

Consultation response

Re: Future Homes Standard (FHS) and Building Regulations Part L (February 2020)

The Active Building Centre (ABC) is funded by UKRI as part of Transforming Construction Challenge through the Industrial Challenge Fund (ISCF) to support the adoption of innovation and resultant benefits from smart technologies; and seeks to transform the way the UK designs, constructs and operates buildings.

The Active Building Centre has reviewed the Part L/ Future Homes Standard consultation and is concerned as detailed below by these proposals. The Active Building Centre and the wider Transforming Construction programme will also be exploring many of aspects of Part L and FHS in their on-going work intended to identify the successful optimisation of Active and low carbon buildings – our research, work and findings should therefore, be a key part of the next tier of development of the FHS so we look forward to an opportunity to share that learning with MHCLG & others as it develops through 2020 and beyond. Main concerns:

- CO₂ reduction & fabric performance;** A Future Homes Standard (England) should strive to produce much less CO₂ than those homes built to current requirements; in practice that means taking a prudent fabric-first approach, using much less energy and what energy a home does use is used as efficiently as possible. The options offered are too low, compared to current best practice (UKCCC, 2019) - allowing poorer fabric homes to be constructed with the performance shortfall met through technology efficiencies. This could enable developers to deliver to lower standards, particularly as the grid decarbonises, passing unnecessary costs onto consumers as well as leading to costly future retrofit. Priority should be given to a best fabric performance option being introduced in 2020 aiming for a higher reduction of CO₂, focusing on improving building fabric first and ensuring all new homes can accept low carbon technologies without needing costly retrofit in the long term; whilst being open to innovation.
- Decarbonising Heat;** The decarbonisation of heat is recognised as a key challenge. Therefore, priority should be to focus on a fabric first approach as the best future-proofing strategy available. If high fabric performance / passive design is adopted, e.g. using Active Buildings principles, passivhaus standards etc, then space heating demand will be minimal, enabling all new homes to accept low carbon technologies without need for costly retrofit in long term.
- Implementation & Costs;** The timings are not reflective of the governments ambition for the Future Homes Standard, that, inter alia, meets Net Zero and the commitment to halve energy use in buildings by 2030. As currently set out it risks many more homes being built that will still need to be retrofitted in the future and not being open to innovation, e.g., the Impact Assessment does not include and provide a fair and reasonable assessment from potential options achieved by designing homes based on the work of the Construction Sector Deal, the Construction Innovation Hub, the Active Building Centre and others as part of the Transforming Construction Challenge, striving for buildings to be constructed 50% faster, 33% cheaper and with half the lifetime carbon emissions.
- Restricting local planning authorities from setting higher energy efficiency standards;** The government should not commence the amendment to the Planning and Energy Act as this would clearly reduce opportunities for innovation, in this case those led by locally identified requirements for action. Historically efforts by local government, such as The Merton Rule, have helped bring forward innovations in design, fabric, and other technologies – reducing the ability of local authorities to act will in turn reduce the scope for innovation at precisely the time when we should be supporting it as a part of our wider Industrial Strategy ambitions.

Re: Future Homes Standard (FHS) and Building Regulations Part L (February 2020)

Question Responses:

Chapter 2 The Future Homes Standard:

Q1) Do you agree with our expectation that a home built to the Future Homes Standard (FHS) should produce 75-80% less CO₂ emissions than one built to current requirements?

c. No – 75-80% is too low a reduction in CO₂

What the Future Homes Standard should strive to achieve (include):

A Future Homes Standard (England) should strive to produce much less CO₂ than those homes built to current requirements; in practice that means using much less energy and what energy a home does use is used as efficiently as possible. These outcomes are in line with stated government policy on the UK wide carbon targets, i.e. to achieve Net Zero, and the more specific ambition of the Industrial Strategy, with its commitment to half energy use in buildings by 2030.

Of course business and practitioners in the UK can already build highly energy efficient low or no carbon buildings; the Future Home Standard, and the Part L review (as a stepping stone to it), should therefore maximise our ability to mainstream these low carbon build capabilities – in doing so the UK will both be better placed to achieve Net Zero and better placed to create, support and deploy future home and building based technologies that will have UK and worldwide market potential.


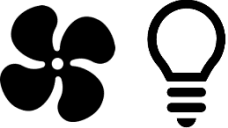



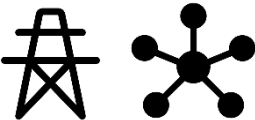
The UK government is already working to develop such technologies and maximise the UK's benefit of their invention and use, not least through the creation of entities such as ourselves, the Active Building Centre. We promote best practice building and system design, as this is the most cost-efficient route to demand and carbon reduction. For the reasons stated above, i.e. building on UK policy, we think these should be prioritised.

Rather than creating a new FHS based on notional values, homes should be future proofed towards net zero targets by maximizing the dwellings fabric performance from the outset: reducing a buildings heat demand, avoiding unnecessary heat losses and negating costly retrofit in the long term, i.e. current 2020 Part L and FHS standard proposals use U-Values and air tightness values that will produce compliant buildings within the National Calculation Methodology (SAP) that far exceed minimum efficiency standards, allowing poorer fabric homes to be constructed with the performance shortfall met through technology efficiencies, such an approach means it is much harder to ensure optimum performance of systems, and less likely to happen (quality of commissioning, consistency of maintenance, replacement with sub-standard alternates etc).

Therefore, for homes to achieve a greater CO₂ reduction from those built today lessons can be learnt from Code for Sustainable Homes, Passivhaus and innovative solutions being developed at the Active Building Centre and by others across the UK. For example, homes can already be built today producing less CO₂ emissions than ones built to current requirement based on passive design/ high fabric performance and further savings being available through on-site renewable energy systems; reducing CO₂ emissions and use of fossil fuel heating (The Buildings Mission 2030, Green Construction Board Task group report (CLC, 2019)).

Active Building General Principles

An Active Building reduces carbon emissions and supports the energy network by intelligently integrating energy technologies for heat, power and transport into energy efficient buildings, using the following principles:

1.  **Building fabric and passive design** – integrated engineering and architectural design approach including consideration of orientation and massing, fabric efficiency, natural day-lighting and natural ventilation. Designed for occupant comfort and low energy by following passive design principles
2.  **Energy efficient systems** - intelligently controlled & energy efficient systems to minimise loads - HVAC, lighting, vertical transportation. Data capture via inbuilt monitoring & standard naming schemas to enable optimisation and refinement of predictive control strategies
3.  **On-site renewable energy generation** - renewable energy generation be incorporated where appropriate. Renewable technologies should be selected holistically, given site conditions and building load profiles
4.  **Energy storage** - thermal and electrical storage should be considered to mitigate peak demand, reduce the requirement to oversize systems, and enable greater control
5.  **Electric vehicle integration** - where appropriate Active Buildings integrate electric vehicle charging. As technology develops, bi-directional charging will allow electric vehicles to deliver energy to buildings as required
6.  **Intelligently manage integration with micro-grids & national energy network** – in addition to intelligent control of building systems, Active Buildings manage their interaction with wider energy networks, e.g. demand side response, load shifting & predictive control methods

Below we consider (A) Introducing a “Futureproofed” Building Performance Metric, (B) Innovation potential, (C) Implementing the Future Homes Standard (timeline)

A) Introduce a “Futureproofed” Building Performance Metric

As a minimum a new Future Homes Standard should be designed to ensure; the most cost-efficient route to demand and carbon reduction, these should be prioritized to future proof against costly retrofit in the future, reduce a higher CO₂ reduction in the long term. The Future Homes Standard/ Part L should be designed to ensure all homes are designed to a “futureproofed” high Performance-based target (KWh/m²/y) achieved through adopting the following principles;

- i) An efficient building fabric & optimized passive design to reduce operational energy
- ii) Regulated loads minimized using energy efficient services and low carbon heat
- iii) Where practicably possible building loads using onsite renewable generation & storage
- iv) Energy storage should also be considered to mitigate peak demand, reduce the requirement to oversize systems, and enable greater control, enabling low carbon energy consumption (thermal stores with low output heat pumps, maximisation of low carbon energy generation, reducing grid stress and carbon intensity through arbitration).

B) Innovation potential

The Future Homes Standard/ Part L regulatory framework should avoid disadvantaging existing or emerging technologies and passing unnecessary costs onto consumers and protecting future generations. Homes should be designed to be equipped (if applicable) with the above and:

- i. suitable energy infrastructure that allows import and export (i.e. two-way flow) of energy, on or off gas grid.
- ii. control systems that allow market functions to be deployed to the benefit of the home user/owner (e.g. arbitrage, aggregation, variable tariff contracts etc.) as well as multi vector energy control to optimise direction of energy flow, including quality metering/monitoring/ comms functions (DSR/DSM).
- iii. further consultation with Ofgem and others to assess the wider energy system benefits of buildings to ensure the UK decarbonises to deliver a net zero economy at the lowest cost consumers; enabling competition and innovation which drive down prices and result in new products and services for heat and reduce CO₂ emissions. For example, Options given in Question 11 use metrics that are unable to quantify wider system energy benefits and cost savings that could be achieved designing homes to “future-proofed” performance-based targets.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/845654/energy-innovation-needhttps://www.r-e-a.net/resources/flexible-futures-report/s-assessment-building-fabric.pdf

<https://www.brookings.edu/research/accelerating-the-low-carbon-transition/>

<https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/>

<https://www.r-e-a.net/resources/flexible-futures-report/>

C) Implementing the Future Homes Standard/ (Timeline 2025)

Part L Standards for New Dwellings in 2020

Part L 2020 standards should be raised and used as a steppingstone towards the development of a new Future Homes Standard, ensuring all new homes can accept low carbon technologies (in particular towards future-proofing homes for low carbon heating) without needing costly retrofit in the long term whilst being open to innovation. Any uplift to energy efficiency standards that are introduced in 2020 means that new homes are futureproofed for low carbon heat, with build standards that minimise heat loss and are affordable to run.

The work of the Active Building Centre and the wider Transforming Construction programme will be exploring many of the elements of Part L and FHS in their on-going work intended to identify the successful optimisation of Active and low carbon buildings – our research, work and findings should be a key part of the next tier of development of the FHS so we look forward to an opportunity to share that learning as it develops through 2020.

We suggest a short-term buildings framework (2020 to 2025) be created after which the FHS can be implemented to be open to innovation, pace of technological change, fair competition and remove policy barriers.

In addition to our evidence and responses (above/below) the following links will take you to additional evidence on the form, function and potential of Active Buildings:

- [The Active Classroom Case Study](#)
- [The Active Office Case Study](#)
- [The Active Industrial Building Case Study](#)
- [A distributed energy future for the UK](#)

Q2) 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?

The decarbonisation of heat is recognised as a key challenge. Therefore, priority should be to focus on a fabric first approach as the best future-proofing strategy available. If high fabric performance / passive design is adopted, e.g. using Active Buildings principles, passivhaus standards etc, then space heat demand will be minimal, enabling all new homes to accept low carbon technologies without need for costly retrofit in long term whilst limiting demand to domestic hot water.

A regulatory framework is required to avoid disadvantaging existing or emerging technologies and passing unnecessary costs onto consumers. Therefore, further consultation with Ofgem and others is necessary to ensure the UK decarbonises to deliver a net zero economy at the lowest cost consumers; enabling competition and innovation which drive down prices and result in new products and services for heat.

For example, energy storage can enable low carbon energy consumption (thermal stores with low output heat pumps, maximisation of low carbon energy generation, reducing grid stress and carbon intensity through arbitration). As such, the impact assessment does not provide a fair and reasonable assessment of the potential costs and benefits of the proposed options available for new homes as it does not consider wider energy system benefits and savings from storage and other technologies.

The work of the Active Building Centre and the wider Transforming Construction programme will be exploring many of the elements of Part L and FHS in their on-going work intended to identify the successful optimisation of Active and low carbon buildings – our research, work and findings should be a key part of the next tier of development of the FHS so we look forward to an opportunity to share that learning as it develops through 2020. Some evidence of low carbon technologies being explored includes:

[https://www.specific.eu.com/wp-content/uploads/2019/12/Active Classroom 2018 Case Study.pdf](https://www.specific.eu.com/wp-content/uploads/2019/12/Active_Classroom_2018_Case_Study.pdf)

[https://www.specific.eu.com/assets/downloads/casestudy/Active Office Case Study.pdf](https://www.specific.eu.com/assets/downloads/casestudy/Active_Office_Case_Study.pdf)

[https://www.specific.eu.com/assets/downloads/casestudy/Solar Heat Storage FINAL.pdf](https://www.specific.eu.com/assets/downloads/casestudy/Solar_Heat_Storage_FINAL.pdf)

Q3) Do you agree that the fabric package for Option 1 (Future Homes Fabric) set out in Chapter 3 and Table 4 of the impact assessment provides a reasonable for the fabric performance of the Future Homes Standard?

c. No – the fabric standard is not demanding enough

The priority should be to reduce a buildings heating demand through good energy efficiency measures, to avoid costly retrofit in the long term. If high fabric performance / passive design is adopted, e.g. to passivhaus standard, then space heat demand will be minimal. Demand will then be limited to Domestic Hot Water.

Q4) 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?

5. The government should not commence the amendment to the Planning and Energy Act as this would clearly reduce opportunities for innovation, in this case those led by locally identified requirements for action. Historically efforts by local government, such as The Merton Rule, have helped bring forward innovations in design, fabric, and other technologies – reducing the ability of local authorities to act will in turn reduce the scope for innovation at precisely the time when we should be supporting it as a part of our wider Industrial Strategy ambitions

Q5) Do you agree with the proposed timings presented in Figure 2.1 (displayed in Chapter 2) showing the Roadmap to the Future Homes Standard?

c. No – the timings are not ambitious enough

The timings are not reflective of the governments ambition for Future Homes Standard that, inter alia, meets Net Zero – as currently set out it risks many more homes being built that will still need to be retrofitted.

If minimum fabric standards set out in Part L (England) 2020/ FHS are not tightened further in line, for example, with those proposed by the Welsh Part L 2020 consultation (Walls 0.18, Floor 0.15 and Roof 0.13) then the Fabric Energy Efficiency Target must remain to highlight the importance of fabric and primary energy. Even if the minimum fabric standards were improved, the house of the future that generate power are likely to need to deal with the fabric shell of the building and the primary energy requirement separately. Retaining FEES would allow this to happen, to remove it would be a backwards step.

Chapter 3 Part L Standards for New Homes in 2020:

Q6) What level of uplift to the energy efficiency standards in the Building Regulations should be introduced in 2020?

d. Other

The options offered are too low, compared to current best practise. Priority should be given to a best fabric performance option being introduced in 2020.

Q7) Do you agree with using primary energy as the principal performance metric?

- a. Yes, agree in principal. Primary energy should be the principal performance metric it provides a focus on demand reduction.

Q8) Do you agree with using CO2 as the secondary performance metric?

B. No. This could risk creating an opportunity for developers to deliver to lower standards, particularly as the grid decarbonises passing unnecessary costs onto consumers.

Q9) Do you agree with the proposal to set a minimum target to ensure that homes are affordable to run?

- b. No. This should be a guaranteed energy performance, e.g. 30 kWh/m²/year; this would therefore provide known running costs thus enabling affordable homes to be run on a budget.

Q10) Should the minimum target used to ensure that homes are affordable to run be a minimum Energy Efficiency Rating?

- b. No. Suggested metric is guaranteed energy performance, as above.

Q11) Do you agree with the minimum fabric standards proposed in table 3.1?

No. Setting a performance metric, as above, would be a more robust way of achieving the outcomes required on reducing energy demand and lower carbon emissions. In general terms UK fabric standards are too low and continue to embed the future retrofit requirement – thereby increasing cost and emissions.

The proposals for Future Homes Standard are not ambitious enough. Part L should aim for a higher reduction of CO₂, replacing fabric efficiency targets with a much higher guaranteed fabric performance target (kWh/m²). Focusing on improving building fabric first as a priority from as early as possible. Avoiding legacy of yet more average building stock. Adding to the decarbonizing heat challenge, and not reducing costs of moving to electric heating.

Q12) Do you think that the minimum fabric standards should be set in the Building Regulations or in the Approved Document (as is the current case)?

Putting the minimum fabric standards should be set in the building regulations to highlight their importance. Having them as part of an Approved Document, which is guidance only, means that they can be regarded as something that can be flexed and therefore ways will be sought to circumvent for reasons such as build costs with detrimental effect on fabric performance, energy efficiency and CO₂ emissions. There should not be a mechanism where poorer than limiting fabric standards are allowed for “technical reasons”. If the building is designed properly with a strong fabric in mind these reasons will not arise. Further consideration is also required as to the best mechanism to support the deployment of a Performance Metric – happy to discuss

Q13) 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?

b. No

Measures should be orientated to deliver maximum energy performance of the building, hence the performance metric above. If minimum fabric standards set out in Part L (England) 2020/ FHS are not tightened further in line, for example, with those proposed by the Welsh Part L 2020 consultation (Walls 0.18, Floor 0.15 and Roof 0.13) then the Fabric Energy Efficiency Target must remain to highlight the importance of fabric and primary energy. Even if the minimum fabric standards were improved, the house of the future that generate power are likely to need to deal with the fabric shell of the building and the primary energy requirement separately. Retaining FEES would allow this to happen, to remove it would be a backwards step.

Q16) Do you agree with the proposal of removing the fuel factors to aid the transition from high-carbon fossil fuels?

Only if low carbon sources of generation and storage recognised with suitable incentives being put in place.

Q17) Do you agree with the proposed changes to minimum building services efficiencies and controls set out in table 3.2?

The work of the Active Building Centre and the wider Transforming Construction programme will be exploring many of the following elements of Part L and FHS in their on-going work intended to identify the successful optimisation of Active and low carbon buildings – our research, work and findings should be a key part of the next tier of development of the FHS so we look forward to an opportunity to share that learning as it develops through 2020. We would like to discuss this table in greater detail with MHCLG directly.

Q18) Do you agree with the proposal that heating systems in new dwellings should be designed to operate with a flow temperature of 55°C?

- a. Yes. One caveat, we agree with 55°C flow heating systems to allow for efficient operation of low-grade heating systems (Gas boilers, heat pumps, solar thermal, industrial waste, lower-standing loss heat networks). However, we should recognise that the revisions to Part L and proposals for FHS should not assume wet heating systems (not least given the move away from GCHS and gas connection).

Q51) Currently only a proportion of new dwellings are required to be airtightness tested. Do you agree with the proposal that all new dwellings should be airtightness tested?

a. Yes

Yes. Air-tightness test should be carried out on all homes

Q52) Currently, small developments are excluded from the requirement to undergo any airtightness tests. Do you agree with including small developments in this requirement?

a. Yes

Q56) Do you agree with the content of the CIBSE draft methodology which will be available via the link in the consultation document? Please make any comments here.

a. Yes, agree should adopt approved methodology (CIBSE) for airtightness testing.

Chapter 7 Transitional Arrangements:

Q65) Do you agree that the transitional arrangements for the energy efficiency changes in 2020 should not apply to individual buildings where work has not started within a reasonable period – resulting in those buildings having to be built to the new energy efficiency standard?

a. we agree with (A) where building work is of some substance, i.e. not a minimal on-site activity to game the system.

Chapter 8 Feedback on the Impact Assessment:

Q68) The Impact Assessment makes a number of assumptions on fabric/services/ renewables costs, new build rates, phase-in rates, learning rates, etc for new homes. Do you think these assumptions are fair and reasonable?

b. No.

As currently set out risks many more homes being built that will still need to be retrofitted and not being open to innovation. The Impact Assessment has not included any options for designing homes based on the work of the Construction Sector Deal, the Construction Innovation Hub, the Active Building Centre and others as part of the Transforming Construction Challenge, striving for buildings to be constructed 50% faster, 33% cheaper and with half the lifetime carbon emissions.

Q69) Overall, do you think the impact assessment is a fair and reasonable assessment of the potential costs and benefits of the proposed options for new homes?

b. **No.** The following show how higher standards, off site and energy integration can all be delivered, and their potential benefits – all need to be re-considered in the Impact Assessment.

See more at www.activebuildingcentre.com

ABC contact regarding this submission – Gill Kelleher Gill@activebuildingcentre.com

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