pleased to respond to this consultation. The proposals represent a positive step towards improving the performance of new buildings in England.

We particularly welcome the focus on low-carbon heat, the step towards more resilient buildings (with the proposed introduction of a new requirement on overheating in homes and the decision to review Part L [energy and carbon] and Part F [ventilation] together and the reinstatement of the Fabric Energy Efficiency Standard (FEES) for new homes.

Whilst a positive step forward, there is scope to be more ambitious. This would require a clearer focus on the end-goal and a change from the established approach. Part L (energy, and carbon), the underlying methodology and its modelling/ compliance tools were not designed with net zero in mind and are too narrow in scope.

We have summarised our key recommendations overleaf

[1] https://www.gov.uk/government/consultations/the-future-buildings-standard

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3. Summary of recommendations

Whilst the Future Homes and Future Buildings Standards are a positive step forward, there is room for more ambition.

The proposals as a whole, present a 'business as usual' approach to change. The future energy system will be very different so we think a new approach which can take account for this. For 'world-leading' new buildings, we need a new approach backed up by new tools designed for the purpose.

Our key recommendations here are:

1. Ambition aligned to net zero

The last update to the energy and carbon part of the building regulations was in 2013. Given both this and our net zero ambitions, the proposed 22 or 27 percent improvement from 2022 does not seem ambitious enough. London has been successfully applying a 35 percent reduction since 2016 for large non-domestic buildings since 2016 and will operate a 'net zero carbon' policy from 2021. We recommend either a higher target overall or different targets for the types of building (offices, hotels etc.) based on ability to improve.

2. Energy not CO2 should be the focus

'Future-fit' buildings are ones in which energy use has been minimised from the outset. Prioritising relative metrics like primary energy and CO2 focuses on impact *now* rather than lifetime impact. This can mask high energy requirements which could be a drain on tomorrow's grid.

3. Building regulation scope should expand to include all future energy use

The building regulations control only part of the energy use in buildings - those from heating, lighting and cooling which are built into the building. In non-domestic buildings, 'unregulated' sources can be double those from 'regulated' sources. We can't manage what we can't measure so we need new forecasting tools and targets to reflect this. When we can 'see' this 'hidden' energy in advance, building design can minimise it from the outset.

4. We need 'very good' – not 'improved'

The 'notional building' approach requires builders to deliver a percentage improvement on equivalent buildings. This delivers buildings that are '*better*' but potentially still not '*good enough*'. A new approach based on maximum energy demand (kWh/ m2/yr.) for both total energy and space, heating and cooling would encourage designers to innovate and design out the need for energy in their buildings from the outset.

5. 'As-built energy performance must reflect design ('performance gap')

We welcome the steps made here but more is needed. A stronger focus on compliance, mitigation where there is a shortfall and Post Occupation Evaluations would support this. Prioritising operational energy as the key metric/ target (our recommendation 2) would allow prospective buyer and tenants to compare buildings and drive a market for buildings that reflect their design credentials (as with the Australian NABERs scheme)

6. Low carbon heating required as soon as cost-effective and affordable

The consultation sets out types of buildings where is it already feasible and affordable to install low carbon space and/ or water heating (such as heat pumps). We recommend low-carbon heating is installed in these buildings from 2022 (when the 2021 uplift applies) with fossil-fuel use phased out in new buildings from 2025.

7. Energy hierarchy approach

The proposed approach will allow gas heating and PV to be substituted for low carbon heating such as heat pumps. This locks-in fossil fuel usage and higher emissions for the 15-year lifetime of the boiler. We support an alternative 'energy hierarchy' approach in which all steps are taken to reduce demand first then heating is supplied, low-carbon where feasible, and only then are lower carbon technologies (such as PV) applied to offset residual emissions.

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4. Our response: Non-domestic

4.1 The Future Buildings Standard

Question 1): Our aim is that buildings constructed to the Future Buildings Standard will be capable of becoming carbon neutral over time as the electricity grid and heat networks decarbonise.
Do you agree that the Future Buildings Standard meets this aim?
a) Yes
b) No
Please explain your reasoning and provide evidence or alternative suggestions
Whilst we agree with the statement, we don't agree that the aim ('*buildings that can become carbon neutral over time*') is sufficiently ambitious. This would equally apply to the current building stock (this too would become carbon neutral over time if the existing fossil-fuel heating were replaced with an electric heating and the grid fully decarbonised).

Energy: We know that buildings of the future will operate in a largely electrified and dynamic energy market where costs could depend as much on *when* energy is consumed as on how *much*. Energy should therefore be the primary focus of a 'future-focussed' standard rather than primary energy or CO2, both relative 'snapshots' of how energy demand is currently met and electricity generated.

A further concern with Primary Energy and CO2 as the headline metrics (CO2 appears to function as a primary rather than a secondary metric), is that relative metrics do not help building users wanting to understand and improve the performance of their buildings or prospective buyers and tenants wishing to compare buildings.

To drive appropriate action here, we support the use of two metrics:

i) Energy Use Intensity (kWh/m2/year) to capture all operation energy ('at the meter' rather than regulated energy use) and
ii) Space heating and cooling (this supports the decarbonisation of heating)

We have a similar concern with the continued use of the 'notional building' approach. A percentage improvement from a notional baseline encourages a 'business-as-usual' approach to design ('better' but not necessarily 'good enough').

Replacing this relative metric with absolute targets (based on relevant benchmarks) for both i) operational energy and ii) space heating and cooling would incentivise new buildings in which energy demand is minimised from the outset (by attention to form, orientation, other passive measures, fabric improvements).

Heating: We welcome the focus on decarbonising heating. This is important but should not detract from the focus on overall energy demand. The heating system both in terms of the fuel and its efficiency has a relatively short lifetime (c. 15 years) in comparison to the average building lifetime (the Impact Assessment here suggests 60 years). Given this, we do not support an approach where gas heating and PV can be substituted for heat pumps/ low carbon heating or where short-term CO2 savings from building services can be traded for lower fabric efficiency.

Instead, we would prefer an' energy hierarchy' approach where the first priority is to reduce energy demand as low as possible. The next step is to supply heating as efficiently and as low carbon a manner as possible before finally offsetting residual demand/ emissions (by onsite renewables such as PV).

On low carbon heating, we support an approach where this is installed in new buildings from 2022 (when the proposed 2021 uplift will take effect), in the types of buildings which MHCLG has indicated as most suited for low-carbon space and or hot water heating. From 2025, our view is that fossil-fuel heating should not be installed in new buildings (except where a relevant exemption applies).

Question 2): We believe that developers will typically deploy heat pumps and heat networks to deliver the low carbon heating requirement of the Future Buildings Standard. What are your views and in what circumstances should other low carbon technologies, such as direct electric heating or hydrogen, be used?
We do not think that the proposed carbon and primary energy based metrics are sufficient to drive low-carbon heating at the rate needed to contribute to the UK's new 2030 emission targets.

The proposed approach relies on builders choosing heat pumps rather than gas + PV as a means of compliance because the consultation modelling suggests that this will currently be the lowest-cost option.

This is unlikely to be sufficient for the following reasons:

- Builders may feel that buildings with gas + PV attract a higher sale price/ rent
- Gas + PV could be easier to deploy at scale for volume builders
- When deployed at volume, there is scope for a more significant cost-saving with gas + PV than heat pumps due to the labour involved and the maturity of the supply chains. This would erode/ close the cost difference identified in the consultation.

A stronger approach would be a clear restriction on installing fossil-fuel heating in new buildings from 2022 when the proposed 2021 uplift will take effect. For the building types where either space heating (for example, warehouses) or hot water heating (for example, hotels and hospitals) is not yet feasible and cost-effective (for builder and end-user), there could be 'class' exemptions.

There should also be a provision to exempt individual buildings/ areas (for example, where buildings would be expected to connect to a forthcoming heat network or low carbon gas pilot). The exemptions should be reviewed on an annual basis.

This Currie and Brown modelling for the Climate Change Committee (CCC) suggests that low-carbon heating would be affordable for the developer and cost-effective for occupants in offices now if installed as part of a package of measures including higher standards for fabric and building services (particularly lighting).

P58-9 of the Currie and Brown report suggests that the provision of a ASHP as part of a package to deliver a 25 percent uplift (from Part L 2013 emissions) could be delivered for under a 2 percent increase in the capital build cost, or less than 1 percent for an air-conditioned office. The modelling found the package would deliver lifetime savings for the occupants (due to the high cost savings delivered by improved lighting efficiency).

Given this saving, the low increase to build costs and BEIS research suggesting that the supply chain could scale up, we would support low carbon heating for Type 1 and 2 buildings and heat pumps or electric point-of-use water heating (where demand is too low for heat pumps) for Type 1 and 3 buildings from 2022.

Direct electric heating: We agree that there is a role for direct electric heating, particularly in buildings/ homes with a very low heat demand. However the lower capital cost means that there is a risk of this being installed inappropriately (with increased costs for the building user, a higher emissions and impact on the grid).

To mitigate this risk, we recommend restricting this option to buildings with a very low space heating demand (for example, Passivhaus levels of 15kWh/m2) where it can be demonstrated that a heat pump would not be justified (for example, where the lower lifetime energy bills would not outweigh the higher capital costs). As there would still be a risk that the as-built building had a higher space-heating demand than the modelled ('performance gap'), there could be an additional requirement for a post-construction evaluation. Where there is more than a 10 percent variance between actual and modelled demand, the builder could be required to install further mitigation measures. With these safeguards, we would be comfortable with direct electric heating being classed as a low carbon heating and permitted instead of a heat pump from 2022 in Type 1 and 2 buildings.

Heat networks: We would be comfortable with heat networks currently supplied by gas-CHP, direct electric heating and electric point-of-use water heating being classed a 'low carbon' heating for the purposes of the 2021 uplift (providing the safeguards outlined above are met).

Low carbon gases: There is not enough information available on the safety, availability, cost, overall role of hydrogen/ other low carbon gases to set out a role for them from 2025 and we cannot afford to delay decarbonisation work in case it becomes feasible later. The Climate Change Committee emphasise that all delays will increase the cost and difficulty of the challenge.

Question 3) Do you agree that some non-domestic building types are more suitable for low carbon heating and hot water, and that some are more challenging?

a) Yes

b) No

Whilst we agree that some buildings will be more challenging particularly in the short-term, we think it feasible for all space heating and most hot water heating to be provided without the use of fossil-fuels from 2025, as recommended by the Climate Change Committee (CCC).

We would prefer a requirement to install low-carbon space and hot-water heating unless a relevant exemption is required (on cost/ feasibility grounds). The proposed performance-based approach seems likely to deliver too many new buildings with fossil-fuel heating 'locked in' for the lifetime of the heating system.

Question 4): Do you agree with the allocation of building types to space and water heating demand types, as presented in Table 2.1 of this consultation document?
a) Yes
b) No

Question 5): We would like to introduce the Future Buildings Standard for all buildings as quickly as possible. When do you think the Future Buildings Standard should introduce low carbon *space heating* for buildings with Type 1 or Type 2 demand (buildings with a space heating demand more suitable for heat pumps)?
a) 2025 – our proposed date
b) Another date (please specify): 2022
Please explain your reasoning.
Research suggests this would be affordable for both developers and building occupants, feasible for the supply chain and commensurate with the need to reduce emissions and grow the supply chain for low-carbon heating.

Affordable: This modelling for the CCC (p58-9) suggests that a package of measures including an ASHP would deliver a 25 percent uplift on Part L 2013 and could be delivered for less than a 2 percent increase in the capital build costs of a natural-ventilated office (or less than 1 percent for an air-conditioned office).

Feasible: in recent government research into supply chain capacity (Heat Pump Manufacturing Supply Chain Research Project Report), manufacturers indicated they would be able to respond to all three deployment scenarios, including a very high growth scenario (building to ~1,714,300 installations by 2035) with no obvious or significant supply limitations or bottlenecks.

32 percent of heat pumps installed nationally in 2019 were manufactured in the UK. The report concludes that UK manufacturing could be scaled-up quite quickly in a high demand scenario. This would support economic growth.

Question 6): We would like to introduce the Future Buildings Standard for all buildings as quickly as possible. When do you think the Future Buildings Standard should introduce low carbon *space heating* for buildings with Type 3 demand (buildings that have space heating demand less suitable for heat pumps)?
a) 2025
b) Another date (please specify)

Question 7): We would like to introduce the Future Buildings Standard for all buildings as quickly as possible. When do you think the Future Buildings Standard should introduce low carbon *water heating* for buildings with Type 1 or Type 3 demand (buildings that have water heating demand more suitable for point-of-use heaters or heat pumps)?
a) 2025 – our proposed date
b) Another date (please specify) 2022
Please explain your reasoning.
As per our response to Q5 and Q2

Question 8): We would like to introduce the Future Buildings Standard for all buildings as quickly as possible. When do you think the Future Buildings Standard should introduce low carbon *water heating* for buildings with Type 2 demand (buildings that have water heating demand less suitable for point-of-use heaters or heat pumps)?
a) 2025
b) Another date (please specify)
Please explain your reasoning.

4.2 Interim (2021) uplift to Part L standards (non-domestic)

Question 9): We would welcome any further suggestions, beyond those provided in this consultation, for improving the modelling process; Part L and Part F compliance; and the actual energy performance of non-domestic buildings.

The Energy Saving Trust welcomes the consultation's acknowledgement that the 'design for compliance' culture in the UK is a significant barrier. We also welcome the approach to begin tackling the difference between the average design and actual performance ('performance gap') in new builds by:

i) Strengthening compliance (for example, requiring photographic evidence of installations/ work quality) and

ii) Mandating controls as part of the base build to improve in-use energy management (Building Automated Control systems for larger buildings, thermostatic radiator values (TRVs) / other zonal controls and strengthening the sub-metering requirements).

Whilst this is certainly positive, the overall approach here could be strengthened by:

1. Replacing the Primary Energy metric with alternative metrics on i) Energy Use Intensity ('at the meter' energy use) and ii) space heating and cooling demand (to support the shift to low carbon heating). These 'user friendly' metrics help tenants and building occupants to 'see' how the base building is designed to work and to compare with actual usage.

2. Endorsing Post-Occupancy Evaluations (PoE) and requiring it for buildings that have received public funding.

As this document highlights the National Australian Built Environment Rating System (NABERS) has been very successful in closing the gap between the modelled and actual energy consumption (the 'performance gap') with its approach to energy-rated 'base builds' (the building with fixed services including lifts and HVAC). This was partly achieved by stimulating a new market for highly energy-rated 'base builds' which developers then strove to meet. Buyers and tenants now expect buildings to operate within 10 percent of the design forecast.

We strongly support the mandatory disclosure of operational energy as a tool to drive user engagement and improve performance. The draft London Plan policy SI2 includes a new 'be seen' policy which will require major development projects to report their in-use energy performance.

Along with the NABERs scheme, mandatory disclosure has helped to reduce operational energy in the non-domestic sector by 70 percent in Australia.

Question 10): What level of uplift to the energy efficiency standards for non-domestic buildings in the Building Regulations should be introduced in 2021?
a) Option 1 – average 22% CO_2 reduction
b) Option 2 – average 27% CO_2 reduction (Government's preferred option)
c) No change
d) Other level of uplift (please specify)
Please explain your reasoning and / or alternative suggestions where applicable.
Out of the two options we would prefer the 27 percent reduction. However, whilst we do not think that a CO2 target is the best approach, if it is the government's preferred lever then we feel a higher target could be supported since:

i) there will have been a nine year gap since Part L was last improved

ii) London has successfully required a 35 percent improvement since 2016 and will operate a net-zero carbon target for all major non-residential development shortly.

Whilst we appreciate that commercial margins are lower outside of the capital and that reductions are harder to achieve in some building types, London's experience suggests that a higher reduction would be feasible if differential targets were applied to different types of buildings (instead of the notional building approach).

This is illustrated by Figure 3.1 from the Impact Assessment reproduced below which indicates that retail warehouses, offices and schools can achieve a reduction of 34-38 percent with the application of Option 2 proposals whereas this would be much lower in hotels and hospital 4-11 percent).

This difference between types of non-domestic buildings suggests that (energy) targets based on benchmarks for building types rather than a notional building approach would be a better placed to deliver ambitious change.

Percentage carbon reduction by building type for proposed Options 1 and 2.

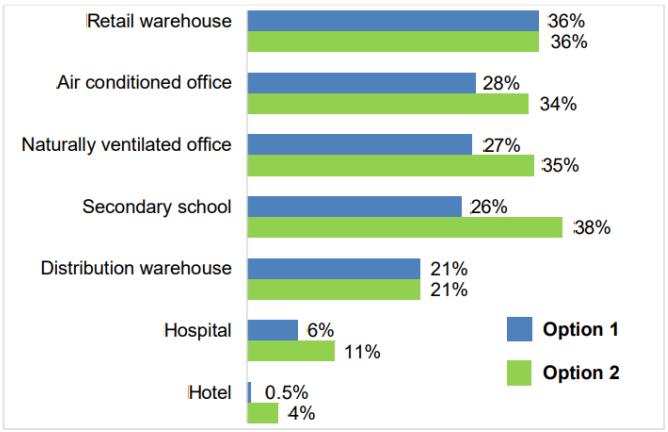


Figure 3.1: Percentage carbon reduction by non-domestic building type for proposed Options 1 and 2.

We would prefer an 'energy hierarchy' approach where the first step is to take all reasonable steps to reduce total anticipated energy demand for the building. This could be driven by both tighter minimum fabric requirements and absolute targets (KWh/m2/yr.) using accepted benchmarks where relevant.

Using absolute rather than relative targets would encourage energy use to be minimised from the outset by focussing attention on the design (building form, orientation and greater use of passive measures).

The second step would be heating. Where low carbon options are suitable (Type 1 and 2 buildings for space heating and Type 1 and 3 buildings for hot water heating), we would support these being required (unless a valid exemption is granted) from 2022 when the 2021 uplift commences.

Where low carbon options are not yet feasible, we would support a requirement to install alternative low carbon technologies especially where this will help the building reduce its current/ future demand on the grid (for example, PV + battery).

We think this approach would deliver net zero buildings faster by stimulating innovation.

Question 11): Do you agree with the way that we are proposing to apply primary energy as the principal performance metric?
a) Yes
b) No

Relevance: The rapidly decarbonising grid means that delivered energy is more relevant as a headline metric than either primary energy or CO2. The primary energy and CO2 impact of electric heating will decrease year on year. Periodic updates to SAP methodology will not be sufficient to keep track of these changes and an impact of this will be to unnecessarily penalise electric heating.

Encourages gas heating: The proposed approach allows low carbon heating to be substituted for gas heating + PV which will 'lock in' emissions. Furthermore the methodology attributes a P.E factor of 1.501 for electricity, versus one of 1.130 for gas which could again encourage gas heating. Whilst the higher P.E factor (usefully) reflects the higher transmission and distribution losses associated with electricity, the methodology does not include other relevant factors (for example, the upstream methane leaks from gas extraction) giving an incomplete picture.

User-friendly: Primary energy is heavily dependent on the wider energy system and as such is a relative measure. This does not help buyers, tenants or occupants to compare buildings or to compare in-use performance (of regulated energy usage) against the designed performance.

The Energy Saving Trust instead recommends two metrics be used in its place:

i) Energy Use Intensity (EUI) measures in kWh/m2/yr.
ii) Space, heating and cooling (kWh/m2/yr.) which is important for low carbon heating.

We recommend that both metrics are calculated at the design stage and reviewed in a Post Occupancy Evaluation to ensure the building is working as intended.

Question 12): Do you agree with using CO_2 as the secondary performance metric?
a) Yes
b) No
If you answered no, please explain your reasoning.
Whilst we do not agree that CO2 should be a primary metric driving the reduction, it is a useful secondary metric to record.

Question 13): Do you agree with the approach to calculating CO_2 and primary energy factors, referred to in paragraph 3.5.7 of this consultation document?
a) Yes
b) No

If you answered no, please explain your reasoning and alternative suggestions.
The proposed carbon factor for electricity is around the current level, so will already be out-dated by the time the new guidance comes into effect. The CO2 factor should be a long-term forecast (or updated annually), rather a three year forecast.

Question 14): Do you agree with the proposals for natural gas being assigned as the heating fuel for any fuels with a worse CO_2 emission factor than natural gas?
a) Yes
b) No
If you answered no, please explain your reasoning and / or alternative suggestions.
A 'notional building' based on gas is likely to encourage gas heating, whereas a presumption for low-carbon heating would:

i) Avoid locking in new fossil-fuel heating (for the 15 year boiler lifetime)

ii) Encourage buildings that are designed to work well with low temperature, heating. These differences in building form, design, orientation and fabric would persist over the 60+ years of the building lifetime.

We instead recommend an approach in which low carbon space or water heating is installed from 2022 where this feasible and affordable (unless a relevant exemption is granted).

Question 15): Do you agree with our proposal of using a hybrid electric/heat pump heating system in the notional building when electricity is specified as a heating fuel?
a) Yes
b) No
If you answered no, please explain your reasoning and / or alternative suggestions.
See our response to Q14 – we do not agree with the continued use of the notional building for the Future Building Standard.

Beyond this however, there is evidence to suggest that the National Calculation Methodology (NCM) underestimates heating demand. Setting a 134% SCOP in the notional building could therefore lead to an over-specification of direct electric heating in this case.

Question 16): Do you agree with the proposal for the treatment of domestic hot water in the notional building?
a) Yes
b) No
If you answered no, please explain reasoning and / or alternative suggestions.

See our response to Q14 – we do not agree with the continued use of the notional building for the Future Building Standard. We think that where demand is suitable, buildings should be required to install heat pumps (or electric point-of-use heating where demand is not high enough to warrant a heat pump).

Question 17): Do you agree with the proposal for connecting to an existing heat network, as presented in the draft NCM modelling guide?
a) Yes
b) No, they give too much of an advantage to heat networks
c) No, they do not give enough of an advantage to heat networks
d) No, I disagree for another reason
No comment
If you answered no, please explain your reasoning and / or alternative suggestions.

Question 18): Do you agree with the proposal for connecting to a new heat network, as presented in the draft NCM modelling guide?
a) Yes
b) No, they give too much of an advantage to heat networks
c) No, they do not give enough of an advantage to heat networks
d) No, I disagree for another reason
If you answered no (b, c or d), please explain your reasoning and provide supporting evidence or alternative suggestions.
No comment

Question 19): Do you agree with the proposed changes to the National Calculation Methodology Modelling Guide and activity database?
a) Yes
b) Yes, but additional changes should be made
c) No
Draft NCM Modelling Guide which accompanies this consultation, and can be found at the following website: http://www.uk-ncm.org.uk/
If you answered b or c, please explain your reasoning / alternative suggestions.

As above, we do not agree with the continued use of the notional building approach for the Future Buildings (and Homes) Standards.

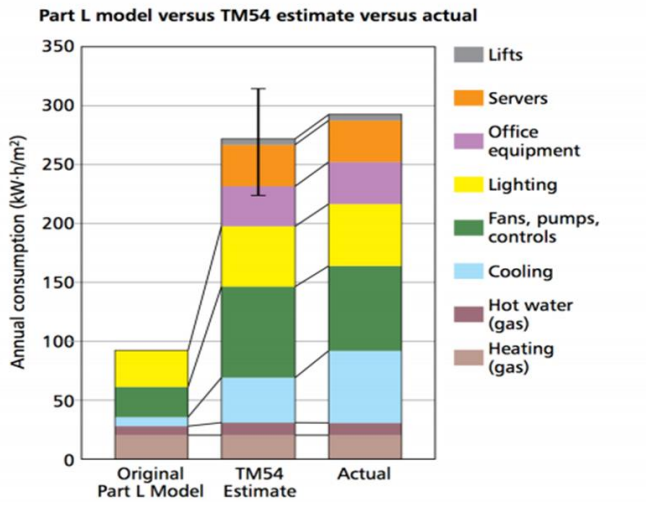
Other relevant considerations:

- NCM underestimates space heating – the proposed NCM changes do not seem to address this issue.
- SBEM uses over-inflated unregulated room heat gain assumptions to cope with regulated fabric heat loss. An improvement here would be a better consideration of likely unregulated energy demands.

Question 20): We would welcome any further suggestions for revising the outputs from SBEM, which would enable easier checking by building control on building completion. Please provide related evidence.

SBEM is used to calculate the target emissions rate (TER) and building emissions rate (BER) - modelled regulated energy usage and the CO2 emissions resulting from this.

In non-domestic buildings, the actual in-use energy usage and resulting emissions can be three times higher (as shown in the diagram from CIBSE below). The continued use of SBEM encourages a 'design for compliance' culture and makes it harder to predict operational energy performance.



We recommend that SBEM is replaced with a more sophisticated, advanced modelling methodology that can more accurately model operational energy building performance.

Existing approaches to build on include:

- NABERS
- CIBSE's tools on evaluating operational energy performance of buildings at the design stage (TM54 and DomEARM)
- Passivhaus Planning Package (PHPP)
- Dynamic Thermal Simulation (DTS).

Question 21): Do you agree with the proposals for limiting heat gains in non-domestic buildings?
a) Yes
b) No, they go too far
c) No, they do not go far enough
d) No, I disagree for another reason
If you answered no. please explain and provide alternative suggestions.
The g-value performance of the reference system should be improved and should be assessed in relation to shading, overheating and daylight.

The approach also needs to consider building-specific factors such as orientation, number of aspects and glazing ratio

4.2.1 Minimum standards for thermal elements, windows and doors

Question 22): Do you agree with the proposed minimum standards for fabric performance in new non-domestic buildings as presented in Table 3.2 of this consultation document?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
d) No, I disagree for another reason
If you answered no. please explain your reasoning and / or alternative suggestions.
No – we support higher fabric values as set out in the table below (column 3).

These higher values have been proposed by RIBA as part of their 2030 Climate Challenge (architecture.com):

	Current Wm2/.K	Proposed Wm2/.K	Energy Saving Trust proposed	Passivhaus
Roof	0.25	0.16-18	**0.1-0.12**	≤0.15
Wall	0.35	0.26	**0.1-0.15**	

Floor	0.25	0.18	**0.1-0.12**	
Window	2.2	1.6	**1.2**	0.8
Roof light	2.2	2.2 (horizontal)	**1.2**	
Doors	2.2	1.4	**1.4**	
Air permeability m3 / (h.m2) @50Pa	10	8	**5**	

Question 23): Do you agree with the proposed minimum standards for fabric performance of new thermal elements in existing non-domestic buildings as presented in Table 3.3 of this consultation document?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
d) No, I disagree for another reason
If you answered no, please explain and provide evidence or alternative suggestions.
We do not think the standards go far enough and would support instead the higher values set out in the table below. These higher values have been proposed by RIBA as part of their 2030 Climate Challenge (architecture.com):

Whilst space or moisture considerations may be a limiting factor for roofs, walls and floors, it is not clear why lower values are proposed for windows and doors in existing buildings. We would prefer an approach that required higher values except for exceptions (space/ moisture/ limitations with door or window frames) than one that was less ambitious because not all renovations can achieve the standards.

	Current Wm2/.K	**Proposed** Wm2/.K	**Energy Saving Trust proposed**	**Passivhaus**
Roof	0.16-18	No change	**0.1-0.12**	≤0.15
Wall	0.28	0.26	**0.1-0.15**	
Floor	0.22	0.18	**0.1-0.12**	
Window	1.6-8	1.6	**1.2**	0.8
Roof light	1.8 (vertical)	2.2 (horizontal)	**1.2**	
Doors	1.8	1.4	**1.4**	

Question 24): Do you agree with the draft guidance in paragraph 4.15 of the draft *Approved Document L, volume 2: buildings other than dwellings* on reducing unwanted air infiltration when carrying out work to existing non-domestic buildings?

a) Yes
b) No
If you answered no, please explain your reasoning.
The provision of new guidance on reducing unwanted infiltration is welcome. However the current draft is not sufficient to achieve the desired outcome.

Guidance should also address air leakage paths in retained existing elements (rather than solely new elements).

Question 25): Do you agree that the limiting U-value for rooflights in new and existing non-domestic buildings should be based on a rooflight in a horizontal position, as detailed in paragraph 4.4 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No

Question 26): Do you agree that we should adopt the latest version of BR 443 for calculating U-values in new and existing non-domestic buildings, as detailed in paragraph 4.1 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No

4.2.2 Building services in new non-domestic buildings

Question 27): Do you agree with the newly proposed minimum efficiencies for natural gas, oil and LPG boiler and domestic hot water system installations in new non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
We agree with the proposed increase in efficiency for gas, oil and LPG boilers but our preferred option of requiring low carbon space heating and water heating as soon as currently feasible (from 2022 - where currently feasible and affordable) would reduce deployment of these heating systems in new build.

It is also important for the guidance to specify that the boiler must be installed in a way that corresponds to the manufacturer's efficiency. For example, for the system

to be designed to 60°C temperature if the boiler is designed to achieve a 95% efficiency at 45°C return temperature.

Question 28): Do you agree with the proposed set of standards for air distribution systems for new non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough

Question 29): Do you agree with the proposals for self-regulating devices for new non-domestic buildings, as set out in Sections 5 and 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No
If you answered no, please explain your reasoning.
No. It is understood that by referring to 'self-regulating devices', the Government means devices that allow for the separate regulation of the temperature in different rooms such as thermostatic radiator valves (TRVs) and/or room thermostats.

These systems already form part of any new development and therefore this mandate does not go far enough in supporting future mandatory operational energy reporting.

A stronger recommendation would be for building automation and control systems to be mandated as part of any new build development. These systems should be able to continuously monitor, log, analyse and allow for the adjustment of a development's energy use. Such systems include meters, smart meters, Building Energy Management Systems (BEMS), Automatic Meter Readers (AMRs) etc.

Question 30): Do you agree with the minimum efficacy proposals for lighting in new non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
If you answered no (b or c), please explain your reasoning.

We think that the dramatic reduction in cost and increase in efficiency of LEDs means that there is scope to tighten minimum lighting standards a little further.

Question 31): Do you agree with the proposals for cooling in new non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
If you answered no (b or c), please explain your reasoning.

Question 32): Do you agree with the proposals to require building automation and control systems in new non-domestic buildings, when such buildings have a heating or air-conditioning system over 290kW?
a) Yes
b) No, a different trigger point should be used
c) No, I do not agree that building automation and control systems should be required in new buildings
d) No, I disagree for another reason
If you answered no, please explain your reasoning and alternative suggestions.
Building automation systems (such as BEMS) are widely used in the majority of largescale domestic and non-domestic new developments.

A lower trigger-point of 180kW (a heating system sized for a 3000m2 building) would increase the effectiveness of this measure. We would also support more guidance for building operators to ensure these are used effectively.

Question 33): Do you agree with the technical specification for new building automation and control systems as EN 15232, Class A?
a) Yes
b) No, the requirements go too far
c) No, the requirements do not go far enough

Question 34): Do you agree with the proposals for improving the commissioning guidance for new non-domestic buildings in Section 8 and 9 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far

c) No, the standards do not go far enough
d) No, I disagree for another reason

Question 35): Do you agree with the proposals for requirements relating to the assessment of overall energy performance of building services installations and providing information to building owners for new non-domestic buildings given in sections 8 and 9 of *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No
If you answered no, please explain your reasoning.

Question 36): Do you agree with the guidance proposals for adequate sizing and controls of building services systems in new non-domestic buildings, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, I do not agree with providing guidance on this
c) No, the guidance should be improved
If you answered no (b or c), please explain your reasoning.

Question 37): Do you agree with proposal that wet space heating systems in new buildings should be designed to operate with a flow temperature of 55°C or lower?
a) Yes, through a minimum standard set in paragraph 5.9 of the *Approved Document L, volume 2: buildings other than dwellings*
b) Yes, through carbon and primary energy credit in SBEM
c) Yes, by another means
d) No, the temperature should be below 55°C
e) No, this standard should not be applied to all new buildings
f) No, I disagree for another reason

Question 38): Do you agree with the proposals to clarify, rationalise and simplify the guidance for building services in new non-domestic buildings, and to incorporate the standards of the Non-Domestic Building Services guidance into the main body of the *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No

Question 39): Do you agree with the proposals to simplify the requirements in the Building Regulations for the consideration of high-efficiency alternative systems in new non-domestic buildings?
a) Yes
b) No
No comment

Question 40): Do you agree with the efficiency proposals for replacement fixed building services in existing non-domestic buildings as detailed in paragraphs 5.4 to 5.7 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No

Question 41): Do you agree with the newly proposed minimum efficiencies for natural gas, oil and LPG boiler and domestic hot water system installations in existing non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough

Question 42): Should minimum boiler efficiency standards in existing non-domestic buildings still benefit from relaxations through the use of heating efficiency credits?
a) Yes, boiler installations should continue to benefit from heating efficiency credits
b) No, boiler installations should no longer benefit from heating efficiency credits (the Government's proposal)

Question 43): Do you agree with the proposed set of standards for air distribution systems for existing non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough

Question 44): Do you agree with our proposed approach and guidance to mandating self-regulating controls in existing non-domestic buildings, including technical and functional feasibility, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?

a) Yes
b) No

Question 45): Do you agree with the minimum efficacy proposals for lighting in existing non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
If you answered no (b or c), please explain your reasoning.
The rapid improvement in efficiency and cost reduction in LEDs since 2013 suggests that there is scope to go further here (and that even where these additional costs were passed through the measure would deliver lifetime savings for the occupants).

Question 46): Do you agree with the proposals for cooling in existing non-domestic buildings in Section 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough

Question 47): Do you agree with the proposals that when Building Automation and Control System is installed in an existing non-domestic building with a heating or air-conditioning system over 290 kW, it should meet the same minimum standards as new non-domestic buildings?
a) Yes
b) No, a different trigger point should be used
c) No, a different standard should be used
d) No, for another reason
If you answered no, please explain your reasoning and alternative suggestions.
As above, we would support a lower trigger-point of 180kW

Question 48): Do you agree with the proposals for requirements relating to the assessment of overall energy performance of building services installations and providing information to building owners for existing non-domestic buildings?
a) Yes
b) No, I do not agree with providing this guidance
c) No, the guidance should be improved

Question 49): Do you agree with the guidance proposals for adequate sizing and controls of building services systems in existing non-domestic buildings, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, do not agree with providing this guidance
c) No, the guidance should be improved

Question 50): Do you agree with the proposal that when whole wet space heating systems (i.e. boiler and radiators) are replaced in existing non-domestic buildings the replacement system should be designed to operate with a flow temperature of 55°C or lower?
a) Yes, through a minimum standard set in paragraph 5.9 of *Approved Document L, volume 2: buildings other than dwellings*
b) Yes, through carbon and primary energy credit in SBEM
c) Yes, by another means
d) No, the temperature should be below 55°C
e) No, this standard should not be applied to all existing buildings
f) No, I disagree for another reason

Question 51): Do you agree with the proposals to restructure the guidance for building services in existing non-domestic buildings, and to incorporate the standards of the Non-Domestic Building Services guidance into the main body of the *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No
If you answered no, please explain your reasoning.
In the first consultation, 76 percent of respondents did not agree to Q28: 'Do you agree with incorporating the Compliance Guides into the Approved Documents?'

The proposal does not ensure that guidance is clear and tailored to the needs of people who need to use it.

Question 52): Do you agree the Government should continue to provide guidance for minimum building services efficiencies in existing non-domestic buildings, if the standard does not go significantly further than the Ecodesign regulations?
a) Yes
b) No, the Ecodesign regulations are sufficient

c) No
If you answered no (b or c), please explain your reasoning.

Question 53): Do you agree with the changes made to simplify, rationalise and clarify the guidance, and the updates to external references in Appendix E and Appendix F, in *Approved Document L, volume 2: buildings other than dwellings*, as outlined in paragraph 3.12.1 of the consultation document?
a) Yes
b) Yes, but not with the changes to the supplementary guidance
c) Yes, but not with the external references
d) No
No comment

Question 54): Do you agree that the measures in Tables D.1 and D.2 of Appendix D of *Approved Document L, volume 2: buildings other than dwellings* are likely to be technically, functionally and economically feasible under normal circumstances?
a) Yes
b) No
No comment

Question 55): Do you agree with the proposals for relaxation factors for modular and portable buildings, as detailed in Tables 2.2 and 2.3 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, the requirements go too far
c) No, the requirements do not go far enough
No comment

Question 56): Do you think that the Pulse methodology should be an approved means of demonstrating airtightness for non-domestic buildings?
a) Yes
b) No
No. We support the use of Pulse methodology as part of an airtightness *process* but not as a *test for compliance*.

Any method of airtightness testing should be sensitive enough to test at 0.1 m3/m2/hr at 50Pa. Pulse methodology is not sensitive enough to do this and cannot provide a means of sustained pressurisation for leakage path diagnostic purposes.

Ensuring effective identification and remediation of significant air tightness defects should remain one of the test's primary objectives

Question 57): Do you agree that we should adopt an independent approved airtightness testing methodology such as the CIBSE draft methodology for non-domestic buildings?
a) Yes, and the CIBSE methodology is appropriate
b) Yes, but with a methodology other than CIBSE
c) No, an independent approved airtightness methodology shouldn't be adopted.

Question 58): Do you agree with the proposal for guidance on the calibration of devices that carry out airtightness testing in new and existing non-domestic buildings?
a) Yes
b) No

4.2.3 Monitoring the as-built performance of non-domestic buildings

Question 59): Do you agree with the proposed approach to energy sub-metering, as detailed in Section 5 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No
We support the use of CIBSE's TM39 as the standard to which new buildings should be sub-metered.

Question 60): Do you agree with the proposed approach to energy forecasting, as detailed in paragraph 9.4 of draft *Approved Document L, volume 2: buildings other than dwellings*?
a) Yes
b) No, I do not agree with the proposed approach
c) No, energy forecasting should not form part of the Building Regulations
If you answered no, please explain your reasoning and alternative suggestions.
We welcome the acknowledgement that Part L compliance calculations are not suitable for energy benchmarking (as they do not include all energy uses, and use standardised usage patterns) and the proposal that the forecast energy performance of non-domestic buildings (over 1,000m2) should be modelled and

handed to the building owner at completion stage for the purposes of energy benchmarking.

We support the use of CIBSE TM54 for the prediction of operational energy use. Design for Performance and NABERS UK would provide a more comprehensive alternative but we appreciate that these will take time to scale-up.

Question 61): Do you agree with the proposals for transitional arrangements for buildings other than dwellings?
a) Yes
b) No
We strongly welcome the proposed change to the transitional arrangements.

Further clarification on what this means in practice would be welcome. For example, with large developments where several building blocks may be built-off of a single podium base. Would each block here be counted as an individual building?

Similarly, clear definition is needed on what constitutes 'work commencing'. We would expect this to mean installation of permanent below and/or above grade works, and not simply demolition or enabling works.

4.3 Interim uplift to Part F standards for non-domestic buildings

We have not responded to this section on ventilation.

5. Our response: Domestic Buildings

5.1 Standards for overheating in new residential buildings

Question 81): How should the Government address the overheating risk?
a) Through a new requirement in the Building Regulations and an Approved Document, as proposed in this consultation
b) Through Parts L and F of the Building Regulations
c) Through government guidance
d) I have an alternative approach
e) It isn't an issue that needs addressing

Question 82): Do you agree with the buildings that are in scope of this new part of the Building Regulations?
a) Yes
b) Yes, but they should be expanded to include more / existing building types
c) No, they should be reduced to only include flats and houses
d) No, I disagree for another reason
Please explain your reasoning.
We welcome the new requirement and the use of a wider definition of 'domestic' than generally used in the regulations so that 'institutional' types of residential buildings such as student accommodation and care homes are captured.

The risk that the changing climate and overheating will pose is well highlighted in the consultation document. Given this we would like to see this new requirement extended to cover non-domestic new build and existing buildings. The conversion of former office blocks into new homes could pose a particular risk going forward.

If this overheating risk is not tackled, there is likely to be a significant increase in the use of mechanical cooling systems such as air conditioning and fans which will increase energy consumption.

Question 83): Do you agree that the division of England based on overheating risk detailed in paragraph 5.6.3 of this consultation document is correct?
a) Yes
b) No, there should be one area

c) No, there should be more areas

If you answered no, please explain your reasoning and provide supporting evidence.

There are locations to the south and east of London that experience higher temperatures (though without/ with less of the same urban heat island effect).

More general categories along with some scope for local planning authorities to require higher standards where local conditions warrant it (microclimate or in dense urban areas with dense concentration of single aspect flats situated on busy roads for example)

Question 84): Do you agree with the categorisation of buildings into Group A and Group B as detailed in paragraph 5.6.5 of this consultation document?

a) Yes

b) No

If you answered no, please explain how buildings should be re-categorised.

The simplified method categorises buildings based on location and then into two further groups A and B, based on the number of fabric elements exposed to outdoors and ability to cross ventilate..

Whilst we welcome a simplified approach as an option to dynamic modelling, the current proposals could lead to unintended consequences (such as limiting daylight and unwelcome inconsistencies).

The London Energy Transformation Initiative (LETI), for example, has highlighted that under the proposals, single-aspect flats would be allowed a higher glazing percentage than triple-aspect flats (or top-floor dual-aspects) which generally have a lower overheating risk. Similarly, a top-floor dual-aspect unit would be group A while the identical unit on the floor below would be group B (without the exposed roof element), leading to different criteria for almost identical units.

Question 85): Do you agree with the simplified method as a means of compliance with the proposed new requirement to reduce overheating risk?

a) Yes

b) No, the method should be more sophisticated

c) No, the method is too easy to pass

d) No, for another reason

If you answered no, please explain your reasoning and provide supporting evidence.

Whilst we welcome a more simplified option, the proposed method is too simple and could lead to other unintended consequences such as a lack of daylight.

An alternative approach, based on a performance standard could require low risk buildings (such as minor developments) to use an updated overheating assessment with higher risk or larger developments assessed using dynamic thermal modelling in accordance with CIBSE TM59 guidance.

A performance-based approach to overheating would give architects and designers greater design flexibility, allowing them to more easily address overheating such as building fabric and heating pipes in common areas

To ensure new homes are meeting the required overheating standard, this should be verified through Post Occupancy Evaluation.

Whilst we are supportive of a simplified method, as proposed, the approach is not fit for purpose. The glazing areas are excessive as a backstop and will not prevent overheating in flats, and the free areas may not be unachievable.

The simplified method does need to set sensible limits on glazing, encourage generous free areas of openings, and require shading when glazing areas are high, but the current proposals are more complicated to apply in practice than they first appear, and lead to unintended consequences.

An alternative simplified method could be based on a glazing limit for all new homes of (approx. 20%) with an additional requirement that if the glazing area: external wall ratio exceeds around 50% for any one room, then the glazing in that room should be shaded and more openable.

Question 86) Do you agree with the maximum glazing area and shading standards for limiting solar gains in the simplified method as detailed in paragraphs 1.6 to 1.9 of the draft *Overheating Approved Document?*

a) Yes

b) No

If you answered no, please explain your reasoning and provide supporting evidence.

As noted above, we think the simplified approach is too simple and needs to differentiate better between:

i) Homes where the glazing is spread over different facades (receiving sun at different times of day) and

ii) Single/ dual aspect homes where glazing could be more concentrated with the 20 percent glazing including full height, full width glazing (with a high overheating risk).

Glazing also needs to be assessed alongside daylighting and winter solar gain.

The shading options proposed could to be better targeted to where glazing is more concentrated, rather than applying to the whole unit.

Question 87) Do you agree with the approach to removing excess heat in the simplified method as detailed in paragraphs 1.10 to 1.13 of the draft *Overheating Approved Document?*
a) Yes
b) No
If you answered no, please explain your reasoning and provide supporting evidence.
No - the free areas proposed are too high and the proposals seem impractical.

The proposals suggest that every glazed panel needs to be operable but non-operable glazing can be beneficial for security/ other considerations and should be permitted where it can be demonstrated it will not increase overheating. Similarly, too many operable windows can risk the thermal efficiency of the envelope.

Question 88): Do you think that adequate levels of daylight will be provided and that homes will be acceptable to purchasers while meeting these proposed standards?
a) Yes
b) No
Yes - daylight levels are as much a function of good window design as glazing area. Constraining the glazing area should encourage more care in how glazing is utilised (placement of windows etc.).

Question 89): Do you agree with offering dynamic thermal analysis as a means of compliance with the proposed new requirement to reduce overheating risk?
a) Yes, as described in the draft *Overheating Approved Document*
b) Yes, but not as described in the draft *Overheating Approved Document*
c) No

Please explain your reasoning and provide alternative suggestions.
Yes - TM59 provides a more flexible approach which is widely recognised, and required by some planning authorities such as the Greater London Authority.

Question 90): Please detail any information you have about the likelihood of occupants opening doors and windows at night in unoccupied rooms.
TM59 takes a stance that homes should be designed to achieve good comfort levels with occupants taking reasonable actions. Where windows are part of this, there needs to be a realistic assessment of the feasibility of this from noise and security perspective and to ensure that the specified window works for a range of occupants – from young families to the elderly.

Question 91): Do you agree with the proposed acceptable strategies for shading and the removal of excess heat, when following the dynamic thermal analysis method, as found in Section 2 of the draft *Overheating Approved Document*?
a) Yes, I agree with both sets of acceptable strategies
b) Yes, but with amendments to the acceptable shading strategies
c) Yes, but with amendments to the acceptable strategies to remove excess heat
d) Yes, but with amendments to both sets of acceptable strategies
e) No, I do not agree with the acceptable strategies

Question 92): Do you agree that the overheating standard should not account for the effect of curtains, blinds and tree cover?
a) Yes, curtains, blinds and tree cover should be excluded
b) Yes, but only curtains and blinds should be excluded
c) Yes, but only tree cover should be excluded
d) No, none of these should be excluded
If you answered b, c or d, please explain your reasoning.

Question 93): Do you agree that the building should be constructed to meet the overheating requirement without the need for mechanical cooling?
a) Yes
b) No

Question 94): Do you agree with limiting noise in new residential buildings when the overheating strategy is in use, and the proposed guidance in Section 3 of the draft *Overheating Approved* Document?
a) Yes

b) Yes, but with amendments to the guidance
c) No, I do not agree with limiting noise when the overheating strategy is in use

Question 95): Do you agree with minimising the ingress of external pollutants when the overheating strategy is in use, and that the external pollutants guidance in *Approved Document F, volume 1: dwellings* should be followed where practicable?
a) Yes
b) Yes, but with amendments to the guidance
c) No, I do not agree with minimising the ingress of external pollutants when the overheating strategy is in use

Question 96): Do you agree with the proposals on security in Section 3 of the draft *Overheating Approved Document* in new residential buildings?
a) Yes
b) No

Question 97): Do you agree with the protection from falling guidance proposed in Section 3 of the draft *Overheating Approved Document*?
a) Yes
b) No
No comment

Question 98): Do you agree with the guidance on protection from entrapment proposed in Section 3 of the draft *Overheating Approved Document*?
a) Yes
b) No

Question 99): Are there any further issues which affect usability that should be included in the *Overheating Approved Document*?
a) Yes
b) No
Yes. Micro-climates. Modelling only considers building fabric and a weather file.

Question 100): Do you agree with the proposed requirement to provide information on the overheating strategy to the building owner?
a) Yes, I agree with the requirement, the list provided and that this should be within a Home User Guide

b) Yes, I agree with the requirement, but think that the list provided should be changed or that this should not be provided within a Home User Guide
c) No, I do not agree with providing information

Question 101): How do you see this new Building Regulation interacting with policies in local plans?
We would support LPAs being able to require the TM59 route in certain urban areas with higher risk factors such as urban heat island, nature of the stock or communal heating systems.

Question 102): Do you agree that this guidance on limiting the effects of heat gains in summer, in both Approved Document L guidance for new dwellings and SAP Appendix P, can be removed?
a) Yes
b) No
If mechanical cooling is proposed then Part L should evaluate the probable cooling load and include the energy consumption within the assessment.

Question 103): Should the transitional arrangements that apply to the overheating requirements align with the proposed transitional arrangements for Part L and F 2021 for new dwellings, as described in paragraph 5.10.2 of this consultation document?
a) Yes
b) No

5.2 Part L standards for domestic buildings in 2021

Question 104): Do you agree with the proposed minimum fabric standards for existing domestic buildings set out in Table 6.1 of this consultation document?
a) Yes
b) No
If you answered no, please explain your reasoning and provide supporting evidence.
No – we would support higher fabrics such as those listed below in bold text. Our table below compares the current and proposed standards from Table 6.1 in the consultation document to those proposed in the recent Welsh government Part L uplift, Passihaus standards and our recommended standards.

The Welsh Government has proposed a higher improvement for roof, floor and roof lights (like this consultation it has proposed measuring this in a horizontal position).

We think here is scope to tighten these a little further. Our recommended values are highlighted in bold in the table below. These are based on RIBA's recommended standards for their 2030 Climate Challenge.

	Current	Proposed	Proposed Wales	Energy Saving Trust proposed	Passivhaus
Thermal elements	U-values Wm2/.K				
Roof	0.16-0.18	0.15	0.13	**0.1-0.12**	≤0.15
Wall	0.28	0.18	0.18-0.21	**0.1-0.15**	
Floor	0.22	0.18	0.15	**0.1-0.12**	
Window	1.6	1.4	1.4	**1.2**	0.8
Roof light	1.6	2.2	1.4		
Doors		1.4	1.4	**1.4**	

Compliance with the proposed standards can be achieved simply by meeting the minimum u-values. Therefore, these need to be more ambitious. There is equally a need to ensure that homes perform to the standards proposed. The Passivhaus institute suggest that space heating demand averages 60 percent higher than the design standard for new build. They estimate that this increases the space heating demand from 54kWh/ m2/yr to 85kWh/m2/yr.

We would like to see 'as-built' performance testing introduced to close this gap such as testing building on the UK government's SMETER programme which uses smart meter and weather data and allows actual building energy performance to be compared to predicted, without being confounded by the effects of occupancy. Comparing in-use, 'as built', smart EPCs with surveyor EPCs could play a significant role in reducing the performance gap when installing energy efficiency measures.

Question 105): Do you agree with the draft guidance in section 4 of the draft *Approved Document L, volume 1: dwellings* on reducing unwanted air infiltration when carrying out work to existing homes?
a) Yes
b) No
If you answered no, please explain your reasoning.
We welcome the intent to reduce air-infiltration but improving the thermal envelope can increase risk of moisture and condensation.

A whole house retrofit approach should be adopted to avoid unintended consequences of elemental improvements, and reference should be made to PAS 2035. The design should also adopt a coherent approach to managing moisture risk, consistent with guidance in BS 5250.

Question 106): Do you agree we should control the primary energy and fabric efficiency of new extensions to existing homes when using SAP method of compliance?
a) Yes
b) No
If you answered no, please explain your reasoning.
An Energy Intensity Metric (kWh/m2) would be more effective in driving energy efficiency in both the existing and proposed sections of the home than a Primary Energy Metric.

Question 107): Do you agree that the limiting U-value for rooflights in existing domestic buildings should be based on a rooflight in a horizontal position?
a) Yes
b) No

Question 108): Do you agree that we should adopt the latest version of BR 443 for calculating U-values in existing domestic buildings?

a) Yes
b) No

Question 109): Do you agree with the proposed minimum fabric standards set out in Table 6.2, and Sections 4 and 11 of draft *Approved Document L, volume 1: dwellings*?
a) Yes
b) No
If you answered no, please explain your reasoning provide supporting evidence.
If building work is being done to a thermal element and its U-value is worse than the threshold U-value, the thermal element should be improved. The improved U-value is the U-value the element should meet once the work is completed.

The current and proposed values are set out in Table 6.2 from the Consultation document.

Table 6.2: Upgrading retained thermal elements in existing dwellings

Element	Current standard's U-values (W/m².K)		Proposed standard's U-values (W/m².K)	
	Threshold U-value	Improved U-value	Threshold U-value	Improved U-value
Pitched roof – insulation at ceiling level	0.35	0.16	0.35	0.16
Pitched roof – insulation between rafters	0.35	0.18	0.35	**0.16**
Flat roof or roof with integral insulation	0.35	0.18	0.35	**0.16**
Wall - cavity insulation	0.70	0.55	0.70	0.55
Wall - external or internal wall insulation	0.70	0.30	0.70	0.30
Floor	0.70	0.25	0.70	0.25

We accept the reasoning for not increasing the cavity and solid wall requirement at this stage but we think there is scope to tighten the values further for roofs and floors. The consultation cities a Ministry of Housing, Communities and Local Government's 2019 report Cost Optimal which stated that it is cost optimal for roofs to be renovated to a U-110 value of 0.11 W/m2.K. Whilst we appreciate that this increases the moisture risk and there is a cost to mitigating this (for example, with vapour barriers), the benefits would seem to outweigh the costs.

Where replacement windows and doors are replaced, it is not clear why a lower standard than in new build should be required (although exemptions could be made if warranted).

Question 110): What level of FEES should be used for Part L 2021?
a) Option 1, full fabric specification

b) Option 2, fabric specification x1.15
c) Neither, it should be higher (as in tighter/ more challenging)
d) Neither, it should be lower
Please explain your reasoning and provide supporting evidence.
We think there is scope to reduce the proposed fabric standard for the notional building further, particularly for walls and walls (see table below comparing the proposed standards with our minimum standard recommendations).

We would also scope a tightening of the minimum standard for air permeability to 3m3/m2.h at 50Pa and the experience in London suggests that many non-domestic buildings are achieving this already.

Thermal elements	Proposed fabric standards for 2021 notional building (Wm2/.K)	Energy Saving Trust proposed (Wm2/.K)
Roof	0.11	**0.1-0.12**
Wall	0.18	**0.1-0.15**
Floor	0.13	**0.1-0.12**
Window	1.2	**1.2**
Doors	1.0	**1.4**
Air permeability	5m3/(h.m2)@50Pa	**3**

Would a higher FEES reduce heat pumps?
The consultation states that a higher FEES might make it less appealing for some developers to install heat pumps under Part L 2021 as it would reduce the difference between the costs of installing heat pumps and the notional building specification, which has a gas boiler and solar panels, will be reduced.

This highlights part of our issue with the continued use of the notional building approach and within the allowing developers to substitute PV for heat pumps. Whilst this may make sense on immediate carbon savings, this approach locks-in gas use for the 15 year lifetime of the boiler during which the grid will keep decarbonising. The lifetime emissions of a gas boiler plus PV will be significantly higher than that of a heat pump.

Where heat pumps are likely to deliver lifetime cost savings for the occupant, they should be installed in all new building from when the uplift is applied in 2022. The government research on the supply chain suggests that it will be able to respond.

Question 111): Do you agree that we have adequately covered matters which are currently in the Domestic Building Services Compliance Guide in draft *Approved Document L, volume 1: dwellings* for existing homes?
a) Yes
b) No
If you answered no, please explain which matters are not adequately covered.
There are flaws with the current Boiler Plus regulations which should be address in this 2022 changes such as:

i) Hydraulic balancing of all systems should be explicitly mandated, rather than being listed as an expectation (which is rarely done in practice).
ii) Boiler Plus should be expanded to cover heat only/system boilers. There are over 350,000 heat only/system boiler replacements a year in England alone which are not covered by Boiler Plus as it currently stands and are likely to be operating less efficiently as a result.

Question 112): Do you agree with the proposed minimum standards for building services in existing homes, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 1: dwellings*?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
If you answered no (b or c), please explain your reasoning.
We agree with the proposed standards apart from the proposed change in the seasonal co-efficient of performance (SCOP) from 2.8 to 3.0. The SCOP of heat pumps is determined both by the efficiency of the technology and that of the building and its heating system.

The higher SCOP could be difficult to achieve in 'hard to retrofit' traditional or listed buildings and as could prevent heat pumps being installed as a result. The National Trust has had considerable success in fitting heat pumps into such buildings.

Question 113): Do you agree with the proposals for replacement fixed building services in existing homes, as detailed in Section 5 of draft *Approved Document L, volume 1: dwellings*?
a) Yes
b) No
If you answered no, please explain your reasoning.

No. as above.

Question 114): Do you agree with our proposed approach to mandating self-regulating controls in existing domestic buildings, including technical and economic feasibility, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 1: dwellings*?

a) Yes

b) No

TRV's are commonly installed in practice so making this mandatory is a no regrets option. Whilst the requirement for self-regulating controls on a room-by-room zonal basis is already required under Boiler Plus, it is a positive step to formalise it in the Building Regulations.

Self-regulating devices should also be mandatory for community (district) heating systems. This is more important than for conventional heating as occupants without room-by-room control may need to open windows to 'dump heat' to avoid overheating. It is unclear if this is proposed. We recommend this is clarified.

Question 115): Do you agree with the proposed specifications for building automation and control systems installed in a new or existing home, as detailed in Section 6 of *draft Approved Document L, volume 1: dwellings*?

a) Yes

b) No

Question 116): Do you agree with the proposals for extending commissioning requirements to Building Automation and Control Systems and on-site electricity generation systems, as detailed in Sections 8 and 9 of draft *Approved Document L, volume 1: dwellings*?

a) Yes

b) No

Question 117): Do you agree with the proposals for requirements relating to the assessment of overall energy performance of building services installations and providing information to homeowners, as detailed in Sections 8 and 9 of draft *Approved Document L, volume 1: dwellings*?

a) Yes

b) No, I do not agree with providing this guidance

c) No, the guidance should be improved

We agree but would also recommend that input from the commissioning sheet is captured and used for a future Buildings Passport to provide a digital thread between homeowners and occupants, as recommended in the Hackitt review.

As much information as possible should be captured by the checklist and commissioning sheet so that accurate information can be passed between owners and other relevant stakeholders like EPC assessors, who can use the information to create more reliable assessments.

Question 118): Do you agree with the proposed changes to water treatment guidance and removing formal guidance on water softening?
a) Yes
b) No
No comment

Question 119): Do you agree with the guidance proposals for adequate sizing and controls of building services systems in domestic buildings, as detailed in Sections 5 and 6 of draft *Approved Document L, volume 1: dwellings*?
a) Yes
b) No, I do not agree with providing this guidance
c) No, the guidance should be improved

Question 120): Do you agree with the guidance proposals on sizing a system to run at 55°C when a whole heating system is replaced, as detailed in Section 5 of draft *Approved Document L, volume 1: dwellings*?
a) Yes
b) No, I do not agree with providing this guidance
c) No, the guidance should be improved
We support the proposal to mandate low-flow temperatures of 55°C (or below) where technically feasible, to futureproof appliances for low carbon heat. However, there is a range of wider factors which determine efficiency, such as system flow temperature and the degree to which systems are hydraulically balanced'.

The proposal may require larger heat emitters and pipework changes. Where there are additional costs and disruption, there should be support for households (including 'making good').

Question 121): Do you agree with the proposed changes to the supplementary guidance and the external references in Appendix D and Appendix E, in the draft *Approved Document L, volume 1: dwellings* as outlined in paragraph 6.8.2.?
a) Yes
b) Yes, but not with the changes to the supplementary guidance
c) Yes, but not with the external references
d) No
If you answered b, c or d, please explain your reasoning.
No, supplementary information provides useful guidance to installers so removing elements increases the chances of poor-quality installations. Whilst we understand the need for clearer and more concise guidance, this should be achieved in conjunction with industry working groups.

Question 122): Do you agree with the proposal for guidance on the calibration of devices that carry out airtightness testing in new and existing domestic buildings?
a) Yes
b) No

5.3 Part F standards for existing domestic buildings in 2021

Question 123): Do you agree that we have adequately covered matters for existing dwellings which are currently in the Domestic Ventilation Compliance Guide in draft *Approved Document F, volume 1: dwellings*?
a) Yes
b) No
No comment

Question 124): Do you agree with the proposed changes to supplementary guidance and the external references used in Appendix E and Appendix F, for existing domestic buildings from the draft *Approved Document F, volume 1: dwellings*?
a) Yes
b) Yes, but not with the changes to the supplementary guidance
c) Yes, but not with the external references
d) No
No comment

Question 125): Do you agree with the proposal to align the guidance and standards for work to existing homes to that outlined in Chapter 4 of the Government Response to the Future Homes Standard consultation?
a) Yes
b) No
No comment

Question 126): Do you agree with the proposed guidance for installing energy efficiency measures in existing homes, as detailed in Section 3 of draft *Approved Document F, volume 1: dwellings*.
a) Yes
b) No
If you answered no, please explain your reasoning and alternative suggestions.
Paragraph 3.10 (a) states that: '*It is assumed any existing purpose-built ventilators are in working order and the equivalent area has not been compromised*.'

It should not be assumed that current provision is adequate in an existing building. Ventilation should always be assessed and improved as necessary in conjunction with any significant improvement works. We suggest removing the term 'assumed'

and replacing it with a requirement for all existing ventilators to be checked and that a photo be taken and provided to building control.

Question 127): Do you agree with the content of the proposed checklist for ventilation provision detailed in Appendix D of draft *Approved Document F, volume 1: dwellings*?
a) Yes
b) No
No comment

Question 128): Do you agree with the guidance in Section 3 of draft *Approved Document F, volume 1: dwellings* when replacing an existing window with no background ventilators?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough

Question 129): Do you agree with the proposals in paragraphs 3.29 to 3.31 of draft *Approved Document F, volume 1: dwellings* in 7.4.11 of this consultation document on work to existing kitchens or bathrooms?
a) Yes
b) No, the standards go too far
c) No, the standards do not go far enough
If you answered no, please explain your reasoning and alternative suggestions.
Kitchens and bathrooms are major sources of water vapour in homes and refurbishment is a perfect time to improve comfort and wellbeing standards.

Question 130): Do you agree with the proposal to provide a completed commissioning sheet to the homeowner, as detailed in Section 4 of draft *Approved Document F volume 1: dwellings*?
a) Yes
b) No